

**Total Quality Management (TQM) Implementations
and Impact in selected Nepalese Manufacturing
Industries**

A Thesis

**Submitted for the award of the Ph. D. degree of
PACIFIC ACADEMY OF HIGHER EDUCATION
AND RESEARCH UNIVERSITY**

BY

Bijay Lal Pradhan

Under the Supervision of

Dr. SAPNA SHRIMALI

**Associate Professor
Faculty of Engineering**

And

Prof. Dr. Hemant Kothari

**Dean, P.G. Studies
PAHER University
Udaipur**



**DEPARTMENT OF MATHEMATICS AND
STATISTICS
FACULTY OF SCIENCE
PACIFIC ACADEMY OF HIGHER EDUCATION
AND RESEARCH UNIVERSITY
UDAIPUR
December 2015**

DECLARATION

I **MR. BIJAY LAL PRADHAN S/O MR MANGAL PRASAD PRADHAN** resident of Narayangarh, Chitwan, Nepal hereby declare that the work reported in this Research entitled “**TOTAL QUALITY MANAGEMENT (TQM) IMPLEMENTATIONS AND IMPACT IN SELECTED NEPALESE MANUFACTURING INDUSTRIES**” submitted to PACIFIC University, Udayapur, Rajasthan, India is my original work done in the form PhD thesis. This work (in a part or in full) has not been submitted to any university for the award of a Degree or Diploma. I have properly acknowledged the material collected from the secondary sources wherever required. I solely own take the responsibility for the originality of the entire content.

Date: 14th December, 2015

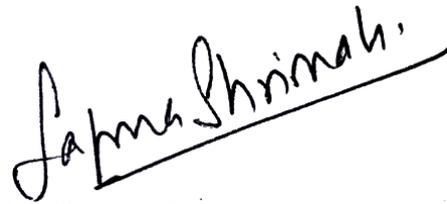
Bijay Lal Pradhan

**DEPARTMENT OF
MATHEMATICS AND STATISTICS
PAHER UNIVERSITY, UDAIPUR**

CERTIFICATE

It gives me immense pleasure in certifying that the thesis entitles “**Total Quality Management (TQM) Implementations and Impact in selected Nepalese Manufacturing Industries**” and submitted by Bijay Lal Pradhan is based on the work research carried out under my guidance. He has completed the following requirement as per Ph.D. regulations of the university;

- (i) Course work as per university rule
- (ii) Residential requirement of the university
- (iii) Regularly submitted Half Yearly Progress Report
- (iv) Published/accepted minimum of two research paper in a referred research journal. I recommend the submission of thesis



Dr. Sapna Shrimali
Associate Professor
Supervisor



Dr Hemant Kothari
Dean P.G. Studies
Supervisor

Date: 14th December, 2015

COPYRIGHT

I Mr. **BIJAY LAL PRADHAN** hereby declare that the Pacific Academy of Higher Education and Research University, Udaipur, Rajasthan shall have the rights to preserve, use and disseminate this thesis entitled “**TOTAL QUALITY MANAGEMENT (TQM) IMPLEMENTATIONS AND IMPACT IN SELECTED NEPALESE MANUFACTURING INDUSTRIES**” in print or electronic format for academic or research purpose.

Date: 14th December, 2015

Bijay Lal Pradhan

ACKNOWLEDGEMENT

The study of TQM implementation and impact in Nepalese manufacturing industries has been done at the Faculty of Science of the Pacific University in India. While conducting this Ph. D. research, researcher has got the persistent support from many people, without whose support this thesis has not been completed in this form. It's my great pleasure to thank all those dignitaries who have supported me directly and indirectly to complete my thesis.

In the first hand I would like to thank by heart to **Prof. Dr. Hemant Kothari**, Dean, PG Studies for his immense support from starting point to the end point of my research. I would like gratitude to Prof. Kothari, who has opened the door for pursuing my Ph.D. degree. I have had the profound opportunity of kindness, easiness and supportive behavior of Prof. Kothari, from whom I have learned much more about insight of the quality management as well the personal habits which will definitely beneficial in my rest of the life. I would also like to express my sincere thanks to my supervisor **Dr. Sapna Shrimali** for her inspiration, cooperation and valuable suggestion to complete my work. In the same way I cannot forget **Prof. Dr. Devendra Bahadur Chhetri** and **Prof. Dr. Sunity Shrestha**, for their imminent support and guidance to indulge myself in the research of quality management. I also would like to give my sincerely thanks to **Prof. Dr. Dinesh Chapagain**, who is said to be Nepali Quality Guru, for his support for making right track of my research. I would like to thanks all the peoples who has support me in different aspect of research work, whose name I am unable to jot down here.

I would like to extend my gratitude to respectable **Prof B.P. Sharma**, President of , PAHER University for his valuable guidance. In the same way I would like to express my heartily thanks to Professor **Suresh C. Ameta**, Dean, Faculty of Science, PAHER University, Udaipur, for his valuable suggestion and Opinion. I also accord my sincere thanks to **Mr. Sarad Kothari** (Registrar, PAHER University for the patient administrative facility.

I would like to express my deep appreciation to all the administrative staff of P.G. studies for their un-hassled administrative work.

I would like to thank **University Grant Commission Nepal** (UGC-Nepal) for selecting me for grant to complete Ph.D. I also would like to thank the academic and administrative staff of UGC-Nepal.

I express my hearty thanks **Dr. Keshav Bhakta Sapkota**, Campus Chief of Birendra Multiple Campus, Tribhuvan University, **Shiva Prasad Poudel**, Pincipal, Balkumari College. In the same way I would like to thank **Mr. Govinda Tamang**, Associate Professor, **Mr Bishnu Hari Koirala**, Assistant Dean, Faculty of Management, Tribhuvan Univesity for his valuable cooperation during my research work. I would like to express my thanks to my colleague **Mr. Guna Raj Chheri** for his cooperation.

My father **Managal Prasad Pradhan** and my mother **Sushila Pradhan**, whom I supposed to be the living god, are my idol in my life. I eternally thanks to my parents for the love, encouragement and blessing. In the same way I would like to thanks my father in law **Kedar Kumar Malla** and Mother in Law **Kusum Malla** for their kindly support which makes to move me in the pathway of success. I would like to thanks all my brothers, sisters, brother in laws, sister in laws for their praiseworthy words which always sensitize me to do my work smoothly. I cannot forget my two small daughters **Ambira** and **Mabira** for their lovely words “baba do your research work properly” cheer me to complete the work efficiently.

Finally, the words will be less to thank my better half **Rajeshwori Malla Pradhan**. Her continual support, insightful encouragement, endorsement only makes me to indulge in the research work. I could never get this success without her back-up.

Bijay Lal Pradhan

Narayangarh, April, 2015

PREFACE

Quality Development has nurtured its enlargement after the Second World War. World renowned industries were pampered to develop new tools and techniques after 1980. Massive research has been conducted under this topic in developed countries but the number is null in the case of underdeveloped countries like NEPAL. To attain a better understanding of TQM implementation and impact in the Nepalese scenario along with the determination of the key factors, this research has coined. The another aim of this research is to share the knowledge of TQM in the Nepalese perspectives.

The extensive literature review on Quality Guru, Quality Awards and the different research was done to achieve the better understanding about the factors of TQM implementation and its impact. On discussion with quality academicians and professionals a conceptual model has developed and tested using path analysis. Sixty eight items were selected to measure the TQM implementation and sixteen items were selected to measure the TQM impact. The 150 questionnaire were distributed to the different industrial hub of Nepal. 103 answered questionnaires were used to analysis the data verify the model developed. Out of 76 items of TQM implementation and 10 items TQM impact, 56 and 10 items were selected for test the proposed model. The estimation of regression coefficients were done using maximum likelihood estimation and the common measures of fit chi square (χ^2/df), IFI, TLI CFI and RMSEA were used to test the validity of the measures.

Top management commitment, education and training and employee empowerment has positive impact on employee satisfaction and employee satisfaction greatly affects the customer satisfaction and business performance. Evaluation and assessment, Process control & improvements and research & development are the factors which are responsible for product quality and customer satisfaction has a positive impact on business performance. Thus the study shows the commitment of Top management and

their involvement is the most essential part for the success of TQM implementation. The concept developed can be implemented to the Nepalese manufacturing industries to get success by implementing TQM in their respective industries.

The study has been covered through the following chapters.

Chapter 1 Introduction

This chapter includes the context how the researcher is motivated to conduct this research. It also deals with the research objectives, research problem and research question on TQM implementation and its impact. In the same way the strategy and the design adopted to conduct the research is also discussed. The model for the organization of study has exhibited.

Chapter 2 Review of Literature

The concepts of quality Guru, the concept given by the popular quality award along with award in the Nepalese context were explored in this chapter. Twenty five empirical researches were studied to formulate the model and construct of TQM implementation were discussed.

Chapter 3 Conceptual Framework and Hypothesis

This chapter presents the process of identification of constructs and models of the research. It also deals with the hypothesis formed on the basis of conceptual models.

Chapter 4 Research Methodology

The research methods were discussed comprehensively under this chapter. The research design, sampling design, development and execution about the questionnaire survey were discussed under this topic. The sampling method, validity and reliability of the data, data analysis techniques and methods of validating the models were discussed in this chapter.

Chapter 5 Results and Analysis

This chapter shows the result of this study. The response rate of the research with non-response bias was discussed. The analysis of demographic characteristics of the respondent was explored in this chapter. Descriptive statistics of each of the items or scales, reliability and item analysis confirmatory factor analysis of each constructs was explored. At last the path analysis was used to testes the hypothesis stated.

Chapter 6 Summary and Conclusion

The summary and conclusion followed by limitation and future research direction of this research has explored in this chapter.

TABLE OF CONTENTS

S.N.	TITLE	PAGE NO.
	AKNOWLEDGEMENTS	I-II
	PREFACE	III-V
	TABLE OF CONTENTS	VI
	LIST OF TABLES	VII-VIII
	LIST OF FIGURES	IX
	ABBREVIATIONS	X
1	INTRODUCTION	1 - 12
2	REVIEW OF LITERATURE	13 - 42
3	CONCEPTUAL FRAMEWORK AND RESEARCH HYPOTHESIS	43 - 69
4	RESEARCH METHODOLOGY	80 - 91
5	RESULTS AND ANALYSIS	92 - 125
6	SUMMARY AND CONCLUSIONS	126 - 130
7	BIBLIOGRAPHY	131 - 136
	APPENDIX 1: LIST OF PUBLICATION	137-138
	APPENDIX 2(I): QUESTIONNAIRE IN ENGLISH VERSION	139 - 145
	APPENDIX 2(II): QUESTIONNAIRE IN NEPALI VERSION	146 - 152
	SPSS OUTPUTS	153 - 161

LIST OF TABLES

Table No.	Title	Page No.
3.1	Comparison of different scholars and award constructs	47
3.2	Number of items in each nine TQM implementation constructs	72
5.1	Response bias analysis	87
5.2	Demographic Characteristics of Respondents	88
5.3	Descriptive statistics of Top Management Constructs	90
5.4	Descriptive statistics of Policy Deployment	91
5.5	Descriptive statistics of supplier empowerment and relationship	92
5.6	Descriptive statistics of process control and improvement	92
5.7	Descriptive statistics of Evaluation and Assessment	93
5.8	Descriptive statistics of Employee involvement and empowerment	93
5.9	Descriptive statistics of Research and Development	94
5.10	Table 5.10 Descriptive statistics of Customer Relationship	95
5.11	Descriptive statistics of Education and training	95
5.12	Descriptive statistics of Product Quality	96
5.13	Reliability Analysis of TQM Implementation	97
5.14	Item to scale correlation matrix (Pearson's correlation)	98

Table No.	Title	Page No.
5.15	Reliability and item analysis of TQM Impact	100
5.16	CFA of Top Management Commitment and involvement	102
5.17	CFA of Policy Deployment	103
5.18	CFA of supplier's empowerment	104
5.19	CFA of Process control and improvement	105
5.20	CFA of Evaluation and Assessment	106
5.21	CFA of Employee involvement & empowerment	107
5.22	CFA of Research and Development	108
5.23	CFA of Customer Relation	109
5.24	CFA of Education and Training	110
5.25	CFA of Product Quality	111
5.26	Testing the theoretical model 1	113
5.27	Testing theoretical model 2	115
5.28	Testing hypothesis of Model 1	114
5.29	Testing hypothesis of Model 2	115

LIST OF FIGURES

Figure No.	Title	Page No.
2.1	The development stage of TQM	13
2.2	Modified PDCA cycle	20
2.3	Factors used for FNCCI Quality Award	23
3.1	TQM Construct according to Quality Gurus	43
3.2	TQM construct according to Quality Award	43
3.3(a)	TQM constructs according to Empirical Research	44
3.3(b)	TQM constructs according to Empirical Research	45
3.3(c)	TQM constructs according to Empirical Research	46
3.4	Conceptual framework of the TQM implementation and Impact	51
3.5	Theoretical model of TQM implementation and its impact	65
3.6	Theoretical model of TQM implementation and its impact constructs	71
5.1	Testing the theoretical model 1	113
5.2	Testing theoretical model 2	114
6.1	Conceptual framework of the TQM implementation and Impact	

ABBREVIATIONS

AD	The Christian era
AMOS	Analysis of Moment Structure
BS	Bikram Sambat
CBS	Central Bureau of Statistics
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
Corr	Correlation
et. al.	all others
EFA	Exploratory Factor Analysis
FDI	Foreign Direct Investment
FNCCI	Nepalese Chamber of Commerce and Industries
GDP	Gross Domestic Production
IDM	Industrial Development Management
IFI	Incremental Fit Index
ISO	International Organization for Standardization
LTD	Limited
NBSM	Nepal Bureau of Standard and Metrology
ML	Maximum Likelihood
NS	Nepal Standard
PDCA	Plan Do Check Act
PDSA	Plan Do Study Act
Ph.D.	Doctor of Philosophy
QC	Quality Control
QMS	Quality Management System

R&D	Research and Development
RMSEA	Root Mean Error of Approximation
Rs.	Rupees (Nepal)
r	Coefficient of correlation
Sig	Significance
SPC	Statistical Process Control
SPSS	Statistical Package for Social Sciences
SQC	Statistical Quality Control
TLI	Tucker-Lewis Index
TQM	Total Quality Management
TU	Tribhuvan University
WTO	World Trade Organization

Chapter one

Introduction

INDEX

S.N.	PARTICULARS	PAGE NO.
	INDEX	1
1.1	BACKGROUND	2
1.2	QUALITY MANAGEEMNT PRACTICE IN NEPAL	5
1.3	OBJECTIVES OF THE RESEARCH	7
1.4	PROBLEM OF RESEARCH AND RESEARCH QUESTIONS	7
1.5	RESEARCH STRATEGY	10
1.6	ORGANIZATION OF THESIS	10

Chapter one

Introduction

1.1 Background

Organizations carry out quality management and improvement programmes for a range of objectives. Magd (2014) explored the benefit of Total Quality Management and Implimentation in manufacturing organizations through promoting exports, improving business performance, holding competitive advantage alongside customer and employee satisfaction. Christos B. Fotopoulos & Evangelos L . Psomas (2009) and Kumar, Garg and Garg (2009) discussed the impact of TQM practices on quality management results and explains the relationship between different TQM practices like leadership, strategic quality planning, employee management & involvement, supplier management, customer focus, process management, continuous improvements and their effect on quality management results in the form of market benefits like increase in profits, improved competitive position, improved performance and increased sales. While customer satisfaction is measured by decline in customer complaints, increase in loyalty, and customer retention rate.

Nepal is a small landlocked developing country which has very less number of manufacturing industries. Due to poor infrastructural developments, lack of technological advancement along with the periodic strikes, manufacturing industries are deprived to get the benefit of TQM implementation. Although some organizations had implemented TQM, many of them had faced massive difficulties and they were unable to get the benefit from it. Some of the mass-production Nepalese manufacturing companies usages the capital intensive production technology and has obtained the product quality in cost effective pattern, but most of

these companies neglects the quality development of people and managerial process. Employee related issue (monitory and non monitory personal development) has to be address through implementing TQM by the Top Management.

Due to the lack of knowledge and perception towards the TQM and its benefit, a barrier exist towards the implementation of TQM and the Nepalese manufacturing organizations are deprive to get the benefit of TQM. Although to retain the companies themselves in the market or according to the market needs, some of the manufacturing companies of Nepal are using ISO 9001:2008 and other national / international certifications, as a result of which awareness in the industries of Nepal has been increasing day by day. As Nepal has signed in WTO, the product which is produced by the Nepalese manufacturing companies has to compete with the international products. So the industries have a challenge to standardize their product and production system. Quality management system persuades the development of the standardized product, improves the process of production and management, implementing the concept of continuous improvement through problem solving techniques. Most of the tools available in TQM were created in the different world renowned companies like Toyota, Motorola, and General electric etc. for solving the problems created in their respective organizations. So adopting these tools in the manufacturing companies of Nepal opens the door to the process of quality management. The quality of the ultimate product can be achieved through the development of the quality management system within the organization through the culture of internal customer concept. Whereas the implementation of TQM is not straightforward, this comprises a series of work like measurement, evaluation and improvements. These continuous work changes the attitude of the people of the organizations towards the quality product and process, which ultimately changes the organization from product process orientation to system orientation. Quality Management System has a scope from shop floor to the strategic level. There will be a series of activities which should be performed in the different field and levels of the organizations. There will be the wide verities of managerial, technical and an

organizational activity has to be performed while implementing the Total Quality Management in industries. Nepal has to create the awareness towards the TQM implementation for the development of the industries to compete with the international products. The new insight has to be developed for the implementation of the concept of TQM.

There is a consensus that TQM is a way of managing an organisation to improve its overall effectiveness and performance (Zhang, Waszink, & Wijngaard, 2000). There is less agreement as to what the primary constructs of TQM are, or what the overall concept of TQM is. No uniform view of TQM exists today. So far, TQM has come to mean different things to different people (Hackman & Wageman, 1995) . Although some of the Nepalese manufacturing companies began to implement total quality control, these companies still lacks effective quality management systems and application at their respective functional areas. Some manufacturing companies in Nepal tried to implement TQM, but they had failed to implement basic component of Quality and advance quality tools. Very little study has found in the context of TQM and no literature is found in the area of TQM implementation and its impact in case of Nepalese manufacturing sectors. So the current situation of TQM implementation in Nepal is still unclear.

Due to the lack of empirical studies in the field of TQM, it is difficult for Nepalese manufacturing Industries to obtain sufficient information to support their TQM implementation practices. As a result, manufacturing companies may have experienced difficulties or failures in implementing TQM. In order to bridge the gap and provide Nepalese manufacturing companies with practical assistance in the area of TQM implementation, this research aimed at identifying TQM implementation constructs, developing an instrument for measuring these constructs, and empirically validating the instrument using data from Nepalese manufacturing companies. Nepalese industrial practitioners will be benefited from the quality management implementation if such instrument is validated in the Nepalese Scenario.

This chapter includes the context how the researcher is motivated to conduct this research. It also deals with the research objectives, research problem and research question on TQM implementation and its impact. In the same way the strategy and the design adopted to conduct the research is also discussed. At last the limitation and chapter summary is exhibited.

1.2 Quality management practices in Nepal

Technological development directs the massive globalization and globalization leads to huge market competition which creates the new thinking in the managerial aspect around the world. To cope with this environment, the manufacturing organizations has developed and implemented new managerial tools and techniques leads towards the Total Quality Management. Although there has been different research study found under the topic quality management, most of them are skewed towards the developed countries. According to Mellat et. al. (2007) there is hard to get the research on TQM which are based on the developing countries.

The implementation of TQM is not so easy. TQM get failure in non western countries since it has not modified according to the local culture. Lack of leadership, lack of qualified human resources, political instability and periodic strike, negative imbalance in trade are the huddles of TQM implementation in the context of Nepal.

Nepal's gross domestic product (GDP) for 2012 was estimated at over \$17.921 billion (adjusted to Nominal GDP). In 2010, agriculture accounted for 36.1%, services comprise 48.5%, and industry 15.4% of Nepal's GDP. Industry mainly involves the processing of agricultural produce, including jute, sugarcane, tobacco, and grain. Data compiled by the Central Bureau of Statistics (CBS) shows growth of the manufacturing sector limited to 3 percent in 2010, 4.1 percent in 2011, 3.6 percent in 2012 and 2.8 percent for 2013. With the manufacturing sector slowing consistently, its contribution to the Nepal's gross domestic product (GDP) has been

hovering between 6.7 percent and 6.9 percent over the last five years. The overall industrial sector, which has been contributing around 15 percent to GDP for the last few years, has witnessed a declining contribution to the economy. The industrial sector's growth has been reported at 4.3 percent, 3 percent and 1.6 percent in 2011, 2012 and 2013 respectively. The condition arises due to the activities slowed down by the manufacturing industries because of hours of power cuts and unfavorable industrial relations.

Nepal Bureau of Standard and Metrology (NBSM) is a national standards body of Nepal which is one of the departments under Government of Nepal, Ministry of industry, commerce and supplies. It is the organization which looks the activities concerning standardization and quality control for qualitative improvement in industrial production and enhances the productivity. NBSM regularly issues National standard 'NS-Mark' to the different industries of Nepal. NS-Quality award and runner up letter of appreciation (two) are the two different types of award distributed to the NS-Mark issued industries of Nepal under large, medium and small categories. Similarly Federation of Nepalese Chamber of Commerce and Industries (FNCCI) have established FNCCI National Award under three categories of industries: large, medium and small. The award is meant to promote quality, excellence for sustainable growth and development of the industry. Many industries of Nepal now has implemented ISO 9001:2008 QMS certification and some still trying to get it to assure the customer, the quality they has maintained. These are the evidence that there is the implementation of Total Quality Management either in whole or at least partly in the industrial sectors of Nepal. But there is no such TQM implementation and impact study had done previously which will support to the industries for appropriate implementation of TQM and get maximum benefit from it. This is the scenario motivates researcher to execute this research.

1.3 Objectives of the Research

According to Mullur and Hiregoudar (2010) the Key factors of Quality Management System are almost invariant across countries. TQM implementation and TQM impact both are abstract variable and is difficult to define. Theoretical and empirical study has to be conduct to get the better insight of TQM implementation and impact. This research aims to identify the TQM implementation constructs along with its impact in Nepalese Scenario. On the basis of these situations the following objectives were set.

1. To attain a better understanding of TQM implementation and impact in the Nepalese scenario along with the determination of the key factors.
2. To obtain the relationship between and among the key factors of implementation of TQM with its impacts.

These research objectives are straight away required to Nepalese organizations for recognizing construct of TQM implementation. The construct can be utilized by the industrial practitioners for the upliftment of their sectors in the days to come. On the basis of the above objectives the problem of the research and research questions are stated below.

1.4 Problem of research and research questions

Developed and developing countries are at the different stage of quality management (Zakuan, Yusof, Laosirihongthong, & Shaharoun, 2010) and there is even considerable variation in the level of quality management development in the different countries of Asian region (Abdullah & Tari, 2012). Product inspection is the first step in the process of total quality management implementation to achieve the organizational success. In the process, the second step is process control, system development and customer relationship which subsequently lead to the Total Quality Management. So the TQM is defined as both philosophy and set of benchmarks that represents the foundation of a continuously improving organization (Pradhan, 2014).

The key success factors of TQM can be described as best practices or ways in which firms and their employees undertake business activities in all key processes. TQM is seen as a relatively new concept and a way for the organization to improve the quality of their products and services. TQM has been playing an increasingly important role in the survival and growth of companies in manufacturing sector. Many companies have arrived at the conclusion that effective TQM implementation can improve their competitive abilities and provide strategic advantages in the marketplace. Many approaches have been used for implementation of TQM. These approaches form an integral part of several International Quality Awards/ National Quality Awards developed by governments of various countries as well as many frameworks developed by individual researchers. Further each quality awards and framework has its own different set of critical success factors. It therefore create a lot of confusion for manufacturing industries which key success factor to chose and which not, so as to implement the concept of TQM for achieving manufacturing excellence.

Grandzol and Gershon (1997) suggests that implementing QMS does not guarantee the successful outcome and one of the reason for not getting successful outcome is the lack of a uniform and consistent definition of quality construct. The early stages of empirical studies like Saraph et al. has done in 1989, of TQM have almost exclusively limited to develop construct for measuring TQM practice. Some studies compare the TQM implementation of different countries. And more recently the study has been conducting to measure the organizational performances on various levels. Zhang (2000) have studied both relationship among the key factors of quality management system and the effect they have on performance. The different studies have produced mixed results. This inconsistency result could be due to three significant differences among studies in terms of research design issues. First, in some studies like Douglas and Judge (2001), TQM is operationalized as single construct to analyze the relationship between TQM and companies' performance, while others operationalize TQM as multidimensional construct, like research done

by Zhang et al (2000). Second, the levels of performance measured vary among the studies. Some studies took performance only at operating level as Samson and Terziovski (1999) has done, while other measures only financial performance only like Douglas and Judge (2001) whereas other like to measure it in multiple level as Das et al (2000). Third, the analytical framework used to investigate the relation between TQM construct and performances also differs among the studies. In other word some of the analysis are based on path analysis (Anderson et al, 1995, Flynn et al 1995, Yeung et al, 2005), some on Structural Equation Modeling (Forza and Flippini, 1998, Kaynak, 2003) some uses the series of multiple regression (Samson and Terziovski 1999) and some uses correlations (Powell, 1995), the studies fall short of investigating which TQM practices have direct and/or indirect effects on various levels of performances.

The structural and technical aspect TQM implementation has to be determined. A systematic organizational improvement technique which includes the socio-cultural standpoint is required to upgrade the quality condition of Nepalese manufacturing industries. To understand the process of TQM implementation, a clear concept on TQM is mandatory. To tap out the concept the first research question has coined. After implementation of the TQM one has to know about the impact of implementing it. So get the concept of elements or factors to be considered for implementation of TQM and the elements is to be considered to study the impact of TQM usage leads for the research question. To address this question a theoretical knowledge is required. The concept whatever determined in the first stage should be verifiable in the context of Nepal. To construct the conceptual framework and validate the framework using empirical research leads the next research question. On the basis of the above activities the following research questions has formulated.

1. What is TQM and what are the key success factors of TQM?
2. What are the measures which are used to identify the impact of TQM implementation?

3. To what extent do the theoretical aspects found in literature can validate the empirical study of TQM implementation and its impact in case of Nepal?
4. How do key factors of TQM implementation affect on TQM impact in the context of Nepal?

1.5 Research Strategy

The selection of suitable research strategy is next vital step in the research methodology. According to Pradhan et. al. (2014) the selection of research strategy is depends on the nature of research questions. Exploratory study is required in what (knowledge seeking) types of research questions. So for first and second research question, the best research strategy here is literature survey. Next research question is to validate the theoretical aspect through the empirical aspect. So here the relevant research strategy is survey research. For the next research question How one factors effect on another the concept of model building and testing has to be implement and here also the survey research technique is appropriate in this question. So the two different method, literature survey and empirical research strategy will be adopt to build a concept and the testing of the concept will be done using hypothesis testing.

1.6 Organization of Thesis

This study is made up of six chapters. Chapter I is introduction. It covers the background, quality management practice in Nepal, research objectives, research problem and research question, strategy of the research and organization of the research. Chapter II is review of literature which includes the definition of quality, definition of quality by quality gurus followed by quality management system and Total quality management concept development. The construct of this research is developed by Review of different quality awards and review of different previous empirical research. The chapter III discussed the conceptual framework and research hypothesis. Chapter IV on research methodology describes the population, sample

and case selection, data collection procedure, method of data analysis, method of measuring validity and reliability of the study. Chapter V describes the finding of the study and discussed them and Chapter VI summarizes the study and its importance and make recommendations for future research.

Chapter two

Review of Literature

INDEX

S.N.	PARTICULARS	PAGE NO.
	INDEX	12
2.1	INTRODUCTION	13
2.2	DEFINITION OF QUALITY	13
2.2.1	DEVELOPMENT OF QUALITY MANAGEMENT SYSTEM	14
2.3	TQM CONCEPT FROM QUALITY GURU	18
2.4	QUALITY AWARDS	24
2.5	SUMMARY	43

Chapter two

Review of Literature

2.1 Introduction

The extended form of quality has been taken since 1980 after the term Total Quality Management (TQM) has coined. The different types of organizations, manufacturing as well as service organization nowadays implemented TQM. The advocates of TQM has stated that while implementing TQM by organization, each employment from Top to down has to be indulge in the TQM program for managing the improvement of the organization through the technique of problem solving. To make the detail concept of TQM implementation and Impact, the detail concept of TQM has to be developed. The development process of quality from Inspection to Quality control and then through quality assurance to TQM has to be studied. The concepts of quality Guru, the concept given by the popular quality award along with award in the Nepalese context were also explored. Finally the chapter concludes with the study of the some chronological empirical research.

2.2 Definition of Quality

Quality gains popularity after the Second World War. Its popularity has increased after the year 1980. Although its popularity is increases day by day there is no any universal meaning of quality. Quality is an abstract term because it gives different meaning to the different people and also in the different context. Although everyone seems to be talking about quality, the concept is slippery and the meaning elusive. (Pfeffer & Coote, 1991). There are different definitions found in the different dictionaries. In the same way different quality experts also has given the different definition on the quality. Most of the definition included the terms product, process, services, customer and satisfaction. Deming, Juran, Crosby are the

prominent quality gurus who has incorporate the stakeholders in the definition of quality The following are the some definition of Quality

“Quality should be aimed at the needs of the consumer, present and future” (Deming, 1986).

“Quality is the fitness for use” (Juran, 1992).

“Conformance to requirements; it is precisely measurable; error is not required to fulfill the laws of nature; and people work just as hard now as they ever did”. (Crossby, 1979)

All the definition above focuses on the requirement of the customer. So the concept has been coined as “Quality is a degree in which it fulfills the requirement of the customer”.

2.2.1 Development of Quality Management System

The recent concept of quality management has not coined suddenly. It took a long process to developed in today’s shape. The concept of inspection was the first step of the quality management during the year 1930. There was development of statistical quality control which were popular during the year 1930-1950. After the year 1950 there are remarkable changes seen due to the development of quality assurance and finally the concept of TQM has coin after 1980 and being used along with the recently coined other quality improvement tools. Following figure illustrate the stages of quality management.

Figure 2.1: The Development Stage of TQM



Inspection

Inspection is supposed to be the first stage of the quality management. After the industrial revolution the concept of inspection has been coined. Fredrick Taylor has developed the concept of quality and assigned the inspector for monitor the quality products and the purpose of inspection was to prevent the defective items to reach to the customer. Seymour (1992) in his study stated that inspection existed in the year 1930 and used for the uniformity of the product.

Quality Control (QC)

In 1931, Shewhart has developed the concept of quality measurement in term statistical control, which is the landmark concept in the field of quality management for improvement of product quality. Shewhart's aim was to use statistical control to eliminate waste and delay (Sallis, 2002). According to Juran (1989), one can use QC for the following managerial process.

- evaluate actual quality performance,
- compare actual performance to quality goals and
- take action on the differences.

This technique is the advance than the inspection. According to Sallis (2002) quality control involves detection and elimination of defective components. It is the process of comparison of current process with the predetermined process. If the difference happens, the improvement process has to be adopted.

Quality Assurance

The third step on the quality management is quality assurance. Seymour (1992) indicated in his research that the term quality assurance was adopted in the industries between the year 1950 to 1980. The concept of quality control is used during and after completion of the process whereas the quality assurance is done before and on the process. The quality assurance is the managerial process of preventing defects and is applied to each department within the organization (Pradhan, 2014). The customer satisfaction is the main aim of quality management which plays as a catalyst for the development of new tools and techniques, hence the term TQM created.

Total Quality Management (TQM)

After the Second World War, Japanese manufacturing companies had religiously devoted to produce the quality product with the help of American Quality experts Deming and Juran. The term “Total Quality” has coined and is said to be revolution in the quality sector. TQM involves all different organizational process for overall development of all stakeholders and organization. The discussion of TQM has been elevated after 1980, after the development of new tools and techniques by the industries involved in TQM. The process of refinement and development of the quality concepts and its application is continued from the process of inspection to quality control and from quality assurance to the TQM. Different author and quality experts had defined TQM as different ways. Oakland and Porter (1994) state that, “TQM is a comprehensive approach to improving competitiveness, effectiveness,

and flexibility through planning in each individual and in every level of the organization". In the same way Ghobadian *et al.* (1998) focuses on planning behavior and practices of the company towards a customer satisfaction, applying problem solving and fear free culture. Oakland (2000) describes the process of effectiveness of TQM implementation as the devotion of each part of the organization together to achieve the common goal of the organization. The recognition of each person and each activity plays a vital role for the proper implementation of the TQM. On the basis of the above statement we can state the TQM as the well organized process to achieve and exceed the needs and expectation of customer by generating the culture of participation and commitment for implementation of continual improvement.

2.3 TQM concept from Quality Gurus

The world renowned quality gurus had developed the concept, tools techniques and principles. To achieve the full knowledge on TQM, one had to understand the contribution of these quality gurus. The following are the philosophies and concept given by quality gurus Deming, Juran, Crosby, Ishikawa and Feigenbaum.

Edward Deming

The most famous quality guru W. Edward Deming devotes his time to construct the principle and method of quality improvement because of which he is considered as a founding father of the TQM. He worked more on statistical concepts although he has done his PhD degree under the subject Physics. In 1950 the association of japons scientists and Engineer invited him to conduct a course on quality control. The revolution on the quality management in Japan has taken place under the Deming's encouragement. Deming has focus on statistical concept variability of the production process and developed management philosophy to eliminate the common cause of variability. Deming emphasized on the satisfaction of

internal and external customer in order to generate the quality product and service. According to Gitlow and Gitlow (1987) Deming highlighted the concept of continuous improvement to cope with the development of new method and technology. Deming has also focused on the responsibility of management and worker and their devotion for the quality improvement. He has enormously emphasized on the usage of statistical process control (SPC) for problem solving.

Deming's method

For the proper implementation of Quality Management in the organization Deming (Out of the Crisis: Quality, Productivity and Competitive position, 1986) has developed the 14 point method for management which is listed below.

- 1 Create constancy of purpose to improve products and services
- 2 Adopt a new philosophy for the new economic age, with management learning what their responsibilities are and assuming leadership for change
- 3 Cease dependence on mass inspection to achieve quality, by building quality into the product
- 4 End the awarding of business on price; award business on total cost and move towards single suppliers
- 5 Improve constantly and forever the system of production and service
- 6 Institute training on the job
- 7 Institute leadership with the aim of supervising people to help them to do better job.
- 8 Drive out fear so that everyone can work effectively together for the organization
- 9 Break down barriers between departments. Encourage research, design, sales and production to work together to foresee difficulties belong to the whole system
- 10 Eliminate slogans, exhortations and numerical targets for the workforce

since they are divisive, given that difficulties belong to the whole system

- 11 Eliminate quotas or work standards and management by objectives or numerical goals; leadership should be substituted instead
- 12 Remove barriers that rob people of their right to pride in their work
- 13 Encourage education and self-improvement for everyone
- 14 Take action to accomplish the transformation

The first three points has emphasis on the culture of the organization. The fourth point focuses on the good and faithful relationship between organization and suppliers. In the same way the fifth point focused on the achievement of success through continuous improvement process. Human resource management and relationship is focused on sixth, seventh and eighth point. Cohesiveness between department is focused in ninth point where as tenth point comes under the cultural aspect of the organization. Point eleven focus on the need of action plan rather than quotas and twelve point focus on human resource education and improvement. The last point again focus on the culture for the continuous improvement.

Deming has developed PDSA cycle for the continuous improvement which is popularly known as Deming Cycle. It is a prominent tool of continuous improvement of the organization.

Joseph M. Juran

“Quality Control Handbook” is a thoughtful book which established stoutly Joseph M. Juran in the field of Quality. Juran had started his carrier as an engineer in 1924 (Beckford, 2002). Juran also worked with Japanese after the second world war in the revolution of quality management. Juran has developed the ‘quality trilogy’ consisting quality planning, quality control and quality improvement (Juran, 1992). First part of the triglogy is Quality planning and it is the process of developing the plan which is required to meet the customer’s need. The second part on the triglogy

is Quality control is the step where the plan should be executed to obtain the goal which is stated in the first step. The last part of the trilogy is Quality improvement which includes the process of raising the quality level of the organization in the path of success.

Juran's center of attention is to establish a quality culture in the industry with the continuous improvement. Juran has argued that eighty percent of the quality problem arises by the management aspect and has focus on the management of the quality in the following five points

- A three- step process of planning, control and action is needed
- Plans and objectives must be measurable
- Management is responsible for quality
- Training and education are essential
- Rewards encouraging quality

Philip B. Crosby

Philip Crosby started his service from military. After military he started his career in the quality management from a quality inspector and moved up to the quality director of manufacturing industry. He then started the consultant service through the Philip Crosby Associate in Florida. Crosby has focus on the accurate statement of the requirement and its measurement continually to conformance of statement which has stated according to requirement (Crosby, 1979). Crosby has focused on the cost of quality elaborating the cost of doing wrong things. One of the philosophies of Crosby is "It is always cheaper to do right thing first time".

As Deming and Juran, he also has stated the responsibility of management for quality improvement. Crosby has developed a popular concept of "Zero Defect", which is based on the motto "prevention is better than cure". As Deming, Crosby also had given fourteen point methods for the quality management. On his fourteen points the first two points focus on the commitment to participate in the quality

management program by forming multidisciplinary teams. Point three and four focuses on the measurement and associate it with cost. In the same way point five and six emphasis on the training for the awareness so that corrective action can be performed. Point seven, eight and nine focused on the establishment of “Zero Defects” program in the organization. Setting goal, establishment of quality council, recognition of contributors and culture of continuity are the remaining points which are set by Crosby.

Kaoru Ishikawa

Kaoru Ishikawa is a Japanese quality authority famous in the world. He has helped thousands of companies including IBM, Bridgestone and Komatsu to turn out higher quality products at much lower costs. His book "What is Total Quality Control?" The Japanese Way, Prentice Hall, Inc. was a best seller in business books. (Pradhan, 2014)

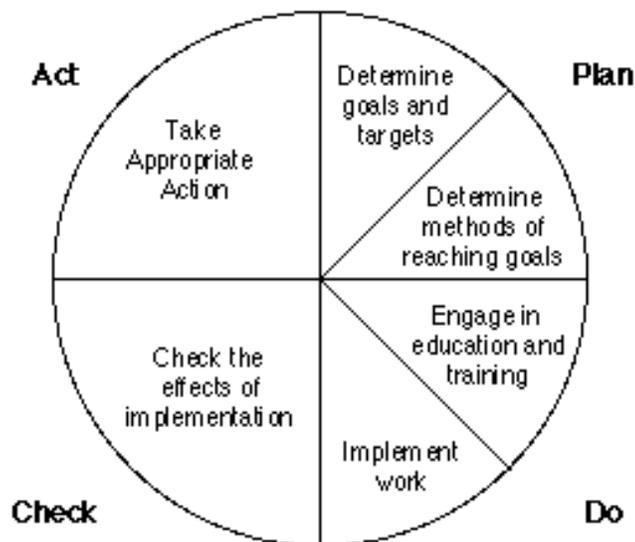
Kaoru Ishikawa focuses on the continued customer focus which is to mean that the customer should get after sales service. He wanted to change the way people think about work. He has developed the concept of company-wide quality control with going one step further. Ishikawa has developed the cause effect diagram which is also called Ishikawa diagram or fishbone diagram with the help of which the root causes of the quality problems can be identifies and solve the quality related problems. The seven quality tools conceptualized by Ishikawa are popular and widely used by the quality professional and taught all over the world under the subject quality management. These tool are control chart, run chart, histogram, scatter diagram, Pareto chart, run chart and flowchart. Next popular quality tools quality circle was also coined by Ishikawa.

Like other quality leaders Ishikawa has emphasized on the leadership importance and support on TQM, training and education towards TQM. He also argued the regulation of achievement of consumer needs by managers consistently and from these needs, all other decisions should be stemmed. Besides his own

developments, Ishikawa drew and expounded on principles from other quality gurus, including those of one man in particular: W. Edwards Deming, creator of the Plan-Do-Check-Act model. Ishikawa expanded Deming's four steps into the following six:

- Determine goals and targets.
- Determine methods of reaching goals.
- Engage in education and training.
- Implement work.
- Check the effects of implementation.
- Take appropriate action.

Figure No. 2.2 : Modified PDCA cycle



Armand V. Feigenbaume

Armand V. Feigenbaum, the idea generator of Total Quality Control added landmark concept on TQM. His book “Total Quality Control” was first published in 1951 under the title “Quality Control, Principles, Practice and Administration”. He

viewed quality as a strategic business tool that requires involvement from everyone in the organization and promoted the use of quality control as a measurement and evaluated tool. Feigenbaum has developed the three steps to quality, among these the first one is quality leadership, which is based on the sound planning of quality effort for the satisfying the customers. The second step is Modern quality technology which should be coped with the employee and the third one is the organizational commitment for continuous improvement through training and motivation of the employees.

Key elements of Feigenbaum's philosophy of quality control (Bhat, 2007) are

1. Total quality control is a system for integrating quality development, maintenance and improvements efforts in an organization that will enable engineering, marketing, production and service to function at optimal economic levels while achieving customer satisfaction.
2. The "control" aspect of quality control should involve setting quality standards, appraising performance relative to these standards, taking corrective action when there is inability of attaining the standard and enhancement in the standard.
3. Factors that affect quality can be divided into two major categories: technological and human. The human factor is the more important one.
4. Operating quality costs can be divided into four categories: prevention costs, appraisal costs, internal failure cost and external failure costs.
5. It is important to control quality at the source.

2.4 Quality Awards

Quality awards or Business excellence award in line with Total Quality Management are installed and operated by several countries for improving organizational performance excellence. Some awards are accessible only to the organizations within the nation and few are even accessible to organizations operating globally in any part of the world. A study done by Musli Mohomad and

Robin Mann (2010) has showed that some of the country has their own national awards for quality and performance excellence uniquely developed in their own way, but many have either applied directly the original award that is developed elsewhere, or with little adjustments in the internationally appreciated quality awards developed by other countries. Most of the quality awards were based on the European Quality award, Malcolm Baldrige National Award and Deming award. It is worth to note that criteria and methodology of three awards are typically used almost all quality and business excellence awards of all countries- Deming award (1951), Malcolm Baldrige award (1987) and European Quality Award (1992). And most important observation is that all these awards are designed based on the application of Total Quality Management. All these awards can also be said as international quality awards as they are open globally to all countries.

Deming Prize

Deming Application prize (Deming Prize) is the renowned quality award which was established by the union of Japanese Scientists and Engineers (JUSE). According to Sallis (1993) it is the prominent quality award in Japan which uses many categories along with organization policy and objectives, organizational structure and information used and education. There are ten criteria for evaluating organizations to award Deming Prize. The award criteria cover all aspects of TQM from Policy to organization and management, education and dissemination, collection dissemination and used of information of quality, analysis, standardization, control, quality assurance, results and planning for the future.

The Malcom Baldrize national award

The Malcolm Baldrige National Award is the American prestigious award established under the name of Malcolm Baldrige, secretary of Commerce, who died on rodeo accident. This is the award which is distributed under the three categories

manufacturing companies, Business organization and service organization. Customer satisfaction is the main motto of this award. The award usage the following categories: leadership, strategic quality planning, information analysis, human resource development and management, management of process quality, quality and operational results, and customer focus and satisfaction (Pradhan, 2014).

European Quality Award

The European Quality Award is the prestigious quality award in Europe whose motto is to find the organization which gives more emphasis on quality and set an example to the other organizations. Employee satisfaction, Customer satisfaction, business performance, and the organization's impact on society are the four major criteria of selecting the organization for award (Sallis, 1993).

NS Quality Award

The NS quality award is an annual award provided by Nepal Bureau of Standards & Metrology (NBSM) to Nepalese Industries for the good quality management system and product quality achievement. It motivates the product of high quality goods according to relevant Nepalese standards and enables to compete more efficiently in the regional (or global) markets. The objective of NS quality award is to improve product quality through implementation of integrated management system. The award promote the following different points: Awareness of quality, business results and market expansions, defect prevention and continuous quality improvement of products, social accountability, environmental awareness, occupational health and safety, customer satisfaction, and trade facilitation.. There are two types of award; one is "NS Quality Award" whereas the next is runner up letter of appreciation (two). The scoring plan of the award is exhibited in the following table. The award is distributed to those product and industry which has already got NS Certification. The award criteria reflect the following eight

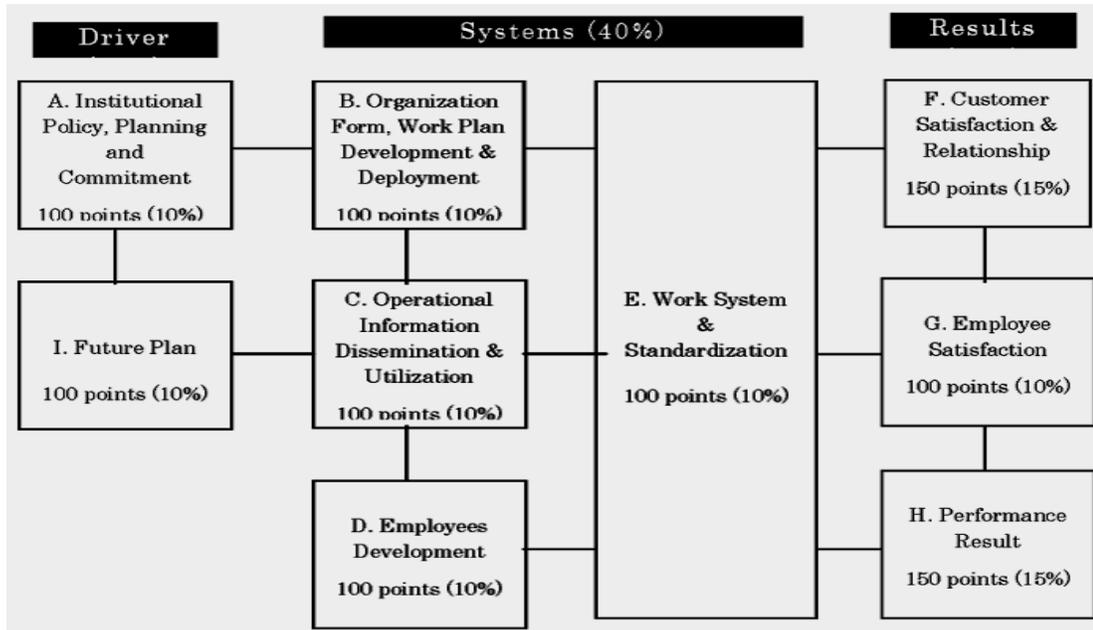
categories: *Leadership, Customer focus, process and system management, Human resource management, information management, Corporate social responsibility, performance and improvements, Infrastructure and housekeeping.*

NBSM has started to distribute the award in three categories: Large Scale, medium scale and small scale. Bhagwati Steel Industry Pvt Ltd, Bara has awarded in the year 2012, Gorkha Brewery Pvt Ltd, Nawalparasi had awarded in year 2011, Mainawati steel industry pvt. Ltd., Biratnagar has awarded in the year 2010, Asian Paint, Kathmandu was awarded in the year 2009 and Panchakanya plastic pvt ltd, Bhairahawa was awarded in the year 2008 under the large scale category. Under medium category Panchakanya Plast ind pvt ltd, Rupandehi was awarded in the year 2012, Probiotech ind pvt ltd, parsa was awarded in the year 2011 and Lumbini Electrical Industry Pvt.Ltd. Butwal was awarded in the year 2010. Before 2010 there was not the provision for different categories. Similarly Himalayan Spring Water Pvt.Ltd. was awarded in the year 2012, Cristal product Pvt.Ltd.Hetunda in the year 2011 and Hisi Polythein & Plastic Industries Pvt.Ltd., Balaju was awarded in the year 2010 under the small scale category.

FNCCI National Excellence Award

FNCCI National Award is the award established by the Federation of Nepalese Chamber of Commerce and Industry (FNCCI). The aim of this award is to promote the organization for in the way of quality. The model of this award is based on the prestigious awards like Deming award, Malcolm Baldrige award and EFQM award. In total there are nine criteria of performance excellence to evaluate for awards and prizes –Institutional policy, planning and commitment, organizational form, work plan development and deployment, Operational information dissemination and utilization, employees development, work system and standardization, customer satisfaction and relationship, employee satisfaction, performance results and future plan. The prize is given yearly in the three categories: large, medium and small scale organizations.

Figure 2.3 Factors used for FNCCI Quality Award



Source: www.fncci.org

2.5 Review of empirical research

Although there are many empirical researches available under TQM implementation and impact the researcher has selected few but mostly cited, chronologically ordered 25 researches which have been discussed below.

The first empirical research was published on quality management factors by Garvin in the year 1983. In his study he has included nine United States and seven Japanese window air conditioner manufactures. Garvin used self reported questionnaire which includes: “quality programs, policies, management attitude, quality information system, product design, supplier’s management, and production employee policies”. In the same way “assembly line reject rate and the rate after delivery service calls” were taken as the impact factors. The result of the study

shows that management of the industries shows the top priority to the quality and top managements are responsible in those companies. In these companies the quality is driven by customers, not any department of the companies. There is a performance appraisal of all the employees and is measures in terms of defect free outputs. Industries has quality information system, which is used for monitoring and improvement in a continuous manners. Training is periodically done; QC techniques and control charts are used by all production systems. Quality audits, commitment to quality, value for money are the concepts used by most of the companies (Garvin, 1983).

Saraph et al. (1989) conducted an empirical research and validated the different construct of quality management. After reviewing the literature they had generated 120 necessities for industrial quality improvement. They had collected 162 data from the quality managers and general managers. After the data collection they had run the factor analysis, and formed eight factors of quality management. After conduction the different measure of validity and reliability the item were reduced into 66. The study constructed the eight factors which are “ The role of management leadership and quality policy; Role of the quality department; Product/service design; Process management; Supplier quality management; Quality data and reporting; Employee relationships; and Training.”

Motwani et al, (1994) conducted an empirical research on quality management in India. inspect quality practices in India using an empirical approach. On the basis of synthesized literature on quality concepts they identified nine quality factors which create an organizational evaluation framework. Following are nine critical factors which is adopted in their research, they are “Top Management, quality policies, the role of quality department, training, product design, vendor quality management, process design, quality data and feedback & employee relation.”

Flynn et. al. (1995) has used path analysis to determine the relationship between the constructs of total quality management practices and its performance. Their study showed the relationship between quality management practice, quality performance and competitive advantages. The study was done on 3 industries with 42 plants in US which contains roughly two-third world class plants. And the information was taken from top & middle level manager and shop floor workers. Path analysis was used to test the proposed model with multiple regression analysis after determining the path coefficients, which were decomposed into their various effects. After trimming the model they had proposed the following ten TQM constructs.

- Top management support
- Customer relationship
- Supplier relationship
- Workforce management
- Work attitudes
- Product design process
- Process flow management
- Statistical control feedback
- External quality performance
- Competitive advantage

Through analysis of path coefficients and elimination of weak paths, they had refined the original model to a trimmed model that would be a useful departure point for future researchers interested in pursuing the relationship between quality management practices and performance. Flynn et al (1995) has found that process flow management and the product design process have positive effects on perceived quality market outcomes while internal measure of the percentage that passed final inspection without requiring rework is impacted by the processes flow management. They had found that both perceived quality market outcomes and percentage passed final inspection with no rework have significant effects on competitive advantage.

Ahire et al (1996) scientifically developed and tested constructs which represent an integrative Quality management philosophy. They had detailed analysis of the literature and identified 12 quality management strategies constructs. They had collected data from 371 manufacturing companies and tested to validate these 12 constructs. LISREL 7 was used for this purpose. These twelve strategies were: “Top management commitment, Customer focus, Suppliers’ quality management, Design quality management, Benchmarking, SPC usage, Internal quality information usage, Employee empowerment, Employee involvement, Employee training, Product quality, Suppliers’ performance”.

Black and Porter (1996) extracted a series of items of TQM from Baldrige Award criteria, and these items formed the basis of questionnaire which was sent to over 200 managers. They had made a self assessment framework to make organizations more effective in the development of total quality systems. After analyzing Baldrige criteria they had identified ten critical components of TQM, they are:

- supplier partnership,
- People and customer management,
- customer satisfaction orientation,
- external interface management,
- communication of improvement information,
- strategic quality management,
- operational quality planning,
- quality improvement measurement systems,
- teamwork structure for improvement, and
- Corporate quality culture

These factors found to be reliable and valid and provided key contribution for a better understanding of TQM.

Zhang et. al. (2000) had done extensive review of the literature and found 11 constructs of TQM implementation. They had developed an instrument measuring these 11 constructs. The reliability and validity of these instruments were tested and validated using data from 212 Chinese manufacturing companies. They have suggested the following 11 constructs of TQM implementation.

- Leadership
- Education and training
- Employee participation
- Supplier Quality Management
- Product Design
- Process control and improvement
- Customer focus
- Vision and Plan Statement
- Evaluation
- Quality system improvement
- Recognition and Reward

Conca et al. (2004) conducted a study to identify critical success factors of TQM and empirically tested with the answers of 108 ISO certified firms in Spain. The intention of this study was to investigate the factors of TQM and identifying the relative importance of each of them in a successful TQM implementation and measure the readiness of the manufacturing industry to adopt it. The approach of this paper was to investigate the degree to which TQM practices were adopted in the manufacturing industry and to identify the impact of different factors on successful TQM implementation. The study had identified the following critical factors of TQM.

- Leadership
- Training
- Specialist training

- Supplier management
- Process Management
- Customer focus
- Learning
- Continuous Improvement
- Quality planning
- Communication

Projogo and Sohal (2004) conducted an empirical research to inspect the association between TQM and innovation performance and compares it with the quality performance. They had a set of data from 194 managers in Australian manufacturing and non manufacturing industries. They observed that there is high degree positive relationship between TQM and product quality where as the degree the degree of relationship is low in case of TQM and innovation although the relationship is positive. The constructs they had used were:

- Leadership
- Strategic planning
- Customer focus
- Information and Analysis
- People Management
- Process Management
- Product Quality
- Product Innovation
- Process Innovation

Sila and Ebrahimpour (2005) had conducted an empirical research to study the relationship among the TQM factors which are listed below. The study output shows that the effective implementation of the TQM improves the performance of the organization. The research also identifies the strong relationship of leadership

and information-analysis with the business results. They had used the following TQM factors:

- leadership,
- strategic planning,
- customer focus,
- information and analysis,
- human resource management,
- process management,
- supplier management
- human resource results,
- customer results,
- organizational effectiveness and
- financial and market results.

Lin et al. (2005) had used structural equation modeling to study the relationship between organizational performance and supply chain management. They had collected the information from the manufacturing industries of Taiwan and Hong Kong. The result showed the strong relationship between quality management practices with suppliers' participation strategy which leads to the customer satisfaction and business result. The construct Lin et al. (2005) had used the following constructs.

- Top mgt. leadership
- Training
- Product/service design
- Supplier quality management
- Process management
- Quality data reporting
- Employee relations
- Customer relations

- Benchmarking
- learning
- Supplier participation
- suppliers selection
- Satisfaction level
- Business results

Tari (2005) studied 106 ISO 9000 certified firms of Spain to identify the components of Total Quality Management in order to make known manager which facilitate successful quality management implementation. The total construct used were divided into factor oriented and result oriented constructs. The construct were:

Factor oriented constructs:

- Customer focus
- Process management
- Leadership
- Suppliers management
- Learning
- Quality Planning
- Continuous improvement
- Employee management

Result oriented constructs

- Customer satisfaction
- Staff indicators
- Quality performance
- Social impact
- Employee satisfaction

Yang (2006) has conducted an empirical research and found that there is positive relationship between TQM practice with customer satisfaction. He also found the positive impact of TQM practice towards employee satisfaction, quality awareness and image of the company. Competitive advantages can be achieved through the TQM practice. The constructs which he has used were; “quality management, process management, employee empowerment and teamwork, customer satisfaction management, quality goal setting and measurement, supplier’s cooperation and quality tools training”.

Jitpaiboon and Rao (2007) measured the relationship between TQM practices and organizational performance using meta-analysis. The analysis also established the reliability of the TQM measurement. The result showed the different degree of relationship between different measure of TQM practices with the two levels of performance namely internal and external. In their study top management construct showed the high bond of relationship with each performance. The study showed the strong impact of the external status due to the TQM implementation. The following construct were used for conducting their research.

- Top management support
- Quality planning
- Suppliers quality
- Benchmarking
- Employee training
- Customer focus
- Employee involvement
- Strategic quality planning

Siddiqui and Rahman (2007) showed that customer orientation and support of top management constitute the key factors in achieving benefits like cost cutting on maintenance of applications, increased management control, improved quality of

products and services, greater customer satisfaction, enhanced productivity, slashed time consumption on production, optimization of human resource use and flexibility in reaching out to customers. They had used Top management, employee involvement, continuous improvement, training, team work, cultural change and customer focus as a factors of TQM implementation.

Das et. al. (2008) has carry out a research on the instrument for the measurement of degree of TQM implementation to identify the possible modification area. They had chosen 275 manufacturing industries of Thailand which had adopted ISO9000 and measured the 10 TQM constructs of them nine were TQM implementation constructs and 1 impact construct. Alltogether there were 52 items within these 10 constructs. They are “ Top management commitment, Supplier quality management, Continuous quality improvement, product innovation, Benchmarking, Employee involvement, Reward and recognition, Education and training, Customer focus, Product quality”.

Arumugam et al (2008) investigated TQM implementation condition of ISO 9001:2000 certified companies of Malaysia. They had studied the relationship between TQM practice with quality performance and their result showed the partial relationship between them. The study showed the leading role of customer focus and continual improvement for better performance of the company. The constructs which they had used were:

- Leadership
- Process Management
- Information Analysis
- Customer focus
- Supplier relationship
- Quality system improvement
- Continual improvement
- People involvement

Fotopoulos et al. (2009), had studied the organizational performance of 370 Greek companies due to the use of total quality management (TQM). They found that, *leadership, process management, service design, human resource management, customer focus, Education and Training, and supplier quality management* are critical success factors in TQM implementation. Exploratory and confirmatory factor analysis were used to measure the reliability and validity and Structural Equation Modeling was used to study the relationship among these latent variables.

Kumar et al (2009) studied the various factors important for total quality management implementation and its relevance in various manufacturing organizations in the context of Indian manufacturing organizations. They had collected 75 questionnaire from various sectors such as automobile engineering, textile engineering, electrical and electronics engineering, light weight engineering and heavy weight engineering from Indian.

- Customers' satisfaction;
- Managements' effective participation
- Employees' effective participation
- Reward schemes;
- Communication system;
- Vendors' power;
- Statistical quality control;
- Fast result techniques;
- Quality planning and cost involved and
- Analytical techniques

Zakuan *et al.* (2010) had studied the TQM implementation and quality performances of manufacturing and service sectors using structured equation modeling. They had deliberate the impact of Total quality management implementation to the organizational performance of Portuguese organizations. They

had observed the positive relationship between these constructs. The construct which they had used for their study were

- Quality Leadership
- Customer focus & Satisfaction
- Quality information & Analysis
- Human Resource Development
- Strategic Planning Management
- Suppliers Quality Management
- Quality results
- Quality Assurance
- Satisfaction Level : customer and employee

Business Result: Productivity, number of successful new product, cost performance and profitability.

Hoang et al (2010) studied 222 manufacturing and service companies and used Structural Equation Modeling to study the relationship between implementation of TQM and organizational characteristics in a newly industrialized country in south East Asia. They found that larger companies had higher implementation level across almost all practice of TQM. TQM practices were statistical more significant in Manufacturing companies compared to service companies and the firms having higher level of innovation also showed higher level of TQM practice implementation. The constructs used by Hoang et al (2010) were as follows:

- Top management commitment
- Employee involvement
- Employee empowerment
- Education and training
- Teamwork
- Customer focus

- Process management
- Information and analysis system
- Strategic planning
- Open organization
- Service culture

Volmohammadi (2011) used seven TQM criteria namely leadership, process management, suppliers, customer focus, employee management, communication and quality information system and tools & techniques to study the impact of TQM implementation. On the organizational performance of Iranian manufacturing SMEs. Sixty five self administered questionnaire were collected from managers of Iranian manufacturing SMEs. The study found that the leadership plays an important role in enhancing organizational performance of the Iranian manufacturing SMEs. The study also observed the significance relationship between TQM practices and organizational performance.

- leadership,
- process management,
- suppliers,
- customer focus,
- employee management,
- communication and quality information system and
- tools & techniques

Phan et al (2011) has done empirical study on relationship between quality management practices and competitive performance in Japanese manufacturing companies. They had gathered data from two surveys including the common sample of twenty seven Japanese manufacturing companies. The study used the eleven quality management practice constructs to determine the degree of TQM

implementation and then impact on different dimension of competitive performance between two periods. The quality management practice and competitive performance used in this study were as follows:

<u>QM Practices</u>	<u>Competitive performances</u>
Top management leadership	unit cost of manufacturing
Formal strategic planning	conformance to product specification
Training	On-line delivery performance
Small group problem solving	Fast delivery
Employees suggestions	Flexible to change product mix
Cross functional product design	Flexible to change volume
House Keeping	Inventory turnover
Process control	Cycle time
Information feedback	Speed of New product introduction
Customer involvement	product capability & performance
Supplier quality involvement	Customer support and service

Bhari et al (2012) has used Structural Equation Modeling and Confirmatory Factor Analysis with the help of Amos to validate eleven constructs of TQM implementation extracted from literature of TQM. They found that implementation of TQM has positive and significant influence in shaping the organizational culture of the company. They also found that employee of Indonesian firms perceived cultural factors in the implementation of TQM as a factor deriving the performance of the company. The construct used by Bhari et al (2012) were: “Leadership, Suppliers quality management, Vision plan statement, Evaluation, Process control improvements, Product design, Quality system improvements, Employee participation, Recognition and reward, Education and training, Customer focus”.

Munizu (2013) has done empirical study with data of fifty five big and small scale fishery industry. The data has been collected from managers of those firms. The construct has been used using literature review and the path analysis has used to

validate it. The study showed the TQM practice has positive and significant effect both on organizational performance and competitive advantage. The different constructs has been used under following three categories:

TQM Practice:

- Leadership
- Strategic planning
- Customer focus
- Information & Analysis
- People management
- Process management
- Suppliers management

Competitive Advantage:

- Cost Price
- Delivery dependability
- Product Innovation
- Time to market

Organizational performance:

- Return on Investment (ROI)
- Market share
- Sales

2.5 Summary

The historical development of TQM was presented in the first section of this chapter. It is followed by the concept of Quality Gurus and popular quality awards along with Nepalese quality awards. The twenty five empirical researches were studies to determine the concept of TQM implementation and impact on the basis of which the constructs can be determined.

In the field of TQM research, there are many researches, which give insights to the implementation of quality management but in case of Nepalese industrial sectors it is about null. Different researcher on TQM validated their constructs for their own research purpose, and has different measurement items, but there is no such study which is suitable and targeted for the Nepalese manufacturing industries. So this study is strictly involve in identification of the constructs and items for implementation of TQM and its impact for the context of Nepalese manufacturing firms.

CHAPTER THREE

CONCEPTUAL FRAMEWORK AND

RESEARCH HYPOTHESIS

INDEX

S.N.	PARTICULARS	PAGE NO.
	INDEX	43
3.1	INTRODUCTION	44
3.2	DETERMINANTS OF TQM IMPLIMENTATION AND IMPACT	44
3.2.1	DETERMINANT OF TQM IMPLIMENTATION	44
3.2.2.1	TQM IMPLIMENTATION CONSTUCT SELECTION	49
3.2.2	DETERMINANT OF TQM IMPACT	51
3.3	CONCEPTUAL FRAMEWORK OF THE STUDY	53
3.3.1	TQM IMPLIMENTATION CONSTRUCTS	54
3.3.2	TQM IMPACT CONSTRUCTS	62
3.4	RESEARCH HYPOTHESIS	65
3.4.1	HYPOTHESIS BETWEEN TQM IMPLEMENTATION AND ITS IMPACT	65
3.4.2	HYPOTHESIS AMONG TQM IMPACT CONSTRUCTS	66
3.4.3	MODEL 1 FORMULATION	68

3.4.4	HYPOTHESIS BETWEEN TQM IMPLIMENTATION CONSTRUCTS WITH TQM IMPACT	69
3.4.5	HYPOTHESIS AMONG TQM IMPACT CONSTRUCTS	74
3.4.6	MODEL 1 FORMULATION	75
3.5	CONSTRUCT OPERATIONALIZATION	76
3.5.1	TQM IMPLIMENTATION	76
3.5.2	TQM IMPACT	77
3.6	SUMMARY	78

CHAPTER THREE

CONCEPTUAL FRAMEWORK AND RESEARCH HYPOTHESIS

3.1 Introduction

This chapter presents the edifice of construct of TQM implementation and impact along with setting hypothesis between and within these constructs. The formation of constructs has been done under TQM implementation and TQM impact. The conceptual frameworks of the research with explanation of each construct were done in this chapter. Lastly the hypothesis were formed on the basis of the model formulated.

3.2 Determinant of TQM implementation and Impact

The literature review on TQM shows that there is enormous issues and approaches. The constructs used for TQM implementation and impact were varies and unclear about which construct to be adopt and which to be left. Most of the theoretical factors and empirical constructs were identified by the scholars and researcher which are based on their respective experiences in their relevant field (Zairi, 1996; Thiagaragan et al., 2001; Putri and Yusof, 2008).

3.2.1 Determinant of TQM implementation

Saraph et al. (1989) defined the critical success factors for TQM as *critical areas of managerial planning and action that must be practiced to achieve effective quality management in business unit*. There has been conducted different theoretical and empirically studies which identifies the construct of TQM implementation.

In this study, Concept of quality gurus; quality award models and empirical research findings are the major three categories used in this study to identify the critical construct of TQM implementation. The concept, model for quality award and empirical research constructs were presented in the following Figure 1, 2, and 3a ,b and c. Figure 1 indicates the construct adopted by five prominent quality Guru, which is used to determining the constructs of this study. In the same way Figure 2 indicates the construct of TQM used by most popular widely used quality award along with two national quality awards. Similarly Figure 3 a,b and c indicates the constructs used by twenty five chronological empirical research. From 35 most popular TQM concept, awards and empirical research most frequently used construct has selected as the construct of the TQM Implementation in this study.

Figure 3.1: TQM constructs according to Quality Gurus:

Juran	Deming	Crosby	Ishikawa	Feigenbaum
<ul style="list-style-type: none"> •Quality Planning •Quality measurement •Training for quality •Quality Trilogy of planning, control, improvement •Pareto analysis •Reward •suppliers Partnership 	<ul style="list-style-type: none"> •Statistical Process Control •The Plan, Do, Check, Act Cycle •Continuous Improvement •Leadership by Management •Training in job •Improve constantly the system •single supplier 	<ul style="list-style-type: none"> •It is cheaper to do it right first time •zero defects •Leadership by Management •Quality improvement teams •Training and awareness •Recognition •continuous improvement 	<ul style="list-style-type: none"> •Companywide quality control •Quality circles •Use of quality tools •Leadership •Education & Training •customer relationship •Statistical process control •Suppliers quality 	<ul style="list-style-type: none"> •Total quality control •Leadership by management •Organizational system •Quality Technology •Training •Customer focus •Innovation •continuous improvement •Quality with suppliers

Based on the above Figure construct for TQM implementation are: Top management leadership, process control and continuous improvement, Research and innovation, Education and training, policy deployment, customer and suppliers focus etc.

Figure 3.2: TQM constructs according to Quality Awards:

Deming Quality Award (2010)	Malcom Baldrige (2005)	EFQM (2005)	NS Quality Award	FNCCI Excellence Award
<ul style="list-style-type: none"> • Policy • Organization & its Management • Education & Dissemination • Collection Diss emination & Use of Inform ation of Quality • Analysis • Standardization • Control • Quality Assurance • Result • Planning for future 	<ul style="list-style-type: none"> • Leadership • Strategic Planning • Measurement, Analysis, and Knowledge Management • Human Resource Focus • Process Management • Customer & Market Focus • Business Results • OrganizationalProfile • Environment, Relationships, and Challenges 	<ul style="list-style-type: none"> • Leadership • Policy and Strategy • People • Processes • Customer Results • People Results, Key • Performance Results • Society Results • Partnership and Resources 	<ul style="list-style-type: none"> • Leadership • Customer Focus • Process and system management • Human resource management • Information management • Corporate social responsibility • Performance and improvement • Infrastructure and housekeeping • NS certified products 	<ul style="list-style-type: none"> • Policy plan and commitment • Workplan development and deployment • Operation information dissemination • Employee development • Work system and standardization • customer service • customer satisfactor and relation • Employee satisfication • Performance result • Future Plan

Based on the above figure the constructs for TQM implementation are: Leadership; Strategy and policy planning; Evaluation and assessment; People Management; Process Management; Customer Management & satisfaction; Business & Performance Results, Management of suppliers/partners; Impact on society; Resources management etc.

Figure 3.3 (a): TQM constructs according to Empirical Research:

<p>Gravin (1983)</p> <ul style="list-style-type: none"> • quality programmes, policies, and management attitudes; • quality information systems; • product design; • production and employee policies • Suppliers management 	<p>Saraph et al.(1989)</p> <ul style="list-style-type: none"> • Management Leadership • Role of the Quality Department • Training • Employee relations • Quality data and reporting • Supplier quality management • Product/service design • Process management 	<p>Motwani (1994)</p> <ul style="list-style-type: none"> • Top management; • Quality policies; • The role of the quality department; • Training; • Product design; • Vendor quality management; • Process design; • Quality data; • Feedback and employee relations. 	<p>Flynn et al. (1995)</p> <ul style="list-style-type: none"> • Top management Support • Customer relationship • Suppliers relationship • Workforce management • Work attitudes • Product design process • Process flow management • Statistical control feedback • External quality performance • Competative advantage 	<p>Black and Porter ((1996)</p> <ul style="list-style-type: none"> • supplier partnership, • People and customer management, • customer satisfaction orientation, • external interface management, • communication of improvement information, • strategic quality management, • operational quality planning, • quality improvement measurement systems, • teamwork structure for improvement, and • Corporate quality culture
<p>Ahire et al. (1996)</p> <ul style="list-style-type: none"> • Top management committment • Employee training • Employee empowerment • Employee involvement • Internal quality information usage • Supplier quality management and performance • Design quality management • Customer focus • Benchmarking • Statistical process control usage • Product quality 	<p>Zhang 2000</p> <ul style="list-style-type: none"> • Leadership • Eudation and training • Employee participation • Supplier Quality Management • Product Design • Process control and improvement • Customer focus • Visition and Plan Statement • Evaluation • Qualiity system improvement • Recognition and Reward 	<p>Conca et al, (2004)</p> <ul style="list-style-type: none"> • Leadership • Training • Specialist training • Supplier management • Process Management • Customer focus • Learning • Continuous Improvement • Quality planning • Communication 	<p>Projogo & Sohal (2004)</p> <ul style="list-style-type: none"> • Leadership • Strategic planning • Customer focus • Information and Analysis • People Management • Process Management • Product Quality • Product Innovation • Process Innovation 	<p>Sila & Ebrahimpour (2005)</p> <ul style="list-style-type: none"> • leadership, • strategic planning, • customer focus, • information and analysis, • human resource management, • process management, • supplier management • human resource results, • customer results, • organizational effectiveness and • financial and market results.

Figure 3.3 (b): TQM constructs according to Empirical Research:

<p>Lin et al. (2005)</p> <ul style="list-style-type: none"> • Top mgt. leadership • Training • Product/service design • Supplier quality management • Process management • Quality data reporting • Employee relations • Customer relations • Benchmarking • learning • Supplier participation • suppliers selection • Satisfaction level • Business results 	<p>Tari (2005)</p> <ul style="list-style-type: none"> • Customer focus • Process management • Leadership • Suppliers management • Learning • Quality Planning • Continuous improvement • Employee management • Customer satisfaction • Staff indicators • Quality performance • Social impact • Employee satisfaction 	<p>Yang (2006)</p> <ul style="list-style-type: none"> • process management • employee empowerment and teamwork • customer satisfaction • quality goal setting • measurement • supplier's cooperation • quality tools training 	<p>Jitpaiboom & Rao (2007)</p> <ul style="list-style-type: none"> • Top management support • Quality planning • Suppliers quality • Benchmarking • Employee training • Customer focus • Employee involvement • Strategic quality planning 	<p>Siddiqui & Rahman (2007)</p> <ul style="list-style-type: none"> • customer focus • top management • employee involvement • continuous improvement • training • Team work
<p>Das et al (2008)</p> <ul style="list-style-type: none"> • Top management commitment • Supplier quality management • Continuous quality improvement • Product innovation • Benchmarking • Employee involvement • Reward and recognition • Education and training • Customer focus • Product quality 	<p>Arumugam et al (2008)</p> <ul style="list-style-type: none"> • Leadership • Process Management • Information Analysis • Customer focus • Supplier relationship • Quality system improvement • Continual improvement • People involvement 	<p>Fotopolous et al (2009)</p> <ul style="list-style-type: none"> • Leadership • Process Management • Service Design • Human Resource Management • Customer Focus • Education and Training • Suppliers Quality Management 	<p>Kumar et al (2009)</p> <ul style="list-style-type: none"> • Customers' satisfaction; • Managements' effective participation • Employees' effective participation • Reward schemes; • Communication system; • Vendors' power; • Statistical quality control; • Fast result techniques; • Quality planning and cost involved and • Analytical techniques 	<p>Zakuan et al (2010)</p> <ul style="list-style-type: none"> • Quality Leadership • Customer focus & Satisfaction • Quality information & Analysis • Human Resource Development • Strategic Planning Management • Suppliers Quality Management • Quality results • Quality Assurance • Satisfaction Level : customer and employee • Business Result

Figure 3.3 (c): TQM constructs according to Empirical Research:

Hoang et al. (1996)	Valohammadi (2011)	Phan et al, (2011)	Bhari et al (2012)	Munizu (2013)
<ul style="list-style-type: none"> • Top management commitment • Employee involvement • Employee empowerment • Education and training • Teamwork • Customer focus • Process management • Information and analysis system • Strategic planning • Open organization • Service culture 	<ul style="list-style-type: none"> • leadership, • process management, • suppliers, • customer focus, • employee management, • communication and quality information system and • tools & techniques 	<ul style="list-style-type: none"> • Top management leadership • Formal strategic planning • Training • Small group problem solving • Employees suggestions • Cross functional product design • House Keeping • Process control • Information feedback • Customer involvement • Supplier quality involvement 	<ul style="list-style-type: none"> • Leadership • Suppliers quality management • Vision plan statement • Evaluation • Process control improvements • Product design • Quality system improvements • Employee participation • Recognition and reward • Education and training • Customer focus 	<ul style="list-style-type: none"> • Leadership • Strategic planning • Customer focus • Information & Analysis • People management • Process management • Suppliers management • Competitive Advantage: <ul style="list-style-type: none"> • Cost Price • Delivery dependability • Product Innovation • Time to market • Organizational performance: <ul style="list-style-type: none"> • Return on Investment • Market share • Sales

Based on the above figure, constructs for TQM implementation are:

“Top management commitment & leadership; Strategic planning; customer focus and satisfaction; quality information and performance measurement; benchmarking; human resource management & development; training; employee empowerment and involvement; employee satisfaction; process management; resource management; business results; product and service design; suppliers management; continuous improvement; and communication etc”.

3.2.1.1 TQM Implementation constructs selection

All these factors (constructs) identified from the above tables were listed in the table below, and most repeated was considered as a constructs (factors) of TQM implementation under this study.

Table 3.4 : Comparison of different scholars and award constructs

Quality Gurus	TQM Implementation constructs													
	Top Management Commitment /Leadership	Policy Deployment/Strategic Quality Mgmt	Process Control & Improvement	Research & Development / Product Design	Education and trainings	Suppliers Empowerment & Relationship	Customer relationship / customer focus	Employee involvement and Empowerment	Evaluation & Assessment / information	Benchmarking	Reward and Recognition	Society and Environment	Statistical process control	Culture
Juran, 1974	√	√	√	√	√	√	√	√			√			
Deming	√		√	√	√	√							√	
Crosby, 1979	√	√	√	√	√	√					√			
Ishikawa	√		√		√	√	√						√	
Feigenbaum, 1983	√	√	√	√	√	√	√	√						
Quality Awards														
Deming QA 2005	√	√			√			√						
MBQA 2005	√	√	√				√	√	√					
EFQM 2005	√	√	√			√	√	√			√			
NSQA	√	√	√				√	√	√		√			
FNCCI QA	√	√					√	√	√					
Empirical Studies														
Gravin (1983)	√	√		√		√		√	√					
Saraph et al., (1989)	√		√	√	√	√		√	√	√				
Motwani (1994)	√	√	√	√	√	√		√	√					
Flynn et al., (1994)	√		√	√		√	√	√	√					
Ahire et al., (1996)	√			√	√	√	√	√	√	√			√	
Black & Porter (1996)		√	√			√	√	√	√					√
Zhang et al (2000)	√	√	√	√	√	√	√	√	√		√			
Conca et al. (2004)	√	√	√		√	√	√	√						
Projogo & Sohal (2004)	√	√	√	√			√	√	√					
Sila & Ebrahimpour(2005)	√	√	√			√	√	√	√					
Lin et al. (2005)	√		√	√	√	√	√	√	√	√				
Tari (2005)	√	√	√		√	√	√	√						
Yang (2006)	√	√	√		√	√	√	√						
Siddiqui & Rahman (2007)	√		√		√		√	√						
Jitpaiboon & Rao (2007)	√	√			√	√	√	√		√				
Das et al (2008)	√		√	√	√	√	√	√		√	√			
Arumugam et al (2008)	√		√			√	√	√	√					
Fotopoulos et al (2009)	√		√	√	√	√	√	√						
Kumar et al (2009)	√	√				√		√	√				√	
Zakuan et al (2010)	√	√				√	√	√	√					
Hoang et al (2010)	√	√	√		√		√	√	√					√
Valohammadadi (2011)	√		√			√	√	√	√					
Phan et al (2011)	√	√	√	√	√	√	√	√	√					
Bhari et al (2012)	√	√	√	√	√	√	√	√	√		√			
Munizu (2013)	√	√	√	√		√	√	√	√					
Frequency of repetition	34	24	28	17	21	28	28	31	22	5	3	2	5	2

From above table researcher has taken nine most repeated constructs in this study. They are *Top management commitment & involvement, Policy deployment with process control and improvement, Research and development, training and education, maintaining suppliers' empowerment and relationship, customer relationship, employee empowerment and involvement, and evaluation and assessment.*

3.2.2 Determinant of TQM Impact

Gravin (1983) has listed eight critical dimension of quality performance which were performance, features, reliability, conformance, durability, serviceability, aesthetics and perceived quality. Flynn et. al. (1995) used perceived quality market outcome, percentage which passed final inspection without requiring rework and competitive advantages as impact variable. They had used perceived quality market outcome as a multidimensional construct which includes conformance, reliability, performance, durability, serviceability and perception of customer satisfaction as in Gravin (1983).

Zhang et. al. (1999) had used product quality as TQM impact where they used the following item: “performance, conformity, reliability, durability, defect rates, internal failure cost and warranty percentage. Kaynak (2003) had used three levels of performance measures : financial, market and operating. They found the positive effect on financial and market performance through TQM practice which is mediated through operating performance.

In the study of Sila and Ebrahimpour (2005), organizational effectiveness, financial and market results were taken as impact of TQM implementation. Lin et. al. (2005) had identified the positive relationship between TQM implementation with satisfaction level of employee and customer. They also identified the positive impact of TQM implementation on different business results including productivity, cost performance, profitability, sales growth, earning growth and market share. This suggestion was also followed by Zakun et al (2010).

Tari (2005) used factor and result oriented constructs of TQM, where result oriented constructs were customer satisfaction, staff indicators, quality performance, social impacts and employee satisfaction. The study suggested that if the management is properly aware about the different components of TQM then only they can develop activities for implementation of TQM. Kakkar and Narag (2007) has showed the relationship between contributing variables and contribution variables. They had determined and validate the following contributing variables: product quality, customer satisfaction, market performance, employee satisfaction, business result, cost & waste reduction, safety, productivity improvement and impact on society.

Das et al (2008) has used performance, reliability, durability, defect rate of primary product as a product quality. Fotopoulous and Psomas (2008) used quality improvement, market benefit, customer satisfaction and protection of natural and social environment as an impact variables. Reduction of defect product, obsolete product, non conformance, reprocessing, warrantee compensations were taken as quality improvements. Sales, profit, performance and competitive position were taken as market benefit instruments. Customer loyalty, satisfaction and complaints were taken as market benefit instruments. Health and security risk, waste and pollution and social issues were in additionally addressed by Fotopoulous and Psomas (2008) than other previous research.

Reviewing the above different empirical studies, the researcher has selected the following four constructs of impact of TQM implementation namely *Customer satisfaction, Employee satisfaction, Product quality and Product performance*.

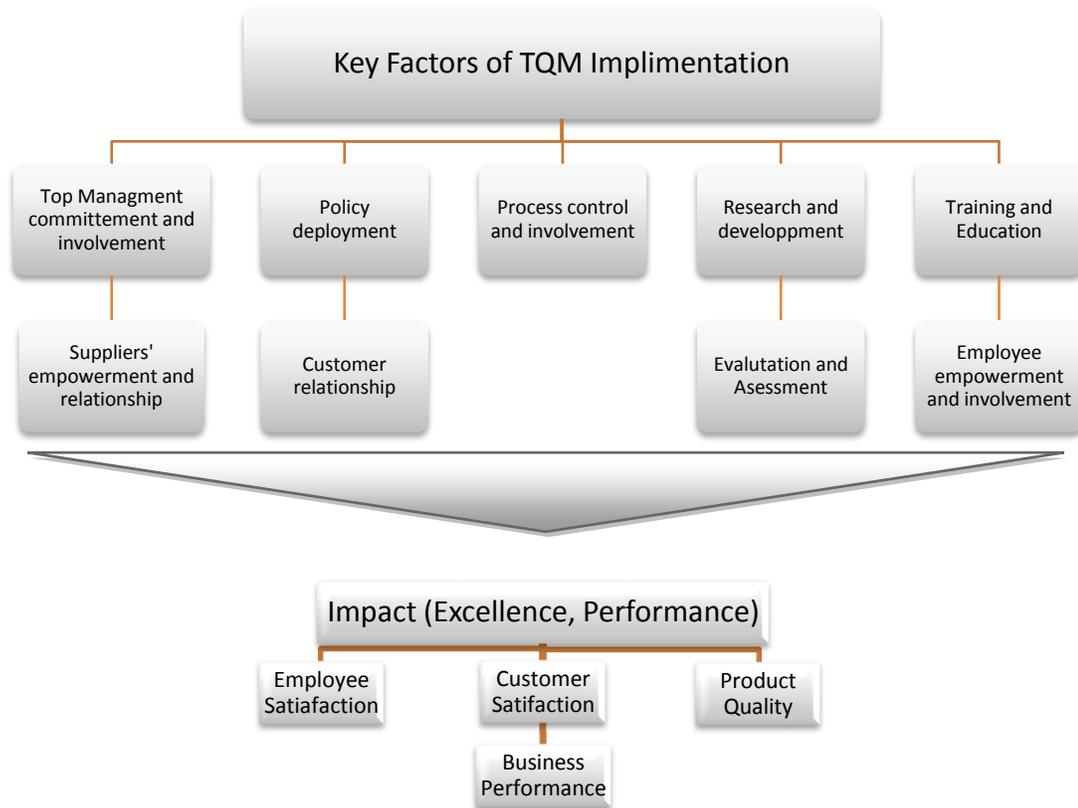
Customer satisfaction has drawn much more attention nowadays. Different quality guru and quality awards also had focused on customer satisfaction. So the customer satisfaction is taken as one of the firms' key performance measure. Many empirical studies had shown the impact of behavior of employee in the company's performance so the employee satisfaction is taken as next important part in business success.

Quality product is one of the most prominent factors for manufacturing industries in the world market. Business strategy development must place high priority on product quality which is the fundamental aspect for business success. Business performance is another factor which is influenced by TQM practice which reflects the competitive capability of a firm in the marketplace with its financial health and predicts its future success or failure. Annual sales, profit and market share are the prime factors to measure the business performance. So these four constructs has selected as a TQM impact in this study.

3.3 Conceptual Framework of the study

The conceptual framework is based on the determinant of TQM implementation and its impact which has carried out on the basis of the review of literature on chapter two. It taps the perception and implementation of quality heads and quality managers and employee concerning quality implementation in the manufacturing of the Nepalese industry. The following is the conceptual framework used in this research.

Figure 3.4: Conceptual framework of the TQM implementation and Impact



3.3.1 TQM implementation constructs

The following are the explanation of the selected constructs which support to select the item under these construct.

1. Top Management commitment & involvement

Although there are many books and researches are available, it is hard to get the universal definition of leadership. In the book Total Quality Management of K Shridhara Bhat, Leadership is defined as the ability to positive influence people and system under one's authority to have a meaningful impact and achieve important result. Anderson et al. (1994) has explained the concept of leadership as: The ability of top management to establish, practice, and lead a long-term vision for the firm, driven by changing customer requirements, as opposed to an internal management

control role. According to Bhat (2007), important role of top management are: Define and communicating business direction, ensuring goal and expectation are met, reviewing business performance and taking appropriate action, creating a work environment that promotes creativity, innovation and continuous improvement, soliciting input and feedback from customers, ensuring effectiveness of employee contribution, motivating, inspiring and energizing the employees, recognizing employee contribution and providing reliable feedback. The European Quality Award (2005) and the Malcolm Baldrige Quality Award (2005) recognize the crucial role of top management in creating the goals, values and systems that guide the pursuit of continuous performance improvement.

Different literature of quality management shows the importance of commitment from top management. The foundation of an effective leadership effort is top management's commitment. Demonstrating such commitment is therefore a primary leadership principle for achieving TQM. Lack of top management commitment is one of the reasons for the failure of TQM efforts (Brown et al., 1994). However, top management commitment itself is not sufficient. It is more important that top management personally should participate in various quality management activities. Furthermore, it should strongly encourage employee involvement in quality management activities. According to DuBrin (1995), an important leadership practice is to encourage people to assess the level of quality.

To be an effective leader in most modern firms, the top manager must continue to develop and learn. Knowledge of the business and continual learning are essential prerequisites to effective leadership (DuBrin, 1995). The extensive literature review by Anderson et al. (1994) suggested that if leadership wants to create organizational cultures that will themselves be more amenable to learning, they must set the example by becoming learners themselves and involving others in the learning process. Thus, a learning organization will be established.

Empowerment is the process of allotting decision-making authority to lower levels within the organization. Top management should empower their employee to

resolve with the problem they faced (Pradhan, 2014). Trustful relationship with the employee and the management has to be developed through the arrangement of resources for the training and education to the employee. From the above TQM literature it is revealed that top management is a noticeable determinant for successful TQM implementation.

2. Policy Deployment

Policy Deployment is a structured process for establishing long range quality goals, at the highest levels of the organization and defining the means to be used to reach these goals (Bhat, 2007). Policy deployment is the process of defining the broad mission vision and goals for the company and then determining the means to be used to reach these goals. A vision statement describes how a firm wants to be seen in its chosen business. As such, it describes standards, values, and beliefs. Vision propels the firm forward and acts against complacency. Vision statement of the organization is the pool for the communication of organization to the customer. Long term vision of the organization is required for quality improvement (Pradhan, 2014). A quality policy is a guideline for the action to be taken in order to reach the quality goals (Bhat, 2007). Quality policy is another instrument which is used by the organization which how the organization is intends to go forward in terms of quality. While determining the policy of the organization, they should set out the different plans which may be strategic business performance plan, quality goal plan, and quality improvement plan etc. Short term and long term strategic business performance plan are the frequently used by the different companies. The time horizon for these strategic plans is three to ten years for long term plan and one or less year for short term plan (Besterfield et al., 2006). Quality enhancement plan will be developed along with the long term strategic plan (Pradhan, 2014).

3. Employee Involvement & empowerment

Employees are the internal customers. Quality betterment is not possible without the employee participation (Pradhan, Acharya, Yadav, Upadhayaya, Shah, & Timalina, 2014). Employee involvement refers to any activity by which employees participate in work-related decisions and improvement activities with the objectives of tapping the creative energies of all employees and improving their motivation (Bhat, 2007). By personally participating in quality management activities, employees acquire new knowledge, see the benefits of the quality disciplines, and obtain a sense of accomplishment by solving quality problems. Involvement is decisive in inspiring action on quality management (Juran and Gryna, 1993). The range of activities involved in employee involvement approaches are : sharing of information; providing input on work related issues, making suggestion and self directed responsibilities such as setting goal, making business decisions and solving problems often in cross functional teams. Quality circle is successfully developed and implemented in Japan and is popular all over the world for tools for corrective action (Pradhan, 2014). According to Deming (1986) involvement of employee in the different decision making activities like goal setting, planning and monitoring and improvement etc encourage them to indulge in the different quality improvement activities which leads to the improvement of performance. Ahire et. al. (1996) had suggested that for the successful implementation of TQM there should have periodic the training and education on quality tools and techniques are essential to the employees to aware the employee regarding the quality related issues. All the different quality gurus had advocated repeatedly on the training and education. In order to have effective learning activities, the organization should continually encourage employees to accept education and training.

4. Supplier empowerment and relationship

Organization must stop awarding business based on the low bidders because price has no value without quality (Bhat, 2007). For the smooth running of the

company there should be continuous supply of raw materials in the required quality. According to Mann (1992), “ Suppliers’ quality management represents industry-supplier partnership, product quality as the criterion for supplier selection, participation in suppliers, communication with suppliers, understanding of supplier performance, and supplier quality audit”. The supplier becomes an extension of the buyer’s organization to a certain extent. A revolution in the relationship between buyers and suppliers has emerged in the form of supplier partnership (Juran and Gryna, 1993). According to the review by Hackman and Wageman (1995), developing partnerships with suppliers is one of the major TQM implementation practices. Collaboratively work with the suppliers is favorable for the long term relationship which is strongly suggested by Deming. Quality audit of supplier is the next important job for the organization which study the capability and performance of the suppliers, which requires the different database of the suppliers practice. Feigenbaum (1991) has advocates on the quality audit to evaluate the suppliers capability, which is important element for preliminary suppliers selection. Deming (1986) has focus on the supplier and stated that “ What one firm buy from another is not just material; it buys something more important namely engineering and capability”. So the suppliers empowerment and relation is the next prominent construct in this study.

5. Evaluation & Assessment

Juran and Gryna (1993) stated that “A formal evaluation of quality offers a starting point by providing an understanding of the size of the quality issue and the areas demanding attention”. Evaluation is the process of measurement of discrepancy between targeted and actual performance which is very important for improvement. Industries should regularly evaluate their business strategies in order to maintain their business in the market. Quality audit is a autonomous organized examination of quality activities in system, product, process or service of the organization so that they can take corrective action to achieve the quality objectives. There should be the

strong database for evaluation process. The database can be used in evaluation process of defect rates and scraps, management process, work proficiency of departments and staffs. Benchmarking is another measurement of performance against that of best-in-class companies, determining how the best-in-class achieve those performance levels and using the information as a basis for our company's targets, strategies and implementation (Bhat, 2007). A benchmarking is a point of reference by which performance is judged or measured; Competitive benchmarking is the continuous process of measuring products, services, and practices against those of the toughest competitors or leading organization (DuBrin, 1995). According to Pradhan (2015), there are many types of benchmarking such as internal, external, non-competitive, competitive, performance, and practice. Benchmarking is able to judge how well an operation is performing, and can be seen as one approach to setting realistic performance standards. It is also concerned with searching out new ideas and practices that might be able to be copied or adapted.

A customer satisfaction survey (customer feedback) and employee satisfaction is a vital to a business. Through customer feedback, a company learns how satisfied its customers and are with its products and services and sometimes about the competitor's product or services (Pradhan, Research Methodology, 2014). In the same way employee satisfaction survey is a method to measure the happiness and bliss of the employee which is the most important for the quality management. So these measurement and evaluation becomes one of the factors in this research.

6. Research and Development

Product design is a special activity which may originate from the customers' need or desire. Basically, it is the essence of the organizations that to fulfill the new wants or desire of the customers as well as to adjust with the changes in the customer's demand (Pradhan, et. al., 2014). Research and development is the prominent branch which create the product design according to customer expectations. Juran and Gryna (1993) focused on the accurate product design which

is responsible for the better quality product and can achieve the competitive advantages in the market. Feigenbaum (1991) has focused on the customer satisfaction survey, customer complain database, field information are essential for improving the product design. The extensively used tool for designing the product is experimental design. Similarly Quality function deployment is also another tool in designing the product which converts the customer expectation into the product without variation, with using the different interlocking matrices. R&D is responsible for all these activities and is becomes a factor of this study.

7. Process Control and Improvement

Process control and improvement is also called process management. Juran and Gryna (1993) had stated that “Process control and improvement connotes a set of methodological and behavioral practices, which are implemented to control and improve processes that produce products and services”. Process control and improvement is essential for the continuation of production process as an expected without breakdown. The equipment which is used for manufacturing the products wears after the continuation of the work which leads to the lower the quality of the products. Preventive and corrective maintenance should be maintain within the organization according to needs of the machine (Pradhan et. al., 2014a). The measurement of the variation in the product attribute is done by statistical process control (SPC). The SPC helps in consistency of the process, reduction in variation by providing reliable information to the management for proper decision making. Quality improvement is not the static thing but it is dynamic. Managers should always search for problems in order to improvement every activities in company for better quality, increase in productivity and decrease in cost continuously (Pradhan, et. al., 2014). There are many tools for quality improvements available to improve the quality product and process. The some of the popular tools are seven QC tools and the seven new QC tools, PDCA cycle. Process control and improvement is one of the most prominent factor in quality management and is taken one factor in this research.

8. Customer relationship

The customers are the valuable assets for any organization. The success of the organization depends on the degree of fulfilling the need and expectation of the customers (Pradhan, 2014). In order to get the full information about the need and expectation of the customer there should be strong relationship with the them. To improve customer focus efforts, customer complaints should therefore be treated with top priority. Obtaining customer satisfaction information is essential for pursuing customer focus efforts. Intensive examination of finished products from the viewpoint of the customer can be a useful predictor of customer satisfaction. Such information includes data on field failures and service-call rates, and analysis and reporting of customer attitude trends regarding product quality. Such information is valuable for new product development also. The results of customer satisfaction surveys can be used to take immediate action on customer complaints, identify problems requiring generic corrective action, and provide a quantitative measurement of customer satisfaction (Juran and Gryna, 1993). The after sales service is another important factor to satisfy the customer. Warranty, guaranty on the product tends to make good relationship with the customers (Pradhan, 2014). The company should chase on the customer focus attempts for long term business success. Customer relation is also again a prominent factor for the quality management.

9. Education and training

Training is the process of gaining new skills and knowledge to perform a assigned job in the company. Education means obtaining general knowledge which can be applied in the different settings (Cherrington, 1995). “Training and education changes negative or neutral thinking of employee to positive thinking and ultimately convert them into proactive employee always striving to do better than what they have done yesterday” (Mukharjee, 2010). In this competitive era, technology and method of work are changing and to survive the industries have to adopt these changes and improve through training and education to the employees. For education

and training the prominent issue is to manage the investment which should be done by top management. The leaders in quality: Deming, Juran and Crosby actively promoted quality training and education (Bhat 2007). According to Bhat (2007), training generally includes quality awareness, leadership, project management, communications, teamwork, problem solving, interpreting and using data, meeting customer requirement, process analysis, process simplification, waste reduction, cycle time reduction, error proofing and other issues that affect employee effectiveness, efficiency and safety.

The cross-functional quality teams among the characteristics of TQM firms stack the cards in favor of learning by the simple fact that they are cross-functional; individual members are exposed to more, and more diverse, points of view than would be the case if they worked mostly by themselves or in within-functional teams (Hackman and Wageman, 1995). Learning is the ability and willingness of the firm to engage in learning or knowledge seeking activities at the individual, group or team, and organizational levels (Anderson et al., 1994). In order to have effective learning activities, a firm should continually encourage employees to accept education and training. The TQM aspiration of continuous improvement in meeting customer requirements is supported by a thorough learning orientation, including substantial investments in training and the widespread use of statistical and interpersonal techniques designed to promote individual and team learning (Hackman and Wageman, 1995).

3.3.2 TQM impact constructs

One of the research questions in this study is, what are the measures which are used to identify the impact of TQM implementation. The literature review indicated that different researchers adopted different indicators for measuring the impact of TQM implementation. To date, no uniform measures have existed. Zakuan et al. (2010) had used employee satisfaction and customer satisfaction, business

results as output variables. Productivity, number of successful new products, cost performance and profitability had been taken as items under the business result construct. After various performance measures had been evaluated in the industry sectors, the researcher has selected four constructs of TQM Impact namely; employee satisfaction, product quality, customer satisfaction, and business performance. The the part of the construct which is selected in this study was already used in the research by Hackman and Wageman (1995) and Zhang (2001). The consequence of these impact construct is described below.

1. Employee satisfaction

Measurement of employee satisfaction is necessary to assess the linkages with the company strategy and to provide a basis for improvement (Bhat, 2007). Employee satisfaction should be one of a firm's key performance measures (Naumann and Giel, 1995). Employee satisfaction is seen as an important factor in business effectiveness because employee satisfaction can lead to behaviors by employees that affect a firm's functioning (Spector, 1997). Employees' negative feelings can lead to behaviors that are harmful to firms. Organizational practices that maximize employee satisfaction will likely see employees who are more cooperative and willing to help the firm be successful. Employee satisfaction is a topic of interest to both researchers who study it and practitioners who work in firms (Naumann and Giel, 1995). There are huge number of studies in different journals about the employee satisfaction and related fields. Employee satisfaction survey helps organization better understanding the "voice of employee" particularly with regard to employee satisfaction, management policies and their internal customer and suppliers (Bhat, 2007).

2. Product Quality

Product quality is one of the most significant factors for a manufacturing industry to retain in the market. Quality product is the means to retain in the market for long period of time (Pradhan, 2014). High priority should be given to the product quality by the company and should be included prominently in the business strategy. Different scholar and research has focused on the strategic business Product quality for global competition. The performance, conformity, Durability, cycle time and defect rates, failure cost, complain are the measures used to tap the impact of TQM.

3. Customer Satisfaction

A customer is one who purchases a product or service from the organization. It is obvious that business cannot survive without satisfying customers. Satisfaction is “a person’s feelings of pleasure or disappointment resulting from comparing a product’s perceived performance (or outcome) in relation to his or her expectations.” Quality and service alone cannot produce recurrent satisfaction. Satisfaction is a distinct and separate issue. It is the customer's entire experience with product, service and its associates that determines his or her declaration of satisfaction (Pradhan, 2014). Kakkar and Narag (2007) in their study indicated that customer satisfaction is the vital issue which is to be attaining through better product quality and resource development and is reflected in better business performance.

4. Business Performance

Business performance is the insistent capability of company which indicates the success and failure of the company. Different researcher and scholar has used different items to measure the business performance Naumann and Giel (1995) in their research they had used parentage of market detain by the product, the changes in the revenue and gain of the company as a business performance. Lee et. al. (1995) has identified market share and profitability as a higher level of items in business

performance. Annual sales, profits and market share are taken as item in the business performance in this study.

3.4 Research Hypothesis

Hypothesis is tentative answer to research problems. They are expressed in the form of a relation between variables (Pradhan, Khatiwadi, & Poudel, Research Methodology, 2014) Hypotheses are tentative conjectures because their authenticity can be evaluated only after they have been tested empirically. In this study the relation between the variables TQM implementation and impact has to be analyzed, so the relationship between and within these variable is stated, and accordingly the hypothesis setup has done.

3.4.1 Hypotheses between TQM Implementation and its impact

In this competitive era TQM has been indispensable tools for every organization to survive in this world. There have been many debates about the benefit of the TQM implementation in the organization. Many research conducted on TQM implementation and its impact, shows the positive impact on the organizational improvements with regards to employee satisfaction, product quality, customer satisfaction, and strategic performance (e.g., Zhang, 2000; Chowdhury et al., 2007; Abdullah et al.,2008)

TQM implementation creates the opportunity to learn and develop skill to solve the problem through the concept of team. It gives the skill development opportunities to the stakeholders so that they can work on the requirement of the changing and challenging customers.

Actually quality personal has accepted that the implementing TQM is an effective means of improving product quality and reducing waste. There is a notion that “the successful implemented TQM not only meet the needs of customer, but also delight

them.” It is the effective way of doing business cope with competitiveness and flexibility. Zakuan et. Al. (2010) has measured organizational performance through employee satisfaction, customer satisfaction and business result. Lakhal et. al. (2006) suggested that the TQM implementation leads to customer satisfaction through product quality. Barros et al (2014) has found the positive relationship between TQM implementation with product quality and product innovation. TQM practices, manufacturing organizations are more likely to achieve better performance in customer satisfaction, employee relations, quality and business performance than without TQM practices. (Hassan, Mukhtar, Qureshi, & Sharif, 2012). They have found the improvement in quality (product based, user based and manufacturing quality) and business performance (total sales, market share and net profit of the organization) are strongly attributed due to the high implementation of TQM practice. Based on these empirical research findings, the following four hypotheses were proposed:

Hypothesis H_{a1}: TQM implementation has a positive effect on employee satisfaction.

Hypothesis H_{a2}: TQM implementation has a positive effect on product quality.

Hypothesis H_{a3}: TQM implementation has a positive effect on customer satisfaction.

Hypothesis H_{a4}: TQM implementation has a positive effect on business performance.

3.4.2 Hypotheses Among TQM impact Constructs

Research has been conducted on the relationships among employee satisfaction, product quality, customer satisfaction, and strategic business performance (annual sales, profits, market share). Satisfied employees certainly have high loyalty and pledge. TQM practices i.e. leadership, training, employee management, information and analysis, supplier management, process management, customer focus, and continuous improvements effects on employee performance which leads to the business success. Anderson et al. (1995) had showed the positive impact of employee satisfaction on customer satisfaction through employee satisfaction. Feigenbaum

(1991) had showed positive impact of motivation of employee to the product quality. Kakkar and Narag (2007) showed from their empirical research that satisfied customer will perform the extra effort so as to improve the product quality and customer satisfaction. On the basis of the above statement the following hypothesis were proposed.

Hypothesis H_{b1}: “Employee satisfaction has a positive effect on customer satisfaction”.

Hypothesis H_{b2}: “Employee satisfaction has a positive effect on business performance”.

Customer satisfaction and product quality performance has increased due to different quality initiatives adopted in manufacturing firms (Raja, Bodla, & Malik, 2011). Anderson et al. (1994) suggested that “product quality has a positive impact on customer satisfaction, providing high quality products and high customer satisfaction is rewarded by economic returns”. The motto of the TQM is to provide the product and service according to the needs and expectation of the customers. Better quality product with reasonable charge will be the demand of customers which ultimately pull customers towards the product. If the demand increases than ultimately the performance of the company automatically increases (Juran and Gryna, 1993, Garg, et. al. 2002, Antony, et. al. 2004). On the basis of the above statements the following hypothesis are proposed:

Hypothesis H_{b3}: Product quality has a positive effect on business performance.

Rahman and Siddiqui (2006) has reported that the benefit of TQM implementation is increasing the customer satisfaction which ultimately increases the quality of product and services and it has a strong relation with business performance. Hassan et al (2012) on their study they have indicated that TQM practices, manufacturing organizations are more likely to achieve better business performance through customer satisfaction. Thus, the following hypothesis was purposed.

Hypothesis H_{b4}: Customer satisfaction has a positive effect on business performance.

3.4.3 Model 1 Formulation

A theoretical model has developed on the basis of above nine hypothesis which is exhibited in the following figure. The relations between TQM implementation, employee satisfaction, product quality, customer satisfaction, and business performance are included in one single model. In these nine hypotheses, TQM implementation is an independent variable and employee satisfaction, product quality, customer satisfaction are mediator variables and business performance is dependent variables.

Figure 3.5: Theoretical Model of TQM Implementation and its impact



3.4.4. Hypotheses between TQM Implementation Constructs and TQM Impact

TQM implementation is an abstract concept composed of nine different constructs so to study the relationship of it with the impact constructs, the individual TQM implementation construct were studied.

1. Top Management Commitment and Involvement

Top management proceeds as the most important element of TQM. It provides leadership and direction for the entire organization to adopt and execute any quality improvement program. A competent top management would be able to implement the TQM implement factors successfully. Sila and Ebrahimpour (2005) identify leadership as one of the factors which is responsible for good business results. Motwani (2001) allocate the four distinct ways that Top management can assist for TQM implementation are: allocating budgets and resources; control through visibility; monitoring progress; and planning for change. There should be a focus on transferring management support to the shop-floor. Most of the research on TQM showed the positive impact of top management commitment and involvement to the satisfaction of the employee. (Antony, Fergusson, Waraood, & Tsang, 2004, Bahri, Hamzah, & Yusuf, 2012, Das, Paul, & Swierczek, 2008). Therefore, the following hypothesis is proposed.

Hypothesis H_{c1}: Top Management commitment and Involvement has a positive effect on employee satisfaction.

2. Supplier empowerment and relationship

Organization has to select the suppliers on the basis of quality rather than exclusively on the basis of cost and the organization has to work with them for the quality product. Motwani (2001) argue that corporation with suppliers have the greatest appeal to most of the companies due to the shared risks associated with the development of new products. Suppliers' partnerships should be based on a quality program and accepted documentation of progress towards continuous improvement in quality. Raw materials and parts are a leading source of process variability. Therefore, product quality of the company will be enhanced through the improving supplier quality by empowering suppliers with having good relationship. Thus, the following hypothesis was proposed:

Hypothesis H_{c2}: Supplier quality management has a positive effect on product quality.

3. Policy Deployment

Effective policy deployment is considered as a major factor of total quality management. Top management must set clear, measurable and achievable policy so that they will set the right direction for the organization. Once the specific policy have been set and agreed upon, resources and capabilities can be employed to attain those policies (Idris, 2011). It is apparent that a targeted quality objective can assist an organization to keep a constant quest for increasing quality levels. On the basis of the above statement following hypothesis has proposed.

Hypothesis H_{c3}: Policy Deployment has a positive effect on product quality.

4. Evaluation and Assessment

To improve the organizational efficiency, effectiveness and innovation, top management has to use reliable and high quality, timely data and information for proper evaluation and assessment. The advance techniques for collecting data, process of storing and process of analysis and to perform these through advance equipment to give the in-time information can greatly affect product quality. It is obvious that the proper ontime evaluation and assessment will play a vital role for quality enhancement. So the following hypothesis has proposed

Hypothesis H_{c4}: Evaluation and assessment has a positive effect on product quality.

5. Process Control and Improvement

Kaynak (2003) stated that “process control and improvement emphasis activities, as opposed to result, through a set of methodological and behavioral practices. Process management includes preventive and proactive approaches to quality management, such as designing fool-proof and stable production schedules and work distribution to reduce variation and improve the quality of the product in production stage”. Process control reduces the variation in the product and process by making the stable

process. TQM combines quality development, maintenance and improvements in an organization that will enable engineering, marketing, production and service to function at optimal economic levels while achieving customer satisfaction (Pradhan, Research Methodology, 2014).

Seven QC tool have been proved to be extremely effective instruments for data collection and analysis, process control and quality improvement. Similarly the Seven New QC Tools act as a new kind of driving force propelling quality management in fresh directions as we enter the age of total quality. Thus the following hypothesis is proposed.

Hypothesis H_{c5}: Process control and improvement has a positive effect on product quality.

6. Research and Development

A part of the process of delivering quality to the customer, organization should know what the customer wants and this activities comes under the research and development procedure. The design of the product and its development is the first and prominent steps in production process. Continuous breakthrough innovation both have important role in quality management of an organization which ultimately gives the quality product (Irani, Baradie, & Love, 2004). On the basis of above statement following hypothesis is stated.

Hypothesis H_{c6}: Research and Development has a positive effect on product quality.

7. Employee empowerment and involvement

In TQM, there will be involvement of employees in the decision making process and their performance will be judged and rewarded. In those environment, employee will perform their additional devotion so the efficiency of the work will be increased which ultimately improve the process, product or service quality (Kaynak, 2003).

“Non managerial employee can make significant contributions when they were empowered, so the employee suggestion and participation are encouraged in a total quality setting”. (Sadikoglu, 2004). New idea can be generated through the empowered employee can delight the esteemed customer (Goetsch & Davis, 2006). According to Rahman & Bullock, (2005) , “quality circles or quality improvement teams will help to make employees feel they are valued, respected and important. Employee participation in decision making and problem solving”. Depending on the above statements the following hypothesis is stated.

Hypothesis H_{c7}: Employee empowerment and involvement has a positive effect on employee satisfaction.

8. Education and Training

Deming (1986) has vigorously stated the importance of training and education for the quality improvement. Learning, obtaining idea and skills is updating oneself in this competitive era. Goetsch & Davis, (2006) segregated the training into technical skill training, supervision skill training, managerial problem solving training, teamwork training. On the basis of the above stated concept following hypothesis is stated.

Hypothesis H_{c8}: Education and training has a positive effect on employee satisfaction.

9. Customer relationship

A customer is one who purchases a product or service from the organization. In this competitive market, any business cannot survive without satisfying customers. A successful organization recognizes the need to put the customer first in every decision. In TQM, there will be continuous contact with customer through the different means so as to get the information about changed need and expectation s

(Bullington, Easley, & Greenwood, 2002). The information obtained from customer satisfaction surveys from discussing their needs with them, from asking for Customer Feedback by analyzing complaints can be utilized to build up customer relationship. On the same way the relationship with customer can be strengthened by using the different tools like Market research, customer audits, panel group discussion, in-depth interview and brainstorming and discussion, which ultimately effect on customer satisfaction. On the basis of these information the following hypothesis is stated.

Hypothesis H_{c9}: Customer relationship has a positive effect on customer satisfaction.

3.4.5 Hypotheses Among TQM Impact Constructs

The five hypotheses among the four constructs of TQM impact were presented in Section 3.3.2. These five hypotheses are re-listed as follows:

Hypothesis H_{b1}: Employee satisfaction has a positive effect on customer satisfaction.

Hypothesis H_{b2}: Employee satisfaction has a positive effect on business performance.

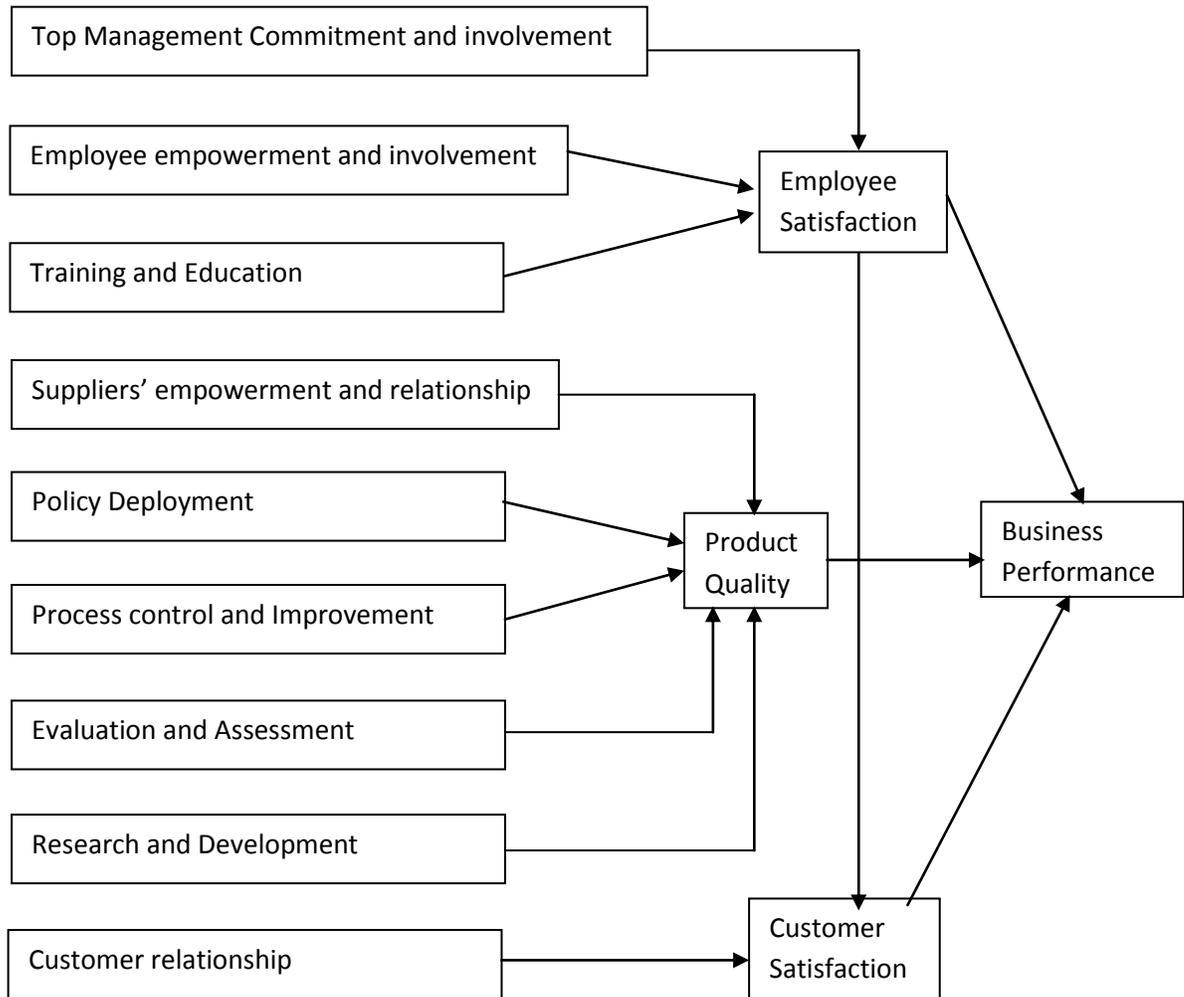
Hypothesis H_{b3}: Product quality has a positive effect on business performance.

Hypothesis H_{b4}: Customer satisfaction has a positive effect on business Performance.

3.4.6 Model 2 Formulation

On the basis of above stated fifteen hypotheses the following model is constructed.

Figure 3.6 : Theoretical Model of TQM Implementation and impact Constructs



The 9 boxes at the left contain TQM implementation constructs where as the four boxes at the right represents the TQM impact constructs. Here TQM implementation were taken as independent variables where as the three constructs employee satisfaction, product quality and customer satisfaction are taken as mediator variable and business performance is taken as dependent variable.

3.5 Construct Operationalization

A set of items for measuring the constructs of TQM implementation and impact has developed carefully so as to tap the concept developed. The following subsection describes the operationalization of the constructs.

3.5.1 TQM Implementation

Different researcher empirically validates the different TQM constructs for their own research purpose and they have different constructs and different measurement items. Since this study have different constructs and the target samples are different, the existing instrument could not be adopted. However some insights has been used. Based on the accessible literature, definition, explanation and the items of these selected 9 constructs, 68 items were developed which is suited to the Nepalese manufacturing industries. To retrieve the information, the widely accepted 5 - point Likert scale was employed “ 1: strongly disagree; 2: disagree; 3: neutral; 4: agree; 5: strongly agree”.

Table 3.2 Number of items in each nine TQM implementation constructs.

Scales	Item Number
Top Management Commitment	9
Policy Deployment	9
Process control & Improvement	5
Research and development	10
Training and education	10
Suppliers' empowerment & relationship	7
Customer relationship	6
Employee empowerment & involvement	7
Evaluation & Assessment	5
Total	68

3.5.2 TQM Impact

1. Employee Satisfaction

This study has some difficulties to conduct interview or questionnaire to employee method to measure the employee satisfaction, because each sample industry will get only one questionnaire. So the alternative procedure of measuring employee satisfaction should be used. However, the alternative method may not be equivalently precise as the interview or questionnaire method. The respondent, quality professionals or top management were asked to estimate the employee satisfaction in ten point scale (10=extremely satisfied, to 1=extremely unsatisfied). Zhang, Waszink & Wijngaard (2000) has adopted and verified the measure of employee satisfaction.

2. Product Quality

The operationalization of product quality should be based on the definition of quality: Conformance to specifications. Thus, product quality can be measured by conformance to product specifications. The every product has its designed specification (e.g., material contents, size, weight, taste, hardness etc). If the product doesn't confirm to its specifications, the product is judged as defective or nonconforming product. Every component of the product also has its specifications and if the component is not as specification then the component cannot be used to fabricate the finished good. Gravin (1987) has given ten component of product quality. These ten items were used to measure the product quality in this study. These are: "Performance, conformity, reliability, durability, cycle time, defect rates, complain, rework, internal failure costs, and external failure costs". The measurement as of percentage of defect rate, internal and external failure cost and inventory cost in percentage of the total expenses is also measured.

3. Customer Satisfaction

Customer satisfaction is the main focus term of the Total Quality Management. It is very important to understand components of customer satisfaction. Basically,

customer satisfaction can be defined as a condition in which the customer's needs can be met through the products and services consumed (Pradhan, 2014). After reviewing the literature on customer satisfaction, it became evident that there is no consensus on how to measure customer satisfaction. Conceptually, customer satisfaction is depends on quality of goods and services, good relations between producers and consumers, and image of product. Many manufacturing industries of Nepal evaluate the satisfaction level in terms of product and service to improve the product quality. The direct observation of satisfaction level of customer in the different product was impossible in this research so the sampled companies were asked the satisfaction level through the respondents (e.g., quality managers or top management). Here also ten point scale (10=extremely satisfied, to 1=extremely unsatisfied) was used.

4. Business Performance

Business Performance is a multidimensional construct which is very complex, with many differences meaning. It depend on who is evaluating, how are evaluated, and what aspects are evaluated. Performance is work ability that shown by work result. Measurement of total quality management on performance according should consider various aspects contained within business process. Three items growth of annual sales, growth in profit and the market share are taken to measure the business performance. For making easiness to the respondent five categories perceptual measure of close end question were asked..

3.6 Summary

First, the constructs of TQM implementation and Impact were constructed on the basis of the literature reviewed. The constructs were explained in a great deal. Two model of TQM implementation and its impact has been established with nine and fifteen hypothesis. Finally the constructs were operationalised.

Chapter four

Research Methodology

INDEX

S.N.	PARTICULARS	PAGE NO.
	INDEX	79
4.1	INTRODUCTION	80
4.2	RESEARCH DESIGN	80
4.2.1	RESEARCH STRATEGY	80
4.3	QUESTIONNAIRE SURVEY	82
4.4	DATA ANALYSIS	85
4.5	VALIDITY AND RELIBILITY	86
4.6	MODEL CHECK AND HYPOTHEIS TEST	90
4.7	SUMMARY	91

Chapter four

Research Methodology

4.1 Introduction

This chapter presents an overview of the methodological perspective of the research. The discussion on the research design has done on the basis of the research question adopted in the chapter 1. It also describes in detail about the development and execution about the questionnaire survey. The sampling method, validity and reliability of the data, data analysis techniques and methods of validating the models were discussed in this chapter.

4.2 Research Design

Designing a research work is a task of making an outline of research work that can be performed systematically within frame. Research design is a mapping strategy which essentially includes objectives, sampling method, research strategy, tools and techniques for collecting the evidences, analyzing the data and reporting the findings (Pradhan, Khatiwadi, & Poudel, 2014). So the main role of research design is to connect the question to data. Research design must follow from the questions to fit them with data. In this section only research strategy and research sample are described below. Other aspect of tool and procedure of data collection, detail sampling procedure for questionnaire survey, and the structured interview are presented in another subsections.

4.2.1 Research Strategy

The most important aspect of selection of strategy is the type of research question. Based on the research question selected in this study, the research strategies of a literature review, a questionnaire survey and

structured interviews were adopted in this research. The explanation for adopting such research strategies are as follows.

1. Literature review

The first and second research question “What is TQM and what are the key success factors of the TQM implementation ” and “what are the measures which are used to identify the impact of TQM ” are the descriptive in nature. To answer this type of question literature review is the most excellent strategy. In this study the literature review gives the TQM concept with its possible constructs. The theoretical and empirical research along with the concept given by the quality experts were the good source of literature review. In the same way the criteria given by the different quality awards gives some insight on it. Basically the identification of the constructs used in this study is the solution of the first and second research questions, which is due to the Literature Review strategy.

2. Questionnaire survey

The next research question were: “To what extent do the theoretical aspects found in literature can validate the empirical study of TQM implementation and its impact in case of Nepal? And How do key factors of TQM implementation affect on TQM impact in the context of Nepal?”. To get the answer to the above question a theoretical model is derived based on the literature review a theoretical model is derived. Then this theoretical model should be tested using different analytical tools. For this purpose the empirical data should be collected. And for empirical data questionnaire survey strategy is the appropriate. The cost of questionnaire survey is less as compare to the other survey. Both mailed questionnaire and the online survey techniques had used for this purpose. The data from the Nepalese manufacturing industries had collected under the constructs of TQM implementation and impact.

In summary, the literature review was conducted to identify question “What is TQM and what are the key success factors of the TQM implementation ” and “what are the measures which are used to identify the impact of TQM ”. A questionnaire survey was used to obtain data from Nepalese manufacturing industries to measure the theoretical and empirical aspects of TQM implementation and its impact in performance of the industries. In a word, the research strategies adopted in this study can be characterized as approaches of quantitative (a questionnaire survey) and qualitative investigations (a literature review).

Manufacturing industries of Pokhara, Butwal, Biratnagar, Hetauda, Birjung, Kathmandu and Patan were selected for investigation since these area are the industrial hub of Nepal. The details about the sample frame for conducting the questionnaire survey is described below.

4.3 Questionnaire Survey

1. Questionnaire Development

There are number of empirical research which had used questionnaire survey to study the Impact of TQM implementation. The developed questionnaire is based on the respective research purpose so the there no exact matches between the questionnaire used. The researcher had developed a questionnaire based on the theoretical constructs, operationalization of these constructs and some already tested questionnaire of the past researches. While developing the questionnaire the understandability, coverage, systematic, explanatory and scope were kept in the mind. The sixty eight questions were associated with nine constructs of TQM implementation where as twenty items were used for the TQM impact.

2. Questionnaire Modification

The questionnaire first was drafted in English and translated into Nepali. While converting in to Nepali some of the technical words has been kept same in English because there was no proper word to explain and these words are popular to the Nepalese people employed in field of quality. The translated questionnaire was sent for review to the five quality experts who have spent many years in quality field. The main purpose of sending this questionnaire is to measure the content validity of the research. They were asked whether 1) statement are clear and simple to understand, 2) statement are accurate to assess the knowledge of the subjects, 3) statements covers the relevant content on TQM implementation and impact, 4) The instructions given are clear and simple to understand, 5) Statements covers all practical aspect of TQM, 6) The contents of Tools are organized in a systematically, 7) The time required to read and respond to tool is adequate. 8) The tool is self explanatory, 9) satisfaction of the following criteria: objectivity, relevancy, specificity, discrimination, validity, reliability and practicability. According to suggestion given by the experts some alternation had done. After modification the modified questionnaire was again tested to five people from the industries engaged in quality field. Their suggestion again incorporated in to the final questionnaire. In final questionnaire there were 68 items under TQM implementation and 20 item under TQM impact. The final questionnaire is attached in the appendix.

3. Contacting Relevant Persons

Between October 2014 and February 2015, the researcher conducted data collection. The researcher contacted the people working in the different industries as a consultant of quality management, peoples of Federation of Nepalese Chambers of Commerce and Industry (FNCCI) and Industry Development Management Limited (IDM). The main aim for contacting these people was to make strategy to collect the data and to discuss the process of sending the questionnaire to the esteemed respondents.

4. Survey Samples

There are 668 industries in ten industrial areas which are in operation. Besides the industrial area there are different industries which are outside the industrial area too. This research is the study of TQM implementation and impact so the sample should be the industry which has implemented TQM or the part of TQM. So the researcher has selected the sample industries which meets the information required for research. For the selection procedure the help of FNCCI, IDM and quality professionals were taken. It was assumed that the selected industries represent the whole manufacturing industries of Nepal, who has implemented TQM as a whole or in a part. Therefore the result can be generalized to all industries of Nepal involved in TQM. On the basis of judgment 100 industries were selected for this purpose. The reason behind this is that there is no such database which indicates that the industries actually applying the TQM or not. So the Judgmental sampling technique was applied with the help of different IDM's, FNCCI branches and quality professionals. The Industries which was selected were from four groups, they are:

- i) Food and Beverage
- ii) Construction materials industries
- iii) Pharmaceuticals industries
- iv) Plastic and Polymers Industries

The researcher has visited the different IDM's office and requested them to help researcher for the collection of the information. The IDM officer has provided a letter to the industries for the support to the research. Similarly the quality professionals and FNCCI people helped to requesting the respondent to fill the questionnaire form. The questionnaire along with the IDM office letter and the cover letter drafted by the researcher has distributed to the quality manager or the Top management of these organizations. The cover letter describes the aim of the questionnaire survey and the information for the responses which can be done either of online or

through filled in the computer and send it back to the researcher through internet and mails. All these format was made available in researchers own website. After long chasing with the targeted industry, sample 80 industries have made responses. So the response rate for this research became 80%. The research questions were first targeted to fill-up by the quality management department of the sampled industries. Since the all the industries has not formed the independent quality management department the responsible person for this or the top management were requested to fill the questionnaire. Since the top management and the responsible person for quality management were very busy with their professional daily work, they did not find much time to fill the questionnaire, so the continuous chasing gives the above response rate in the research.

4.4 Data Analysis

The first step in data analysis is to test the validity and reliability of the information collected. In evaluating the measurement instruments, reliability analysis and confirmatory factor analysis was applied. For testing the model hypothesized in this study IBM SPSS (Statistical Package for Social Sciences) 20 version with AMOS (Analysis of Moment Structure) 20 version was used.

Demographic situation of the respondent

The different demographic situation affects the research output. The variation in analysis can be obtained due to variation on the demographic condition of the study. The study of the nature of the respondent will be done under it. The existence of the response bias can be observed through different demographic variables. The demographic variable under this study are age, Gender, duration of involvement in the company, the duration of in the current post, and numbers of employee in the company.

Descriptive statistics of the constructs

Descriptive statistics measures the characteristics of the individual variables. Mean, standard deviation, variation, skewness and kurtosis are the four different characteristics of the descriptive statistics. The descriptive statistics are very much important for the further analysis of the different constructs. The descriptive statistics of TQM implementation and TQM impact construct were identified in this study.

4.5 Validity and Reliability

Measurement is the process of observing and recording the observations that are collected as a part of a research effort. The observed data should verify the reliability of measurement and verify the true score theory which is done through the measurement of Reliability, Item analysis and validity of the observed data.

4.5.1 Reliability

The measurement scale which is used for measurement of constructs must produce results that are repeatable and therefore trustworthy. If the same measurement instrument is applied on the same individual on a number of occasions, the result would closely agree. C.R. Kothari (1990) has defined reliability as the condition where measurement scale provides consistent result. Reliability of a survey item is the degree to which repeated measures will yield similar responses (Subedi, 2010). The reliability of a test suffers to the consistency of score obtained of the some item / individual on different occasions or with different sets of equivalent (Pradhan, Khatiwadi, & Poudel, 2014). The internal consistency is measured by calculating a statistics known as Cronbach's alpha. The coefficient alpha measures internal consistency reliability among a group of items combined to form a single scale. Generally, reliability coefficients of 0.70 or more are considered good.

Item Analysis

Nunnally (1967) developed a method of evaluating the assignment of items to scales that considers the correlation of each item with each scales. Specifically, the item-score to scale-score correlation are used to determine whether an item belongs to the scale assigned, to some other scales, or should be eliminated. The scale-score is obtained by computing by the correlation between each item with the average score of the all the items in the same construct. The correlation having value more than 0.5 is considered as good measure.

Validity

Validity indicates the degree to which an instrument measures that it is supposed to measures (Kothari, 1990). Validity is concerned with the question of whether researchers are measuring what they think and what they are measuring. Interpretation of measurement scores ultimately involves predictions about a subject's behavior in a specified situation. If the measurement is an accurate predictor, it is said to have good validity. Researchers have recognize three main types of validity, they are: i) Content validity ii) Construct validity iii) Criterion-related validity (Panta, 2009). Content validity and construct validity were applied in this study.

Content Validity

Content validity is the representativeness or adequacy of the item selected of the content of the measuring instrument. Content Validity is also known as logical validity. However it provides a logical base for the instruments validity which should go through a rigorous assessment of instruments. In this research the nine TQM implementation constructs and four TQM impact construct were operationalized after extensive review of literature and the instrument were evaluated by academicians and practitioners. The detail process and the references taken in this process is exhibited on subsection 4.3 under questionnaire survey.

Construct Validity

Construct validity refers to whether a scale measures the unobservable social construct that it claims to measure. It is the validity, most complex and abstract because of the complexity of the social parameter. A scale is said to possess construct validity to the degree that it confirms to predicted association with other theoretical postulates. The essence of construct validity is its dependence on theory and the examination of observed association is a test of theory as valid scale. Construct validity can be evaluated by statistical methods that show whether or not a common factor can be shown to exist underlying several measurements using different observable indicators. For determining construct validity, we associate a set of other proposition with the result received from the use of our measuring instrument. If measurements on our devised scale correlated (associated) in a predicted way with the other propositions, we can conclude that there is construct validity (Pradhan et. al. 2014). Factor analysis is a statistical tools which analyze the interrelationship among the items and then explains the underlying dimension (factors) of each of the items. There are two form of factor analysis: i) exploratory factor analysis and ii) confirmatory factor analysis.

Confirmatory factor analysis (CFA) enables us to test how well the measured items represent the constructs. The key advantage is that the researcher can analytically test a conceptually grounded theory explaining how different measured items represent important psychological, social and business measures (Hair et. al., 2009). In this study two constructs TQM implementation and TQM impact were developed with 68 items for TQM implementation and 16 items for TQM impact. These instruments were made based on the different review and researches (theories and empirical study), so it is appropriate to use confirmatory factor analysis. Amos 20.0 is used to measure the CFA. Amos 20 provides different methods for estimating structural models. Among them are maximum likelihood (ML), Generalized least square (GLS), Un-weighted least square (UWLS), Scale free least square (SFLS), Asymptotically distribution free (ADF). After the discussion

of the research guide prof. Dr. Hemant Kothari, ML estimates were used since it is efficient estimator (because it produces most reliable estimates).

4.6 Model check and hypothesis testing

The fitted models were tested on the basis of path analysis. Path diagram were drawn in AMOS 20. The models fitted were tested using regression coefficient determined using maximum likelihood estimation. The model fit were tested using normed chi square (χ^2/df) i.e. χ^2 divided by degree freedom (because χ^2 is sensitive to the sample size). The value of normed chi square value less than 2 indicates the good model fit. (Hair et. al. 2009). In the base line comparison incremental fit index (IFI) proposed by Bollen (1989), Tucker Lewis Index (TLI) Proposed by Tucker and Lewis (1973) and comparative fit index (CFI) proposed by Bentler(1990) are widely used relative improvement in fit to the model. So these fit indices were used in the model test. These values more than 0.9 is the indication of good fit model. In the same way most used tool Root mean square error approximation (RMSEA) which is not affected by sample size is used to test the model fit. The values of RMSEA less than 0.08 represent the reasonable error present in the population where as less than 0.05 is more reliable. So in this study common measures of goodness of used were normed chi square (χ^2/df), IFI, TLI, CFI and RMSEA. The stated hypothesis were tested using the MLE regression estimator. The validation of the regression coefficients were done by t-values or p-values. The following decision rule (thumb rule) is used to test the hypothesis: If the p-value is less than 0.1, the hypothesis is rejected, and if p-value lies between 0.05 to 0.1 then hypothesis will be weakly accepted, when p value lies between 0.01 to 0.05 then the hypothesis will be moderately accepted and if the value is smaller than 0.001 then the hypothesis will be strongly accepted.

4.7 Summary

This chapter includes the process of data collection and analysis. The different qualitative and quantitative strategy was adopted in this study: literature survey, questionnaire survey and structured interviews. The detail process of conducting literature survey, questionnaire survey and structured interviews along with the sample size and its justification were described. In the same way the process of validity and reliability were also described. There is great support of the IDM, FNCCI, ISO consultants and different quality professionals, which makes the successful and commendable data collection. The chapter also describes the process, method and techniques for data analysis too.

Chapter five
Results and Analysis

INDEX

S.N.	PARTICULARS	PAGE NO.
	INDEX	91
5.1	INTRODUCTION	92
5.2	RESPONSE RATE AND NON RESPONSE BIAS	93
5.3	DEMOGRAPHIC CHARACTERISTICS OF RESPONDENT	93
5.4	DESCRIPTIVE STATISTICS OF IMPLIMENTAITON CONSTRUCTS	96
5.5	RELIABILITY AND ITEM ANALYSIS	102
5.6	VALIDITY OF MEASUREMENT	106
5.7	MODEL FIT AND HYPOTHESIS TESTING	118
5.8	SUMMARY	124

Chapter five

Results and Analysis

5.1 Introduction

This chapter shows the result of this study. The response rate of the research with non-response bias was discussed. The analysis of demographic characteristics of the respondent was explored in this chapter. Descriptive statistics of each of the items or scales are exhibited in the subsection of this chapter. The reliability and item analysis confirmatory factor analysis of each constructs was explored. At last the path analysis was used to test the hypothesis stated.

5.2 Response rate and Non-response Bias

In this study, 110 questionnaires were returned out of 150 questionnaires distributed. So here the response rate is 73.33% of the proposed sample. Among the returned questionnaire 7 responses were discarded because 4 of them has partially answered (some of the answers or some demographic variables were left) and 3 of them were response bias (same answer to each of the likert scale). Therefore the final response rate becomes 68.66%. Since the demographic variable of the non-responded respondent is not available, the direct bias test cannot be used. Therefore in this study, the time of data collection were used to tap the non response bias. The three demographic variables (age, experience and post) are taken for this analysis. First 20 responses who has responded earlier and last 20 responded were selected for the analysis of the response bias, the following table shows the response bias.

Table 5.1 Response bias analysis

Demographic Characteristics	Anova (first 20 and last 20)	
	F	Significance
Age	.795	.505
Experience	1.022	.409
Post	.477	.700

Source: Sample Survey 2014

The table above shows that there is no significance bias of the non response due to the early and late responses. Thus it has been concluded that the responses are not significantly differ than the non response. So, non response bias is not present in this study.

5.3 Demographic Characteristics of Respondent

This section describes the demographic characteristics of the respondents. Age, Gender, , experience in industry, post and experience in the post of the respondents are shown below.

Gender

Table above shows that majority of the respondents were male 82 (79.6%). The ratio of male to female is approximately 8:2. It shows that executives and quality field female are not involved in the industrial sectors of Nepal.

Age

Majority of the respondents were in the productive age group 25-45 (70.9%). 17.5% of the respondents were from the age group above 45. The mean age of the respondent was identifies as 40.32 years with standard deviation of 10.5 years. The data indicates that the majority of the respondents are from adult group.

Table 5.2 Demographic Characteristics of Respondents

Variables	Categories	Count	%
Gender of the respondent	Male	82	79.6%
	Female	21	20.4%
	Total	103	100.0%
Age of Respondent	below 25	3	2.9%
	25-35	36	35.0%
	35-45	37	35.9%
	45-55	18	17.5%
	above 55	9	8.7%
	Total	103	100.0%
Number of employee	below 25	3	2.9%
	25-50	7	6.8%
	50-100	27	25.2%
	100-200	15	14.6%
	200-500	45	43.7%
	above 500	7	6.8%
	Total	103	100.0%
When you started you job	below 5 years	14	13.6%
	5-10	33	32.0%
	10-15	25	24.3%
	15-20	22	21.4%
	above 20	9	8.7%
	Total	103	100.0%
Position of Respondent	Executive	25	24.3%
	Manager	34	33.0%
	QC Officer	32	31.1%
	Technician	12	11.7%
	Total	103	100.0%
When you are in this position	below 5 years	46	44.7%
	5-10	37	35.9%
	10-15	11	10.7%
	15-20	9	8.7%
	Total	103	100.0%

Source: Sample Survey 2014

Number of employee

Next demographic variable of the industry is number of employee involved in the industry. Majority of the industries have number of employee 200-500. The number of industries which has 200-500 employees was 45(43.7%). In the same way 25.2% of the industries under study had 50-100 employees in their respective industries. The average number of employee per industry is 259.28 with standard deviation of 264.52. Here the data reveals that there is more variation in the number of employee.

Involvement in organization

Most of the respondent had remained in the organization since 5 to 10 years and their percentage is 32.0%, and the second largest category of years of involvement in the organization is 10 to 15 years it's percentage is 24.3. The average numbers of years involved by the respondent in the organization is 12.35 years with standard deviation of 6 years.

Position

Majority of the respondent 34(33%) are Managers and the second major position is QC officer whose number and percentage are 32 and 31.1%.

Duration of the involvement

Most of the respondents are involved in their respective post below 5 years and its number and percentage are 46 and 44.7%. And the second highest year of involvement in the recent post were 5 to 10 years and its number and percentage are 37 and 35.9%. There is no one person who was involved in the same post since 20 years. The average duration holding in the current post by the respondent is 7.58 years with standard deviation of 4.9 years

5.4 Descriptive Statistics of Constructs

There were nine constructs of TQM implementation and four constructs of TQM impact. Each constructs were constructed using different items. 5-point likert scale. The nature of distribution (normality) affects the analysis and estimation. So descriptive statistics (mean, SD, variance, skewness and kurtosis) of these constructs were measured and described below.

Descriptive statistics of TQM Implementation

There were 9 constructs of TQM implementation and for each construct scale has created with different items.

Top management commitment

The first construct of the TQM implementation is Top management commitment. There were 9 items under this constructs. 5-point likert scale was implemented under each item. The descriptive statistics of this construct is presented below. The table below shows that the mean of each 9 items were ranged from 4.06(\pm .698) to 4.39 (\pm 0.490). All the mean score is higher than the central point of the score 3. The table below shows the normality of the distribution of items under the scale top management commitment, since its skewness and kurtosis value is less than \pm 2.

Table 5.3 Descriptive statistics of Top Management Constructs

Items	N	Mean	St. Dev.	Variance	Skewness	Kurtosis
Leadership 1	103	4.39	.490	.240	.465	-1.820
Leadership 2	103	4.29	.620	.385	-.287	-.616
Leadership 3	103	4.25	.724	.524	-.425	-.990
Leadership 4	103	4.14	.715	.511	-.205	-1.007
Leadership 5	103	4.13	.696	.484	-.175	-.904
Leadership 6	103	4.13	.737	.543	-.354	-.590
Leadership 7	103	4.06	.698	.487	-.256	-.325
Leadership 8	103	4.15	.746	.557	-.388	-.640
Leadership 9	103	4.30	.654	.428	-.401	-.711

Source: Sample Survey 2014

Policy Deployment

The second construct of the TQM implementation is policy deployment and there were also 9 items under this constructs like in top management commitment. The descriptive statistics of this construct is presented below. The table below shows that the mean, standard deviation, variance, skewness and kurtosis of each 9 items. The average value were ranged from 3.96 (± 0.699) to 4.24 (± 0.664). All the mean score is higher than the central point of the score 3. The table below shows the normality of the distribution of items under the scale policy deployment. And here also skewness and kurtosis value is less than ± 2 .

Table 5.4 Descriptive statistics of Policy Deployment

Items	N	Mean	St. Dev.	Variance	Skewness	Kurtosis
Policy 1	103	4.24	.664	.441	-.314	-.750
Policy 2	103	4.06	.712	.506	-.085	-.996
Policy 3	103	4.13	.737	.543	-.204	-1.120
Policy 4	103	4.16	.764	.583	-.272	-1.232
Policy 5	103	4.11	.625	.390	-.077	-.426
Policy 6	103	4.08	.710	.504	-.112	-.984
Policy 7	103	3.96	.699	.489	.053	-.921
Policy 8	103	4.00	.714	.510	.000	-1.010
Policy 9	103	4.07	.731	.535	-.106	-1.103

Source: Sample Survey 2014

Supplier empowerment and relationship

The next construct of the TQM implementation is supplier empowerment and relation and there were only 5 items under this constructs like in top management commitment. The descriptive statistics of this construct is presented below. The table below shows that the mean, standard deviation, variance, skewness and kurtosis of each 5 items. The average value were ranged from 4.25(± 0.653) to 4.50 (± 0.670). Although the skeness and kurtosis values are showing negative, the values obtained are not beyond the limit of ± 2 . So the distribution of the items under the construct supplier empowerment and relationship is normal.

Table 5.5 Descriptive statistics of supplier empowerment and relationship

Items	N	Mean	St. Dev.	Variance	Skewness	Kurtosis
Supplier 1	103	4.45	.668	.446	-.809	-.446
Supplier 2	103	4.50	.670	.449	-.981	-.203
Supplier 3	103	4.47	.698	.487	-.937	-.378
Supplier 4	103	4.26	.656	.431	-.332	-.721
Supplier 5	103	4.25	.653	.426	-.308	-.705

Source: Sample Survey 2014

Process control and improvement

Process control and improvement is the next construct of the TQM implementation where it has 10 items. The descriptive statistics of this construct is presented below. The table below shows that the mean, standard deviation, variance, skewness and kurtosis of each 10 items. The average value were ranged from 4.16(\pm .826) to 4.36 (\pm 0.655). In this constructs also the value of skewness and kurtosis is under limit \pm 2 indicates the normality of the distribution.

Table 5.6 Descriptive statistics of process control and improvement

Items	N	Mean	St. Dev.	Variance	Skewness	Kurtosis
Process control 1	103	4.16	.826	.682	-.298	-1.472
Process control 2	103	4.32	.782	.612	-.635	-1.080
Process control 3	103	4.24	.785	.617	-.460	-1.232
Process control 4	103	4.36	.655	.429	-.530	-.665
Process control 5	103	4.21	.621	.385	-.175	-.527
Process control 6	103	4.31	.642	.412	-.389	-.676
Process control 7	103	4.20	.746	.556	-.351	-1.121
Process control 8	103	4.30	.654	.428	-.401	-.711
Process control 9	103	4.29	.788	.620	-.570	-1.158
Process control 10	103	4.27	.730	.533	-.473	-.993

Source: Sample Survey 2014

Evaluation and Assessment

After Process control and improvement next higher item construct is Evaluation and Assessment which has 10 items. The descriptive statistics of this construct is presented below. The table below shows that the mean, standard deviation, variance, skewness and kurtosis of each 10 items. The average value were ranged from 3.85(\pm .746) to 4.24 (\pm 0.634). This is the construct which is comparatively low scored by the respondents. The distribution of the scores are also normal as in earlier case.

Table 5.7 Descriptive statistics of Evaluation and Assessment

Items	N	Mean	Std. Dev.	Variance	Skewness	Kurtosis
Evaluation 1	103	4.01	.634	.402	-.008	-.452
Evaluation 2	103	4.24	.551	.303	.060	-.294
Evaluation 3	103	4.02	.577	.333	.001	.091
Evaluation 4	103	4.01	.693	.480	-.013	-.882
Evaluation 5	103	3.86	.701	.491	.194	-.933
Evaluation 6	103	3.85	.746	.557	.244	-1.159
Evaluation 7	103	3.98	.714	.509	.028	-1.008
Evaluation 8	103	3.95	.784	.615	.086	-1.362
Evaluation 9	103	3.96	.862	.744	.076	-1.660
Evauation 10	103	3.94	.765	.585	.099	-1.272

Source: Sample Survey 2014

Employee involvement and empowerment

The descriptive statistics of this construct is presented below.

Table 5.8 Descriptive statistics of Employee involvement and empowerment

Items	N	Mean	Std. Dev.	Variance	Skewness	Kurtosis
Employee 1	103	4.19	.687	.472	-.271	-.857
Employee 2	103	4.17	.678	.459	-.228	-.809
Employee 3	103	4.22	.699	.489	-.338	-.909
Employee 4	103	4.28	.720	.518	-.481	-.943
Employee 5	103	4.13	.637	.405	-.111	-.531
Employee 6	103	4.22	.641	.410	-.235	-.637
Employee 7	103	4.35	.750	.563	-.677	-.913

Source: Sample Survey 2014

The table above shows that the mean, standard deviation, variance, skewness and kurtosis of each 7 items. The mean score were ranged from 4.13(\pm .637) to 4.35 (\pm 0.750). The skewness and kurtosis of each of the items are below the \pm 1, although the limit is \pm 2. So we can say the constructs of Employee involvement and empowerment is normal.

Research and Development

Research and Development is the next construct of the TQM implementation where 6 items were used. The descriptive statistics of this construct is presented below. The table below exhibits the mean, standard deviation, variance, skewness and kurtosis of each 6 items. The mean score were ranged from 4.10(\pm .811) to 4.29 (\pm 0.788). The distribution of the items are normal as skewness and kurtosis values are less than \pm 2.

Table 5.9 Descriptive statistics of Research and Development

Items	N	Mean	Std. Dev.	Variance	Skewness	Kurtosis
R & D 1	103	4.29	.788	.620	-.570	-1.158
R & D 2	103	4.30	.654	.428	-.401	-.711
R & D 3	103	4.10	.811	.657	-.180	-1.455
R & D 4	103	4.31	.642	.412	-.389	-.676
R & D 5	103	4.20	.746	.556	-.351	-1.121
R & D 6	103	4.23	.703	.494	-.361	-.921

Source: Sample Survey 2014

Customer Relationship

Customer relationship is another prominent construct of the TQM implementation where the research adopted 7 items under this constructs. The descriptive statistics of this construct is exhibited below. The mean score of this scale were ranged from 4.10(\pm .811) to 4.25 (\pm 0.682). Similarly the skewness and kurtosis values are below the normal range. So the distributions of observation under these items were normal under the construct customer relationship.

Table 5.10 Descriptive statistics of Customer Relationship

Items	N	Mean	St. Dev.	Variance	Skewness	Kurtosis
Customer relation 1	103	4.25	.682	.465	-.365	-.824
Customer relation 2	103	4.23	.703	.494	-.361	-.921
Customer relation 3	103	4.10	.811	.657	-.180	-1.455
Customer relation 4	103	4.16	.724	.525	-.245	-1.051
Customer relation 5	103	4.25	.724	.524	-.425	-.990
Customer relation 6	103	4.17	.612	.374	-.104	-.402
Customer relation 7	103	4.19	.780	.609	-.356	-1.269

Source: Sample Survey 2014

Education and Training

The last construct of TQM implementation is Education and training which has five items for measurement. Mean, standard deviation, variance, skewness and kurtosis are measured and exhibited in the table below. The mean score of this scale were ranged from 3.88(\pm .770) to 4.04 (\pm 0.743).

Table 5.11 Descriptive statistics of Education and training

Items	N	Mean	Std. Dev.	Variance	Skewness	Kurtosis
Education 1	103	4.06	.765	.585	-.099	-1.272
Education 2	103	4.01	.734	.539	-.015	-1.123
Education 3	103	4.06	.712	.506	-.085	-.996
Education 4	103	4.08	.723	.523	-.118	-1.061
Education 5	103	3.98	.741	.549	.031	-1.157

Source: Sample Survey 2014

Descriptive statistics of TQM Impact

This research included four impact constructs namely employee satisfaction, product quality, customer satisfaction and business result. Of these employees satisfaction has only one measurement items where the customer satisfaction is measured using two items. The constructs business result has three constructs and product quality has ten items. The mean, standard deviation, variance, skewness and kurtosis are shown in the table below. Mean value of employee satisfaction is 8.39 (\pm 1.174), where 10 point

scale was used. The mean value is more greater than its central value 5. Under the construct product quality the average value is ranges between 3.84 (± 0.724) to 4.23 (± 0.675). Two item were used in customer satisfaction and its average value is 8.56 (± 1.073) and 8.58 (± 1.015). It indicates that the satisfaction level of both employee and customer are in good condition in Nepalese industrial area. In the same way the average business performance are 3.82, 3.74 and 3.35 with their respective standard deviation .556, .559 and .837. In case of Normality, all four constructs of TQM impact were normal as all the skewness and kurtosis values are lies between ± 2 .

Table 5.12 Descriptive statistics of Product Quality

Items	N	Mean	St. Dev.	Variance	Skewness	Kurtosis
Employee Satis	103	8.39	1.174	1.377	-.407	-.407
Product Quality 1	103	4.23	.675	.455	-.797	-.909
Product Quality 2	103	4.20	.691	.478	-.877	-.943
Product Quality 3	103	4.10	.707	.500	-.970	-1.116
Product Quality 4	103	4.00	.714	.510	-1.010	-1.113
Product Quality 5	103	4.05	.691	.478	-.873	-.966
Product Quality 6	103	3.98	.626	.392	-.385	-.627
Product Quality 7	103	4.00	.642	.412	-.515	-.785
Product Quality 8	103	3.93	.675	.456	-.772	-.854
Product Quality 9	103	3.93	.675	.456	-.772	-1.080
Product Quality 10	103	3.84	.724	.525	-1.051	-1.039
Customer Satis 1	103	8.58	1.015	1.030	.281	-1.281
Customer Satis 2	103	8.56	1.073	1.150	-.164	-.600
Performance 1	103	3.82	.556	.309	-.062	-.446
Performance 2	103	3.74	.559	.313	-.403	-.460
Performance 3	103	3.35	.837	.700	1.147	.695

Source: Sample Survey 2014

5.5 Reliability and Item analysis

Reliability of TQM Implementation

There were 9 constructs of TQM implementation and for each construct scale has created with different items (see appendix 1 and 2). Then reliability measures were performed for items of each scale. The table 5.1 shows the cronbatch's alpha for different TQM implementation scales. This

table shows that the scales which were constructed are reliable ones, except in case of research and development construct whose value is less than the cutoff range. As we know that, reliability coefficients of 0.70 or more are considered good.

Table 5.13 Reliability Analysis of TQM implementation

SN	Scales	Number of items	Cronbatch's alpha
1	Top Management Commitment and involvement	9	0.874
2	Policy Deployment	9	0.842
3	Suppliers' empowerment and relationship	5	0.80
4	Process Control and improvement	10	0.795
5	Evaluation and Assessment	10	0.885
6	Employee Empowerment and Involvement	7	0.817
7	Research and Development	6	0.619
8	Customer Relationship	7	0.771
9	Training and Education	5	0.805
		68	

Source: Sample Survey 2014

Item Analysis of TQM implementation

Table 5.14 elaborates the correlation of the nine scales of measurement with their corresponding measurement scales. The corresponding measurement scales were the average of each constructs. The table shows that all values of item to scale correlation were greater than 0.50 except one item in the top management commitment and involvement. These correlations are significant on both 0.5 and 0.01 level. Since all the items were highly correlated with the measurement scale, it is concluded that all the items has been appropriately assigned into the scale. The complete correlation matrix is presented in appendix 4.

Table 5.14 : Item to scale correlation matrix (pearson's correlations)

	Item numbers									
	1	2	3	4	5	6	7	8	9	10
Scales										
Top Management Commitment and involvement	.408**	.671**	.746**	.723**	.736**	.729**	.749**	.781**	.745**	--
Policy Deployment	.647**	.662**	.720**	.684**	.710**	.577**	.671**	.702**	.617**	--
Suppliers' empowerment and relationship	.716**	.739**	.805**	.726**	.681**	--	--	--	--	--
Process Control and improvement	.616**	.593**	.644**	.648**	.566**	.566**	.653**	.537**	.584**	.534**
Evaluation and Assessment	.627**	.743**	.757**	.798**	.664**	.647**	.633**	.725**	.773**	.697**
Employee Empowerment and Involvement	.676**	.778**	.758**	.657**	.660**	.667**	.642**	--	--	--
Research and Development	.608**	.571**	.632**	.585**	.585**	.543**	--	--	--	--
Customer Relationship	.640**	.657**	.710**	.629**	.619**	.767**	.555**	--	--	--
Training and Education	.754**	.722**	.725**	.795**	.752**	--	--	--	--	--

Source: Sample Survey , 2014

Reliability and item analysis of TQM Impact

In this study, the four constructs of TQM impact were used. They were Employee Satisfaction, Product Quality, Customer Satisfaction and Business Performance. These constructs were measured by one, ten, two and four items respectively. The details of the construct are exhibited in appendix 1 and 2. The internal consistency analysis and item analysis are presented below.

Employee Satisfaction

Since only one item is used to measure the employee satisfaction, it is not necessary to conduct internal consistency analysis, item analysis, and factor analysis for this scale. It is assumed that it is the reliable and valid scale for employee satisfaction. The detail explanation is in chapter 3 under operationalization in subsection 3.5.2.

Product Quality

The cronbach alpha for the construct product quality is 0.827 which is greater than 0.70 (exhibited in the table 5.15) which indicates that the scale is reliable. Similarly the coefficients of items to scale correlation were greater than 0.5, which indicates that the items have been assigned to the scale appropriately.

Customer Satisfaction

Two items were used to tap the customer satisfaction and the table 5.15 shows that the cronbach alpha is 0.912 which indicate that the scale is reliable. The same table shows the correlation of items to the scales were greater than 0.5, which indicates that both items were selected appropriately.

Business Performance

The table 5.3 below shows that the measurement cronbach alpha and correlation of items for business performance. The cronbach alpha 0.690 (<0.70) indicates that the scale shows little problem in construct. However no any items were deleted because the all the correlation with scales were greater than 0.5 and were significant in both 0.05 and 0.01 level of significance.

Table 5.15 Reliability and item analysis of TQM Impact

	Scale 1 (PQ)	Scale 2 (CS)	Scale 3 (BP)
Items	10	2	3
CA	.827	.912	.690
Item1	.632**	.957**	.782**
Item2	.699**	.961**	.772**
Item3	.641**	--	.804**
Item4	.550**	--	--
Item5	.610**	--	--
Item6	.618**	--	--
Item7	.594**	--	--
Item8	.625**	--	--
Item9	.619**	--	--
Item10	.667**	--	--

Note: CA indicates Cronbach's alpha.

Source: Sample Survey 2014

5.5 Validity

In this study content validity and construct validity were used to measure the validity of the instruments used.

Content Validity

In this research the nine TQM implementation constructs and four TQM impact construct were operationalized after extensive review of literature and the instrument were evaluated by academicians and

practitioners. The detail process and the references taken in this process is exhibited on the research methodology chapter under the process of developing questionnaire and survey instruments. The researcher has assumed that the constructs which are used in this research has content validity.

Construct Validity

In this study two constructs TQM implementation and TQM impact were developed with 68 items for TQM implementation and 20 items for TQM impact. These instruments were made based on the different review and researches (theories and empirical study), so the loadings of the items on the constructs should be checked. So, confirmatory factor analysis is appropriate for testing the construct validity in this research. For this purpose path diagram was constructed and factor loading was tested in AMOS 20 using different absolute, incremental and parsimonious fit indices.

Confirmatory Factor Analysis

The nine constructs of TQM implementation and three constructs of TQM impact have more than one constructs. So the test of unidimensionality is required on the basis of the data gathered. Modification of the construct had done if it the analysis showed any requirements.

Amos 20 provides different methods for estimating structural models. Among them are maximum likelihood (ML), Generalized least square (GLS), Un-weighted least square (UWLS), Scale free least square (SFLS), Asymptotically distribution free (ADF). After the discussion of the research guide prof. Dr. Hemant Kothari, ML estimates were used since it is efficient estimator (because it produces most reliable estimates). In model fit it is tested whether the model fits the data. Different parameters were used to test the overall model fit. The common measures to judge the goodness of fit chi square (χ^2/df), IFI, TLI CFI and RMSEA are selected for this study.

Table 5.16 CFA of Top Management Commitment and involvement

Item	Description	Initial	Final		
		MLE	MLE	Load	
1	Top Management vigorously participates in the quality management programs.	0.33			
2	Top Management communicates the company's philosophy to the employees.	0.61			
3	Top Management strongly encourages employee involvement in quality management and improvement activities.	0.68	0.62	0.11	
4	Top management learns quality related concepts and skills.	0.65			
5	Top management arranges enough resources for education and training.	0.70	0.70	0.15	
6	Top management focuses on product quality rather than yields.	0.69	0.68	0.13	
7	Communication and links are established between employee and top management.	0.72	0.75	0.19	
8	Top management permits employees to solve quality problems.	0.77	0.82	0.27	
9	Top management quality audit is regular in our company	0.72	0.73	0.19	
Obtained Fit Indices					
	χ^2/df	RMSEA	IFI	TLI	CFI
Initial	(56.309/27) = 2.086	0.103	.919	.890	.917
Final	(16.236/9) = 1.804	.089	.971	.951	.971

Of these nine items, item 1 was showing very low MLE (0.33) and items 2 and 4 were showing comparatively low MLE. Top management's communication skill and their knowledge is questionable mark during this study. Where the factor weights for these three items were respectively .05, .10 and .10 which is comparatively low than other factor loading. Although these items are important in this construct, were deleted for getting overall measurement fit. Although the modified measure gave a speck more RMSEA other indices are reasonably good. So the construct Top management commitment and involvement retains only six items.

Table 5.17 CFA of Policy Deployment

Item	Description	Initial	Final		
		MLE	MLE	Load	
1	Our company has a clear long-term vision statement.	0.58	0.57	.09	
2	The vision effectively encourages employees' commitment to quality management.	0.61	0.60	.09	
3	Our company has a clear short term business performance plan.	0.68	0.71	.13	
4	Our company has a clear quality policy.	0.65	0.71	.12	
5	Our company has a detailed quality goal.	0.68	0.67	.13	
6	Our company has effective quality improvement plans.	0.50			
7	Various policies and plans are well communicated to the employees.	0.61	0.57	.08	
8	Employees from different levels are involved in making policies and plans.	0.64	0.61	.09	
9	The concept PDCA is used while making policy	0.54			
Obtained Fit Indices					
	χ^2/df	RMSEA	IFI	TLI	CFI
Initial	(52.04/27) = 1.927	.095	.908	.873	.905
Final	(22.283/14) = 1.592	.076	.959	.937	.958

Of these nine items, item 6 and 9 had low MLE as compare to others. It indicates that the selected companies are weak in planning phase and the use of PDCA cycle to make the plan & policies. The factor weights for these two items were respectively low (0.059 and 0.068). After deleting these two items the construct gave the very well fit indices values (sound over the acceptable level). Researcher supposed that the deletion of these two item in the policy deployment and measure with seven items remains does not violate the content validity of the measurement.

Table 5.18 CFA of supplier's empowerment

Item	Description	Initial MLE	Final MLE	Initial Load	
1	Our company regards product quality as the most important factor in selecting suppliers	0.64	0.63	.10	
2	Suppliers are selected on the basis of quality aspect.	0.76	0.75	.17	
3	Company works closely with suppliers towards long term partnership and improvement	0.78	0.82	.18	
4	Our company has detailed information about suppliers' performance	0.62	0.59	.09	
5	Our company regularly conducts suppliers' quality audit	0.53		.07	
Obtained Fit Indices					
	χ^2/df	RMSEA	IFI	TLI	CFI
Initial	$(22.216/5) = 4.443$	0.184	.893	.779	.890
Final	$(11.01/2)=5.505$	0.210	.929	.78	.927

Five items were used to measure the suppliers empowerment and the analysis shows χ^2/df (4.43), which is more than the accepted limit. But the item analysis shows the correlation of each items with the aggregate score is more than 0.681 (see table no 5.14). After deleting item no. 5 although IFI (0.929), CFI (0.927) are good enough but other indices does not shows the goodness of fit. Observing the sensitivity of the question quality audit (item 5) researcher decided not to exclude the item from measurement, keeping in the mind it may shows the problem on content validity of the measurement.

All the five measures of suppliers empowerment originally constructed measure were taken for further analysis.

Table 5.19 CFA of Process control and improvement

Item	Description	Initial MLE	Final MLE	Initial Load	
1	There is a quality improvement coordinating body (quality steering committee)	.54		.06	
2	We have a clearly stated working instructions	.52		.06	
3	For internal operation we are using well-organized and perfect database	.59		.07	
4	Our company implement various inspections effectively in all levels (incoming, process and final product)	.62		.10	
5	The intend of evaluating employee performance is for improvement not for criticism	.52		0.7	
6	Our company has a well equipment and maintenance plan	.51		.07	
7	QC tools are widely used to solve the problems	.61		.08	
8	Statistical process control is widely used in our company	.47		.06	
9	PDCA cycle is used for improvement and process control	.49		.05	
10	Continuous quality improvement is an important goal of this company	.44		.05	
Obtained Fit Indices					
	χ^2/df	RMSEA	IFI	TLI	CFI
Initial	$(31.67/35) = 0.905$.000	1.019	1.026	1.000

Since all the fit indices shows the very good result of goodness of fit.

All the correlation value of correlation of each item in item analysis (see table no. 5.14), are also more than 0.5, which also indicates that the entire item are important for measuring the process control and improvement.

Table 5.21 CFA of Evaluation and Assessment

Item	Description	Initial	Final		
		MLE	MLE	Load	
1	Our company regularly audits various business strategies	0.58			
2	Our company regularly conducts quality audits	0.75	0.77	0.21	
3	Benchmarking is extensively used in our company	0.77	0.79	0.23	
4	Our company has detailed quality related data such as defects rates and scraps	0.79	0.77	0.17	
5	Quality related data are used to evaluate the management of our company	0.62	0.63	0.10	
6	Quality related data are used to evaluate the performance of all departments	0.56			
7	Quality related data are used to evaluate the performance of employees	0.55			
8	Quality related information is displayed at the shop floor.	0.69	0.70	0.11	
9	Customer satisfaction survey is regularly updated	0.71	0.68	0.09	
10	We have a measurement scale and perform regularly the employee satisfaction survey.	0.65	0.66	0.10	
Obtained Fit Indices					
	χ^2/df	RMSEA	IFI	TLI	CFI
Initial	(77.021/35) = 2.201	0.108	.905	.875	.902
Final	(24.008/14) = 1.721	0.084	.967	.950	.967

In initial output, out of ten items item number 6 and 7 have score weight less than or equals to .06 and the score is .075 for the item 1. The correlation of item 6,7 and 1 with average items were also comparatively low then the other items. So these items have less impact in the constructs. After deleting these constructs the fit indices had shown an improvement, although the RMSEA value is in boarder line. So the remaining seven items were taken for further analysis in the construct evaluation and assessment.

Table 5.21 CFA of Employee involvement & empowerment

Item	Description	Initial	Final		
		MLE	MLE	Load	
1	Our company has cross-functional teams or quality circles.	0.65	0.72	0.18	
2	Employees are actively involved in quality related activities	0.78	0.86	0.4	
3	Our company implements suggestions from employee extensively	0.72	0.65	0.14	
4	Employees are very committed to the success of our company	0.55			
5	Employees are encouraged to fix problems they find	0.56			
6	Reporting work problem is encouraged in our company	0.58	0.51	0.09	
7	Employees are taken as valuable resources and encouraged in every activity by top management.	0.54			
Obtained Fit Indices					
	χ^2/df	RMSEA	IFI	TLI	CFI
Initial	(49.347/14) = 3.255	0.157	.845	.759	.840
Final	(0.501/2) = .25	0.000	1.013	1.041	1.000

The construct employee involvement and empowerment initially has seven items. The initial analysis of correlation of items with its average score also has indicated that the item 4, 5 and 7 has low relationship. While the entire items were kept in CFA, it also has showed this factor has shown the relatively less preference. The factor score weights for these items 4, 5, and 7 were 0.078, 0.091 and 0.072. The scale should be modified, since all the initial fit indices were below the cutoff ranges. Since as stated in the theory most of the companies of Nepal are in capital intensive and are producing product in cost effective pattern and has given less emphasis on quality development of people. It may be the reason that these score has shown less inclination. So the items 4,5 and 7 were deleted for further analysis. The scale employee involvement and empowerment has only four items which gives the very fit indices.

Table 5.23 CFA of Research and Development

Item	Description	Initial	Final		
		MLE	MLE	Load	
1	The customer requirement are thoroughly considered through market feedback system	0.48	0.51	0.13	
2	Various department participate in product development process	0.50	0.56	0.19	
3	New product designs are thoroughly reviewed before production	0.43	0.32	0.07	
4	Our company finds product value superiority through performance and satisfaction survey.	0.51	0.49	0.15	
5	Experimental design is used extensively in product design process.	0.49	0.53	0.15	
6	Quality Function Deployment (QFD) is used extensively in product design.	0.36			
Obtained Fit Indices					
	χ^2/df	RMSEA	IFI	TLI	CFI
Initial	(28.150/9) = 3.128	0.144	.732	.494	.696
Final	(7.754/5) = 1.551	0.073	.940	.864	.932

Initially the number of item under research and development has six items. The Item analysis (table 5.14) reveals that the constructs 6 has relatively low degree of correlation. While keeping all the items in the CFA, each of the fit indices was below the cutoff range. The factors weight for item 6 was only .06 which is comparatively low with others. The literature also shows that the QFD practices are relatively low than the other tools of quality implementation in case of Nepal. After deleting item 6, CFA model gives the better result of goodness of fit. Except TLI (0.864) other values of fit indices gave the higher values than the cutoff value. So ultimately only five item were left for Research and Development constructs of TQM implementation.

Table 5.23 CFA of Customer Relation

Item	Description	Initial	Final		
		MLE	MLE	Load	
1	Our company collects extensive complaint information from customers.	0.57	0.70	0.18	
2	Quality-related customer complaints are treated with top priority.	0.57	0.67	0.15	
3	Our company conducts a customer satisfaction survey every year.	0.6	0.65	0.15	
4	Our company always conducts market research in order to collect suggestions for improving our products.	0.54			
5	Our company provides warranty on our sold products to customers.	0.56			
6	Our company has been customer focused for a long time.	0.77	0.58	0.13	
7	Our company has strong after sales service	0.45			
Obtained Fit Indices					
	χ^2/df	RMSEA	IFI	TLI	CFI
Initial	$(56.331/14) = .4024$	0.172	.777	.653	.769
Final	$(7.754/5) = 1.551$	0.073	.940	.864	.932

Originally there were seven items under customer relation. The correlation analysis of items from table 5.14 reveals that the items 4, 5 and 7 were less inclination towards the aggregate measure. The correlation values for these items were respectively 0.629, 0.619 and 0.555. The initial CFA measures also indicate the same items have relatively low value. It shows that the most of the companies does not focus on the after sales service as well the warranties and guarantee of the products which they produced. After deleting these items from the CFA, the remaining measures gave the good result in the fit indices. The fit indices with maximum likelihood estimate with factor score weight (load) is exhibited in the above table.

Table 5.24 CFA of Education and Training

Item	Description	Initial	Final		
		MLE	MLE	Load	
1	Employees are encouraged to accept education and training in our company	0.67	0.65	.16	
2	Resources are available for employee education and training in our company	0.59			
3	Most employees in our company are trained on how to used quality management methods and tools	0.62	0.65	.12	
4	Employees are regarded as valuable, long-term resources worthy of receiving education and training throughout their career	0.78	0.80	0.32	
5	Most employees in our plant are interested to attend quality seminar or training programs	0.70	0.74	0.24	
Obtained Fit Indices					
	χ^2/df	RMSEA	IFI	TLI	CFI
Initial	(13.206/5) = 2.641	0.127	.946	.888	.944
Final	(0.627/2) = 0.313	.000	1.012	1.039	1.000

Resources is the prime elements for education and training in any organization. The item 2 is the indication of management for the resources for training and education. The construct initially including all five items gave not satisfactory result on χ^2/df and RMSEA. Although the correlation table 5.14 shows the correlation with aggregate index is 0.722, it is the least correlation among the other items. In the CFA analysis also shows the relative lower value of MLE in the item 2. After deletion of the item 2, the model approaches to significant enhancement level lowering the value of χ^2 from 13.2 to 0.63. Similarly the other indices also gave the significantly better results. Since, the industries of Nepal are operating in cost effective pattern and the management and may restrict in the allocation of resources for conduction training and education programs. Therefore research think that the content validity will not affect the analysis by deleting item 2.

Table 5.25 CFA of Product Quality

Item	Description	Initial	Final		
		MLE	MLE	Load	
1	Performance of our primary product has increased	0.59	0.64	0.20	
2	The conformity rates of our primary products has increased	0.67	0.80	0.41	
3	The durability of our primary products has increased	0.58	0.63	0.19	
4	The reliability of our primary products has increased	0.47			
5	The cycle time of our product has decreased	0.55			
6	The defect rates of your primary products has decreased	0.56			
7	The frequency of rework has decreased	0.53			
8	The internal failure cost has decreased	0.57			
9	The external failure costs has decreased	0.57			
10	The customer complain of our product has decreased	0.60	0.44	0.10	
Obtained Fit Indices					
	χ^2/df	RMSEA	IFI	TLI	CFI
Initial	$(87.972/35) = 2.513$	0.122	.809	.746	.802
Final	$(0.511/2) = .256$	0.000	1.019	1.059	1.000

Ten items were used to measure the product quality. While putting all items in CFA the model was not satisfactory in all aspect of fit indices. The items 4 ,5, 6, 7, 8 ,9 had relatively low value of regression coefficient in CFA output. The correlation table (table no 5.15) also shows the relatively low bond of correlation in these items. So these items were deleted from the construct product quality. Performance, conformity and durability and complains of the product has been taken as the product quality. After deleting these item 4 ,5, 6, 7, 8 ,9 the tit indices has stunningly achieved the cutoff range of these fit indices. Maximum likelihood estimate with factor score weight (load) is exhibited in the above table.

5.6 Model Fit and Hypothesis testing

There were two theoretical models hypothesized in this study. In the first model, TQM implementation was independent variable (the value of which is calculated by summing the score of all of the 68 items) along with four dependent TQM impact variables (employee satisfaction, product quality, customer satisfaction and business performance). In the second model, All nine TQM implementation were independent variables and four TQM impact variables were dependent variables. Amos 20 was employed to test the fit of the model through the path analysis.

Model 1

To compare the reasonable fit between the empirical data with theoretical model, the conceptual model developed by reviewing literature and modified measurement model were compared with regression coefficients and model fit indices, which is describes below. The theoretical concept of model one integrates eight hypotheses which is to be tested simultaneously. A hypothesis is said to be satisfy with empirical evidence if the path coefficients are significant. The path coefficient is exhibited in the following figure and the coefficients with t-values (C.R.) and p-values were displayed in the following table. Out of the eight hypotheses stated three hypotheses were strongly satisfied, where as one hypothesis the employee satisfaction has positive impact on business performance is moderately satisfied. Two hypotheses were weakly satisfied and remaining two were not supported at all, since their C.R. values are respectively 0.58, 0.81. Table 5.27 below shows the χ^2/df value (0.005) , RMSEA(0.000) along with other fit indices shows the model fits very well in the observed data. All the hypothesis testing detail acceptance and rejection of the hypothesis is stated briefly in the table 5.29 below.

Figure 5.1: Testing the theoretical model 1



Table 25.6: Testing the theoretical model 1

Item	Regression description	Coeff.	C.R.	P-value	
1	TQM implementation → Employee Satisfaction	0.94	27.25	***	
2	TQM implementation → Product Quality	0.71	1.82	*	
3	TQM implementation → Customer Satisfaction	0.21	10.2	***	
4	Employee Satisfaction → Business Performance	0.47	2.09	**	
5	Employee Satisfaction → Customer Satisfaction	0.55	6.15	***	
6	Product Quality → Business Performance	0.56	0.58	.578	
7	Customer Satisfaction → Business Performance	0.53	1.61	*	
8	TQM implementation → Business Performance	0.57	0.81	.422	
Obtained Fit Indices					
	χ^2/df	RMSEA	IFI	TLI	CFI
Value	(0.01/2) = 0.005	0.000	1.003	1.018	1.000

Model 2

A conceptual model was developed on the basis of literature review which consists of nine hypotheses with the relationship between TQM constructs with TQM impact constructs in the same way the relationship among the TQM impact constructs were stated with four hypotheses. So all together there were thirteen hypotheses under this model. Path diagram was created in the AMOS 20 and fitted the amendment items in the constructs. Some of the fit indices however does cross the cutoff range, χ^2/df (1.97) and RMSEA value 0.097 value indicates that the model can be reasonably accepted. Among the thirteen hypothesis six hypothesis were strongly satisfied the theory and two hypothesis were weakly supported.

Figure 5.27 Testing theoretical model 2

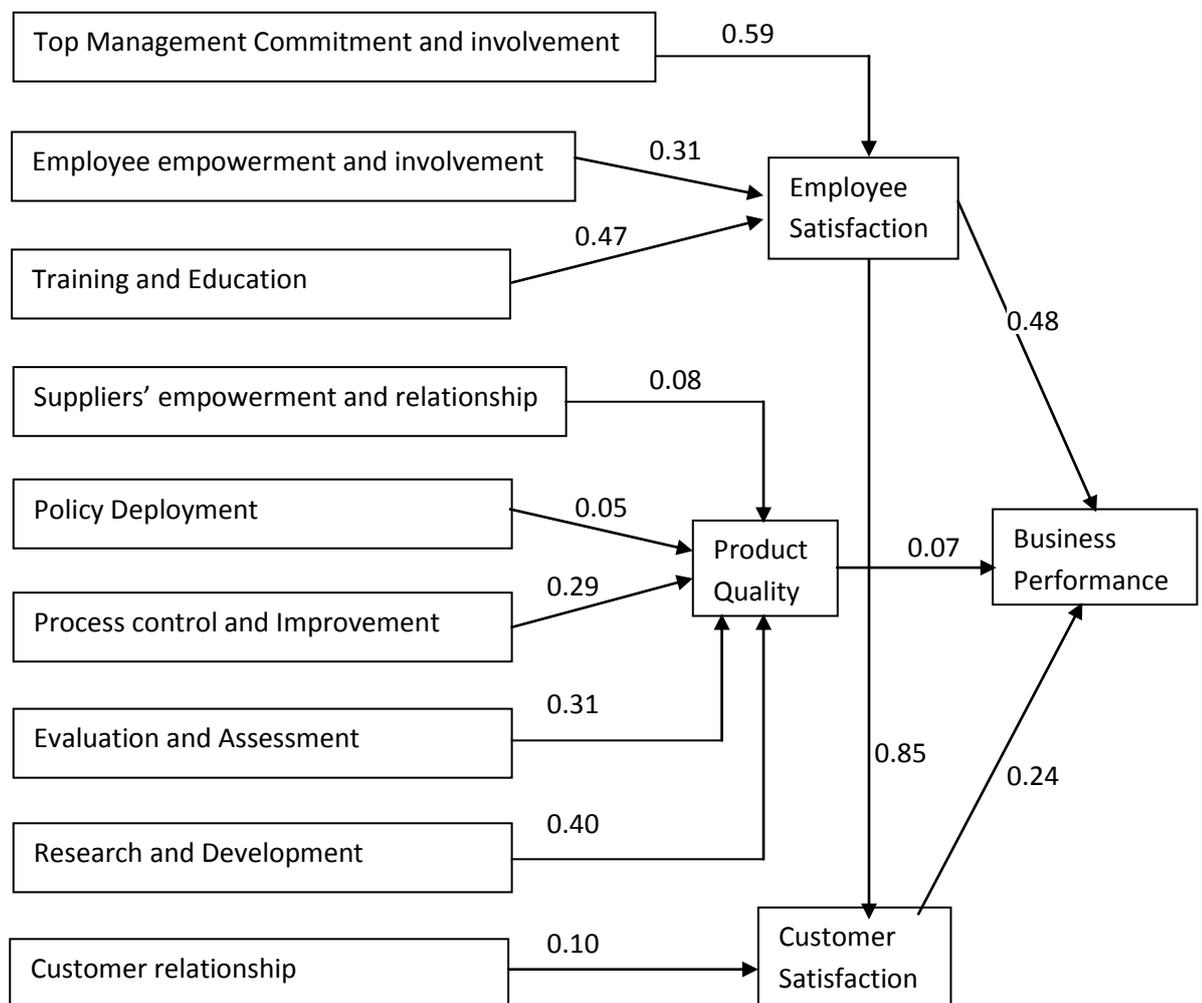


Table 28: Testing Theoretical Model 2

Item	Regression description	Coeff.	C.R.	P-value	
1	Top Management → Employee Satisfaction	0.59	10.4	***	
2	Employee Involvement → Employee Satisfaction	0.31	5.40	***	
3	Training and Education → Employee Satisfaction	0.47	8.17	***	
4	Suppliers Empowerment → Product Quality	0.08	0.96	0.337	
5	Policy Deployment → Product Quality	0.05	0.62	0.533	
6	Process control → Product Quality	0.29	3.57	***	
7	Evaluation → Product Quality	0.31	3.84	***	
8	Research & Development → Product Quality	0.04	5.01	***	
9	Customer Relation → Customer Satisfaction	0.10	1.94	0.052	
10	Employee satisfaction → Customer Satisfaction	0.85	16.49	***	
11	Employee satisfaction → Business Performance	0.48	3.62	***	
12	Product Quality → Business Performance	0.07	0.98	0.325	
8	Customer Satisfaction → Business Performance	0.24	1.78	0.076	
Obtained Fit Indices					
	χ^2/df	RMSEA	IFI	TLI	CFI
Value	(128.037/2) = 1.97	0.097	0.834	0.832	0.826

5.8 Hypothesis Testing

Table 5.28: Testing hypothesis of Model 1

SN	Hypothesis	Coeff.	T	Result
1	TQM implementation has positive impact on employee satisfaction	0.94	27.25	Strongly Supported
2	TQM implementation has positive impact on product quality	0.71	1.82	Weekly Supported
3	TQM implementation has positive impact on customer satisfaction	0.21	10.2	Strongly Supported
4	TQM implementation has positive impact on business performance	0.57	0.81	Not Supported
5	Employee satisfaction has positive effect on customer satisfaction	0.55	6.15	Strongly Supported
6	Employee satisfaction has positive effect on business performance	0.47	2.09	Mixed Supported
7	Product quality has positive effect on business performance	0.56	0.58	Not Supported
8	Customer satisfaction has positive effect on business performance	0.53	1.61	Weekly Supported

Source: Sample survey, 2014

Table 5.29: Testing hypothesis of Model 2

SN	Hypothesis	Coeff	T	Result
1	Top Management commitment and involvement has positive impact on employee satisfaction	0.59	10.4	Strongly Supported
2	Supplier empowerment and relationship has positive impact on product quality	0.08	0.96	Not Supported
3	Policy deployment has positive impact on product quality	0.05	0.62	Not supported
4	Evaluation and assessment has positive impact on product quality	0.31	3.84	Strongly Supported
5	Process control and improvement has positive impact on product quality	0.29	3.57	Strongly Supported
6	Research and development has positive impact on product quality	0.04	5.01	Strongly Supported
7	Employee empowerment and involvement has positive impact on employee satisfaction	0.31	5.4	Strongly Supported
8	Education and training has positive impact on employee satisfaction	0.47	8.17	Strongly Supported
9	Customer relation has a positive effect on customer satisfaction	0.1	1.94	Weakly Supported
10	Employee satisfaction has positive effect on customer satisfaction	0.85	16.49	Strongly Supported
11	Employee satisfaction has positive effect on business performance	0.48	3.62	Strongly Supported
12	Product quality has positive effect on business performance	0.07	0.98	Not supported
13	Customer satisfaction has positive effect on business performance	0.24	1.78	Strongly Supported

Source: Sample survey, 2014

5.7 summary

This chapter deals with the analysis of the data obtained from 103 manufacturing industries of Nepal. The response biased was checked and no bias was found. The data reveals that majority of the people are engaged in the industrial sectors of Nepal. Most of the respondents were manager, although it was asked to reply the questions by quality manager. It happens due to busyness of the quality manager and may be the quality management is managed by the managers only. The 68 items of the TQM constructs and 16 item of the TQM impact were checked its normality and found that all the items were normal (showing all skewness and kurtosis value less than ± 2). Similarly the mean values of each item were more than the middle value 3 with certain variation. All the construct except business performance shows the construct were reliable. The cronbach's alpha for the construct business performance (0.69) shows little less than the cutoff point 0.70. The confirmatory factor analysis was performed to check the unidimensionality of the construct. Out of 68 items of the TQM implementation 56 items were selected for further analysis. Model 1 and Model 2 were tested using path analysis and the model 1 was satisfactory fitted where as model 2 was restrictedly accepted. Out of the eight hypotheses stated three hypotheses were strongly satisfied, one hypothesis moderately satisfied, two hypotheses were weakly satisfied and remaining two were not supported at all. In the same way the model two, among the thirteen hypotheses six hypotheses were strongly satisfied and two hypotheses were weakly supported.

Chapter six
Summary and Conclusions

INDEX

S.N.	PARTICULARS	PAGE NO.
	INDEX	125
6.1	INTRODUCTION	126
6.2	SUMMARY OF THE STUDY	126
6.3	CONCLUSION	129
6.4	LIMITATIONS	130
4.4	FUTURE RESERCH	130

Chapter six

Summary and Conclusions

6.1 Introduction

This chapter poses two parts first part deals with the summary of the research and the second with conclusions obtained from this study. In the same way discussion on the implication, limitation and future research direction of this research has done.

6.2 Summary of the study

There has vast development of TQM tools and techniques since 1980, and different world renowned industries are indulge to implement the TQM in their respected industries. Since one and half decade, there is large number of research conducted. Large number of research has conducted during the last one and half decade. The researcher has used different definition of TQM and had used different construct and items to measure TQM implementation and impact. Similarly on the aspect of the result also there has been confusion that some has shown positive relationship between the constructs of TQM implementation and impact where as some showing no specific leading relationship among those constructs. In addition, there has not been any research conducted regarding TQM implementation and impact in Nepalese manufacturing industries. In the basis of this ground the research was conducted on with the following objectives

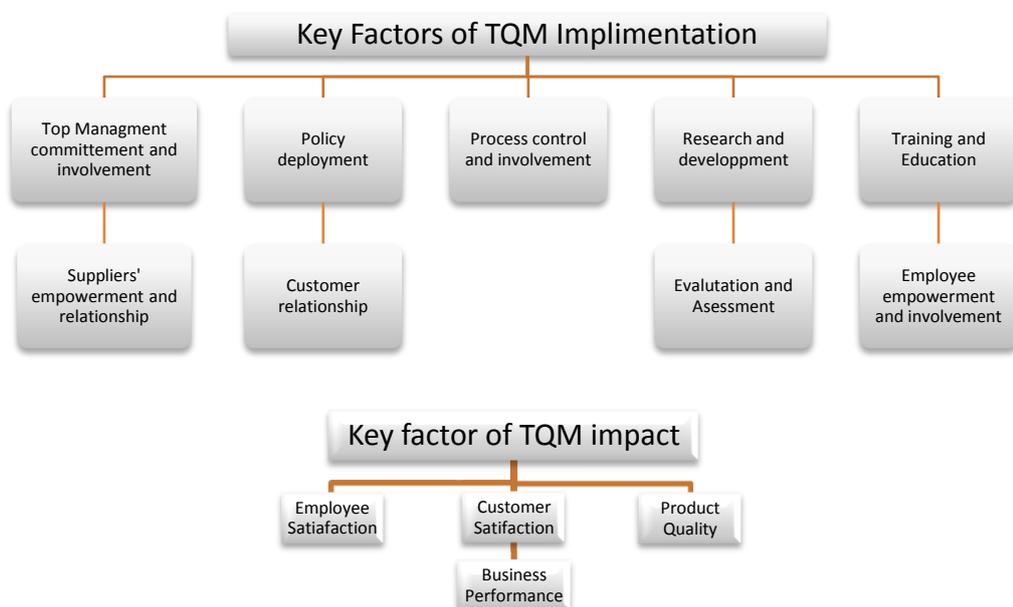
- ~ To attain a better understanding of TQM implementation and impact in the Nepalese scenario along with the determination of the key factors.
- ~ To obtain the relationship between and among key factors of Implementation of TQM with its impact.

The following four research question were setup to clutch the above stated research objective.

- ~ What is TQM and what are the key success factors of TQM?
- ~ What are the measures which are used to identify the impact of TQM implementation?
- ~ To what extent do the theoretical aspects found in literature can validate the empirical study of TQM implementation and its impact in case of Nepal?
- ~ How do key factors of TQM implementation affect on TQM impact in the context of Nepal?

To get the solution to the above research questions the extensive review of literature were done. The concept and philosophy given by quality gurus Deming, Juran, Crosby, Ishikawa and Feigenbaum was followed by European Quality award, Malcolm Baldrige National Award and Deming award, NS Quality award and FNCCI quality award was studied. On the basis of the five philosophy, five quality award and twenty five empirical research, the constructs of TQM implementation was determined. In the same way the constructs of impact were also obtained. Altogether following nine construct of TQM implementation and four constructs of TQM impact were obtained on the basis of literature review.

Figure 6.1 Conceptual framework of the TQM implementation and Impact



Two models of TQM implementation and impact was affirmed. First model consist eight hypotheses, four states relationship between TQM implementation with four factors of TQM impacts and the remaining four states the relationship among four factors of TQM impact. In the same way the nine hypotheses were setup to establish the relationship between different constructs of TQM implementation with constructs of TQM impact. This was incorporated in the second model along with the four factor relationship of TQM impact. Sixty eight items were selected to measure the TQM implementation and sixteen items were selected to measure the TQM impact. The 150 questionnaire were distributed to the different industrial hub of Nepal. The selection of the industries was done on the basis of their practice in quality management. For selection the help from consultant of quality management, peoples of Federation of Nepalese Chambers of Commerce and Industry (FNCCI) and Industry Development Management Limited (IDM) was taken. Out of 150 questionnaires, 110 questionnaires were returned and 103 were used for analysis because of their appropriateness. The data were analyzed using IBM SPSS statistics 20 and AMOS 20. The analysis begins with no response biased found. First the demographic analysis was done and is followed by the summary statistics of ninety four items. The reliability of the measurement were checked and found all the items were reliable except one construct business performance (0.69) shows little less than the cutoff point 0.70. In the same way validity of the items were checked using confirmatory factor. After analyzing CFA, 56 items of the TQM implementation were taken for further analysis out of 76 items. Model 1 and Model 2 were tested using path analysis and the model 1 was satisfactory fitted where as model 2 was restrictedly accepted. Out of the eight hypotheses stated three hypotheses were strongly satisfied, one hypothesis moderately satisfied, two hypotheses were weakly satisfied and remaining two were not supported at all. In the same way the model two, among the thirteen hypotheses six hypotheses were strongly satisfied and two

hypotheses were weakly supported. The estimation of regression coefficients were done using maximum likelihood estimation and the common measures of fit chi square (χ^2/df), IFI, TLI CFI and RMSEA were used to test the validity of the measures.

The literature review and its comparative analysis gave the insight on the TQM implementation and factors, which gave the answer to the first two research questions. The two model test gave the answer to third and fourth research questions which describes the validation of the theoretical aspects with the study of relationship between and among the factors of TQM implementation and TQM impact.

6.3 Conclusion

First of all, the theoretical concept was developed on the basis of Nepalese manufacturing industries. The TQM implementation construct and its impact constructs were determined and tested its reliability and validity. The tested construct can be used by the researcher to measure the impact of TQM implementation. The further analysis of the models gives the following conclusions. TQM implementation has positive relationship with the employee satisfaction, customer satisfaction where as the relationship is weak in case of product quality. Similarly the relationship of employee satisfaction to the customer satisfaction is significantly highly positive. Although the significance is low, employee satisfaction effect positively to the business performance.

The model shows that the top management commitment, education and training and employee empowerment has positive impact on employee satisfaction and employee satisfaction greatly affects the customer satisfaction and business performance. Evaluation and assessment, Process control & improvements and research & development are the factors which are responsible for product quality and customer satisfaction has a positive impact on business performance. Thus the study shows the commitment of Top management and their involvement is the most essential part of the

TQM success. This model can be implemented to the Nepalese manufacturing industries to progress in their TQM implementation attempt.

6.4 Limitations

The empirical research has been done on the basis of data obtained from 103 manufacturing companies on the basis of judgmental sampling. So the generalization may be limited. Next the employee satisfaction was measured on the basis of the perception of satisfaction level on their respective companies. Due to indirect nature of asking question, the measure cannot be equivalent to the direct measure of the customer satisfaction. So the research findings may be biased. In the same way the customer satisfaction also was measure from the industries itself, instead of measuring it from customers. It is assumed that the data so obtained may not be reliable and may be biased on the certain degree. The next limitation of the study was the common method of variance, which is only one questionnaire, was filled from one industry.

6.5 Future research

This research explores on TQM implementation and impact constructs. So, relatively high degree knowledge research on TQM implementation is the first standpoint of the future research. Replication of the research with the more sample size would be supportive to validate the finding of the research. Structural Equation Modeling (SEM) can be used to tap the unobserved variable for the samples more than 200. The model and the relationship found in this study can be used in other countries to inspect either these relationship goes in the same way or not. Next the structural interview and case study can be used to get more insight to validate the relationship established by empirical research.

Bibliography

- Abdullah, M. B., & Tari, J. J. (2012). The influence of soft and hard quality management practices on performance. *Asia Pacific Management Review* , 17 (2), 177-193.
- Adhikari, D. R., & Pandey, D. L. (2014). *Research Methodology*. Kathmandu: Asmita Publication.
- Aguayo, R. (1990). *Dr. Deming: the Man Who Taught the Japanese*. London: Mercury Books.
- Ahire, S. L., Waller, M. A., & Golhar, D. Y. (1995). Quality management in TQM versus non-TQM firms: An emperical investigation. *International Journal of Quality & Reliability Management* , 13 (8), 8-27.
- Aized, T. (2012). *Total Quality Management & Six Sigma*. Croatia: Inteck.
- Antony, J., Fergusson, C., Waraood, S., & Tsang, H. Y. (2004). Comparing total quality management success factors in UK manufacturing and service industries: some key findings from survey. *Journal of Advances in Management Reserach* , 1 (2), 32-45.
- Arumugam, V., Ooi, K. B., & Fong, T. C. (2008). TQM practices and quality performance: An investigation of their relationship using data from ISO 9001:2000 firms. *TQM Journal* , 20 (6), 636-650.
- Bahri, S., Hamzah, D., & Yusuf, R. M. (2012). Implimentation of Total Quality Management and Its Effect on Organizationa Performance of Manufacturing Industries Through Organizational Culture in Sourth Sulawesi, Indonesia. *IOSR Journal of Business and Management* , 5 (1), 10-24.
- Bessant, J., Caffyn, s., Gilbert, J., Harding, R., & Webb, S. (1994). Rediscovering continuous improvement. *Technovation* , 14 (1), 17-29.
- Besterfield, D. H., Besterfield-Michna, C., Besterfield, G. H., & Besterfield-Sacre, M. (2006). *Total Quality Management*. Delhi: Prentice Hall of India.
- Besterfield, D. H., Besterfield-Michna, C., Besterfield, G. H., & Besterfield-Sarce, M. (2006). *Total Quality Management*. Delhi: Prentice Hall of India.
- Bhat, K. S. (2007). *Total Quality Management Text and Cases*. Banglore: Himalaya Publishing House.
- Bullington, S. F., Easley, J. Y., & Greenwood, A. G. (2002). Success factors in initiating versus maintaining a quality improvment process. *Engineering Management Journal* , 14 (3), 8-14.

- Charantimanth, P. M. (2006). *Total Quality Management*. Delhi, India: Pearson Education.
- Christos, B. F., & Evangelos, L. P. (2009). The impact of soft & hard TQM elements on quality management result. *International Journal of Quality and Reliability Management*, 26 (2), 150-163.
- Crosby, P. (1979). *Quality is free*. New York: McGraw-Hill.
- Dahlgard, J. J., Kristensen, K., & Gopal, K. K. (2002). *Fundamentals of Total Quality Management*. London & New York: Taylor & Francis.
- Das, A., Paul, H., & Swierczek, F. W. (2008). Developing and validating total quality management (TQM) constructs in the context of Thailand's manufacturing industry. *Benchmarking: An international journal*, 15 (1), 52-72.
- Deming, W. (1986). *Out of the Crisis: Quality, Productivity and Competitive position*. Cambridge: Mass.
- Flynn, B. B., Schroeder, R. G., & Sakakibara, S. (1995). The Impact of Quality Management Practices on Performance and Competitive Advantage. *Decision Sciences*, 26 (5), 659-691.
- Fornell, C. (1992). A national customer satisfaction barometer, the Swedish experience. *Journal of Marketing*, 56, 6-21.
- Fornell, C., Johnson, M. D., Anderson, E. W., Cha, J., & Bryant, B. E. (1996). The American customer satisfaction index: Nature, purpose, and findings. *Journal of Marketing*, 60, 7-18.
- Garg, D., Garg, T. K., & Kumar, R. (2002). Quality management practices in Indian industries. *Productivity*, 43 (3), 426-433.
- George, S., & Weimerskirch, A. (1997). *Total Quality Management: Strategies and Techniques Proven at Today's Most Successful Companies*. New York: John Wiley & Sons Inc.
- Goetsch, D. L., & Davis, S. B. (2006). *Quality Management: Introduction to Total Quality Management for Production, Processing, and Services* (Fifth ed.). New Jersey: Prentice Hall.
- Hackman, J. R., & Wageman, R. (1995). Total Quality Management: Empirical, Conceptual and Practical Issues. *Administrative Science Quarterly*, 40, 302-342.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2009). *Multivariate Data Analysis*. Delhi: Pearson Education.

- Hassan, M. U., Mukhtar, A., Qureshi, S. U., & Sharif, S. (2012). Impact of TQM practices on firm's performance of Pakistan's Manufacturing Organization. *International Journal of Academic Research in Business and Social Sciences* , 2 (10), 232-259.
- Hoang, D. T., Igel, B., & Laosirihongthong, T. (2010). Total quality management (TQM) strategy and organizational characteristics: Evidence from a recent WTO member. *Total quality management* , 21 (9), 931-951.
- Idris, F. (2011). Total Quality Management And Sustainable Company Performances: Examining The Relationship In Malaysian Firms. *International Journal of Business and Society* , 12 (1), 31-52.
- Irani, Z., Baradie, M., & Love, P. (2004). Total Quality Management and corporate culture: Constructs of organizational excellence. *Technovation* , 24, 643-650.
- Jitpaiboon, T., & Rao, S. S. (2007). A meta analysis of quality measures in manufacturing system. *International journal of quality and reliability management* , 24 (1), 78-102.
- Johnson, M. D., Gustafsson, A., Andreassen, T. W., Lervik, L., & Cha, J. (2001). The evolution and future of national customer satisfaction index model. *Journal of Economic Psychology* , 22, 217-245.
- Juran, J. (1989). *Juran on leadership for quality: an executive handbook*. New York: The Free Press.
- Juran, J. (1992). *Juran Quality by Design: The new step for planning quality into goods and services*. New York: The Free Press.
- Juran, J. M., & Godfrey, A. B. (1999). *Juran's Quality Handbook*. New York: Mc Graw-Hill.
- Juran, J. M., & Gryna, F. M. (1993). *Quality Planning and Analysis: From Product Development Through Use*. New York, NY: McGraw-Hill.
- Juran, J. M., & Gryna, F. M. (1982). *Quality Planning And Analysis: From Product Development through Use*. New Delhi: Tata McGraw-Hill Publishing Company Ltd.
- Kakkar, S., & Narag, A. S. (2007). Recommending a TQM model for Indian organizations. *TQM Magazine* , 19 (4), 328-353.
- Kaynak, H. (2003). The relationship between total quality management practices and their effects on firm performance. *Journal of Operation Management* , 405-435.
- Kothari, C. R. (1990). *Research Methodology*. Jaipur: New Age International Publishers.

- Kuhn, T. S. (1962). *The Structure of Scientific Revolutions* (2nd Edition ed.). USA: The University of Chicago Press Ltd.
- Kumar, R., Garg, D., & Garg, T. K. (2009). Total Quality Management in Indian Industries: relevances, analysis and directions. *The TQM Journal*, 21 (6), 607-622.
- Lin, C., Chow, W. S., Madu, C. N., Kuei, C. H., & Yu, P. P. (2005). A structural equation model of supply chain quality management and organizational performance. *International journal of production economics*, 355-365.
- Liston, C. (1999). *Managing Quality and Standards*. Buckingham: Open University.
- Magd, H. A. (2014). TQM Constructs Development and Validation in the context of Egyptian Manufacturing Sector: A snapshot Perspective. *UITM-Sarawak*. OMAN.
- Mallur, S. B., & Hiregoudar, N. L. (2010). A Survey of TQM Practices in North Karnataka Manufacturing SMEs: an Empirical Evaluation. *World Congress on Engineering*. London.
- Montgomery, D. C. (2009). *Introduction to Statistical Quality Control*. Arizona, USA: John Wiley & Sons.
- Motwani, J. (2001). Critical factors and performance measures of TQM. *The TQM Magazine*, 13 (4), 292-300.
- Oakland, J. S. (2000). *TQM Text with Cases*. Burlington: Butterworth-Heinemann.
- Panta, P. R. (2009). *Social Science Research and Thesis Writing*. Kathmandu: Buddha Publication.
- Pfeffer, N., & Coote, A. (1991). *Is Quality Good for You ? A Critical Review of Quality Assurance Inwelfare Services*. London: Institute of Public Policy Research.
- Phan, A. C., Abdallah, A. B., & Matsui, Y. (2011). Quality management practices and competitive performance: Empirical evidence from Japanese manufacturing companies. *International Journal of Production Economics*, 518-529.
- Pradhan, B. L. (2014). *Quality Management*. Kathmandu, Nepal: KEC Publication.
- Pradhan, B. L. (2014). *Research Methodology*. Kathmandu: KEC Publication.
- Pradhan, B. L., Acharya, K. P., Yadav, A. K., Upadhyaya, R. P., Shah, L. B., & Timalisina, P. K. (2014). *Production and Operation Management* (Second ed.). Kathmandu, Nepal: KEC Publication.
- Pradhan, B. L., Khatiwadi, R. P., & Poudel, N. B. (2014). *Research Methodology*. Kathmandu: KEC Publication.

- Prajogo, D. I., & Sohal, A. S. (2004). The relationship between organization strategy, total quality management (TQM) and organization performance-the mediating role of TQM. *European Journal of Operation Research* , 35-50.
- Rahman, S., & Bullock, p. (2005). Soft TQM, hard TQM, and Organizational Performance Relationships: an empirical investigation. *Omega* , 33, 77-83.
- Raja, M. W., Bodla, M. A., & Malik, S. A. (2011). Evaluating the effect of Total Quality Management practices on Business Performance: A Study of Manufacturing Firms of Pakistan. *Internal Journal of Business and Social Science* , 2 (9), 110-117.
- Sadikoglu, E. (2004). Total Quality Management: Context and Performance. *The Journal of American Academy of Business, Cambridge* , 5 (1-2), 364-366.
- Sallis, E. (2002). *Total Quality Management in Education*. London: Cogan Page Ltd.
- Saraph, J. V., Benson, P. G., & Schroeder, R. G. (1989). An Instrument for Measuring the Critical Factors of Quality Management. *Decision Sciences* , 810-829.
- Seymour, D. (1992). *On Q: Causing Quality in Higher Education*. New York: Macmillan.
- Siddiqui, J., & Rahman, Z. (2007). TQM principles' application on information systems for empirical goals: A study of Indian organizations. *The TQM Magazine* , 19 (1), 76-87.
- Sila, I., & Ebrahimpour, M. (2005). Critical linkages among TQM factos and business results. *International Journal of Operations and Production Management* , 25 (11), 1123-1155.
- Subedi, P. K. (2010). *Social Research Method*. Kathmandu: Kriti Publication.
- Subedi, P. K. (2010). *Social Resrach Method*. Kathmandu: Kriti Publication.
- Tari, J. J. (2006). Components of successful total quality management. *The TQM Magazine* , 17 (2), 182-194.
- Taylor, F. (1998). *The Principles of Scientific Managment*. New York: Dover Publication.
- Valmohammadi, C. (2011). The impact of TQM implimentation on the organizational performance of Iranian manufacturing SMEs. *The TQM journal* , 23 (5), 496-509.
- Yang, C. C. (2006). The impact of human resource management practices on the implimentation of total quality management: An emperical study on high tech firms. *The TQM Magazine* , 18 (2), 162-173.

Zakuan, N. M., Yusof, S. M., Laosirihongthong, T., & Shaharoun, A. M. (2010). Proposed relationship of TQM and organisational performance using structural equation modeling. *Total Quality Management and Business Excellence* , 21 (2), 185-203.

Zakuan, N. M., Yusof, S. M., Laosirihongthong, T., & Shaharoun, A. M. (2010). Proposed relationship of TQM and organizational performance using structured equation modeling. *Total Quality Management and Business Excellence* , 21 (2), 185-203.

Zhang, Z., Waszink, A., & Wijngaard, J. (2000). An instrument for measuring TQM implementation for Chinese manufacturing companies. *International Journal of Quality & Reliability Management* , 17 (7), 730-55.

Appendix 1 : List of Paper published (paper-1)

The Effectiveness of ISO 9001:2008 Certification in Educational Institution of Nepal

THE EFFECTIVENESS OF ISO 9001:2008 CERTIFICATION IN EDUCATIONAL INSTITUTION OF NEPAL

Prof. (Dr.) Hemant Kothari

Dean, PG Studies

Pacific Academy of Higher Education & Research University, Udaipur

Bijay Lal Pradhan

Lecturer

Birendra Multiple College, Nepal

ABSTRACT

Competitive environment and trade liberalization has fuelled any organization to focus on customer satisfaction through the quality of service and goods. The international organization for standardization (ISO) system has emerged as the most integrated for the improvement of the organization with reference to qualitative product and service. Some of the educational industry of Nepal implemented ISO 9001:2008 certification and most of them have claimed that there is significant improvement in quality of system of service after implementation of such quality initiatives.

This study was undertaken to investigate the effectiveness of ISO 9001:2008 certification in quality of educational service industry of Nepal. Investigation of the motives and current practices of ISO 9001:2008 in such institutions were done.

Two ISO 9001:2008 certified educational organizations are selected for the study. Sample includes Management committee members, Top management and Department heads and some teaching and not teaching staffs.

INTRODUCTION

Among various definitions of total quality management (TQM), one definition tendered here is, "TQM is the totally integrated effort for gaining competitive advantage by continuously improving every facet of organization culture". TQM focuses externally on meeting customer(s) requirements exactly, while internally on management commitment, and employee training and education. The main objective of TQM is to entrench quality into processes, thus products and services. TQM focuses the entailment of everyone inside an organization (including internal customer) and linked persons outside the organization, such as customers (External). The ISO 9000 series are basically standards 'used for external quality assurance purposes and designed for internal use'. It has become the key tool for service/product reliability and customer

Available in the following web:

http://ijmtpublication.com/files/AOMR_1_2_2011/AOMR_1_2_2011_5.pdf

Key Factors of TQM Implementation and Impact in Industries of Nepal: A Conceptual Model

Prof. Dr.Hemant Kothari
Dean, PG Studie,Pacific University, Udaipur, India
deanpg@pacific-university.ac.in

Dr.. Sapana Shrimali
Associate Professor, Pacific University, Udaipur, India
shrimalisapana@gmail.com

Bijay Lal Pradhan
Lecturer, Tribhuvan University, Nepal
bijayprad@gmail.com

Abstract

The implementation of TQM in manufacturing industries is linked with its key factors which are responsible for achieving effective results. The purpose of this study is to identify key factors of TQM implementation and impacts. This study identifies nine key factors of TQM implementation and four factors of TQM impact from the extant literature which can help industry to achieve business excellence. The nine TQM implementation key factors are *Top management commitment & involvement, Policy deployment, process control and improvement, Research and development, training and education, maintaining suppliers' empowerment and relationship, customer relationship, employee empowerment and involvement, evaluation and assessment* whereas key TQM impact factors were *excellence and performance in Customer satisfaction, Employee satisfaction, Product quality and Product performance.*

Introduction

Organizations carry out quality management and improvement programmes for a range of objectives. The successful implementation of TQM in manufacturing sector would promote exports, attract foreign direct investment, improve business performance, achieve a competitive advantage, and customer and staff satisfaction (Magd, 2014). These benefits are important for all organizations, especially in developing countries, such as Nepal, where the general quality level is relatively low and need to be increased in the chase of effective inter-organizational cooperation. During the process of implementation, organization has to face different difficulties and often fails to get benefits from quality management implementation. Fotopoulus et al (2009) and Kumar et al (2009) discussed the impact of TQM practices on quality management results and explains the relationship between different TQM practices like leadership, strategic quality planning, employee management & involvement, supplier management, customer focus, process management, continuous improvements and their effect on quality management results in the form of market benefits like increase in profits, improved competitive position, improved performance and increased sales. While customer satisfaction is measured by decline in customer complaints, increase in loyalty, and customer retention rate.

Appendices

Appendix 1: questionnaire in English version

TQM Implementation and Impact

Namaskar, I am Bijay Lal Pradhan, UGC-Nepal-sponsored doctoral candidate at the Pacific University, India. The topic of my study is “Total Quality Management (TQM) implementation and impact in Nepalese Manufacturing companies”. I need some information from you. You have been selected because you are the key person to implement the TQM in your organization. All the information which you will provide will keep confidential and will be used for academic purpose only.

The personal benefits for the participation cannot be determined. However, the organizational benefits are expected to be significant and include the conceptual knowledge buildup for Nepalese manufacturing companies.

You may reach to me at 9845085498 if you have any questions concerning this study. Or you can mail me at bijayprad@gmail.com

Date:

Background information

1. Name of interviewee:	
2. Position in the company:	
3. No. of full time employees in company:	
4. No. of years of involvement with QMS	
5. Your years of education	
6. Yours years of service in present organization	
7. Your years of service in present post:	
8. Your age	

Background information on QMS implementation

9. From when your industry started to give emphasis on quality?
10. In which areas in your industry has given emphasis on quality?
11. In your opinion why your industry has given emphasis on quality?

Read the following statements and indicate your level of agreement/disagreement for the following statements

1. Top Management Commitment and involvement

Construct: Top Management commitment and involvement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Top Management vigorously participates in the quality management programs.					
2. Top Management communicates the company's philosophy to the employees.					
3. Top Management strongly encourages employee involvement in quality management and improvement activities.					
4. Top management learns quality related concepts and skills.					
5. Top management arranges enough resources for education and training.					
6. Top management focuses on product quality rather than yields.					
7. Communication and links are established between employee and top management.					
8. Top management permits employees to solve quality problems.					
9. Top management quality audit is regular in our company					

2. Employee involvement & empowerment

Construct: Employee involvement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Our company has cross-functional teams or quality circles.					
2. Employees are actively involved in quality related activities					
3. Our company implements suggestions from employee extensively					
4. Employees are very committed to the success of our company					
5. Employees are encouraged to fix problems they find					
6. Reporting work problem is encouraged in our company					
7. Employees are taken as valuable resources and encouraged in every activities by top management.					

3. Policy Deployment

Construct: Policy Deployment	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Our company has a clear long-term vision statement.					
2. The vision effectively encourages employees' commitment to quality management.					
3. Our company has a clear short term business performance plan.					
4. Our company has a clear quality policy.					
5. Our company has a detailed quality goal.					
6. Our company has effective quality improvement plans.					
7. Various policies and plans are well communicated to the employees.					
8. Employees from different levels are involved in making policies and plans.					
9. The concept PDCA is used while making policy					

4. Customer Relationship

Construct: Customer Relationship	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Our company collects extensive complaint information from customers.					
2. Quality-related customer complaints are treated with top priority.					
3. Our company conducts a customer satisfaction survey every year.					
4. Our company always conducts market research in order to collect suggestions for improving our products.					
5. Our company provides warranty on our sold products to customers.					
6. Our company has been customer focused for a long time.					
7. Our company has strong after sales service					

5. Process control and improvement

Construct: Process control & Improvement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. There is a quality improvement coordinating body (quality steering committee)					
2. We have a clearly stated working instructions					
3. For internal operation we are using well-organized and perfect database					
4. Our company implement various inspections effectively in all levels (incoming, process and final product)					
5. The intend of evaluating employee performance is for improvement not for criticism					
6. Our company has a well equipment and maintenance plan					
7. QC tools are widely used to solve the problems					
8. Statistical process control is widely used in our company					
9. PDCA cycle is used for improvement and process control					
10. Continuous quality improvement is an important goal of this company					

6. Suppliers Empowerment and Relationship

Construct: Suppliers Empowerment and Relationship	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Our company regards product quality as the most important factor in selecting suppliers					
2. Suppliers are selected on the basis of quality aspect.					
3. Company works closely with suppliers towards long term partnership and improvement					
4. Our company has detailed information about suppliers' performance					
5. Our company regularly conducts suppliers' quality audit					

7. Evaluation and Assessment

Construct: Evaluation Assessment	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Our company regularly audits various business strategies					
2. Our company regularly conducts quality audits					
3. Benchmarking is extensively used in our company					
4. Our company has detailed quality related data such as defects rates and scraps					
5. Quality related data are used to evaluate the management of our company					
6. Quality related data are used to evaluate the performance of all departments					
7. Quality related data are used to evaluate the performance of employees					
8. Quality related information is displayed at the shop floor.					
9. Customer satisfaction survey is regularly updated					
10. We have a measurement scale and perform regularly the employee satisfaction survey.					

8. Research and Development

Construct: Research and Development	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. The customer requirement are thoroughly considered through market feedback system					
2. Various department participate in product development process					
3. New product designs are thoroughly reviewed before production					
4. Our company finds product value superiority through performance and satisfaction survey.					
5. Experimental design is used extensively in product design process.					
6. Quality Function Deployment (QFD) is used extensively in product design.					

9. Education and training

Construct: Education and training	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Employees are encouraged to accept education and training in our company					
2. Resources are available for employee education and training in our company					
3. Most employees in our company are trained on how to use quality management methods and tools					
4. Employees are regarded as valuable, long-term resources worthy of receiving education and training throughout their career					
5. Most employees in our plant are interested to attend quality seminar or training programs					

Impact of TQM Implementation

1: Customer Satisfaction

Please state the customer satisfaction level for your company

Customer Satisfaction	Extremely Unsatisfie	2	3	4	5	6	7	8	9	Extremely satisfied
1. The customer satisfaction level for product quality provided by your company										
2. The customer satisfaction level for service quality provided by your company										

2. Employee Satisfaction

Construct: Employee Satisfaction	Extremely Unsatisfied	2	3	4	5	6	7	8	9	Extremely satisfied
State the perceived overall employee satisfaction level of your company										

3. Operational Performance

a. Compared with the other companies within the similar industry in Nepal, please state the situation of your primary products.

Construct: Product Quality	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Performance of our primary product has increased					
2. The conformity rates of our primary products has increased					
3. The durability of our primary products has increased					
4. The cycle time of our product has decreased					
5. The defect rates of your primary products has decreased					
6. The customer complain of our product has decreased					
7. The frequency of rework has decreased					
8. The internal failure cost has decreased					
9. The external failure costs has decreased					

4: Business Performance

- i) What is the condition of annual sales of your organization as compare to the last year:

(a) Decreased a largely	(b) Decreased slightly	(c)
Stayed almost the same	(d) Increased slightly	(e)
Increased a great deal		
- ii) Do you think your firm was:

(a) Losing money badly	(b) Losing money slightly	(c)
Breaking even	(d) Making some profits	(e)
Very profitable		
- iii). What is the relative market share of your company's product compare with the largest company like your company (take its market share as 100%)

(1) 0% - 20.0%	(2) 20.1% - 40%	(3) 40.1% - 60%
(4) 60.1% - 80%		(5) 80.1% - 100%

We are at the last of the questionnaire. Please feel free to include any other comments that you may have concerning TQM implementation and its impact in your organization. Once again thank you.

Comments:

Appendix 2: Questionnaire in Nepali Version

प्रश्नावली: TQM को प्रयोग तथा यसका असरहरु

नमस्कार म बिजय प्रधान Researcher, Quality Management. नेपालको औद्योगिक क्षेत्रमा गुणस्तर व्यवस्थापनको प्रयोग तथा यसको असर सम्बन्धी अध्ययन गर्न लागेको छु । तपाईं क्वालीटि सम्बन्धीत व्यक्ति भएको हुनाले तपाईं संग यस सम्बन्धमा केहि जिज्ञासा राख्न चाहान्छु।

अध्ययन सिलसिलामा समग्रताको प्रयोग गरिने हुनाले तपाईंले दिनुभएका संस्थागत तथा व्यक्तिगत तथ्य तथा तथ्यांकहरु गोप्य रहनेछन् । मसंग व्यक्तिगत रुपमा भेटन तथा यस अध्ययन बारेमा जानकारी लिनको लागी मलाई मोवाइल नं ९८४५०८५४९८ मा सम्पर्क गर्न सक्नुहुनेछ अथवा मलाई bijayprad@gmail.com मा मेल गर्न सक्नु हुनेछ ।

तपाईंको नाम: _____

तपाईंको संस्थाको जम्मा कर्मचारी संख्या: _____

तपाईंको यस संस्थामा कति वर्ष काम गर्नु भयो? _____

तपाईंको पद: _____

तपाईं यस पदमा कहिले देखि हुनुहुन्छ? _____

यस संस्थामा कहिले देखि आवद्ध हुनुहुन्छ? _____

तपाईंको उमेर : _____

कहिले देखि तपाईंको संस्थाले क्वालीटिलाई महत्व दिन थालेको हो?

यस संस्थाले कुन कुन क्षेत्रमा क्वालीटिलाई महत्व दिएको छ?

तपाईंको बिचारमा संस्थाले किन क्वालीटिलाई महत्व दिन थालेको होला?

तल दिइएका बिबरणहरु पढी आफ्नो सहमती असहमतीको लागी चित्तबुझ्दो ठाउमा ठीक (✓) चिन्ह दिनुहोला ।

गुणस्तर व्यवस्थापन लागु गर्न व्यवस्थापनको प्रतिवद्धता तथा सहयोग कस्तो रहेको छ?

उच्च व्यवस्थापनले	अत्यन्त असहमत	असहमत	तथस्त	सहमत	अत्यन्त सहमत
1. आफुलाई सकृय रुपमा क्वालीटि व्यवस्थापनमा संलग्न राख्दछन् ।					
2. आफ्ना कर्मचारीहरुलाई कम्पनीको Philosophy बारेमा राम्रो संग सुसुचित गराउदछन् ।					
3. आफ्ना कर्मचारीहरुलाई क्वालीटि व्यवस्थापनमा तथा सुधार कार्यमालाग्न अत्यन्त प्रोत्साहित गर्दछन् ।					
4. क्वालीटि सम्बन्धीको विचार तथा विधीको नियमित अध्ययन गर्दछन् ।					
5. तल्लिम तथा प्रशिक्षण लाई आवश्यक पर्ने अर्थ तथा जनशक्ती जोहो गर्दछन् ।					
6. वस्तुको मात्रा भन्दा क्वालीटिलाई बढी महत्व दिन्छन्					
7. आफ्ना कर्मचारीहरुसंग राम्रो संवाद तथा सम्बन्ध स्थापित गरेका छन् ।					
8. आफ्ना कर्मचारीहरुलाई क्वालीटि सुधार कार्यमा सामर्थ बनाउन प्रोत्साहित गर्दछन् ।					
9. नियमित क्वालीटि audit गराउदछन् ।					

निती तथा यसको कार्यान्वयनको अवस्था

	अत्यन्त असहमत	असहमत	तथस्त	सहमत	अत्यन्त सहमत
1. हाम्रो संस्थाको स्पष्ट long-term vision statement छ ।					
2. कर्मचारीहरुलाई क्वालीटि व्यवस्थापनमा प्रभावकारीरुपमा लाग्न vision ले प्रोत्साहित गर्दछ					
3. हाम्रो संस्थाको स्पष्ट short term business performance plan छ ।					
4. हाम्रो संस्थाको स्पष्ट quality policy छ ।					
5. हाम्रो संस्थाको स्पष्ट detailed quality goal छ ।					
6. हाम्रो संस्थाको प्रभावकारी quality improvement plans छ ।					
7. कर्मचारीहरुलाई विभिन्न निती तथा योजनाहरु सुसुचित गराइन्छ ।					
8. निती तथा योजनाहरु बनाउन विभिन्न तहका कर्मचारीहरुलाई सहभागी गराइन्छ ।					
9. निती निर्माण कार्यमा PDCA concept को प्रयोग गरिन्छ ।					

प्रक्रिया नियन्त्रण तथा क्रमीक सुधार का कार्यक्रमको अवस्था

	अत्यैन्त असहमत	असहमत	तथस्ट	सहमत	अत्यैन्त सहमत
1. हाम्रो संस्थामा गुणस्तर सुधार संयोजन कमिटी छ । (quality steering committee)					
2. हाम्रो संस्थामा स्पष्ट कार्य निर्देशिका छ ।					
3. हाम्रो संस्थामा उचित तथा प्रभावकारी तथ्यांकीय आंकडा छ जसले आन्तरीक कार्यसन्चालनमा सघाउछ					
4. हाम्रो संस्थाले विभिन्न तहमा विभिन्न प्रभावकारी निरीक्षण (inspections) कार्य गर्ने गर्दछ । (incoming, process and final product)					
5. कर्मचारीहरुको कार्य सम्पादन मुल्याङ्कनको मुख्य उद्देश्य सुधार हो आलोचना होइन ।					
6. उत्पादन तथा मालसमान मर्मत सम्भार योजना (Plan) अनुसार हुने गर्दछ ।					
7. हाम्रो संस्थाले गुणस्तर नियन्त्रण विधी QC tools अत्याधीक प्रयोग गर्दछ ।					
8. कार्य नियन्त्रण तथा सुधारको लागी हाम्रो संस्थाले statistics process control को अत्याधीक रुपमा प्रयोग गर्दछ ।					
9. हाम्रो संस्थाले गुणस्तर नियन्त्रण तथा सुधारको लागी PDCA cycle विधीको अत्याधीक प्रयोग गर्दछ ।					
10. निरन्तर गुणस्तर सुधार Continuous quality improvement हाम्रो संस्थाको प्रमुख लक्ष हो ।					

संस्थाको कर्मचारीको आवद्धता तथा ससक्तीकरणको निती

	अत्यैन्त असहमत	असहमत	तथस्ट	सहमत	अत्यैन्त सहमत
1. हाम्रो संस्थामा cross-functional teams वा quality circles छ ।					
2. कर्मचारीहरु सक्रियरुपमा गुणस्तर सम्बन्धीकार्यमा सहभागी हुन्छन् ।					
3. हाम्रो संस्थाले कर्मचारीहरुबाट आएको गुणस्तर सम्बन्धी सुझावहरुलाई अत्याधीक कार्यान्वयन गर्दछ ।					
4. कर्मचारीहरुबाट संस्थाको सफलताको लागी प्रतिवद्ध छन् ।					
5. कर्मचारीहरुलाई समस्याको तुरुन्त समाधानको लागी प्रोत्साहित गरिन्छ ।					
6. कर्मचारीहरुलाई समस्याको तुरुन्त सम्प्रेसण गर्न प्रोत्साहित गरिन्छ ।					
7. व्यवस्थापनले कर्मचारीलाई महत्वपुर्ण श्रोतको रुपमा लिने गर्दछ ।					

अनुगमन एवं मुल्याङ्कन

	अत्यन्त असहमत	असहमत	तथस्त	सहमत	अत्यन्त सहमत
1. हाम्रो संस्थाले नियमित रुपमा business strategies को audit गराउदछ ।					
2. हाम्रो संस्थाले नियमित रुपमा क्वालीटि audit गराउदछ ।					
3. Benchmarking को प्रयोग अत्याधीक रुपमा गरिन्छ।					
4. हामीसंग गुणस्तर सम्बन्धीको पुर्ण तथ्यांक जस्तै: defects rates and scraps आदी छ ।					
5. व्यवस्थापनको कार्यदक्षताको मुल्याङ्कन गर्न गुणस्तर सम्बन्धी तथ्यांकको प्रयोग गरिन्छ ।					
6. विभिन्न विभागहरुको कार्यदक्षताको मुल्याङ्कन गर्न गुणस्तर सम्बन्धी तथ्यांकको प्रयोग गरिन्छ ।					
7. कर्मचारीहरुको कार्यदक्षताको मुल्याङ्कन गर्न गुणस्तर सम्बन्धी तथ्यांकको प्रयोग गरिन्छ ।					
8. गुणस्तर सम्बन्धीको सुचना एवं जानकारीहरु कार्य क्षेत्रमा टांसीएका, टांगीएका छन् ।					
9. नियमित Customer satisfaction survey गरिन्छ ।					
10. हामीसंग employee satisfaction नाप्ने मापक छ जसको प्रयोग बाट संस्थाले नियमित रुपमा employee satisfaction survey गर्दछ ।					

ग्राहकसंगको सम्बन्ध

	अत्यन्त असहमत	असहमत	तथस्त	सहमत	अत्यन्त सहमत
1. हाम्रो संस्थाले प्रसस्तमात्रामा ग्राहक गुनासोको अध्ययन गर्ने गर्दछ ।					
2. गुणस्तर सम्बन्धीको ग्राहक गुनासो लाई विषेश महत्व दिने गरिन्छ ।					
3. संस्थाले प्रत्येक वर्ष ग्राहक गुनासो सर्भे (customer satisfaction survey every) गर्दछ ।					
4. वस्तुको गुणस्तर वृद्धि गर्ने सुझाव संकलन गर्न संस्थाले प्राय market research गर्ने गर्दछ ।					
5. वस्तुको बिक्री पश्चात warranty को प्रावधान छ ।					
6. लामो समय देखि हाम्रो संस्थाले ग्राहकको चाहानालाई विषेश महत्व दिइरहेको छ ।					
7. वस्तुको बिक्री पश्चात दरिलो after sales service को प्रावधान छ ।					

अनुसन्धान तथा बिकाश

	अत्यन्त असहमत	असहमत	तथस्त	सहमत	अत्यन्त सहमत
1. ग्राहकको आवश्यकता बजार प्रतिक्रिया प्रणाली (feedback system) द्वारा निर्धारण गरिन्छ ।					
2. वस्तु बिकाशको (Product development) प्रक्रियामा विभिन्न विभागहरुको सहभागीता रहन्छ					
3. नयां वस्तु नमुनाको बृहत्तर समिक्षा गरी मात्र उत्पादन प्रक्रिया अगाडी बढाइन्छ ।					
4. हाम्रा वस्तुको value विशीष्टता performance and satisfaction survey मार्फत पत्ता लगाइन्छ					
5. वस्तु बिकाशको प्रक्रियामा अनुसन्धान विधी (Experimental design) को प्रयोग गरिन्छ ।					
6. वस्तु बिकाशको प्रक्रियामा Quality Function Deployment (QFD) को प्रयोग गरिन्छ ।					

आपूर्तिकर्ता सामर्थ्यता तथा सम्बन्ध

	अत्यन्त असहमत	असहमत	तथस्त	सहमत	अत्यन्त सहमत
1. वस्तुको गुणस्तरमा आपूर्तिकर्ताको चयनले महत्वपूर्ण भुमीका खेल्दछ भन्ने हाम्रो संस्थाको बुझाइ छ ।					
2. हाम्रो संस्थामा आपूर्तिकर्ताको चयन आपूर्तिकर्ताको गुणस्तरमा भर पर्दछ ।					
3. हाम्रो संस्थाको आपूर्तिकर्तासंगको सम्बन्ध दिर्घकालिन साभादेरी तथा सुधारात्मक रहन्छ ।					
4. हामीसंग आपूर्तिकर्ताको कार्यक्षमताको पुर्ण विवरण सहितको तथ्यांक रहन्छ ।					
5. आपूर्तिकर्ताको नियमित क्वालीटि audit गराउदछौं					

शिक्षा तथा तालिम

	अत्यन्त असहमत	असहमत	तथस्त	सहमत	अत्यन्त सहमत
1. कर्मचारीहरुलाई शिक्षा तथा तालिमलिनको लागी संस्थाले प्रोत्साहित गर्ने गर्दछ ।					
2. कर्मचारीहरुको शिक्षा तथा तालिमको लागी संस्थाले आवश्यक अर्थको व्यवस्थापन गर्ने गर्दछ ।					
3. प्रायजसो संस्थाका कर्मचारीहरु गुणस्तर व्यवस्थापनका शैली तथा प्रक्रियाको तालिम प्राप्त छन् ।					
4. कर्मचारीहरु लामो अवधीक महत्वपूर्ण श्रोत हुनाले कर्मचारीलाई आफ्नो कार्यजीवन भर विभिन्न तालिमहरु दिइने गर्दछ ।					
5. प्रायजसो संस्थाका कर्मचारीहरु गुणस्तर सम्बन्धी तालिम तथा सेमिनार लिन लालायीत हुन्छन् ।					

TQM प्रयोग पछीका असरहरु

1. कर्मचारीहरुको संतुन्स्टता

कर्मचारीहरुको संतुन्स्टता	पूर्ण सन्तुन्स्टता छैन	2	3	4	5	6	7	8	9	पूर्ण असन्तुन्स्टता छैन
समग्रतामा कर्मचारीहरुको संतुन्स्टता कस्तो पाउनुभएको छ ?										

2. कार्य सम्पादन

तपाइको संस्थाद्वारा प्रमुख उत्पादित वस्तुहरु नेपालमा यस्तै अन्यसंस्थाहरुबाट उत्पादित वस्तुहरुको तुलनात्मक अवस्था

वस्तुहरुको गुणस्तर	पूर्ण असहमत	असहमत	तथस्त	सहमत	पूर्ण सहमत
1. मुख्यवस्तुहरुको Performance दर बढेको छ ।					
2. मुख्यवस्तुहरुको Conformity दर बढेको छ ।					
3. मुख्यवस्तुहरुको टिकाउपन (Durability) दर बढेको छ ।					
4. वस्तुहरुको Cycle Time (एक युनिट वस्तु उत्पादन गर्दा लाग्ने समय) घटेको छ ।					
5. मुख्यवस्तुहरुको (Defect) त्रुटि दर घटेको छ ।					
6. ग्राहकहरुको वस्तु प्रतिको गुनासो (Complain) घटेको छ ।					
7. वस्तुहरुको पुर्नकार्य (Rework) दर घटेको छ ।					
8. वस्तुहरुको आन्तरीक त्रुटी खर्च internal failure cost घटेको छ ।					
9. वस्तुहरुको बाह्य त्रुटी खर्च external failure cost घटेको छ ।					

3: ग्राहक सन्तुन्स्टी Customer Satisfaction

तपाइको अध्ययनमा ग्राहक सन्तुन्स्टी कस्तो पाउनु भएको छ ?

ग्राहकहरुको संतुन्स्टता	पूर्ण सन्तुन्स्टता छैन	2	3	4	5	6	7	8	9	पूर्ण असन्तुन्स्टता छैन
1. संस्थाद्वारा उत्पादित वस्तुहरु प्रति ग्राहक सन्तुन्स्टी										
2. संस्थाद्वारा दिइने सेवा प्रति ग्राहक सन्तुन्स्टी										

4: Business Performance

- i) तपाइको विचारमा अधिल्लो वर्षको तुलनामा यो वर्षको वार्षिक आम्दानी
(a) धेरै घटेको छ । (b) अलि अलि घटेको छ । (c) घट बढ छैन ।
(d) अलि अलि बढेको छ । (e) धेरै बढेको छ ।
- ii) तपाइको विचारमा संस्थाको अर्थिक अवस्था
(a) संस्था पुरा घाटामा छ (b) संस्था केही घाटामा छ (c) संस्था Breaking even
मा छ (d) संस्था केही फाइदा गरेको छ (e) संस्था पुरा फाइदामा छ
- iii). नेपालमा तपाइको जस्तै वस्तु उत्पादन गर्ने जसको उत्पादन दर सबैभन्दा बढी छ (यस लाई शत प्रतिशत मान्दा) तपाइको विचारमा यस संस्थाबाट उत्पादित वस्तुहरुको market share कति होला?
(1) 0% - 20.0% (2) 20.1% - 40% (3) 40.1% - 60% (4) 60.1% - 80% (5)
80.1% - 100%

अन्त्यमा तपाईंलाई क्वालीटि व्यवस्थापन सम्बन्धी केही कुरा भन्नु छ?

समय दिनुभयो, महत्वपूर्ण जानकारीहरु पनि दिनुभयो, यहांलाई धेरै धेरै धन्यवाद ।

Appendix 3

Correlation among the Top Management Commitment (TMC) items

		Correlations for Analysis 1 ^c									
		1	2	3	4	5	6	7	8	9	M
TMC1	Pearson Correlation	1	.140	.274**	.352**	.171	.080	.277**	.219*	.305**	.408**
	Sig. (2-tailed)		.157	.005	.000	.084	.421	.005	.026	.002	.000
TMC2	Pearson Correlation	.140	1	.555**	.507**	.391**	.498**	.413**	.373**	.362**	.671**
	Sig. (2-tailed)	.157		.000	.000	.000	.000	.000	.000	.000	.000
TMC3	Pearson Correlation	.274**	.555**	1	.540**	.462**	.454**	.417**	.458**	.521**	.746**
	Sig. (2-tailed)	.005	.000		.000	.000	.000	.000	.000	.000	.000
TMC4	Pearson Correlation	.352**	.507**	.540**	1	.478**	.433**	.377**	.422**	.457**	.723**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000	.000	.000
TMC5	Pearson Correlation	.171	.391**	.462**	.478**	1	.543**	.470**	.587**	.476**	.736**
	Sig. (2-tailed)	.084	.000	.000	.000		.000	.000	.000	.000	.000
TMC6	Pearson Correlation	.080	.498**	.454**	.433**	.543**	1	.558**	.537**	.388**	.729**
	Sig. (2-tailed)	.421	.000	.000	.000	.000		.000	.000	.000	.000
TMC7	Pearson Correlation	.277**	.413**	.417**	.377**	.470**	.558**	1	.624**	.563**	.749**
	Sig. (2-tailed)	.005	.000	.000	.000	.000	.000		.000	.000	.000
TMC8	Pearson Correlation	.219*	.373**	.458**	.422**	.587**	.537**	.624**	1	.632**	.781**
	Sig. (2-tailed)	.026	.000	.000	.000	.000	.000	.000		.000	.000
TMC9	Pearson Correlation	.305**	.362**	.521**	.457**	.476**	.388**	.563**	.632**	1	.745**
	Sig. (2-tailed)	.002	.000	.000	.000	.000	.000	.000	.000		.000
Mean	Pearson Correlation	.408**	.671**	.746**	.723**	.736**	.729**	.749**	.781**	.745**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

c. Listwise N=103

Correlation among the Policy Deployment items

Correlations for Analysis 2^c

		1	2	3	4	5	6	7	8	9	M
Policy 1	Pearson Correlation	1	.323**	.478**	.370**	.315**	.376**	.380**	.352**	.309**	.647**
	Sig. (2-tailed)		.001	.000	.000	.001	.000	.000	.000	.001	.000
Policy 2	Pearson Correlation	.323**	1	.416**	.344**	.493**	.399**	.359**	.386**	.256**	.662**
	Sig. (2-tailed)	.001		.000	.000	.000	.000	.000	.000	.009	.000
Policy 3	Pearson Correlation	.478**	.416**	1	.592**	.439**	.300**	.295**	.391**	.366**	.720**
	Sig. (2-tailed)	.000	.000		.000	.000	.002	.002	.000	.000	.000
Policy 4	Pearson Correlation	.370**	.344**	.592**	1	.478**	.213*	.342**	.449**	.262**	.684**
	Sig. (2-tailed)	.000	.000	.000		.000	.031	.000	.000	.008	.000
Policy 5	Pearson Correlation	.315**	.493**	.439**	.478**	1	.401**	.458**	.374**	.349**	.710**
	Sig. (2-tailed)	.001	.000	.000	.000		.000	.000	.000	.000	.000
Policy 6	Pearson Correlation	.376**	.399**	.300**	.213*	.401**	1	.243*	.368**	.179	.577**
	Sig. (2-tailed)	.000	.000	.002	.031	.000		.013	.000	.071	.000
Policy 7	Pearson Correlation	.380**	.359**	.295**	.342**	.458**	.243*	1	.432**	.523**	.671**
	Sig. (2-tailed)	.000	.000	.002	.000	.000	.013		.000	.000	.000
Policy 8	Pearson Correlation	.352**	.386**	.391**	.449**	.374**	.368**	.432**	1	.432**	.702**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000		.000	.000
Policy 9	Pearson Correlation	.309**	.256**	.366**	.262**	.349**	.179	.523**	.432**	1	.617**
	Sig. (2-tailed)	.001	.009	.000	.008	.000	.071	.000	.000		.000
Mean	Pearson Correlation	.647**	.662**	.720**	.684**	.710**	.577**	.671**	.702**	.617**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

c. Listwise N=103

Correlation among the Policy Deployment items

Correlations for Analysis 3^b

		1	2	3	4	5	6
Supplier 1	Pearson Correlation	1	.575**	.475**	.290**	.324**	.716**
	Sig. (2-tailed)		.000	.000	.003	.001	.000
Supplier 2	Pearson Correlation	.575*	1	.593**	.371**	.407**	.793**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
Supplier 3	Pearson Correlation	.475*	.593**	1	.566**	.342**	.805**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
Supplier 4	Pearson Correlation	.290*	.371**	.566**	1	.485**	.726**
	Sig. (2-tailed)	.003	.000	.000		.000	.000
Supplier 5	Pearson Correlation	.324*	.407**	.342**	.485**	1	.681**
	Sig. (2-tailed)	.001	.000	.000	.000		.000
M_supplier	Pearson Correlation	.716*	.793**	.805**	.726**	.681**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	

** . Correlation is significant at the 0.01 level (2-tailed).

b. Listwise N=103

Correlation among the Process Control and Improvement (PCI) items

Correlations for Analysis 4^c

		1	2	3	4	5	6	7	8	9	10	M_imp
PCI1	Pearson Correlation	1	.256**	.380**	.331**	.202*	.185	.410**	.330**	.337**	.108	.616**
	Sig. (2-tailed)		.009	.000	.001	.040	.061	.000	.001	.001	.277	.000
PCI2	Pearson Correlation	.256**	1	.351**	.328**	.302**	.268**	.307**	.135	.245*	.275**	.593**
	Sig. (2-tailed)	.009		.000	.001	.002	.006	.002	.173	.013	.005	.000
PCI3	Pearson Correlation	.380**	.351**	1	.363**	.234*	.257**	.383**	.333**	.233*	.226*	.644**
	Sig. (2-tailed)	.000	.000		.000	.017	.009	.000	.001	.018	.022	.000
PCI4	Pearson Correlation	.331**	.328**	.363**	1	.364**	.315**	.371**	.226*	.347**	.265**	.648**
	Sig. (2-tailed)	.001	.001	.000		.000	.001	.000	.022	.000	.007	.000
PCI5	Pearson Correlation	.202*	.302**	.234*	.364**	1	.398**	.307**	.202*	.172	.325**	.566**
	Sig. (2-tailed)	.040	.002	.017	.000		.000	.002	.040	.082	.001	.000
PCI6	Pearson Correlation	.185	.268**	.257**	.315**	.398**	1	.296**	.242*	.226*	.299**	.566**
	Sig. (2-tailed)	.061	.006	.009	.001	.000		.002	.014	.021	.002	.000
PCI7	Pearson Correlation	.410**	.307**	.383**	.371**	.307**	.296**	1	.355**	.215*	.221*	.653**
	Sig. (2-tailed)	.000	.002	.000	.000	.002	.002		.000	.029	.025	.000
PCI8	Pearson Correlation	.330**	.135	.333**	.226*	.202*	.242*	.355**	1	.285**	.135	.537**
	Sig. (2-tailed)	.001	.173	.001	.022	.040	.014	.000		.004	.174	.000
PCI9	Pearson Correlation	.337**	.245*	.233*	.347**	.172	.226*	.215*	.285**	1	.338**	.584**
	Sig. (2-tailed)	.001	.013	.018	.000	.082	.021	.029	.004		.000	.000
PCI10	Pearson Correlation	.108	.275**	.226*	.265**	.325**	.299**	.221*	.135	.338**	1	.534**
	Sig. (2-tailed)	.277	.005	.022	.007	.001	.002	.025	.174	.000		.000
mean	Pearson Correlation	.616**	.593**	.644**	.648**	.566**	.566**	.653**	.537**	.584**	.534**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

c. Listwise N=103

Correlation among the Evaluation and Assessment (EA) items

Correlations for Analysis 5^c

		1	2	3	4	5	6	7	8	9	10	M
EA 1	Pearson Correlation	1	.499**	.509**	.401**	.290**	.335**	.347**	.435**	.359**	.365**	.627**
	Sig. (2-tailed)		.000	.000	.000	.003	.001	.000	.000	.000	.000	.000
EA 2	Pearson Correlation	.499**	1	.633**	.559**	.544**	.397**	.262**	.527**	.454**	.523**	.743**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.008	.000	.000	.000	.000
EA 3	Pearson Correlation	.509**	.633**	1	.612**	.491**	.348**	.334**	.544**	.514**	.491**	.757**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.001	.000	.000	.000	.000
EA 4	Pearson Correlation	.401**	.559**	.612**	1	.487**	.458**	.555**	.542**	.608**	.427**	.798**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000
EA 5	Pearson Correlation	.290**	.544**	.491**	.487**	1	.487**	.230*	.469**	.316**	.424**	.664**
	Sig. (2-tailed)	.003	.000	.000	.000		.000	.019	.000	.001	.000	.000
EA 6	Pearson Correlation	.335**	.397**	.348**	.458**	.487**	1	.418**	.306**	.494**	.277**	.647**
	Sig. (2-tailed)	.001	.000	.000	.000	.000		.000	.002	.000	.005	.000
EA 7	Pearson Correlation	.347**	.262**	.334**	.555**	.230*	.418**	1	.366**	.540**	.339**	.633**
	Sig. (2-tailed)	.000	.008	.001	.000	.019	.000		.000	.000	.000	.000
EA 8	Pearson Correlation	.435**	.527**	.544**	.542**	.469**	.306**	.366**	1	.461**	.453**	.725**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.002	.000		.000	.000	.000
EA 9	Pearson Correlation	.359**	.454**	.514**	.608**	.316**	.494**	.540**	.461**	1	.576**	.773**
	Sig. (2-tailed)	.000	.000	.000	.000	.001	.000	.000	.000		.000	.000
EA 10	Pearson Correlation	.365**	.523**	.491**	.427**	.424**	.277**	.339**	.453**	.576**	1	.697**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.005	.000	.000	.000		.000
mean	Pearson Correlation	.627**	.743**	.757**	.798**	.664**	.647**	.633**	.725**	.773**	.697**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

c. Listwise N=103

Correlation among the Employee Empowerment and involvement items

Correlations for Analysis 6^c

		1	2	3	4	5	6	7	M
Employee 1	Pearson Correlation	1	.621**	.460**	.225*	.190	.346**	.419**	.676**
	Sig. (2-tailed)		.000	.000	.022	.055	.000	.000	.000
Employee 2	Pearson Correlation	.621**	1	.558**	.360**	.357**	.429**	.438**	.778**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000
Employee 3	Pearson Correlation	.460**	.558**	1	.497**	.421**	.369**	.354**	.758**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000
Employee 4	Pearson Correlation	.225*	.360**	.497**	1	.414**	.330**	.324**	.657**
	Sig. (2-tailed)	.022	.000	.000		.000	.001	.001	.000
Employee 5	Pearson Correlation	.190	.357**	.421**	.414**	1	.603**	.276**	.660**
	Sig. (2-tailed)	.055	.000	.000	.000		.000	.005	.000
Employee 6	Pearson Correlation	.346**	.429**	.369**	.330**	.603**	1	.224*	.667**
	Sig. (2-tailed)	.000	.000	.000	.001	.000		.023	.000
Employee 7	Pearson Correlation	.419**	.438**	.354**	.324**	.276**	.224*	1	.642**
	Sig. (2-tailed)	.000	.000	.000	.001	.005	.023		.000
M_employ	Pearson Correlation	.676**	.778**	.758**	.657**	.660**	.667**	.642**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

c. Listwise N=103

Correlation among the Research and Development items

Correlations for Analysis 7^c

		1	2	3	4	5	6	M
Research and Development 1	Pearson Correlation	1	.537**	.251*	.487**	.279**	.223*	.667**
	Sig. (2-tailed)		.000	.010	.000	.004	.023	.000
Research and Development 2	Pearson Correlation	.537**	1	.376**	.488**	.364**	.413**	.759**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000
Research and Development 3	Pearson Correlation	.251*	.376**	1	.212*	.232*	.426**	.614**
	Sig. (2-tailed)	.010	.000		.031	.018	.000	.000
Research and Development 4	Pearson Correlation	.487**	.488**	.212*	1	.642**	.281**	.735**
	Sig. (2-tailed)	.000	.000	.031		.000	.004	.000
Research and Development 5	Pearson Correlation	.279**	.364**	.232*	.642**	1	.430**	.706**
	Sig. (2-tailed)	.004	.000	.018	.000		.000	.000
Research and Development 6	Pearson Correlation	.223*	.413**	.426**	.281**	.430**	1	.676**
	Sig. (2-tailed)	.023	.000	.000	.004	.000		.000
M_rd	Pearson Correlation	.667**	.759**	.614**	.735**	.706**	.676**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

c. Listwise N=103

Correlation among the item of Business Performance

Correlations for Analysis 3^b

		1	2	3	M
Business Performance 3	Pearson Correlation	1	.399**	.456**	.782**
	Sig. (2-tailed)		.000	.000	.000
Business Performance 2	Pearson Correlation	.399**	1	.424**	.772**
	Sig. (2-tailed)	.000		.000	.000
Business Performance 3	Pearson Correlation	.456**	.424**	1	.804**
	Sig. (2-tailed)	.000	.000		.000
M_prof	Pearson Correlation	.782**	.772**	.804**	1
	Sig. (2-tailed)	.000	.000	.000	

** . Correlation is significant at the 0.01 level (2-tailed).

b. Listwise N=103

Correlation among the Customer relationship items

Correlations for Analysis 8^c

									M
Customer relation 1	Pearson Correlation	1	.449**	.470**	.257**	.148	.416**	.220*	.640**
	Sig. (2-tailed)		.000	.000	.009	.136	.000	.025	.000
Customer relation 2	Pearson Correlation	.449**	1	.442**	.179	.230*	.411**	.310**	.657**
	Sig. (2-tailed)	.000		.000	.071	.019	.000	.001	.000
Customer relation 3	Pearson Correlation	.470**	.442**	1	.408**	.459**	.343**	.063	.710**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.528	.000
Customer relation 4	Pearson Correlation	.257**	.179	.408**	1	.298**	.450**	.276**	.629**
	Sig. (2-tailed)	.009	.071	.000		.002	.000	.005	.000
Customer relation 5	Pearson Correlation	.148	.230*	.459**	.298**	1	.503**	.190	.619**
	Sig. (2-tailed)	.136	.019	.000	.002		.000	.054	.000
Customer relation 6	Pearson Correlation	.416**	.411**	.343**	.450**	.503**	1	.466**	.767**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000
Customer relation 7	Pearson Correlation	.220*	.310**	.063	.276**	.190	.466**	1	.555**
	Sig. (2-tailed)	.025	.001	.528	.005	.054	.000		.000
M_cr	Pearson Correlation	.640**	.657**	.710**	.629**	.619**	.767**	.555**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

c. Listwise N=103

Correlation among the items of Education and Training

Correlations for Analysis 9^b

		1	2	3	4	5	M
Education and Training 1	Pearson Correlation	1	.435**	.354**	.506**	.504**	.754**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
Education and Training 2	Pearson Correlation	.435**	1	.524**	.423**	.325**	.722**
	Sig. (2-tailed)	.000		.000	.000	.001	.000
Education and Training 3	Pearson Correlation	.354**	.524**	1	.467**	.393**	.725**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
Education and Training 4	Pearson Correlation	.506**	.423**	.467**	1	.588**	.795**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
Education and Training 5	Pearson Correlation	.504**	.325**	.393**	.588**	1	.752**
	Sig. (2-tailed)	.000	.001	.000	.000		.000
M_tra	Pearson Correlation	.754**	.722**	.725**	.795**	.752**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	

** . Correlation is significant at the 0.01 level (2-tailed). b. Listwise N=103

Correlation among the items of Product Quality (PQ)

Correlations for Analysis 1c

		1	2	3	4	5	6	7	8	9	10	M
PQ 1	Pearson Corr	1	.528**	.363**	.244*	.312**	.359**	.340**	.229*	.315**	.275**	.632**
	Sig. (2-tailed)		.000	.000	.013	.001	.000	.000	.020	.001	.005	.000
PQ 2	Pearson Corr	.528**	1	.501**	.377**	.369**	.372**	.199*	.366**	.324**	.318**	.699**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.044	.000	.001	.001	.000
PQ 3	Pearson Corr	.363**	.501**	1	.466**	.371**	.292**	.151	.219*	.240*	.355**	.641**
	Sig. (2-tailed)	.000	.000		.000	.000	.003	.127	.026	.015	.000	.000
PQ 4	Pearson Corr	.244*	.377**	.466**	1	.258**	.285**	.171	.203*	.061	.322**	.550**
	Sig. (2-tailed)	.013	.000	.000		.008	.004	.084	.039	.541	.001	.000
PQ 5	Pearson Corr	.312**	.369**	.371**	.258**	1	.387**	.221*	.322**	.238*	.328**	.610**
	Sig. (2-tailed)	.001	.000	.000	.008		.000	.025	.001	.015	.001	.000
PQ 6	Pearson Corr	.359**	.372**	.292**	.285**	.387**	1	.439**	.229*	.368**	.210*	.618**
	Sig. (2-tailed)	.000	.000	.003	.004	.000		.000	.020	.000	.034	.000
PQ 7	Pearson Corr	.340**	.199*	.151	.171	.221*	.439**	1	.407**	.385**	.464**	.594**
	Sig. (2-tailed)	.000	.044	.127	.084	.025	.000		.000	.000	.000	.000
PQ 8	Pearson Corr	.229*	.366**	.219*	.203*	.322**	.229*	.407**	1	.527**	.419**	.625**
	Sig. (2-tailed)	.020	.000	.026	.039	.001	.020	.000		.000	.000	.000
PQ 9	Pearson Corr	.315**	.324**	.240*	.061	.238*	.368**	.385**	.527**	1	.439**	.619**
	Sig. (2-tailed)	.001	.001	.015	.541	.015	.000	.000	.000		.000	.000
PQ 10	Pearson Corr	.275**	.318**	.355**	.322**	.328**	.210*	.464**	.419**	.439**	1	.667**
	Sig. (2-tailed)	.005	.001	.000	.001	.001	.034	.000	.000	.000		.000
mean	Pearson Corr	.632**	.699**	.641**	.550**	.610**	.618**	.594**	.625**	.619**	.667**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

c. Listwise N=103

Correlation between the items Customer Satisfaction

Correlations for Analysis 2^b

		1	2	M
Customer Satisfaction 1	Pearson Correlation	1	.840**	.957**
	Sig. (2-tailed)		.000	.000
Customer Satisfaction 2	Pearson Correlation	.840**	1	.961**
	Sig. (2-tailed)	.000		.000
M_cs	Pearson Correlation	.957**	.961**	1
	Sig. (2-tailed)	.000	.000	

** . Correlation is significant at the 0.01 level (2-tailed). b. Listwise N=103

