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AN INVESTIGATION INTO THE LEVEL OF ISO 9000 CERTIFICATION AND ITS IMPACT ON PERFORMANCE OF GHANAIAN FIRMS

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THIS THESIS IS SUBMITTED TO THE UNIVERSITY OF GHANA- LEGON, IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF PHILOSOPHY DEGREE IN OPERATIONS MANAGEMENT.

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DECLARATION

I do hereby declare that this work is the result of my own research and has not been presented by anyone for any academic award in this or any other university. All references used in the work have been fully acknowledged.

I bear sole responsibility for any shortcomings of this study.

……. ……..…..

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CERTIFICATION

I hereby certify that this thesis was supervised in accordance with procedures laid down by the University.

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DEDICATION

I dedicate this work to my twin mums, Mrs. Attaa Birago (Snr and Jnr) as a special gift for their 50th Anniversary celebration.

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I am very thankful to Almighty God for the gift of life, the wisdom, and His grace which has been with me till the completion of yet another step in the ladder of life. I also sincerely thank my supervisor, Dr. Francis Yaw Banuro, whose selfless attention has aided me to complete this research successfully. I am forever indebted for his time and effort expended on me. I also appreciate the good works of Dr. Kwaku Ohene Asare, Dr. Anthony Afful Dadzie and the other Lecturers of the OMIS Department, whose constructive inputs and encouragement added up to the completion of this research. Many thanks also go to the respondents who spent time off their busy schedules to provide the needed information for this work.

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LIST OF ABBREVIATIONS

AGI	Association of Ghana Industries
AVE	Average variance extracted
BVC	Bureau Veritas Certification
CA	Cronbach's Alpha
CR	Composite Reliability
DFSS	Design for Six Sigma
DMADV	Define, Measure, Analyze, Design and Verify
DMAIC	Define, Measure, Analyze, Improve and Control
EPA	Economic Partnership Agreement
ESO	European Standards Organizations
GSA	Ghana Standards Authority
IEC	International Electro-Technical Commission
ISO	International Organization of Standards
LISREL	Linear Structural Relations
NBSSI	National Board of Small Scale Industries
PDC	Policy Development Committees
PLS	Partial Least Square
QMP	Quality Management Principles
RIW	Relative Importance Weight
SEM	Structural equation modeling
SGS	Societe General de Surveillance
SIPOC	Supplier-Input-Process-Output-Customer
SME	Small and Medium Enterprises
SPSS	Statistical Package for the Social Sciences
TC	Technical Committees
TQM	Total Quality Management
UN	United Nations
VIF	Variance Inflation Factor
WTO	World Trade Organizations

ABSTRACT

In the context of globalization and trade liberalization with other European countries in the form of Economic Partnership Agreements, Ghanaian firms should be ready to compete with foreign firms in the global market. ISO 9000 is one of the concepts that have facilitated the institution of sustainable quality management practices across the globe. Meanwhile knowledge and practice of ISO 9000 principles seem to be missing in Africa. The purpose of this study is to find out how the ISO quality management principles affect performance, and to explore the factors that are causing the low patronage of the standards in Ghana. Primary data is collected from ISO 9000 certified and non-certified firms with the use of questionnaire which was analyzed using PLS-SEM technique, some non-parametric tests of comparison and relative importance weight methodology.

The results revealed only few significant positive relationships between the individual principles and the five performance indicators. Moreover, quality management principles as a composite variable significantly affect firms' performance positively. In comparison, certified firms did perform significantly better in terms of operational performance, product quality and customer satisfaction, but performed insignificantly different from that of non-certified firms in terms of marketing and competitiveness and financial performance. Finally, lack of top management's consent seems to be the most considered factor accounting for low patronage of certification, followed by the constraint of resources, financial and human, needed for the implementation process. Most of the non-certified firms, however, indicated their intentions of pursing the ISO 9000 standards in the future.

CHAPTER ONE

INTRODUCTION

1.1 Research Background

Globalization and its associated surge in the use of technology have erased the boundaries to competition by firms in any given country. Competitiveness, both locally and globally has been the focus of all firms worldwide. The reason is that competitiveness and firm performance have, in most works, been studied jointly (Doyle & Wong, 1998; Liao, 2005; Shurchuluu, 2002; Twomey, 2002). Among other things, researchers have concluded on two key elements, prices and quality, which determine a product or firm's competitiveness (Djerdjouri, 2000; Tsiotras & Gotzamani, 1996). Until recently, companies emphasized on mass production, by producing large quantities of products, with the purpose of lowering cost. There was relatively less emphasis on quality during those periods. In recent times, however, this ideology has changed, because customers' demand for quality products has increased. Trends in Operations Research have shown that quality has gained prominence in ensuring competiveness, leading to profitability of firms (Cagnazzo, Taticchi & Fuiano, 2010; Djerdjouri, 2000; Tsiotras & Gotzamani, 1996). Tsiotras and Gotzamani (1996) posit that customers' behavior has changed toward acceptance of high cost, so long as this high cost is justified by higher quality. For this reason, the increased manufacturing cost associated with quality is no more an impediment to quality production.

Initially, quality was achieved by focusing on inspection and screening out defective products (Pycraft, Singh & Phihlela, 2000). This method of dealing with quality was an 'after the event' way of ensuring quality. Thus, defective products were recognized only after resources have been wasted in producing them. There was the need for concepts and approaches which

do not only detect defectives but most importantly solve problems of quality (Okpala, 2012). To Gotzamani and Tsiotras (2001), the most appropriate way to ensure quality is the use of preventive quality management techniques rather than corrective methods of quality management. They concluded that the former ensures reduction in the cost of production whereas the latter compounds in increased cost and lower productivity.

A number of approaches have been subscribed to in the management of quality. These approaches help to ensure improvement in efficiency of firms and the improvement of competitiveness by firms through quality processes and productions. One of such approaches, most often recommended for organizations to ensure quality and improve competitiveness and performance, is through the implementation of Total Quality Management (TQM) tools and concepts in their operations (Valmohammadi, 2011). Tobin (1990) defines TQM as the totally integrated effort for gaining competitive advantage by continuously improving every facet of an organizational culture. Kumar, Choisne, Grosbois and Kumar (2009) also define TQM to be a holistic approach that seeks to integrate all organizational functions to focus on meeting customer needs and organizational objectives. Improvements in performance have sometimes been attributed to firms ascribing to TQM philosophy, and there have been a lot of studies to this effect (Kumar, et al., 2009). Organizational performance results such as fewer mistakes, waste reduction, customer satisfaction and retention, improvements in the quality of product and service delivery, and financial improvements have been studied to be associated with the adoption of TQM in the operations of firms (Demirbag, Tatolglu, Tekinkus & Zaim, 2006; Froza & Flippini, 1998; Valmohammadi, 2011).

One of the most prominent Total Quality Management concept implemented by firms is the ISO 9000 series (Beskese & Cebeci, 2001; Langrosen & Langrosen, 2005; Lo, Wiengarten, Humphreys, Yeung, & Cheng, 2013; Tsiotras & Gotzamani, 1996). It is seen as one of the

wheels on which TQM runs. Ho (1994) refers to ISO 9000 as the vehicle that leads to planning TQM. Tsiotras and Gotzamani (1996) similarly posit that the development of ISO 9000 international standards has led to widespread quality assurance developments in Europe. Beskese and Cebeci (2001) also remark that ISO 9000 and TQM are the most popular topics studied in the area of quality initiatives, concluding that they account for significant improvements in the competitiveness of firms.

Similar to the studies on TQM, studies about ISO 9000 have shown that implementation of the standards brings out a lot of performance implications to certified firms. Some of these include improvement in internal efficiency (Gotzamani & Tsiotras, 2002); reduction in start-up problems and internal cost of production, and growth in market share and sales revenue (Dimara, Skuras & Tsekouras, 2004; Starke, Eunni, Fouto & Angelo, 2012); and increased customer satisfaction and asset turnover (Nicolau & Sellers, 2002; Starke, et al., 2012). These benefits are enough motivation to induce a firm to adopt and implement the ISO 9000 International standards.

1.2 Research Problem

Irrespective of the benefits that accrue to the implementation of ISO 9000 and TQM concepts, their adoption by many businesses in Africa and other developing countries is minimal (ISO Survey, 2013). From the most recent ISO Survey (2013), 1,129,446 firms are globally certified for the standard, of which 9,856 firms are in the African continent. This represents less than 0.9% of certified firms in the world. Of the numbers in Africa, 49 are from Ghana. This represents less than 0.5% of the total in Africa. In effect, Ghana accounts for about 0.004% of all firms in the world that are certified with ISO 9000 standards. This figure, compared to the number of firms in Ghana (although an exact number of firms may be

unknown), seems very paltry. The 49 firms, for example, represents less than 4% of the membership of the Association of Ghana Industries (total membership of 1,265 as of August, 2014).

Awan and Bhatti (2003), in their study to evaluate the registration process of ISO 9000 in Pakistan, testified that adoption and implementation of ISO 9000 quality management system is dawdled in developing countries. They concluded that low patronage of ISO 9000 standards is perhaps because there have not been as much studies which expound on implementation of quality standards or its relevance to businesses in parts of Africa and other developing countries. In recognition of this, the International Organization of Standards has instituted programmes like the Twinning Relationships and Awards for Young Professionals specifically for developing countries, with the clear intention of encouraging and boosting the awareness and importance of ISO standards in developing countries (ISO 2014).

Few studies on the standards were identified in Africa. One of these studies is by Beshah, Kitaw and Alemu (2013) who analyzed the significance of ISO 9000 on the performance of two firms in Ethiopia. They concluded that the relationship between certification and performance was not clearly seen. Another study is by Turner, Ortman & Lyne (2000) to assess the adoption of the standards by South African Agribusiness firms. Abusa and Gibson (2012), and Edu (2014) studied ISO 9000 in relation to TQM implementation in Libyan and Ghanaian Manufacturing companies respectively. It was the work of Beshah, et al. (2013) which studied the impact of ISO 9000 on performance, while the others did not consider the effect of ISO 9000 on the performance of firms.

The problem of the low numbers for Ghana becomes even more of a worry in light of Ghana's subscription to the Economic Partnership Agreement with European countries. Many studies have highlighted on the rigor with which European countries expect

certification from firms (Awan & Bhatti, 2003; Tsiotras & Gotzamani, 1996). Tsiotras and Gotzamani, (1996) for example, claimed that;

> *European countries, in a parallel effort to protect both their consumers and their domestic manufacturing and economy, established and adopted national standards. The hundreds of national regulations and standards that foreign competitors should comply with, in order to have their products accepted, created technical difficulties and high certification and inspection costs, resulting in less competitive prices for their products. With the EC starting to eliminate internal trade barriers, the Europeans recognized the need to adopt common standards and regulations that will harmonize the standardization process and create a common market. ISO 9000 is expected to play an important role in this harmonization.*

Awan and Bhatti (2003) consider the standard a prerequisite for supplying goods and services in many businesses in the European community. This indicates that, although Ghanaian firms can export their goods to Europe due to the few trade barriers, their business counterparts in Europe may have their expected specifications, of which ISO 9000 certification is primary. A lot of American firms, for example, got certified with an underlying motive of establishing commercial relationships with European markets (Bhuiyan & Alam, 2004; Kazilunas, 2010).

Giving the low patronage of the standards in Africa and other developing countries, less effort has been made to find out the factors that could be accounting for it. *The black box* ideology (Bunge, 1963) is adopted to inquire the factors that account for such a situation. This philosophy describes phenomena that can be better appreciated and accurately defined by considering the inner workings of an external observation. This study looks beyond the challenges and hitches encountered during the implementation process of the standards to find out the possible factors that are deterring them from subscribing to the standards.

1.3 Research Purpose

The purpose of this research is to investigate the level of ISO 9000 Quality Management Standard certification in Ghana. The study will compare the performance of certified firms against non-certified firms, thus, the benefits accruing from implementation will be made clear. It will also identify the factors that hinder the ISO 9000 certification in Ghana.

1.4 Research Objectives

The study outlines these objectives to enable the achievement of the purpose of the study.

1. To assess the effect of ISO 9000 Quality Management Principles on firm performance.
2. To assess the differences in the performance of ISO 9000 certified and non-certified firms.
3. To determine the factors that hinder certification of the standards in Ghana.
4. To develop a framework for ISO 9000 implementation in Ghana.

1.5 Research Questions

In pursuance of these objectives this research seeks to answer the following questions.

1. How does the implementation of ISO 9000 Quality Management Principles affect firms' performance?
2. Is there a significant difference in the performance of certified and non-certified firms?

3. What are the factors accounting for low patronage of ISO 9000 certification in Ghana?

1.6 Significance of the Research

The study is significant to research, practice and policy. With respect to its significance to research, this study assists in adding to the deficient studies on ISO 9000 certification in Ghana and Africa. The results and discussion could be useful to other developing countries. It also adds up to the various studies on quality and performance management in literature. Future researchers on ISO 9000 in the African continent and other developing countries should find the results and discussion of this work useful.

Concerning its significance to practice, the study's intention to bring out some of the performance benefits of ISO 9000 certification can increase the awareness and popularity of the standards and to provide a basis to motivate most firms to apply for certification. This study provides enough information about some benefits of ISO 9000 certification in the African context that will be lucrative to unregistered firms. CEO of firms in Ghana and Africa as a whole should find this thesis valuable.

The study will inform policymaking, both governmental and private, of the presence or absence of some policies that are serving as impediments to the certification of ISO 9000. The ISO community will, by the help of this study, identify reasons that account for the minimum patronage of their standards in Africa and other developing countries. Policies can therefore be altered, as much as possible, or instituted in line with a smooth and encouraging atmosphere to promote the certification of ISO 9000 in Ghana as well as in other developing countries. Policymakers in the African continent, particularly Ghana, are the beneficiaries of this thesis.

The study also seeks to develop a framework that will identify practical approaches to facilitate the implementation of ISO 9000 standards in Ghana. Firms that are yet to implement ISO 9000 can use it as a tool for directing their efforts towards implementing the certification process.

1.7 Research Methodology

The study will use quantitative approach to achieve its purpose. A survey will be used to gather information from firms that will be sampled for the study.

Population and Sampling

For this study, there are two populations. The first population constitutes firms that are registered under the ISO 9000 standards. As of 2013, there were 49 firms that were ISO 9000 certified in Ghana (ISO, 2013). These firms are distributed across industries in Ghana, and for that matter, attention will not be given to the segregation of the industries that these firms are operating in. A sample of 30 firms which accounts for about sixty percent (60%) of the total certified firms will be used in the study.

However, the second population is non-certified firms in Ghana. The sample from this population will be used as a control group to compare the performance of certified and non-certified firms. This sample also provides information to achieve the objectives of finding reasons that are hindering the subscription of ISO 9000 certification. A sample of 70 firms is expected to be drawn from this population. Specifically the sample will be drawn from firms registered with the Association of Ghana Industries (AGI).

The study was restricted to firms in Accra and Tema Metropolitan Regions. These selections were made because of the high concentration of firms in these two localities. Considering the problems of the addressing system of the country and specifically the area of the study,

locating some of the firms by their addresses is very unlikely. Some firms do not have office addresses on their website, and those which have provided addresses might be incorrect because it has not been updated after there had been changes. To deal with the location problem, a convenient sampling technique will be used where companies whose location can be identified were selected for the study.

Primary source of data will be used for this study through the answering of questionnaire by respondents from the sample under study. Some data will also be derived from other available secondary sources for the purpose of confirming the primary data received and for triangulation purposes.

Statistical Package for the Social Sciences (SPSS) software and the Partial Least Square software for Structural Equation Modeling (SEM-PLS) will be used to analyze the data gathered from the respondents. To assess the effect of the quality management principles on performance, the SEM-PLS will be used. The analysis will be presented in the form of charts, tables and graphs for further expositions to be made on them.

1.8 Research Limitations

The study is carried out amid a number of restrictions and limitations. First, the study assesses the performance of firms after implementation of the standards. Unfortunately, the number of firms that are ISO 9000 certified is very few. This gives limitations to the types of quantitative analysis that can be done for the study.

Finance is another constraint to this study. The study demands a number of visits to and from the selected firms for questionnaire distribution and collection of data from respondents. This is associated with a huge financial burden while there are no research funds. As a result of

this constraint, the firms that will be included in the study are restricted to firms in the Accra and Tema metropolis in the capital region of Ghana, Greater Accra. Moreover, some of the visits to the firms have to be substituted with phone calls and emails to make correspondence with study subjects.

Again, lack of an up-to-date database containing information on the ISO 9000 certified firms in the country is a challenge. This is because, the latest survey was published in 2013, hence the number of certified firms as at 2015 is not specifically known. New firms might have been certified between the periods or the already certified firms might have failed to meet the requirements for re-certification. Moreover, there is no list of the certified firms in Ghana. Taking the names of registered firms from some of the certification bodies is the surest way to ensure that certified firms as of 2014 are captured in the study.

One important limitation is the unavailability of secondary data on the implementation of the principles and the performance of the firms. A subjective response on the implementation of and performance from certification may not give objective picture of the effect of the quality management principles. A panel secondary data, for instance, might provide more detailed information as to the effect of the implementation of these principles on performance. Meanwhile, there is no database to get such information of firms.

Finally, the study is hinged on the collaboration and assistance of the study respondents. There is the possibility that some of the respondents may not respond to some of the questionnaire items and interview questions, since some of the questions discuss financial and operational activities that firms want to keep confidential. In order to get the best and accurate responses, the questionnaire will indicate a full assurance of confidentiality, and that the information that will be provided by respondents will be used only for academic purposes.

1.9 Organization of the Study

This study has been structured into eight chapters. The first chapter describes the background to the study, and the statement of the problem that has informed this study. It also presents the purpose, objectives of the study and the research questions, and finally, the limitations of the study. The context of the study is captured in Chapter two. The International Organization of Standards, the instituting body of ISO 9000 is described. Further to this, the ISO 9000 set of standards is discussed. The governing body in Ghana that is authorized in the dealing of ISO 9000 is briefly discussed in this chapter.

Relevant literature was reviewed in Chapter three. This is to reflect on works that have been done on ISO 9000 and TQM and their benefits, providing a theoretical framework, basis and support for the study. Studies that relate other contextual factors that could affect the performance of firms that implement quality management standards were also be reviewed. Chapter four discusses the methodology used for the research. The research approach, sampling techniques and procedure for the study, as well as sources of data and data collection procedures were mentioned in this chapter. Brief description of the analytical techniques used is provided in this chapter.

The Chapter five of the report presents the results of the analyzed data collected from the field in order to generate significant and important deductions. This analysis is made in pursuit of answering the research questions and achieving the objectives posed earlier in the study. Chapter six of the study presents a summary of the major deductions and findings of the research. The various findings of the study are brought out in relation to previous studies on ISO 9000, to see the linkages with and diversion from existing literature.

Chapter seven of the study was used to develop a model that will serve as a tool to aid the implementation of ISO 9000 certification in Ghana. Chapter eight summarizes the work, and

outlines the implications of the findings. Recommendations and gaps for future research are also outlined. This chapter ends with the conclusion of the study.

CHAPTER TWO

CONTEXT OF THE STUDY

2.0 Introduction

This chapter presents the context of the study. The chapter is in three sections, the first part describes the International Organization of Standards. The second section specifically talks about ISO 9000 series of standards, its principles and the motivation for certification, whereas the final section describes the extent of ISO 9000 certification in Ghana.

2.1 International Organization of Standardization (ISO)

ISO is a non-governmental organization's network of the national standards of countries on the basis of one member per country. The organization was founded in Europe in 1947 and currently has its Central Secretariat in Geneva, Switzerland, that coordinates the system (ISO, 2014). The name of the organization is even standardized to eliminate any confusion that could result from the translation of "International Organization for Standardization" into different languages, which would lead to different acronyms. Therefore the name "ISO" is not an acronym, but was derived from the Greek word "*isos*" meaning "*equal*" or *"uniform"*. ISO serves as a mother body that coordinates with other international, regional and sub-regional standard bodies like African Organization for Standardization (ARSO) and European Standards Organizations (ESOs) and also deals with many other international organizations like the World Trade Organizations (WTO), United Nations (UN) and its agencies in achieving its aims.

2.1.1 Membership

As of 2013, the ISO had a membership of 165 countries, constituted by national standard authorities representing each member country (ISO Survey, 2013). These authorities come from all regions over the world; developing as well as industrialized countries. The organization that is serving as a representative of a particular country would have to present documents that confirm its status as the most representative of standardization in that country. If this organization changes its name or responsibilities, notice should be served the ISO membership team for the changes to be effected. Membership in the ISO body is of three (3) categories, Subscriber member, Correspondent member and Full member. Full members influence ISO standards by participating and voting in ISO technical and policy meetings. They also sell and adopt ISO international standards nationally. Correspondent members attend ISO technical and policy meetings only to observe the development of the standards, although they can also sell and adopt the standards nationally. Subscriber members on the other hand cannot sell or adopt ISO international standards nationally. They do not participate in technical and policy meetings. There are 4 subscriber members, 42 correspondent members and 119 full members. Application for membership is voluntary, although a set of requirements must be met, in order to inform which type of membership status a country can join. These requirements are stipulated in terms of membership fees and the structures of the applying institution.

2.1.2 Objectives of the ISO

The ISO has the objective to facilitate trade across countries, through the establishment of standards for goods and services that will be accepted by international communities (Stevenson & Barnes, 2001). In pursuit of this objective, ISO has published more than 20,500

international standards covering almost all aspects of products, technology and business (ISO, 2015). These standards published by ISO serve as strategic guidelines and tools for companies to tackle some of the challenges of doing business. The standards harmonize technical specifications of products and services, which help organizations to be efficient. Moreover, they break down international barriers to trade, while increasing access to new markets and sustainable economic growth. These standards cover an estimated 80% of world traded commodities, ranging from food products to machines, energy management and environmental protection. For instance, ISO 14000, ISO 22000, ISO 26000, ISO 50001 and ISO 9000 are standards for Environmental Management, Food Safety, Social Responsibility, Energy Management, and Quality Management Systems respectively.

2.2 ISO 9000:2008: Quality Management Standards

During the Second World War in 1945, production systems were expected to efficiently and strictly produce military products to meet certain quality requirements, leading to a call for setting up of standards to meet specifications (Devos, Guerrero-Cusumano & Selen, 1996, Magd and Nabulsi, 2012). Although quality management as a philosophy gained its prominence in Japan, the first quality standard was issued by the United States Defense Department in 1958 (Devos, et al., 1996). Later in 1979, the British Standard 5750 (BS 5750), the first commercial standard in Britain, was established for quality management.

In 1987, a set of standards was issued by an ISO body to establish a global industrial and manufacturing standard called ISO 9000. This set of standards had its roots in the BS 5750 (Magd & Nabulsi, 2012). The BS 5750 standards were adopted with few changes made to it as the international standards, ISO 9000. It is no surprise that the first phase of growth of the

ISO 9000 set of standards was prominently found in the UK and other parts of the European communities (Marimon, Casadesus & Heras, 2010). These standards were revised in 1994, with few changes to publish the ISO 9000:1994 (Zeng, Tian & Tam, 2007). As and when necessary, the standards are reviewed to reflect the changes in the competitive business environment (Magd and Nabulsi, 2012). Revisions were made for other principles to be incorporated into the standards to arrive at ISO 9000:2000 and ISO 9000:2008 in year 2000 and 2008 respectively.

The ISO 9000 standard is a series of international standards that deal with quality systems often used for quality assurance purposes. These standards are not for standardizing products and services as peoples' perceptions have always been. It rather ensures systematic methods and procedures for producing quality goods and services. It is a standard that guarantees that products are manufactured using certified methods of production that eliminate variation in the processes and procedures. Thus ISO 9000 standards apply to the quality management systems serving as a quality assurance standard for organizations (Terziovsky, Samson and Dow, 1997). The basis for the standard is the belief that the creation of quality goods and services is as a result of quality processes and systems devoid of variations and defects.

2.2.1 The ISO 9000 Structure

ISO 9000 standard consists of a number of components nested into one composite heading, ISO 9000. This informs why some studies usually refer to it as ISO 9000 series, set or family of standards. The current ISO 9000:2008 set of standards is made up of four separate standards: ISO 9000, ISO 9001, and ISO 9004 and ISO 19011 (ISO, 2009). A full

understanding of the purposes and roles of each of the components makes it easier for an organization to get certified.

ISO 9000: 2005 Quality Management Systems- Fundamentals and Vocabularies

This standard provides the fundamental descriptors and vocabularies used in the whole ISO 9000 family of standards. It provides a platform and ground rules to understand the terminologies, principles and requirements of the other components. It serves as a guide to introduce users to the eight principles of quality management, and their implications on the achievement of continual improvement.

ISO 9001:2008 Quality Management System Requirements

ISO 9001 is a standard in the ISO 9000 series against whose requirements an organization's quality management system can be certified by external bodies (ISO, 2009). Before the revision of the standards in the year 2000, the ISO 9001 was made up of three isolated sets of standards (ISO 9001:1994, ISO 9002:1994 and ISO 9003:1994). ISO 9001 is a model for quality assurance, applicable when an organization demonstrates the ability for quality design, development, production, installation and servicing of products. It is applicable for quality assurance aimed at the detection and control of non-conformities in the production process. This standard enlists the eight principles that a firm has to implement in order to get certified.

ISO 9004:2009 Managing for the sustained success of an organization- A quality management approach

ISO 9004:2009 is the part of the set of standards that emphasizes on risk and strategies of implementation. It provides an indication on how quality management can be successfully

achieved and sustained. It is designed to provide guidance for companies to develop and implement effectively the quality systems expressed in the ISO 9001:2008 standard.

ISO 19011:2011 Guidelines for Auditing Management Systems

This is a supporting document which applies to organizations that are responsible for carrying out audits of management systems. Particularly, it specifies the competence of the personnel and companies that are involved in carrying out audits, and how their activities are to be managed and controlled.

2.2.2 Principles of ISO 9000:2008

The current ISO 9000 series, ISO 9000:2008 has eight principles that an applying organization is required to uphold.

1. **Customer Focus**: An organization that seeks for certification must be focusing on providing quality goods and services to meet the current and future needs of its customers. To achieve this, customer needs and expectations are collected through customer complaints and suggestions and market surveys, and these expectations are well communicated to the appropriate units concerned. An organization must be structured so that its goals are directly linked with customer needs and expectations.
2. **Leadership**: Implementation of quality systems should have the involvement of top management, that will serve the leadership and direction roles to achieve quality aims. Top management must set a clear vision and establish policies that focus on quality improvement. Moreover, the leadership of an organization must be ready and capable of acquiring and distributing resources of the right quality, including human resources, to facilitate the achievement of quality aims. They should be committed to

the quality concept and also provide inspiration and motivation for the staff at the lower level of the hierarchy.

3. **Involvement of People**: Involving people and their abilities at all levels can bring benefits to an organization. All employees in the organization must realize the importance of their roles in quality attainment. Management should roll out programmes that recognize the contributions and efforts of staff, for example, giving awards for best performing worker in a given period. Communication and sharing of knowledge and experience should also be encouraged across departments and units as quality is an entire organizational approach.
4. **Process Approach:** Managing activities and resources as a process gives clear indications of what all the inputs and outputs are and thus gives a clearer idea of how desired outcomes can be achieved. An organization must formalize the processes and systems for production, with effective supervision to ensure that these processes work as planned.
5. **System Approach to Management**: Organization's effectiveness and efficiency depend on its ability to identify, understand and manage interrelated processes as a system. Each staff and department or unit's role and responsibility in the attainment of quality is explicitly explained. Most especially, the synergistic effect of all departments pursuing their roles towards the quality visions is well linked and explained. Departments are described to feel as complements rather than as competitors.
6. **Continual Improvement:** Customers' demands and expectations keep on changing and hence there is no optimal quality standard reached. An organization must therefore continuously pursue measures that will improve on the quality. An

organization should invest in research, training methods and equipment for continual improvements.

7. **Factual Approach to Decision Making:** Decisions should be based on the analysis of reliable and accurate data and information. Decision makers should not only rely on intuition and experience, though essential, but must ensure that there are accurate and reliable information and facts that can aid decisions. Data is collected and analyzed, and the information is communicated to decision makers as timely as possible.
8. **Mutually Beneficial Supplier Relationships**: The enhancement of the ability to create value depends on the relationships with suppliers. This relationship must balance both short-term and long-term considerations of both parties. The organization and its suppliers must devise activities for development and improvement to enhance quality of supplies and eventually the products.

2.3 Motives for Implementing ISO 9000

One of the issues considered in TQM and specifically ISO 9000 studies pertains to the motives for undertaking the certification. Firms are motivated to register for certification with the intention of improving quality, reducing the rate of rejection and rework, making them competitive, achieving world-class operation, streamlining and improving operations, improving firm's reputation for quality, improving internal communication, responding to customer and suppliers purchase requirements, etc (Jang & Lin, 2008; Gotzamanni and Tsiotras 2002; Prajogo, 2011). These factors have been grouped into two broad spectrums; internal and external motivations (Jang & Lin, 2008; Gotzamanni and Tsiotras 2002; Prajogo, 2011; Terziovski, Samson and Dow, 1997). The two classes of motives are discussed below.

2.3.1 External Motives

External motivation drives an organization to ascribe to certification in reaction to external pressures, to enhance its reputation or meet the expectations of customers. Thus, a firm pursues certification to gain an institutional value and to influence the external perception about it. In the early years of ISO 9000, many firms acquired certification so that it could be used as a means to prove to third parties, customers or suppliers that the firm has complied with quality standards (Martinez-Costa, Martinez-Lorente & Choi, 2008). Some of the reasons that externally motivate a firm to pursue ISO 9000 certification are;

a. Pressure from competitors

Firms can increase their competitiveness by producing quality goods and services. Nevertheless, some firms ascribe to subscription not with the ultimate purpose of competing on the ticket of quality producing; rather they believe that having the certification is enough to keep up with competitive pressures from both local and international markets (Choi and Eboch, 1998; Kazilunas, 2010; Prajogo, 2011). Instead of certification serving as a proactive measure to increase a firm's competitiveness, some firms only apply for certification because competitors are certified. Cagnazzo, et al., (2010) considers this to be a short-sighted goal for "getting certified".

b. Improve company's image and reputation

It is easy to market a firm with an ISO 9000 label, since the label communicates the quality intents and capabilities of the firm. Some firms consider ISO 9000 certification as a necessary factor to enhance corporate reputation. A firm that suffers quality reputation problems can mitigate redeem if it gets certified to a quality standard like ISO 9000.

c. Satisfy external demand pressures from the market.

Some firms pursue certification because it has become the norm of trade within and between some countries. Firms use ISO 9000 certification as a passport to doing business in many countries and an entry mechanism into some markets. Entry into some markets requires that a firm is certified. A case in question is a study by Bhuiyan and Alam (2004) which concluded that most US companies get certification with an underlying reason of creating and improving the commercial relationships with European Markets.

d. To facilitate quality acceptance contracts with customers

Numerous studies have confirmed the impact of ISO 9000 certification on customer satisfaction (Cagnazzo, et al., 2010; Han, Chen and Ebrahimpour, 2007; Singh, 2008). For this reason, some customers have the belief that certification to ISO 9000 series of standards automatically comes with strong evidence that a firm has the ability of producing high quality products that could provide the expected satisfaction. Some firms, in order to appeal to this faction of customers will apply for certification.

2.3.2 Internal Motivation

These are the reasons for certification based on the deliberate effort to build an effective quality assurance programme (Prajogo, 2011). The focus is on implementing a continual quality improvement systems and processes through the establishment and use of quality policy, objectives, audit results, data collection and analysis, documentation and monitoring, operation traceability, preventive and corrective actions. The revision of the standards towards the achievement of TQM over the years has necessitated concentrating on the pursuit of mostly the internal motives (Martinez-Costa, et al., 2008). The emphasis is now on improving internal communication, management systems and practices, and quality culture of

an organization. Some of the internal reasons that motivate firms to apply for certification include;

a. Continuous process improvements

The nature of quality requires that firms put in place systems and processes that can meet the dynamism of customers' expectations. Some firms undertake certification because they realize this need and believe that subscribing to the ISO 9000 series of standards can better help them to continuously improve their production processes. The management and employees seek to constantly review the production process to ensure the development of more improved ways of producing goods and services.

b. Provision of better processes and products

Although ISO 9000 standards do not guarantee the production of quality goods and services, certification provides a level of assurance that there is a high level of conformance to the quality systems put in place to provide the final goods. Some firms will get certified in order to ensure that the best systems and processes are in place to provide the best of goods and services.

c. Part of a TQM based strategy

ISO 9000 has been considered by some researchers as a means to TQM implementation (Edu, 2014; Gotzamani and Tsiotras 2002; Martinez- Costa, et al., 2008; Sharma, 2005). For this reason, firms that intend to pursue TQM philosophy have the belief that applying for certification to ISO 9000 is a step to maturity in quality assurance.

d. Need to formalize management systems

An organization that seeks to maintain consistency in its operations can be motivated to apply for certification. As a requirement for certification, an applying firm needs to document all the processes and procedures of operation, for it to be assessed and refined (Huarng & Chen, 2002; Starke, et al., 2012). This serves as a quality manual that guide the daily operations of the firm. This can ensure that the processes work in a systematic manner.

2.4 ISO Representation in Ghana

Ghana has a full membership status with the ISO and has the rights to participate in developing international standards and policies, and governance of ISO. Full membership status also comes with the right to sell ISO standards and publications, using copyrights and the ISO logo and name. In Ghana, The Ghana Standards Authority (GSA) is the official representative of ISO in the country. The GSA has the mission of promoting standardization for the improvement of quality of goods and services and sound management practices in both the industry and in public institutions. It has affiliations with other regional and international standardization bodies like the African Organization for Standardization (ARSO), International Electro-Technical Commission (IEC) and International Organization for Legal Metrology (OIML). It is a participating member in 17 ISO Technical Committees (TC) and 3 Policy Development Committees (PDC). It also has a member status in two other ISO technical committees. GSA provides three ISO certifications: Product Certification (ISO/IEC 22000:2005), System Certification (ISO 9001:2008) and Environmental management systems certification (ISO 22000).

The GSA is headquartered in Accra, but operates a decentralized system with five regional board offices in Ho, Koforidua, Takoradi, Kumasi and Tamale. The Systems Certification Department of the GSA is the unit that specifically provides ISO 9001:2008 Management

Systems Certification to firms in Ghana. GSA received accreditation to give ISO 9001 in 2012 and had certified 4 firms as of 2013. Although, GSA is the official country representative, other private bodies, like Societe General de Surveillance (SGS) and Bureau Veritas Certification (BVC), provide ISO certification to Ghanaian companies and have respectively certified 25 and 20 firms as at the end of 2013. These bodies, however, derive their authority from their mother bodies in other countries.

2.4.1 Trend of ISO 9000 Certification in Ghana

ISO 9000 series of standards have not been a very popular practice in Africa relative to other continents (Awan & Bhatti, 2003; ISO Survey, 2013). As of 2013, 49 firms in Ghana had certified to the standards, accounting for about 0.004% of the total number of subscriptions in the world. There has not been a significant increase in the number of firms that certified to the standards since 1994 when Ghanaian firms started to get certified. The period between 2001 and 2009 realized a marginal level of improvements in the number of firms that got got certified, before it declined in 2010 and 2011. The number significantly rose in 2012, from 9 firms to 41 firms. This increase was sustained from 2012 to 2013. This is graphically represented in Figure 2.1 below (ISO Survey, 2013).

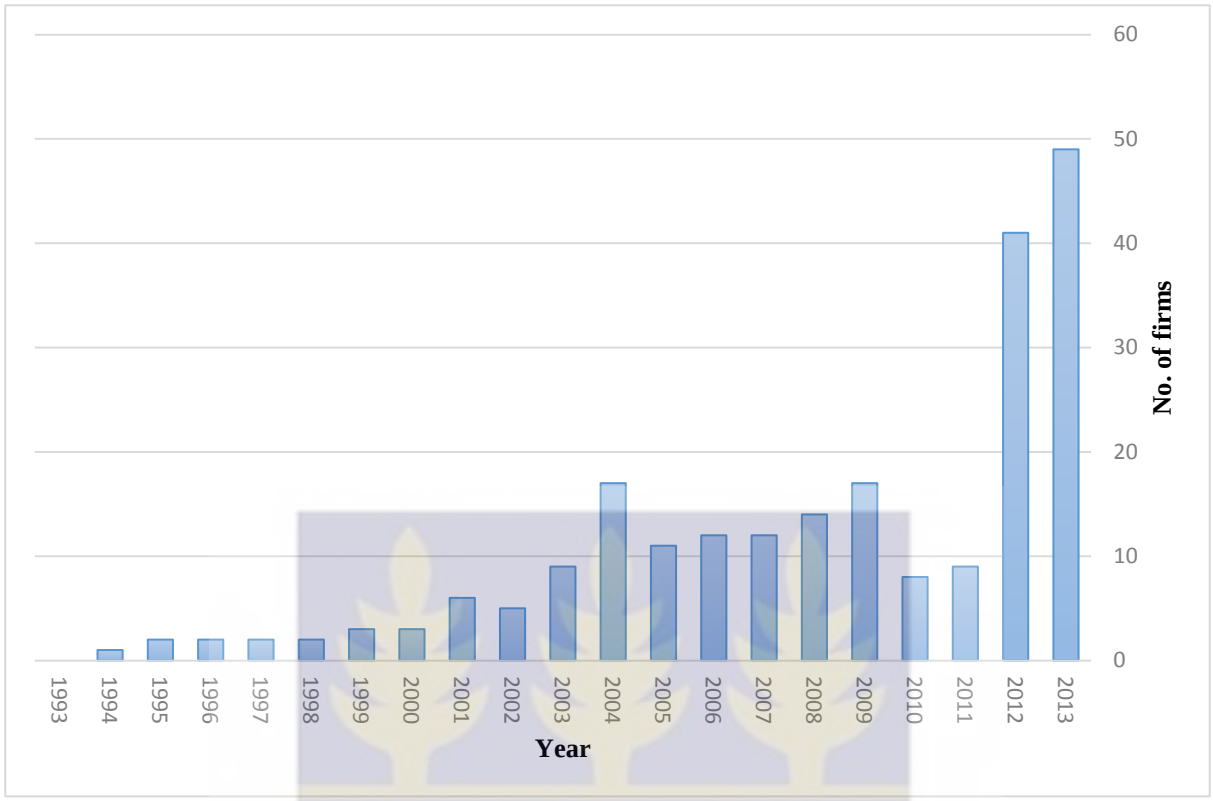


Figure 2. 1 The evolution of ISO 9001 certificates in Ghana, 2013 (ISO Survey, 2013).

2.4.2 Industrial Survey of ISO 9000 in Ghana

ISO 9000 standards are set not only for manufacturing firms, but also cover firms in the service industry, as well as the agricultural, extraction and construction industries. 39 firms out of the total 49 firms with ISO 9000 certification in Ghana were captured in the Industry Survey reported by ISO (ISO, 2013). These firms were categorized under 17 different sectors. Although these standards are applied across these industries, there has not been as much research in the service sector as compared to the manufacturing sector in ISO 9000 literature. Lee, To and Yu (2009) consented that the majority of research papers on ISO 9000 has concentrated on the manufacturing, extraction and construction sector, and less on the service sector. Basic metal and fabricated metal products industry accounted for 6 of the 39 certified firms, the majority among all the sectors. The number of firms in the other industries is represented in the Table 2.1.

Table 2. 1 Distribution of firms across the industrial sectors

	Sector	Number of firms
1	Agriculture, Fishing and Forestry	1
2	Basic metal & fabricated metal products	6
3	Chemicals, chemical products & fibres	1
4	Concrete, cement, lime, plaster etc.	1
5	Construction	2
6	Education	2
7	Electrical and optical equipment	2
8	Financial intermediation, real estate, renting	1
9	Food products, beverage and tobacco	5
10	Information technology	1
11	Manufacture of coke & refined petroleum products	1
12	Other Services	3
13	Printing companies	1
14	Public administration	1
15	Rubber and plastic products	4
16	Transport, storage and communication	4
17	Wholesale & retail trade, repairs of motor vehicles	3
	TOTAL	**39**

Source: ISO 9000 industrial Survey for Ghana (ISO 2013).

2.5 Conclusion

The International Organization of Standards, the governing body of the world standards, sets standards that cover about 80% world traded products, including food and machines. One prominent standard set has been the ISO 9000 which is a quality system management standard, directed towards TQM. This chapter discussed the principles of the ISO standard and the intentions that motivate firms to apply for certification. Finally, the chapter describes the extent of ISO 9000 certification in Ghana.

CHAPTER THREE

LITERATURE REVIEW

3.0 Introduction

Since the inception of quality management concept by Shewart, and its propagation by Deming, Juran and the other gurus in the field, attention on quality of goods and services has progressively being considered as a prominent requirement of a firm's operation systems (Brah, Wong, & Rao, 2000). This has gradually led to the embracement of Total Quality Management practices and philosophies like the Just-In-Time Inventory systems, Six Sigma, and ISO 9000. These practices are now seen as prerequisite for a company's survival and not just a competitive advantage as it used to be initially. These practices come with a number of performance implications for implementing firms. The remarkable upsurge in the number of companies attaining certification worldwide, gives an indication that the decision to pursue a quality system yields performance benefits to subscribing organization.

3.1 Theoretical Review

Since the inception of the ISO 9000 sets of standards in 1993 (although a voluntary standard), more than 1,129,446 have been certified from 165 countries. An understanding of why firms choose to register for certification is very necessary. Many different theories have been used to explain why firms associate themselves with ISO 9000 certification, although some of these theories have not been explicitly mentioned in some studies. This study will refer to the Resource- Based and Institutional theories in explaining why firms go in for certification.

3.1.1 Resource-Based Theory

Resource-based theory explains the differences in the performance of different organization on the basis of the usage of different resources available to them (Peteraf & Barney, 2003). This theory is linked to the works of Barney (1991) and Wernefelt (1984). The theory examines how firms in competitive environments are able to attain and maintain sustainable positions using the resources available to them (Hoopes, Madsen, & Walker, 2003). Certification is thought of as a resource to firms. The relationship is that, certification to the standards serves as a resource that makes a firm improve on its internal organizational processes in order to outplay its competitors. The core of resource-based theory is that firms compete against other firms with the resources and capabilities at their disposal. A resource is defined as anything, tangible or intangible that could be thought of as strength for an organization (Wernerfelt, 1984). Examples of resources that firms compete with include trade contracts, employee expertise, knowledge and skills, machinery and technology, brand names, and efficient processes and procedures (Wernerfelt, 1984). One of the resources that have gained attention in research is routines (Asif, Bruijn, Douglas and Fisscher, 2009; Barney, 1991; Peng and Khoury, 2008). Routines are defined as the patterns of activities or the way things are done (Grant, 1996). It includes both patterns of behavior and standard and operating procedures that are implicitly or explicitly guided by written values and policies (Ketokivi & Schroeder, 2004). The structured approach of the standard, which includes procedure documentation and monitoring, error reduction, operation traceability, after sales service and client communication, helps to build an effective quality assurance program. Improvements in quality and productivity of several firms have been attributed to the implementation of ISO 9000 (Kazilunas, 2010; Naveh & Marcus, 2005; Poksinska, Dahlgaard & Antoni, 2002; Yahya & Goh, 2001).

From the perspective of the resource-based theory, many studies have explained the internal justification for getting certified (Adams, 1999; Benner & Veloso, 2008; Naveh & Marcus, 2005; Tzelepis et. al., 2006). Meanwhile, subscription to the standards does not position a firm in an isolated circle, or does not guarantee a unique and sustainable competitive advantage as resource-based theorists posit, probably because a lot other firms have been subscribed to the standard. However, it is viewed as a valuable resource that certified firms can use to improve their internal processes to increase productivity, relative to non-certified counterparts. The work by Skinner (1969) provides the foundation for the use of operational strategy as an organizational resource to increase performance of firms. The internalization of ISO 9000 practices translates into an improved operational performance, which consequently leads to business performance (Nair & Prajogo, 2009). ISO 9000 certification is seen as a differentiating resource that could explain the differences in the performance of certified firms and non-certified firms. The principles in the standard are not necessarily unique business practices, however, certified firms are able to implement it in a better way to build unique internal operational capabilities, which could lead to variability in the performance of certified firms against competitors in the market (Prajogo, 2011).

3.1.2 Institutional Theory

A number of theories have explained actions of organizations, one of which is the Institutional theory. Institutional theory is flowing from the social sciences but DiMaggio & Powell (1983) are referenced as the propounders of the new Institutional theory. It explains why all organizations in a particular setting, industry, or geographic location or any particular field tend to look and act the same (DiMaggio & Powell, 1983). Scott (1995) defines institutions to mean "regulative, normative and cognitive structures and activities that provide stability and meaning for social behavior". The theory posits that firms in an industry are

likely to show some forms of variability in the initial stages of the organization's life cycle, but express some increasing level of homogeneity as time goes on.

Institutions provide an environment that influences the behavior of organizations called isomorphism. There are rules, requirements, assumptions, beliefs and procedures that specify what constitutes acceptable and appropriate organizational behavior and forms (Papadimitrou & Westerheidjen, 2010). This constraining forces influence organizations in the same population, with the same set of environmental conditions, to resemble other organizations (Hawley, 1968). The concept of isomorphism states that institutions tend to copy other organizations that seem to be successful. The institutional influence of isomorphism is in three forms; coercive, normative, and mimetic (DiMaggio & Powell, 1983). Coercive force emanates from political and legal influences (Papadimitrou & Westerheidjen, 2010). It also refers to the pressures from entities that have resources on which an organization depends. Mimetic force refers to the imitation of other successful organizations in response to uncertainty. Normative force is associated with professionalization. It refers to following standards and practices of a profession, usually established by education and training methods, and by professional networks (Miles, 2012).

Subscription to ISO 9000 sets of standards is usually considered under the normative isomorphic forces. Meanwhile, other studies explain why certification of ISO 9000 standards reflects all three forces of isomorphism (Boiral, 2003; Corbett & Kirsch, 2001; Clougherty & Grajek, 2008; Guler, Guille & Macpherson, 2002; Kostova & Roth, 2002; Singh, Power & Chuong, 2011). Coercive pressure may arise when firms pursue certification as a response to the demands posed by customers or suppliers, or other parties to whom an organization largely depends on (Prajogo, 2011). Mimetic pressure is reflected when a firm gets certified to match competitors' actions, or wants to imitate the performance benefits that certified

organizations enjoy, and in situations where firms are uncertain about the business and industry environment in which they operate (Prajogo, 2011; Dubey, Gunasekaran & Ali, 2015). Normative pressure also arises when firms believe that ISO 9000 are professional standards set to help implementing firms to enjoy an enhanced organizational performance (Nair & Prajogo, 2009). Consistent with institutional theorists, some firms adopt the standards primarily for its symbolic value (Nair & Prajogo, 2009). Low performing firms are influenced by one or more of the institutional pressures to get certified, possibly with the anticipation that certification will increase confidence with customers and suppliers, enhance organizational status, create and strengthen corporate reputation, which will eventually enhance business performance.

In reference to the resource-based theory, this study posits that the implementation of the principles in the ISO 9000 standards affects the performance of the organizations. Consistent with the theory, this standard as an intangible organizational resource provides a competitive edge that causes the differences in the performance of certified and non-certified firms. Initially, certification to ISO 9000 standards served as a move that provides unique competitive advantage to firms. However, in line with the explanations of the Institutional theory, as more and more firms get certified to ISO 9000 standards, some level of isomorphism is created among certified firms. Certification therefore, as a competitive tool is lessened. It is only seen as an entry key to compete or an order qualifier, but not necessarily lead to competitive success or not seen as an order winner (Nair & Prajogo, 2009).

Meanwhile, a firm can gain some level of advantage based on the extent of internalizing the ISO 9000 principles. Thus, the real value of certification is realized when certified firms effectively implement the principles of the standards for an improved internal processes (Naveh & Marcus, 2005). Internalization will equip firms with a set of routines and

procedures of the internal operations, tacit or explicit, which serves as a unique factor that organizations will benefit from. This kind of uniqueness can hardly be imitated by firms who have not been certified.

Since the concept of quality management has not received much attention in the Ghanaian context, this study intends to present the extent of absorption of the system and how subscribed firms are benefiting from implementation. The study also examined the kind of pressures that influenced adoption ISO 9000 quality management systems. The study will find out which isomorphic pressures are reflected in the motives for getting certified for the standards. Among the motives for certification to represent coercive isomorphism (satisfy external demand pressures and to facilitate quality acceptance contracts with customers); mimetic isomorphism (pressure from competitors) and normative isomorphism (continuous process improvements, provision of better processes and products, part of a TQM based strategy and need to formalize management systems).

3.2 ISO 9000 Principles and their Implementation

ISO 9001 principles are referred to as critical success factors. This is because of their direct and significant influence on the successful implementation or otherwise of ISO 9000 certification (Kazilunas, 2010; Sohal & Terziovski, 2000; Wahid & Corner, 2009). These principles were discussed in Section 2.2 of Chapter 2. They are;

1. Customer focus
2. Leadership
3. Involvement of people
4. Process approach

5. System approach to management
6. Continual improvement
7. Factual approach to decision making
8. Mutually beneficial supplier relationship

One of the areas much studied in ISO 9000 quality system is its implication on performance. Some papers studied ISO certified firms over a period, some studies just compared the performance of the firms before certification and after certification (Bayati & Taghavi, 2007; Corbett, Motes-Sancho & Kirsch, 2005; Gotzamani and Tsiotras; 2001), and others, the performance difference between ISO 9000 certified and non-certified firms (Heras, Casasdesus & Dick, 2002(a); Koc, 2007; Lima, Resende & Hasenclever, 2000). Most of these studies, however, did not necessarily consider studying the performance in relation to the extent of practicing the principles of the ISO 9001, assuming that the principles are homogeneously practiced by all firms (Corbett, Motes-Sancho & Kirsch, 2005; Gotzamani and Tsiotras; 2001; Koc, 2007). Performance with ISO 9000 certification should not be studied in isolation, because, there is empirical evidence to prove that the extent of the practice of the above principles has an impact on the extent of performance to be achieved at the end of a period (Abraham, Crawford, Carter & Mazotta, 2000; Koc, 2007; Lee, et al., 2009). Martinez- Costa, Choi, Martinez and Martinez-Lorente (2009) pointed out that the extent of practice reflects on the performance of a firm.

A firm's adoption of the ISO 9000 standards is considered as a change in an organization, and the way this change is managed has implications on performance. This change process concerns the whole organization and causes a change in the fundamental behavior and the routine of activities in the organization (Pekovic & Galia, 2009). From the results of Abraham, et al. (2009), it was concluded that the actions of management to clarify the

purpose and required principles of the standards, together with creating a quality culture that enables a transformational change to take place led to high performance. This suggests that a good fit between the extent of ISO 9000 practices and internal performance eventually leads to improved firm performance. Lee, et al. (2009) rather grouped ISO 9000 implementation firms into two clusters, on the basis of the level of adoption and practice of the principles. Cluster 1, which recorded higher scores in the extent of practice benefited from increased overall performance, relative to those in Cluster 2. This indicates that a firm does not just improve its performance because it is certified, but the commitment and extent of practicing the principles do influence the benefits to be realized (Corbett, et al., 2005). There is anecdotal evidence that some firms implement these standards rigorously and comprehensively than others and are likely to obtain more value from certification.

Although these eight principles are usual business practices that all firms try to implement, it should be emphasized that firms that have been certified by ISO 9000 certification are perceived to implement these principles better than non-certified firms (Koc, 2007; Martinez-Costa, et al., 2008, Morris, 2006). Proponents of the standards claim that the requirements are as usual as any business management practices. The reason is that the documentation of the process in the form of the process manual, and supervision by quality management auditors induce the extent of implementing these principles (Jang & Lin, 2008). They argue that the process of documentation leads to increased communication throughout the organization and this eventually makes its processes better (Jourbert, 1998; Morris (2006). As communication is heightened and subsequently processes are documented, it gives room to identify inefficiencies, reduce cost and increase quality. On this basis, similar questions on implementing the eight principles were asked both samples of the study; certified and non-certified firms.

3.3 Relationship between ISO 9000 Practice and Organizational Performance

Ho (1994) defined performance to mean the achievements in quality and quantity for a work done, individually or as a group. Firms make decisions and take certain actions in the management of their operations in order to achieve gains at the end of the day. The focus of performance and its measurement has gradually shifted from dominantly financial factors to a mix of financial and non-financial since the 1980s (Rezaei, Celik & Baalousha, 2011). The criteria currently used to measure performance have been on one or a combination of some factors like financial, safety, quality, operations, personnel and customer satisfaction (Naveh and Marcus, 2007; Poksinska, et al., 2002; Gotzamani and Tsiotras, 2001).

In other settings and countries, there have been numerous studies that show that ISO 9000 affects performance. Martinez-Costa, et al. (2008) commented that the days of wondering whether or not quality standards like TQM and ISO 9000 affect performance is far past. This is as a result of the superfluity of papers that have assessed the performance of certified firms. Some of these studies compare ISO 9000 certified firms and ISO 9000 non-certified firms to examine whether or not there is a significant difference in their performance (Heras, et al., 2002a; Koc, 2007; Lima, et al., 2000). Other studies also assess whether firms have improved in their performance after certification by comparing the 'before' and 'after' performance of the studied institutions (Bayati & Taghavi, 2007; Corbett, et al., 2005; Gotzamani and Tsiotras; 2001). Meanwhile, most of these studies are concentrated in the developed countries, and there have not been as many papers to study this relationship in African countries. A study by Beshah, et al. (2013), for example, explored the significance of ISO 9000 quality system for performance improvement in Ethiopia. They concluded that the relationship between ISO 9000 certification and performance was not clearly seen. This study is yet to explore if such a relationship exists in Ghana. Some performance benefits associated

with implementing the quality management principles are reviewed in the subsequent subsections.

3.3.1 Operational Performance

The effectiveness of an organization's operations in relationship with ISO 9000 is one of the most researched benefits from implementation of the principles (Poksinska, et al., 2002). Operational performance or efficiency refers to the relationship between outputs to inputs used in producing them, such that a firm is considered operationally efficient if it can produce more than proportional outputs with the same or reduced inputs. Before certification, a firm documents its processes and activities, in order to conceptualize the ideal processes in the form of a quality manual. This manual is supposed to guide the operations of the firm. After a period of being certified, a firm that keeps to the precepts in the manual can increase its operational performance (Stevenson & Barnes, 2001). Magd (2006) mentioned that as firms improve documentation of processes and product, potential for operations improvement becomes apparent. Increased documentation also leads to increased symmetrical distribution of information in the production processes (Kazilunas, 2010; Poksinska, et al., 2002). A study by Koc (2007) on manufacturing SMEs in Turkey assessed 17 manufacturing parameters including product design, machine setup, inventory management, value of defective work done and tool utilization. He realized that ISO 9000 certified firms performed better on these parameters than non-certified firms. He also mentioned that a firm that performs well on these parameters is able to reduce breakdowns and accidents, variability in production and wastage of materials. In the same study, these parameters led to cost reduction, increased product quality and increased delivery performance. Naveh and Marcus (2007) on a study in the transport industry in the US also found a significant positive relationship between implementation of the principles and increased safety or reduced accidents. These principles

also impacted on employee satisfaction leading to increased productivity (Casadesus & Gimenez, 2000; Singels, Ruel & Water, 2001; Sun, 2000). Also with respect to employee productivity, ISO 9000 improved team spirit, and clearer working procedures, which leads to reduced staff conflicts. Sharma (2005) discovered that implementation of the standards led to operating efficiency, which brought about reduced cost of production and increased quantity of production. Product quality is enhanced, and fewer defects expected if the process is well established. The use of statistical process control for example goes a long way to ensure that the products are within the specified acceptable limits. This position is shared by Hareton, Leung, Chan & Lee, (1999) and Prajogo (2011). The documentation of the processes and increased communication encouraged supervision over the processes, leading to a reduction in waste and increased productivity. The principles enforce significant discipline towards quality. Although many firms are motivated to go in for certification with market related motives, the benefits experienced are usually affect the improvement of the internal organizational procedures (Lipovatz, Stenos and Vaka, 1999). The results of a study by Poksinska, et al. (2002) showed that 72% of 135 firms studied claimed they have improved on internal procedures as a result of applying the principles in the standards, whilst almost 90% responded that ISO 9000 registration had improved the overall organizational performance. This changed characteristic of a firm's operational performance is referred to by some researchers as internal improvements in an organization (Corbett, et al., 2005). The continuous improvement principle of the quality management principles ensures that firms put systems and processes in place to better their operational performance as time goes on. Other studies that have looked at ISO 9000 and operational excellence include (Abraham, et al., 2000; Buttle, 1997; Casadesus, Gimenez & Heras, 2001; Corbett, et al., 2005; Lo, et al., 2013).

3.3.2 Quality Improvements.

The primary benefit of undertaking ISO 9000 certification is for organizations to increase the effectiveness of their quality systems, through the elimination of errors and saving money on rework and scrap. Lipovatz, et al. (1999) concluded that a firms considered the improvements of a company's product quality as one of the main technical benefits from implementing the standards. The results of a study by Gotzamani and Tsiotras (2001) on Greek firms, which was specifically directed at the extent to which ISO 9000 certification lead to TQM, concluded that certification boosts the quality culture and commitment of a firm, and ISO 9000 is seen as a significant first step towards TQM. Heras, Dick and Casasdesus (2002b) found that the ISO 9000 quality management principles increased a firm's emphasis on quality and how quality can consistently be achieved leading to both internal and external quality improvements. Internal quality referred to reduction in waste and duplication of efforts, while external quality referred to quality as perceived by customers. Morris (2006) rather concluded that certification of ISO 9000 does not necessarily improve the quality of a firm's product, relative to non-certified firms.

3.3.3 Improved Customer Satisfaction

In a market where similar products are being produced at the same market price, an organization that achieves highest conformance to quality requirements is able to satisfy its customers' expectations. Customer focus is one of the main priorities of certification as reflected in the principles of the ISO 9000 standard. A company's improvement on its manufacturing parameters through quality management practices is reflected in the value that is offered to customers. It has been empirically confirmed that conformance to quality standards are positively correlated with increased customer satisfaction (Mcguire & Dilt,

2008). The study by Casadesus and Gimenez (2000) confirmed that ISO 9000 Quality Management Principles lead to an improvement in the interaction with customers of the organization, as well as reduction in customers' complaint. Sun (2000) studied 363 Norwegian firms, and realized significant a relationship between certification and product quality, which led to complaint reduction. A customer is satisfied with the offerings of the firm through the provision of quality products, on time delivery and reliability of services. Not only is the external customer of the firm satisfied, the internal customer, employees, are also satisfied (Ho, 1994). Employees are psychologically impacted when there is a reduction in defective products, scrap, and the need for rework (Sila, 2007). When procedures are well instituted, employees enjoy working in a safe environment. Some other works that showed a positive relation to customer satisfaction include studies by Abraham, et al., (2000), Han, et al., (2007) and Singh (2008).

3.3.4 Marketing and Competitive Benefits

ISO 9000 can be used as a promotional tool by certified firms and also as a tool for competitive advantage. It helps communicate about the quality attributes of the firm, and this information goes a long way in promoting the organization and its products. Buttle (1997) listed marketing benefits to include keeping existing customers, gaining new customers, using the standard as a tool for promotion and increasing growth in sales. These benefits increase the competitiveness of a firm in the industry and the market, and eventually lead to increased market share. Certification may sometimes be a requirement for awarding contracts or it increases the likelihood of wining some contracts. Douglas, Coleman and Oddy (2003) concluded that certification allowed firms to tender for work which would otherwise be unattained without ISO 9000. Casadesus and Gimenez (2000) in the study across industries of

Spanish firms realized that 58% of the cases surveyed indicated that the standard had allowed a considerable increase in market share together with an upward trend in the company's sales. Although Heras, et al. (2002b) found no evidence to support a difference between pre and post certification, they realized that sales growth has consistently been better for certified firms than non-certified firms.

3.3.5 International Trade

Quality management has been no more just a desirable practice for an organization, but more of an obligation if a company seeks to survive, grow and to become competitive and profitable, especially in the international market (Ferguson, 1996). European buyers, for instance, stringently rely on ISO 9000 certification as a screening criterion to identify potential suppliers of products (Pekovic & Galia, 2009; Wayhan, Kirche and Khumawala, 2002). The ISO 9000 standards have evolved from just a means to harmonize the European regulatory and trade standards over the past 20 years into a global standard across 165 countries (Mcguire & Dilts, 2008; ISO, 2013). Products that meet international standards like the ISO 9000 can be distributed across all member countries without subjecting it to stringent national standards and requirements. Clougherty and Grajek (2013), in their study of international standards and international trade found that ISO 9000-rich nations benefit more from standardization whereas ISO-poor nations see ISO 9000 standards to represent a barrier in international trade. For the case of US based firms, one of the major benefits of becoming certified was to allow access to European markets (Johnson, 1997; Bhuiyan & Alam, 2004). Cagnazzo, et al. (2010) refer to ISO 9000 certification as a passport to doing business in Europe and across many other countries.

3.3.6 Financial Performance

One section of performance that has received extensive study is the financial impacts of certification. This is because, perhaps, firms are interested in the bottom line effect of any decision and investment they make. The decision to invest in quality management principles, similarly, is tied to the impact on the financial performance of subscribing firms. The many studies on ISO 9000 and financial performance have indicated that there is a positive relationship between ISO 9000 certification and financial performance (Corbett, et al., 2005; Din, Abd-Hamid & Bryde, 2011; Heras, et al., 2002a; Mcguire & Dilts, 2008). A very remarkable evidence is the survey by Lloyds Register of Quality Assurance Ltd (1996), which discovered that the profit margins and returns on capital employed by certified firms on the average, was more than double the average of the industry. Corbett, et al. (2005) also observed significantly huge improvements in the financial performance of American manufacturing firms over a 10-year period, by comparing the firms' financial parameters in pre-certification to post certification period. Heras, et al. (2002b) in the study across the industries in the Basque region of Spain, compared the financial performance of 400 ISO certified firms and 400 non-certified firms over a five year period. Their results proved that a significant difference exists in the financial performance of registered firms over and above non-certified firms. Mcguire and Dilt (2008) also assessed how a public announcement of a firm's certification impacted on the firm's performance in the financial market (stock market) by studying 204 firms in Czech Republic. They did not find any evidence of any significant change in the stock performance of these firms, although they concluded that a firm's financial performance had an impact as a result of certification. The financial performance does not only look at the traditional financial measures, based on accounting concepts, but also financial management systems (Din, et al., 2011).

Financial performance seems to flow from operational excellence and increased market share, which brings about increased revenue (Lo, et al., 2013). It may also be achieved from a reduction in the cost of production through improved operational excellence (Corbett, et al., 2005), and reduced external failure cost (Corbett, et al., 2005).

3.4 Why Some Certified Firms Fail to Achieve Desired Results.

The effectiveness of ISO 9000 implementation to implicate on performance has been controversially studied. Others have questioned the conclusion that implementation of the standard leads to improved performance, because a number of literature have expressed contrary to some of the studies above. Some studies have proved that the implementation of the principles leads to realization of improvement in one or more performance aspect, while other studies have proved otherwise (Han, et al., 2007; Lima, et al., 2000; Lo et al, 2013; McGuire and Dilts, 2008; Morris, 2006; Rahman, 2001; Singels, et al., 2001). For instance, Lima, et al., (2000) in Brazil, Singels, et al., (2001) in the Netherlands, Martinez-Costa and Martinez- Lorente (2002) in Spain did not find a significant relationship between ISO 9000 certification and firm performance. Naveh and Marcus (2005) found out that application of ISO 9000 standard may lead to operational benefits but not necessarily leading to an improvement in financial performance. Morris (2006) also discovered there was no significant difference in the financial performance between ISO 9000 certified electronics manufactures and their non-certified colleagues. A lot other studies expressed similar inconsistencies (Han, et al., 2007; Lima, et al., 2000).

Some researchers indicated that the inconsistency in the relationship can be as a result of differences in some firm specific characteristics, like firm type and firm size, that can affect the extent and patterns of implementing the ISO 9000 principles. These factors have been

referred to as contextual factors (Benner & Tushman, 2002; Lee, et al., 2009; Lo, et al., 2013; Sousa & Voss, 2008). Other researchers also mentioned that the motives for seeking certification, as described in section 2.3, is another reason to explain for such mixed results (Prajogo, 2011; Sharma, 2005). Therefore, the mixed results in terms of benefits of ISO 9000 cannot be attributable to the standard per se, rather, the motives that underlie certification (Prajogo, 2011).

3.4.1 Effects of Motives for Certification on Performance

One of the issues considered in TQM and specifically ISO 9000 studies pertains to the motives for undertaking the certification. The reasons for initiating the certification process have been studied to have effects on the effectiveness of the certification and somehow the performance benefits that come with certification (Jang & Lin, 2008; Terziovski, Samson & Dow, 1997). This is because, the motive, as a driver and as a goal to achieve, determines the way firms would implement the standard (Poksinska, et al., 2002; Prajogo, 2011). Gotzamani and Tsiotras (2002) reiterates this point by the mention that, not only does the content and the requirement of a quality assurance standard affect the long-term effectiveness and the performance of a firm's certification, rather, the motives and the way firms adopt and implement also have a great impact. They concluded that, the true motives for certification, and the commitment to quality improvements dictate the depths of implementation and eventually the effects of the certification. This is because the motive for subscribing to ISO 9000 quality standard influences the allocation of resources and the level of commitment of the company towards quality systems (Hareton, et al., 1999). Terziovski, Power and Sohal (2003) adds up that the motive for adopting ISO 9000 coupled with other factors like maturity of the quality culture significantly affects the benefits that can be derived from certification.

Although both internal and external motives are all valid to influence an organization to apply for certification, there have been a lot of studies that have concluded that implementation of certification motivated by internal factors is associated with higher performance, as compared to external motivation (Van der Wiele, Dale & Williams, 2000; Martinez- Costa, et al., 2008; Terziovski, et al., 2003; Gotzamani and Tsiotras, 2002; Poksinska, et al., 2002). It has been empirically confirmed that companies that apply for certification with the aim of improving quality management practice, and internal organization and quality culture reaped higher benefits than firms that apply for external motives such as market pressures and customer demands (Van der Wiele, et al. 2000; Withers and Ebrahimpour, 2001). Van der Weile, et al. (2000) for instance observed that external motives positively correlated with customer relationships and organizational control, but internal motives were found to have positive correlations with the two factors, as well as financial benefits and market share. Terziovski, et al. (2003) also noticed that internal motives for certification significantly had effects on business performance and helped to reduce errors and waste. Prajogo (2011), in the study of Australian firms found that internal motives had a positive relationship with implementation and operational performance. From the perspective of strategic fit, he concluded that internal motives made the relationship between implementation and performance stronger, while external motives had no statistically significant relationship with performance and also weakened the relationship between implementation and performance.

Pursuing certification with internal motives seems to lead to higher benefits. Perhaps firms that implement the standards on external motives do not necessarily target the root of improving quality. Rather, they concentrate just on the superficial activities, at least necessary, to help attain the objective of appealing or responding to the pressures of their external stakeholders. Such firms only treat the certification as an end in itself, instead of seeing it as a means to achieving greater heights of quality management (Kazilunas, 2010;

Prajogo, 2011). These organizations only target conformance to the standards just at the surface or at the administrative level, upholding the symbolic value of certification rather than the technical or operational value (Choi and Eboch, 1998; Zbaracki, 1998). Even though most firms are driven to acquire certification with external motives, they can go the next step in implementing the ISO 9000 standards by practicing the principles in totality and appealing to the internal need for quality rather than mere conformance to the surface guidelines. This is because not only do internal motives replicate in improved performance through internal results, but they also lead to improvements in external results (Martinez- Costa, et al., 2008).

3.4.2 Performance and Contextual Factors

Contextual factors have been studied alongside some other management practices. Papadakis, Lioukas and Chambers (1998) studied how contextual factors affect decision making in an organization, whereas Pawar and Eastman (1997) also studied such factors in relation to leadership styles. Both studies concluded that contextual factors critically influence these management practices. Lee, et al., (2009) studied contextual factors specific to ISO 9000 implementation and performance in the service industry. They argued that, even among ISO 9000 certified firms, there exist discrepancies in the realization of benefits because there are differences in the level of adoption, and that the level of adoption is influenced by some critical success factors and other contextual factors. In quality management literature, some of the contextual factors studied to have impacted on performance from subscription of quality systems include, size of the firm, type of firm and experience in quality system certification (Sila, 2007; Terziovski & Samson, 2000; Ahire & Dreyfus, 2000; Shah &Ward; 2003; Sadikoğlu & Zehir, 2008; Terziovski, et al., 2003). Lo, et al. (2013), on the contrary, studied a number of factors grouped under firm level and industry level contextual factors and their impacts on benefits from certification. Technology intensity, labor productivity,

labor intensity were categorized under firm level contextual factors whereas industry efficiency levels, level of competition, sales growth and adoption of ISO 9000 were considered under the industry level. Their results showed that firms with low technology intensity, high labor intensity and low labor productivity enjoyed higher benefits from implementing the standards. With respect to industry level, firms in industries with low efficiency levels, high competition, high sales growth and low ISO 9000 adoption levels also realized increased benefits from ISO 9000 adoption. The factors to be considered in this study are reviewed in the subsequent subsections.

3.4.2.1 Type of Firm

Due to the differences in the nature of goods and services, there exists a possibility that industry type may affect the impact or the success of adopting the ISO 9000 or a quality management standard. The production or manufacturing sector can highly adapt to the consistency requirements in the quality standards to ensure production of quality goods. Meanwhile, due to the variability in service provision and response to services, strict adherence to standards can affect performance of service firms (Terlaak and King, 2006).

In fact, many researchers understand that the certification originated as a standard purposely for manufacturing sectors (Din, et al., 2011; Sharma, 2005), but has now been adopted by other industries and business sectors. This adoption is perhaps because of the realization of the performance benefits that manufacturing firms have enjoyed from certification. In Malaysia, for example, the adoption of ISO 9000 certification by construction companies was triggered by a challenge from Egan (1998), after the results of his study of the construction industry revealed poor performance. He concluded his study with a challenge that the construction industry could improve in the five years ahead, if they would imitate the manufacturing firms to ascribe to quality production systems. This led to the increased

subscription of lean production, JIT and ISO 9000 adoption among other quality systems in the construction industry of Malaysia. An analysis by Casadesus, et al. (2001) showed that, ISO 9000 had important effects on manufacturing companies during the early years of instituting the standards (1993-1996), even before many firms in the service industry became subscribed to it.

Nonetheless, performance as a result of ISO 9000 certification has been assessed in various industries including construction (Din, et al., 2011; Ofori & Gang, 2001), transport (Naveh & Marcus, 2007), electronics (Morris, 2006) and other service industries, and the manufacturing organizations (Lee, et al., 2009). Findings and conclusions from empirical studies have had a mixed indication on how firm type affects quality practices and eventual performance from subscription to quality standards. Some papers found no statistical difference in the impact of quality management practices across firms in different industries (Ahire & Dreyfus, 2000; Sadikoğlu & Zehir, 2008; Shah & Ward; 2003; Sila, 2007). Some other studies confirmed that the type of firm affects some of the quality management practices (Rungtusanatham, Forza, Filippini & Anderson, 1998; Shrivastava, Mohanty & Lakhe, 2007). Rungtusanatham, et al. (1998) discovered that firm type significantly affected leadership and process management practices, whereas Shrivastava, et al. (2007) found that service firms significantly practiced the proactive business orientation and participative approach (systems approach in ISO 9000 principles) more intensively than manufacturing firms.

3.4.2.2 Size of Firm

Firm sizes have also been studied to have implication on the firm's performance from ISO 9000 certification. The operational definition for sizes of firms have been considered in a number of ways and in different contexts based on some criteria, which include number of

employees and value of fixed assets (Agyapong, 2010; Terziovski & Samson, 2000). The results from Lee, et al., (2009) revealed that firm size is unlikely to be considered as a crucial variable when deciding on how to implement the standards. Sila (2007), on the contrary, investigated the effects of firm size on the practice of TQM and performance of applying firms. The results showed that firm size was statistically significant in affecting the TQM practices and eventually performance, such that larger firms enjoyed higher performance. Terziovski and Samson (2000), in a cross-sectional study of manufacturing firms in Australia and New Zealand concluded that the size of a company affects the benefits received by the firm in quality practices. The reason that accounts for most small firms' inability and sometimes unwillingness to implement some of these standards may be because of the complexity of the standards and the firms' lack of support (Varkoi, 2010). Powel (1995) and Fisher (1993), in comparing the sizes of firms, similarly concluded that larger companies benefited more than smaller firms in the adoption of ISO 9000. Although both small and large firms benefit from adoption of the standards, the extent of benefits does vary probably because there is the likelihood that large firms, unlike small firms, have subscribed to other quality management systems before certification or subscribed to other quality standards or have the capacity to implement to the finest details, the requirements of the standards (Starke, et al., 2012). Arauz and Suzuki (2004) in their study of ISO 9000 performance among Japanese industries also discovered different trends in small, medium and large organizations with respect to the benefits from certification. A study by Sadikoğlu and Zehir (2008) investigated the contingency effect of the size and type of firm on quality management practices and observed that there was a statistical significance on how firm size affects TQM practices. They concluded that large firms implemented the quality management practices intensively, eventually leading to realization of higher impact than smaller firms. With

respect to competitive advantage from implementing quality standards, firms are better-off being bigger than small (Ismail, Baradie and Hashmi, 1998).

3.4.2.3 Length of ISO 9000 Experience

Other studies considered how the experience in certification reflects on performance (Abraham, et al., 2000; Lee, et al., 2009; Hareton, et al., 1999). This factor refers to the length of years that a firm has been certified to the standards. As a requirement, certified firms undergo an audit every three years to be re-certified. Two assumptions can be made about firms that have been certified for longer periods. First, a firm that goes through a number of re-certification has improved on the required principles from over the years of practice. Second, a firm that goes through re-certification has realized at least some improvements or benefits in performance outcomes from certification that propels for re-certification. This makes it worthwhile to consider a firm's experience in implementation and its effect on performance. Hareton, et al. (1999) mentions that it seemed to take a while for the benefits to be observed after implementation and postulated that the longer time it takes a firm to remain certified, the more the likelihood of observing the benefits. Terziovski, et al. (2003) mentioned that maturity in quality culture significantly affected the benefits that can be derived from certification. This position is shared by Abraham, et al. (2000), although the study by Lee, et al. (2009) expressed the contrary. Nevertheless, the findings of Lee, et al. (2009) in the study of the service industry showed that there is no significant relationship between the experience from certification and performance benefits. They revealed that the number of years by which these firms have implemented the standards was unlikely to be considered a crucial variable in determining the benefits from implementation. Gotzamani and Tsiotras (2001) rather indicated that there is a significant difference between the performance of recently certified firms and firms that have been certified for longer period. They concluded that a firm's commitment to quality and the progress towards TQM increases

as time goes on, and for that matter, as a firm attains maturity in quality assurance, it achieves significant improvements in many other areas.

3.5 Some Factors that could hinder Subscription to ISO 9000 Certification.

Although there has not been any study to assess the impact of international quality certification like the ISO 9000 quality systems on firms in Ghana and a lot other developing countries, there abound numerous literature, including those discussed above, that have emphasized the essence of applying for registration. In the study to investigate TQM acceptability in developing economies, Lakhe and Mohanty (1994) mentioned that developing nations are synonymous with poor quality products. He stated that most firms are yet to acknowledge the importance of quality because they still perceive quality as an ancillary and not a necessity for production, maybe because the call for quality has not been made by customers of these firms. ISO 9000 has gone from the time when it was seen as a competitive advantage to a time when it has gained the status as a necessary practice to ensure quality, and a fundamental tool for the survival of firms. Meanwhile, there has not been any paper that investigates why there is the minimum patronage of the ISO 9000 standard by firms in developing countries including Ghana. Some studies have explored the challenges and barriers that certified firms encounter in the implementation process. Some of these factors, together with a lot others may be accounting for less certification.

It is interesting to know that some firms have no idea of what ISO 9000 certification is, neither are they aware of any such quality management systems. A study by Lewis, Pun and Lalla (2005) on Small and Medium scale Enterprises (SMEs) in Trinidad and Tobago indicated that some firms were ignorant of the standards but a lot other firms had little prior knowledge of such quality management systems. Moreover, firms will not subscribe to certification if they have no idea about the positive impacts of certification. Reasonably, there

has not been as much studies on the performance impact that ISO 9000 firms in Africa are benefiting from. This makes certification a less lucrative venture to invest in (Awan & Bhatti, 2003).

Again, the decision to adopt quality standards and culture is highly dependent on the decisions and policies that emanates from top management. The involvement of top management is therefore essential in the decision to adopt the standard and a necessary factor to ensure a successful implementation (Yahya & Goh, 2001). The realization by management of the necessity for quality and quality standards is a significant drive that will push a firm to apply for certification. If leadership considers certification as a strategic tool, it informs the extent of their involvement. The implication is that there is a higher probability that top management will actively be involved in the implementation of the ISO 9000 principles in an internally motivated organization, as compared to an organization that applied with external intentions (Jansen, 2008; Bhuiyan & Alam, 2005). Some top managers have a weak interest in the conception and establishment of quality management standards and in the application of specific quality management regulations and policies. Perhaps, they have not realized the need to get certified, or have not realized the opportunity cost of not being certified (Gotzamani, 2005; Janas & Luczac, 2002).

Moreover, any organization has its own culture which refers to the way things are done in that organization. This culture affects almost every facet of the organization's policies and their implementation and comes with the mentality of ‘we have always done it this way’. Although a firm may have a sense for quality and undertake existing quality measures, the introduction of ISO 9000 quality standard may present a rather different look to quality. The requirement to close the gap between the old culture and the new culture of quality may prove to be one of the difficult challenges that may inhibit a firm to subscribe for certification

(Gotzamani, 2005). This is principally because of the differences in the principles required by the separate quality cultures or standards. Meanwhile, a change in an existing system means the change of familiar and appreciated well established processes and routines. Change in such routines will automatically encounter resistance, especially, when such parties are pessimistic of the effect of the change in the employees' organizational status. The introduction of the standard induces fear and threat to employees and they defend themselves by resisting the process.

One other factor that could be a reason for firms' non-subscription to ISO 9000 standards may be the resource demands of the certification process. A lot of studies have elaborated that the standard is a cost and time intensive programme to undertake (Jansen, 2008; Simmons & White, 1999). Firms, especially small and medium scale enterprises encounter the challenge of contemplating on whether to get certified to the ISO 9000 standards. This is primarily because they lack or have insufficient ability to dedicate money, time and other resources for such a resource intensive process (Lee & Palmer, 1999; Jansen, 2008). Firms with limited financial resources, especially small and medium scale firms consider certification as an infeasible practice (Gustafsson, Klefsjo, Berggren & Granfors-Wellemets, 2001). These costs include fees for calibrating existing equipment and purchasing new machines, consultant and certification audit fees, cost of establishing the documentation system, surveillance fees and the cost of maintaining the system (Hareton, et al., 1999).

Availability and capability of adequate and capable human resource can also be a factor that impedes a firm to undertake certification. Undertaking the road to certification demands getting the right number and quality of human resources, which involve recruiting competent personnel, training and development of existing personnel, and efficient allocation of

personnel responsibilities. The issue is that, employees, who are the core of the implementation process, must comprehend and be capable to implement these requirements.

Another obstacle to the implementation of the standard is the lack of understanding of the standard's importance and the difficulty to understand its requirements. A survey conducted in Hong Kong by Lee, Leung & Chan (1999) on industrial and engineering employees at the supervisory levels in ISO 9000 certified and non-certified firms revealed that understanding the principles of the ISO 9000 standard and its requirements is the major roadblock for firms who want to subscribe. This obstacle is as a result of perhaps the technicalities in the ISO 9000 requirements. Kim (1994) discovered in his survey that some firms misinterpreted the ISO 9000 requirements.

The perceived bureaucratic nature of the process is another reason that could inhibit the pursuance of ISO 9000 standards. The standard implementation is perceived as an extremely bureaucratic procedure due to the requirements of the system documentation. The issue with documentation is partly caused by the fact that most of the companies, especially SMEs do not keep archives of the necessary files which they would have to reproduce in the course of the certification process. The excessive paperwork puts a lot of prospective firms away from applying for certification. This reason brands the process as a very frustrating venture to pursue (Lipovatz, et al., 1999; Kim, 1994).

From the above, the following factors surfaced as obstacles that hinder registration of ISO 9000.

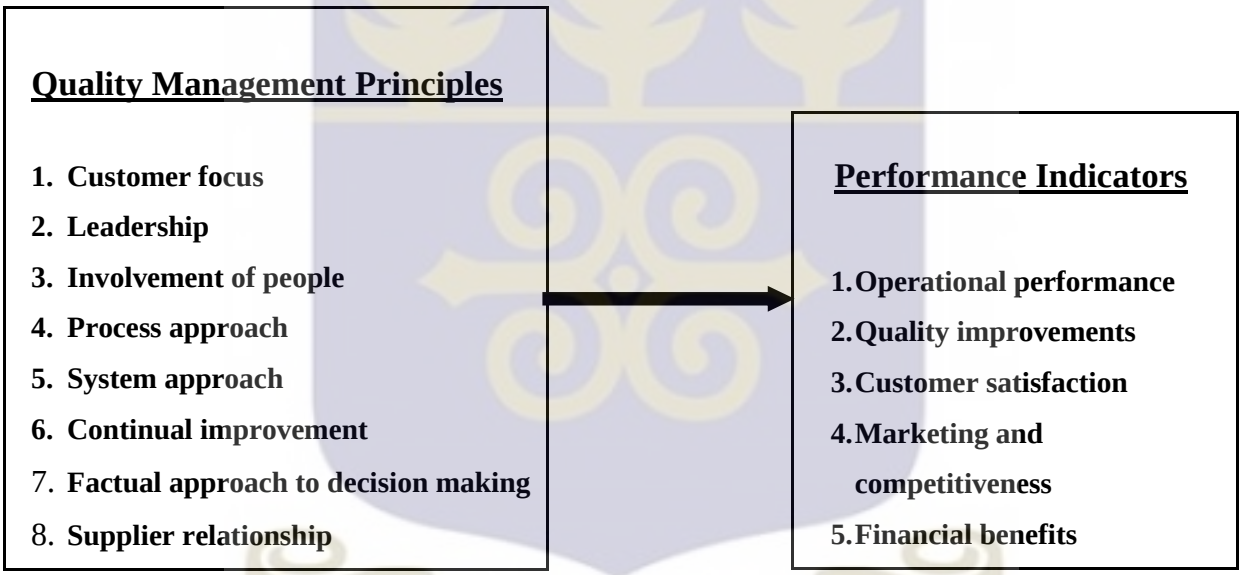
1. Some uncertified firms see no remarkable impact of the standards on certified firms.
2. Less attention is given to quality production by producers and customers of goods and services.
3. There is lack of top management consent and involvement in some uncertified firms.

4. Pursuit of certification faces resistance due to the change it brings to the organizational culture.
5. Some firms are constrained with financial resource requirements.
6. Human resource and the right expertise are also lacking in some firms.
7. The requirements of the standard are difficult to understanding.
8. Implementation of the standard is seen by firms as a bureaucratic process.

3.6 Conceptual Framework

Figure 3.1 below is a conceptual model to investigate the effect of ISO 9000 quality management systems in Ghana. This model is supposed to assess the performance benefits that are associated with certification, primarily in relation to the extent of adopting the ISO 9000 principles. The extent of adoption will be assessed by the extent of jointly practicing the eight principles. These principles are considered the critical success factors which influence the magnitude of its expected benefits (Sohal & Terziovski, 2000).

Figure 3. 1: Conceptual model to measure the impact of ISO 9000 implementation of firms in Ghana.



Source: Author's construct (2015)

CHAPTER FOUR

METHODOLOGY

4.0 Introduction

This chapter presents an overview of the methodological perspective of the research work. The sections in this chapter describe the research design adopted, the description of the population to be sampled and the sampling procedure for the study. The subsequent sections deal with the instrumentation for the data collection, data entry and analysis.

4.1 Research Design

The research design refers to the overall plan that a researcher uses for an empirical research. It consists of the blueprint that is used to integrate all components of a study to facilitate a logical way of addressing a research problem as unambiguously as possible (Punch, 2000). It includes the strategy, the population and sample, the processes, tools and materials for the collection, measurement, analysis and reporting of the data collected for the research (Bickman & Rog, 1998). The four types of research designs are the cross-sectional design, longitudinal design, experiments and case studies (Walliman, 2006). The decision to choose any of these designs is primarily informed by the objectives of a study. A cross-sectional design entails the collection of data on more than one case out of a population, usually, enough cases that are representative of the population, and data collected at a single point in time as a snapshot of the ideas, information, or opinions. A repeated cross-sectional survey that ascertains the possible influence of time on the results of a study is known as the longitudinal design. In experimental design, which is quite different from the two mentioned above, the researcher has control over the cases studied. It observes the effects of a manipulation of conditions on a set of cases, after all other factors are isolated or controlled.

Finally, a case study is a detail study of one or a small number of events or entities, usually within their own contexts. The research design precedes decision on a strategy to use in a research method. The two main distinctions in research strategies are the quantitative method and the qualitative methods. This study applies quantitative techniques to find answers to its research questions.

In this study, the cross-sectional design of research is followed, where responses are received from perceptions of respondents from ISO 9000 certified and non-certified firms at a particular point in time. The survey approach is adopted for this study for two main reasons. First, the lack of secondary data on the implementation of ISO principles as well as on certain performance parameters made information hard to come by, other than resorting to survey questionnaires. Secondly, the time constraint for the period of the study did not permit the use of case study approach to study and monitor the implementation and performance from these principles. A case study that will cover less than a year of the operations and performance of firms will be inadequate to form conclusions on the effect of the principles of ISO 9000.

The positivist paradigm for research is employed in this study. A paradigm, as simply defined by Guba (1990), is a basic set of beliefs that guide actions. These paradigms are differently mentioned by different authors, for instance, it is referred to as philosophical assumptions (Crotty, 1998), alternate knowledge claims (Creswell, 2003), or broadly conceived research methodologies (Neuman, 2000). They are certain assumptions that researchers make with respect to how they will learn and what will be learned during the inquiry or the research. The positivist approach sees social research as fundamentally the same as natural science research. It assumes that social reality is made up of objective facts that researchers can measure precisely and use statistics to test causal relationships (Neuman, 2007). This approach implies that when other researchers repeat the basics of a study, identical or very

similar results should be obtained. Practically, positivists view inquiry as a series of logically related steps that espouse rigorous data collection and analysis. Data analysis of a positivist goes through multiple levels, sometimes employing computer programs to assist in analysis, and rigorously applying validity and reliability checks on their instruments (Creswell, 2007).

4.2 Population

For this study, there are two populations. The first population constitutes firms that are registered under the ISO 9000 certification standards. As of 2013, there were 49 firms that were ISO 9000 certified distributed across industries in Ghana (ISO, 2013). The study will not concentrate on the certified firms operating in any specific industry or sector. This is because of the relatively few numbers of firms represented in each sector. Three broad categorizations however will be made for the sake of analysis. The manufacturing sector includes industries like the rubber and plastics, metal and fabricated metal, electrical and optical equipment and chemical products. The service sector also includes education, information technology, public administration, financial intermediation and real estates, and the wholesale and retail trades. Other sectors include the construction, agriculture, fishing and forestry. Unfortunately, the names of the certified firms could not be retrieved from the ISO survey, although some of the other than the names provided by the certification bodies.

The second population consists of ISO 9000 non-certified firms in Ghana. The main purpose of sampling from this population is to use them as a control group to compare the results of the performance parameters between certified and non-certified firms, to ascertain whether or not some differences exist in performance. A control group can help provide a baseline against which the performance can be evaluated. According to Walliman (2006), the control group should be identical, as near as possible to the experimental group. Meanwhile, because of the heterogeneous nature of the firms registered in the ISO 9000, the sample from this

population is selected after a careful assessment of the ISO 9000 firms that will be used for the study. This is to ensure that the sample consists of firms as identical or similar as possible in terms of their objectives and the nature of their production process for an appropriate comparison. Consistent to Simmons and White (1999), firms in this control group will be selected based on their industry classification. These firms are sampled from the list of firms in the records of the Association of Ghana Industries (AGI).

The AGI is a voluntary association of businesses in Ghana, which provides the services of policy advocacy, information dissemination and trade promotion in the country. This association is made up of more than 1200 members, comprising small, medium and large scale firms in the manufacturing and services industries. These members are categorized according to the sector of operation, which cut across almost every sector of economic activity in the country. Some of such industries include the advertising, agribusiness, associates, automotive and transportation, chemicals, electrical and electronics, energy, financial services, food and beverages, garments, textiles and leather, hospitalities and tourism, metals and building products, etc. Not only will the sample from this population help in comparing performance of certified firms, it will also provide information in ascertaining the impeding factors that account for the low level of ISO 9000 certification in Ghana.

The area of this study is restricted to firms in Accra and Tema metropolis, located in the capital region of Ghana, Greater Accra. This geographical area was selected because of the high concentration of firms in these two localities. These two cities, according to the business report by the Commonwealth Network, hold about 55% of the manufacturing industries in Ghana. In addition, most service providers have their offices (especially head or main offices) in these two locations. Accra is the capital city of the Greater Accra region. Some of the major places that serve as hubs of business establishments in Accra are primarily the

Commercial Area, North Industrial Area and South Industrial Area. Tema, on the other hand, is considered the most industrialized metropolis in Ghana. The Free Zone Area, Heavy Industrial area and Light Industrial Area are the pivotal points that host most of the firms in Tema.

4.3 Sampling

From the first set of population, ISO 9000 certified firms in Ghana, a sample of 30 firms which accounts for about sixty percent (61%) of the total certified firms are expected to be drawn from this set of firms using convenience sampling technique. Access to a list of all certified firms was not possible probably because it does not exist. The names of firms included in the sample are names of firms that were provided by the certifying bodies upon request by the researcher. The names compiled were from GSA, BIVAC and SGS, numbering thirty eight (38) firms. Addresses of the firms were retrieved from googles and it came to realization that five (5) of the compiled names were firms in other regions outside the study jurisdiction. Moreover, considering the problems of the addressing system of the country, locating some of the firms by their addresses is very unlikely. Some firms do not have office addresses on their website, and those who have it might have incorrect details because it had not been updated after there had been changes. Of these, 30 firms had reachable addresses and these were used for the study. Overcoming these location problems made convenient sampling the appropriate technique, where companies whose location can be identified are selected for the study.

A sample of 70 firms is expected to be conveniently selected from the second set of firms, which would be used as a control group to which performance of ISO 9000 firms are compared.

4.4 Data Sources and Collection

From the literature reviewed, most studies on ISO 9000 and its implication for performance have made use of either secondary data from databases or primary data through surveys and interviews or case studies. Meanwhile, the application of questionnaire was prominent among the data that were used. Primary source of data is used for this study. The aim is to distribute a questionnaire to each organization to receive responses from an employee higher in the organization's hierarchy, ideally, Quality or Operations manager. Although a sample size of 100 (30 certified and 70 non-certified firms) were decided, 108 sets of questionnaire were distributed. The researcher wanted to have backup responses for the inevitable situation of non-responses from some firms, especially on the side of the non-certified firms. Most of the questionnaire distribution was done personally by the researcher aided by an introductory letter from the school. Only two respondents requested for the questionnaire to be sent through mail, which they filled and returned through mail.

4.4.1 Instrumentation

The data collection was done with sets of questionnaire to solicit for information from the firms sampled for the study. The questions were designed following the literature reviewed about ISO 9000 and quality management. The questionnaire were divided into five sections; Section A was made of questions on the background of the firm; Section B included questions designed to gather information on the level of adoption of the Quality Management Principles, whereas Section C solicited for responses on the perceived performance benefits derived from performing these principles. Same sets of questions in Sections A, B and C were answered by both certified and non-certified firms. The reason is that, the quality management principles are generic management practices, and as indicated in the literature,

all firms implement them to some extent, and hence enjoy benefits from implementation. Section D will contain questions specific to ISO 9000 firms, hence only certified firms will be required to answer. It will include questions that assess the motivation for certification and the firm specific factors (contextual factors) that affect performance. It further asks questions on whether firms have subscribed to other quality standards and whether they have the intention to re-certify to the ISO 9000 standards. Section E, on the other hand, seeks answers from non-certified firms. It asks questions on the reasons for non-certification. It further finds out whether non-certified firms have the intention to apply to the standards in the future.

Categorical answers will be demanded for the questions in section A and D, whereas the Likert scale with five points will be used to allow respondents to indicate their performance against the criterion considered in sections B, C and E. The heterogeneous nature of firms to be assessed makes the use of Likert scale a good choice because it is believed that its use would reduce the effect of any significant differences in the, sizes, sectors, and scopes of activities (Brah, et al., 2000; Cagnazzo, et al., 2010). Moreover, many of these firms are privately owned firms and for that matter, public release of information on their activities and performance will be lacking, or they may be unwilling, as a matter of policy, to provide such confidential financial information. These made it necessary to treat the results as interval data for analysis.

Some of the questions are potentially sensitive, and others quite related to competitive practices by firms. To assure respondents of confidentiality, the results of the survey ensured anonymity. The questionnaire also promises that responses provided by the firms will only be used for academic purpose.

4.4.2 Operationalized Measures of Some Variables

Quality management principles: This study assesses the level at which firms perform all the 8 principles published in ISO 9001:2008. These principles are Customer focus, Leadership, Involvement of people, Process approach, System approach to management, Continual improvement, Factual approach to decision making, Mutually beneficial supplier relationship. The various statements in these sections to assess the extent to which these principles are adhered to are based on ISO 9000 and other TQM literature (Lee, et al., 2009; Fotopoulos and Psomas, 2010; Martinez-Costa et al, 2009; Martinez-Costa, et al., 2008; Huarng and Cheng, 2002).

Performance variables: Implementation of the ISO 9000 principles affects various facets of the business, as indicated in most quality literature. Five of such areas considered in this study are operational performance, quality improvements, marketing and competitiveness, customer satisfaction, and firm financial performance (Fotopoulos & Psomas, 2010; Huarng & Cheng, 2002; Jang & Lin, 2008; Koc, 2007).

***Motivation for certification*:** Items for internal and external motivation were developed based on the studies by Bayati & Taghavi, (2007) and Prajogo (2011). Factors like pressure from competitors, satisfaction of external demand pressures, improvement in company's reputation and facilitation of contracts with customers were categorized under external factors that motivate firms to get certified. Other firms also get certified as a TQM strategy and also on the basis for continuously improving on quality efforts.

Size of Firms

The operational definition used in the Ghanaian context by the National Board of Small Scale Industries (NBSSI) on the basis of the number of employees will be used in this study.

According to NBSSI (2015), Micro enterprises are firms that have less than five employees or fixed assets (excluding land and building) not exceeding $10,000. Small enterprises employ between 6 and 29 or with fixed assets not exceeding $100,000. Medium enterprises employ between 30 and 99 employees with fixed assets up to $1 million. Large scale firms comprise firms whose employment exceeds 100 and with fixed assets larger than $ 1 million. For the purpose of this study, micro, small and medium firms are all categorized as small firms with employee size fewer than 100. Large firms, on the other hand, have employees greater than 100.

4.5 Analysis

In this study, descriptive statistics, Structural Equation Modeling, Mann-Whitney U-test, Kruskal Wallis test, and Relative Importance Weighting technique will be used to analyze the data. The output of the analysis will be presented in Chapter 5 of the study, in the form of tables and charts for clearer appreciation of the results.

Structural Equation Modeling (SEM) will be used to explain and predict the relationship between implementation of the ISO 9000 quality management principles and the performance benefits derived by firms. Some of the few studies that have applied SEM to ascertain such a relationship include the works by Han, et al., (2007) on how implementation of the ISO 9000 principles affects TQM and business performance. Jang and Lin (2008) also studied on how the motivates for certification affected the depth of implementation and consequently, how they affect a firm's performance; whereas Terziovski and Guerrero (2014) also studied how certification impacts on product and process innovation performance. Other studies include research by Abas and Yaacob (2006), Fotopoulos and Psomas (2010), Prajogo and Sohal (2006), Singh (2008), Tari, Molina and Castejon (2007).

4.5.1 Motivation for SEM

Structural Equation Modeling is a comprehensive statistical approach used in the testing of hypothesis of relationships among variables, latent or observed (Chin & Newsted, 1999). This modeling technique was developed by Jöreskog in 1973, and has since been used in a lot of social science research (Fotopoulos & Psomas, 2010; Haenlin & Kaplan, 2004; Jang & Lin, 2008). Basically, this technique indicates two main aspects of its procedure, first, the causal process under study are represented by a series of structural equations and secondly, these relationships are pictorially modeled to facilitate a clearer conceptualization of the theories and constructs under study (Hair, Black, Babin, Anderson, & Tatham, 2006; Hair, Hult, Ringle and Sarstedt, 2014).

Before SEM, regression based approaches were primarily used to study the cause and effect relationships among variables, however they have their limitations (Haenlin & Kaplan, 2004). First, although model building implies omitting some aspects of reality, the regression based approaches postulate a simple model structure. Meanwhile, Jacoby (1978) mentioned that we live in a complex multivariate world and for this reason, the study of one or two variables in isolation would be relatively artificial and inconsequential. This limitation is especially recognized when one is investigating the potential effects of moderating and mediating variables in a relationship. In such situations, the relationship may consist of multiple dependent and independent variables or a dependent variable may simultaneously be an independent variable in other complex dependence relationships (Jang & Lin, 2008). Secondly, these approaches consider all variables as observable, and for that reason, only a handful of relevant variables can be considered observable. McDonald (1996) explained that a variable can be considered observable if and only if its value can be obtained by means of real world sampling experiments. Meanwhile, some constructs that affect some reaction and

behaviors and other variables, like customer satisfaction, are not always observed directly. Finally, there is the conjecture that these approaches measure all the variables without error. Meanwhile, it needs to be stressed that each observation of the real world is accompanied by a certain level of measurement error, composed of two parts, systematic error and random error (Bagozzi, Yi & Philips, 1991).

Many researchers over the years have been resorting to Structural Equation Modeling as an alternative in order to overcome these limitations. SEM, referred to by Haenlin and Kaplan (2004) as second generation analytical technique, allows researchers to simultaneously analyze relationships among multiple independent and dependent constructs (Gefen, Straub & Boudreau, 2000). Moreover, this technique allows a researcher to include unobservable variables as construct measured by one or more indicators (called manifest variables or observed measures). SEM also explicitly computes measurement errors for each of the observed variables.

Basically, two approaches have been used to estimate parameters in Structural Equation Modeling; the covariance-based approach (CBSEM) and the Partial Least Square approach (PLS) which is a variance-based approach. Some of the statistical software packages that rely on the CBSEM algorithm are the EQS, AMOS, SEPATH and LISREL. This approach was used in the studies mentioned in the previous section to have used SEM analysis (Han, Chen and Ebrahimpour, 2007; Jang and Lin, 2008; Terziovski, and Guerrero, 2014; Prajogo & Sohal, 2006; Fotopoulos and Psomas, 2010; Abas & Yaacon, 2006; Tari, Molina and Castejon, 2007). Meanwhile, in this study, the PLS, a variance-based approach of SEM designed by Wold (1982) will be used. Specifically, SmartPLS, Version: 2.0.M3 software, developed by Ringle, Christian, Wende, Sven, Will, and Alexander was used. The differences

between these two main approaches are presented in Table 4.1, and the justification for the use of the PLS-SEM approach is subsequently presented.

Table 4. 1 The distinction between PLS approach and CBSEM approach.

Criteria	**PLS**	**CBSEM**
Objective	Prediction oriented	Parameter-oriented
Approach	Variance-based	Covariance-based
Assumptions	Non-parametric	Typically multivariate normal distribution and independent observations (parametric)
Latent variable scores	Explicitly stated	Indeterminate
Epistemic relationship between a latent variable and its measures	Can model either formative or reflective measures	Typically models with only reflective indicators
Implication	Optimal for prediction accuracy	Optimal for parameter accuracy
Model complexity	Models with Large complexity (e.g. 100 constructs and 1000 indicators)	Small to moderate complexity (e.g. Less than 100 indicators)
Sample size	Recommended minimal size from 30 to 100 cases	Recommended sample size between 200 and 800

Source: Chin (2000).

4.5.2 Justification for the use of PLS Approach in this Study

For this study, the PLS approach is selected above the other approaches of SEM because of these reasons;

i. This approach does not only confirm the relationship between ISO 9000 principles and performance, it also explains and helps predict such relationships (Jang & Lin, 2008; Pullman, Granzin & Olsen, 1997). All relationships are simultaneously modeled, ignoring the concerns of multicollinearity.

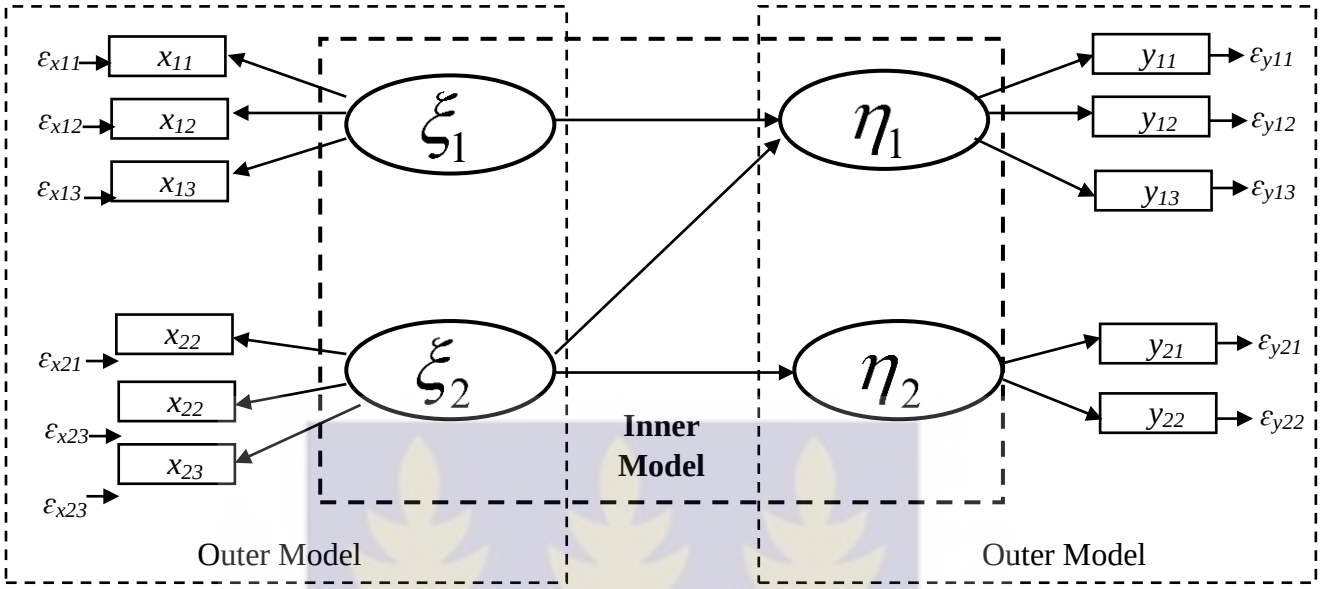
ii. This approach is less stringent with multivariate sampling assumptions like the randomness of the sample and the normality of the distribution of the data of each variable, but provides robust results on the constructs being measured (Calantone, Graham and Mintu-Wimsatt, 1998).

iii. It is also particularly advantageous in the use of small sample size as in the case of this study (Hair, et al., 2014; Mahmood, Bagci and Ford, 2004). Hair, et al., (2014) characterized PLS to achieve high levels of statistical power even with small sample sizes.

4.5.3 The PLS Path Model

Although SEM simultaneously estimates parameters for both the links between the manifest variables and their constructs and the links among different constructs, it is usually analyzed and interpreted in two sequential stages: the measurement model (the outer model) and the structural model (inner model). The outer model is first defined. This is the model that specifies the relationship between the latent constructs and their manifest variables or indicators. The inner model consequently specifies the relationship between the inner constructs. This relationship is depicted in Figure 4.1 below.

Figure 4. 1: The PLS Path Modeling



Adopted from: Henseler, Ringle & Sinkovics (2009).

$$x = \Lambda_x \xi + \varepsilon_x \} \text{ The measurment model for the exogenous variables}$$
$$y = \Lambda_y \eta + \varepsilon_y \} \text{ The measurment model for the endogenous variables}$$
$$\eta = \beta\xi + \zeta \} \quad \text{The structural model to estimate the coefficients for the relationship}$$

Where *x* and y are the observed variables for the exogenous latent construct ξ and the endogenous latent construct η, Λ_x and Λ_y represents the loading (pattern) coefficients of the latent construct on each manifest variable *x* and *y respectively*, and ε_x and ε_y are the measurement error term for *x* and *y* respectively. For the structural model, β is the coefficient of the latent exogenous construct on the latent endogenous variable. ζ is the random disturbance term in the structural model. It does not reflect measurement error, rather, it is known as errors in equations, which provides an indication that the endogenous variables are not perfectly explained by the independent variables (Diamantopoulos, 1994; Haenlein & Kaplan, 2004).

4.5.3.1 The Outer Model (Measurement Model)

In order to progress to specify the structural model, the researcher must assess the validity and reliability of the indicators that were used for the specification of the measurement model. This is very necessary because, as the reliability and validity of the estimated unobserved variables increase, the accuracy of the structural paths increases. Two types of reliability test; individual item reliability and composite reliability and two types of validity test; convergent validity and discriminant validity are made in the measurement model.

Individual Item Reliability

The reliability of each indicator used in measuring a construct in the measurement model should be assessed. A latent variable should explain a substantial part of each indicator's variance, at least half (50%). The rule of thumb is to accept items with loadings (the absolute correlation between a construct and each of its manifest variable) of 0.7 and above (Fornell, Tellis & Zinkhan, 1982; Henseler, Ringle & Sinkovics, 2009). It was suggested by Hulland (1999) to carefully review before eliminating items with loadings below 0.5, if it can be confirmed that the inclusion of this indicator add very little explanatory power to the model. Meanwhile, for this study, the threshold of 0.7 will be used based on using the outer loading relevance test (Hair, et al. 2014), which indicates that a variable with loadings of above 0.7 shows that the factor is relevant in the model.

Composite Reliability

Beyond each individual indicator, a researcher must check the internal consistency also known as the composite reliability. Traditionally, Cronbach's alpha has been applied for this test, but the limitation is that this measure assumes equal reliability of all the indicator variables, and for that matter, deemed as providing underestimation of the internal consistency of the latent variables in the model (Hair, et al., 2014). The composite reliability

measure is used in this model, accounting for different loading for the indicators. The formula for composite reliability measure is as follows;

$$\rho_c = \frac{\left(\sum \lambda_j\right)^2}{\left[\left(\sum \lambda_j\right)^2 + \sum \mathrm{Var}(\varepsilon_i)\right]}$$

Where: ρ_c = composite reliability

λ_j= indicator loadings

$Var(\varepsilon_i)$= indicator error variance

The interpretation of composite reliability is similar to that of Cronbach's alpha measure, where a value of above 0.7 is satisfactory (Nunnally, 1978).

Convergent Validity (Average Variance Extracted)

Convergent validity measures the degree to which multiple items measuring the same concept are in agreement. The average variance extracted (AVE) is used in measuring the variance captured by the indicators relative to measurement error (Fornell and Larcker, 1981). A value from this measure greater than 0.50 justifies a sufficient convergent validity. It indicates that the latent construct accounts for more than 50% of the variance in the indicators (Henseler, et al., 2009).

$$\mathrm{AVE} = \frac{\left(\sum \lambda_j^2\right)}{\left[\sum \lambda_j^2 + \sum \mathrm{Var}(\varepsilon_i)\right]}$$

Where: AVE =Average Variance Extracted

λ_j= indicator loadings

$\mathrm{Var}(\varepsilon_i)$= indicator error variance

Discriminant Validity

Another complementary test of validity to be assessed is discriminant validity, which refers to the degree to which items of a construct differ from measures of other constructs or to which items measure distinct constructs (Hassan, Talib, Harun & Johari, 2012). In PLS path modeling, two measures of discriminant validity can be used; the Fornell-Larcker criterion and the cross-loadings. The Fornell-Lacker criterion claims that latent variable share more variance with its indicators than with any other latent variable. Thus, the AVE of each latent variable should be higher than the squared correlations with all latent variables. The cross-loading criterion also claims that the loading of each indicator should be greater than all of its cross-loadings. Both measures are important and complementary; whereas Fornell-Larcker criterion helps to assess discriminant validity on the construct level, cross-loadings checks for validity on the indicator level (Henseler, et al., 2009).

4.5.3.2 The Inner Model (Structural Model)

Once reliability and validity have been established for the measurement model, the inner model estimates can also be evaluated. Wold (1982) claims that the PLS model applies predictive oriented measures that are non-parametric, because it makes no distributional assumptions. According to Henseler, et al. (2009), the essential criterion for the assessment of the structural model is the coefficient of determination (R^2) of the endogenous variables. Hair, et al. (2014) proposed some steps that can be used to assess the structural model. This involves the assessment of collinearity, path coefficients and coefficient of determination.

Collinearity Assessment

This test assesses the strength of collinearity among the independent variables (quality management principles) in the model. These constructs are not expected to be highly collinear with each other. Variance Inflation Factor (VIF) or the tolerance value in regression analysis is used to assess collinearity. It describes how much of the variability of the specified

independent variable is not explained by the other independent variables in the model. VIF values above 10 or tolerance values of less than 0.10 raise concerns or indicate multi-collinearity (Pallant, 2001).

Assessing the significance and relevance of the structural model relationships

After applying the PLS-SEM algorithm, estimates are obtained for the structural model relationships. These are called the path coefficients. They represent the hypothesized relationships between the constructs. The path coefficients of the path model can be interpreted just as the standardized beta coefficients in an OLS regression. They explain the estimated change in the endogenous constructs for a unit change in an exogenous construct.

Assessing the level of R^2

The R^2, the coefficient of determination, measures the proportion of an endogenous construct's variance explained by its predictor constructs. It measures the model's predictive accuracy. It is calculated as the squared correlation between a specific endogenous construct's actual and predicted values. It ranges from 0 to 1 with higher values indicating higher levels of predictive accuracy. Although there are no specific rules of thumb for acceptable levels of R^2, values of 0.75, 0.50, or 0.25 for endogenous variables can be respectively described as substantial, moderate or weak (Hair, Black, Babin, & Anderson, 2010; Hair, et al., 2014; Henseler, et al., 2009).

4.5.4 Bootstrapping

The distribution free nature of PLS path modeling makes it very inappropriate to undergo the parametric-based techniques for significance testing (Chin, 1998). Resampling techniques such as bootstrapping are used in PLS models to help determine the significance of the paths. (Davison, Hinkley & Young 2003; Efron & Tibshirani, 1993). The bootstrapping technique treats the observed sample as it represents the population, by creating a large, pre-specified

number of bootstrap samples, by randomly drawing cases with replacement from the original sample.

4.5.4 Comparison of the Medians of the Categories in the Study

Inferring from the validity and reliability test from the PLS path modeling, the second objective of this study will be achieved by applying the independent Mann-Whitney U-test, a non-parametric equivalent to the t-test, to compare the median performance of ISO 9000 certified and non-certified firms. This test will inform whether a significant difference exists in the mean score for the two groups. The Kruskal-Wallis test was also used to assess the differences in the median performance score for the different industrial categories; service, manufacturing and construction, extraction and agriculture. It is used when the level of measurement of the data is ordinal. It evaluates whether the ranks for the groups compared significantly differ. For robustness check, the parametric equivalence for these non-parametric tests will be computed as well. Although the emphasis is on the non-parametric tests, the parametric equivalence will also be reported for confirmation.

4.5.5 Relative Importance Weight

Further to these analyses, the Relative Importance Weight (RIW) was used in analyzing the relative intensity of the factors that is accounting for low patronage of ISO 9000 in Ghana. The score for each factor is calculated by summing up scores assigned to it by respondents as a ratio of the sum of responses for all other factors (Frimpong, Oluwoye & Crawford, 2003). Mathematically, the RIW is computed as;

$$RIW = \frac{\sum_{i=1}^{5} a_i \times n_i}{\sum_{j=1}^{N} x_j}$$

Where: x_j =the sum of the *jth* factor; j=the factors *1,2,3,4,…N; N*=total number of factors (10);

a_i=constant expressing the weight given to the ith response: *i=1,2,3,4,5.*

a_1=5 for a response of 'most considered factor'

a_2= 4 for a response of 'considered factor'

a_3= 3 for a response of 'neutrally considered factor'

a_4=4 for a response of less considered factor

a_5=5 for a response of least considered factor.

n_i= the frequency of the *ith* response.

These analyses will be done with the help of computer softwares because of the mathematical complication in their imputation. Smart PLS software version 2.3 was used to run the PLS-SEM. The IBM SPSS statistical software, v 20 was used for the Mann-Whitney U-test, Kruskal-Wallis test, and descriptive statistics. The data was prepared and presented using Microsoft Excel.

CHAPTER FIVE

DATA PRESENTATION AND ANALYSIS

5.0 Introduction

Prior to the analysis, the responses from the questionnaire were examined, with SPSS statistical package, to check for accuracy of the data entry, missing values and outliers. The software was also used to provide summary statistics on the respondents of the data. Further to this, it was used for Kruskal-Wallis and Mann-Whitney U-test of comparison. The Smart PLS was used to analyze the relationship between ISO 9000 Quality Management Principles and performance.

5.1 Firm Characteristics

Out of the 108 copies of the questionnaire distributed, 88 of them were returned. From which three were not fully complete and could not be used, hence 85 responses were analyzed. This gives an effective response rate of about 79%. Of the 85 received responses, 29 are ISO 9000 certified firms. A sample size of 30 ISO 9000 certified firms was expected from the 49 in Ghana. The 29 received responses represent about 96% of the expected sample size of 30. The remaining 56 responses represent about 80% of the expected sample from ISO 9000 non-certified firms.

5.1.1 Respondents

The intention of the researcher was to reach informed people in the organization, who have a good idea of how the quality management principles are being implemented and its effect on

performance. The study sought answers from particularly General Managers, Plant managers, Operations Managers and other quality concerned personnel of the firm. Table 5.1 provides frequencies of the categories of personnel who answered the questionnaires provided to the firm.

Table 5. 1 Position of respondents

Position	Frequency	Percentage
General manager	4	4.71
Plant manager	7	8.24
Operations manager	13	15.29
Quality manager	16	18.82
Production floor supervisor	14	16.47
Member of the quality department	14	16.47
Other	17	20.00
Total	**85**	**100.00**

Source: Field of study, 2015

Sixteen (16) respondents were quality managers, representing the highest category with a percentage of 18.82. This is followed by Production floor supervisors, Members of the quality department and Plant managers in that order, with the least being the General managers. Meanwhile, there were 17 responses from 'Other,' representing personnel outside the specified category. Upon inquiry, it was explained that usually, not a single person was involved in the answering of the questions because of their technical nature. It was passed on to different officers who had the requisite knowledge to provide the information needed, hence, they needed not tick any one specific officer. However, there is the assurance that the respondents were in good positions to provide the needed answers.

5.1.2 Industry

The firms represented in the study are not specific to a particular industry. This is primarily because the ISO 9000 firms in Ghana are scattered across different industries. Responding firms were grouped under three categories; Service, Manufacturing, and Extraction, Construction and Agriculture. The distribution among these industries is presented in Table 5.2.

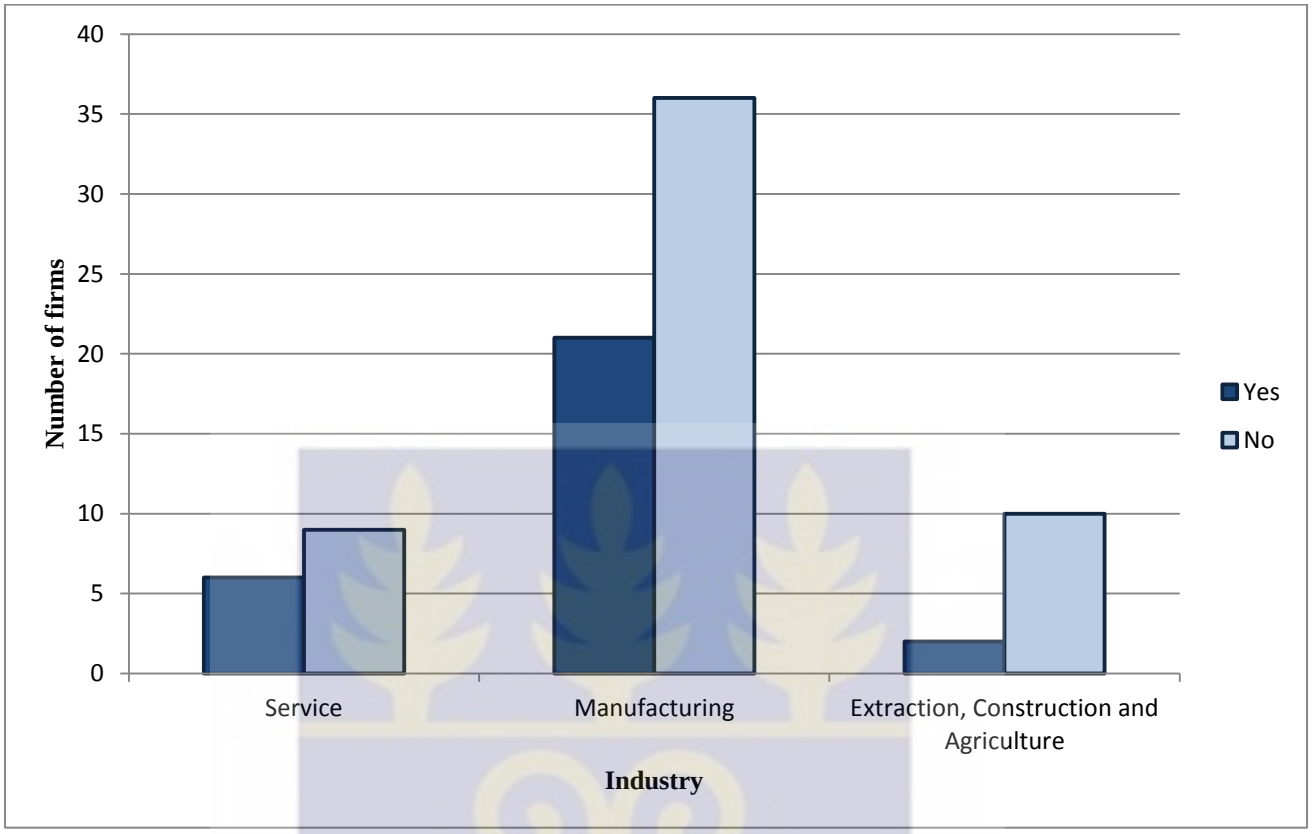
Table 5. 2 Industry of operation and their subscription to ISO 9000

Industry	ISO Certification		Total	Percentage
	Yes	No		
Service	6	9	15	18%
Manufacturing	21	36	57	67%
Extraction, Construction and Agriculture	2	10	12	14%
No response	0	1	1	1%
			85	**100%**

Source: Field of study (2015)

Fifteen (15) of the responding firms were service providers; of which six (6) were ISO 9000 certified and nine (9) were not certified. Fifty seven (57) were manufacturing firms comprising twenty one (21) certified firms and thirty six (36) non-certified firms. Out of the twelve (12) firms in the extraction, construction and agriculture industry, two (2) were certified and 10 not certified. One out of the 85 firms rather ignored this question. A pictorial presentation of this distribution is presented in Figure 5.1

Figure 5. 1 Industry of operation and their subscription to ISO 9000



Source: Field of study (2015)

5.1.3 Distribution of respondents based on years of operations

The belief that the maturity of a firm affects the level of performance derived from the implementation of the quality principle required responses on the year of existence of the firms understudied. A representation of years of operation of the firms that were studied is shown in Table 5.3. Six firms have been in operation for less than 5 years, giving a percentage of 7.06%. Fourteen firms representing 16.47% have been in operation for more than 5 years, but below 10 years. Sixty five other firms representing the majority of the firms understudied have operated for more than 10 years. Table 5.3 reveals these figures in a tabular form.

Table 5. 3 Number of years of Operation

	Frequency	Percentage
0-4.99	6	7.06
5-9.99	14	16.47
Above 10	65	76.47
Total	**85**	**100.00**

Source: Field of study (2015)

5.1.4 Firm Size

The responding firms for the study had varying sizes, based on the number of the employees. Information on the size of the firm was requested to provide a basis for comparison of firm performance. For this study, the size of a firm was assessed using the number of employees (Agyapong, 2010). A distinction is made between the average sizes of ISO 9000 certified and non-certified firms from the classification made by the National Board of Small Scale Industry (NBSSI). Large firms are firms with employee size of more than 100, and firms with less than 100 employees otherwise. These results are presented in Table 5.4.

Table 5. 4 Sizes of responding firms

	Number of Employees			
Subscription to ISO 9000	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
ISO certified Firms	24	1700	337.41	348.63
Non-certified firms	20	650	179.35	148.90

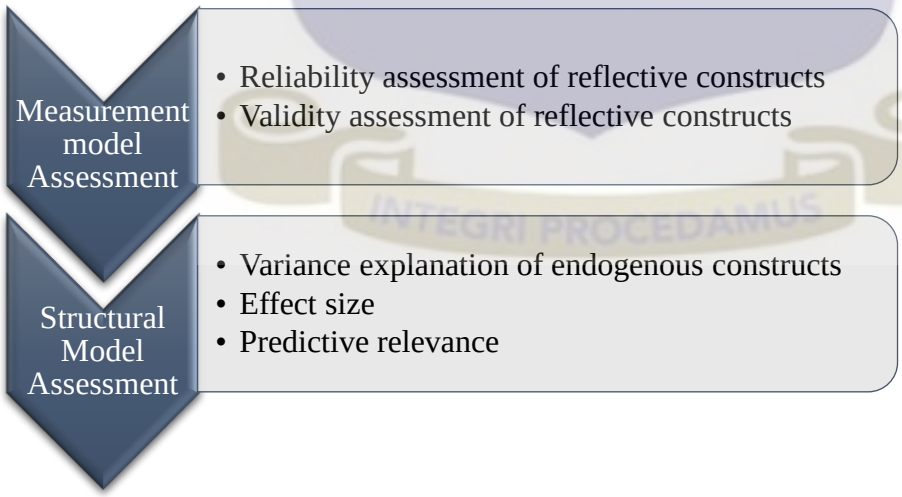
Source: Field of study (2015)

For the ISO 9000 non-certified firms, the firm with the minimum size had 20 employees whereas the largest firm had 650 employees. The average size of a non- certified firm had an employee size of 179 with a standard deviation of 148.90. Specific to ISO 9000 certified firms, the firm with the minimum size had 24 employees and the maximum size was 1700 employees, with the average employee size of 337, although it had a high deviation of 348.63.

5.2 The Partial Least Square Analysis

The Partial Least Square (PLS) Structural Equation Modeling was used to assess how implementation of the quality management principles impacts on the performance of firms in Ghana. PLS path modeling has two sets of linear equations, the measurement model and the structural model. The measurement model needed to be checked for reliability and validity of the relationships between the indicator variables before the structural model can be assessed. The results are presented in two phases. This is depicted in Figure 5.2

Figure 5. 2 The two-step approach in PLS-SEM



Adopted from: Hair, et al. (2014)

5.2.1 The Measurement Model Assessment

The measurement model was assessed for reliability and validity of the indicator variables' ability to measure their respective constructs. Composite reliability was primarily used as the reliability test. Outer loading relevance test was also used to confirm the inclusion or exclusion of some indicator variables for the latent constructs. For validity, AVE was used for convergent validity, whereas cross-loading test and Fornell-Larcker tests were used for discriminant validity.

Most of the indicator variables loaded highly on their respective latent constructs, whiles other variables loaded less than the required value of 0.7. Eventually the low loading indicators affected the other reliability and validity tests. Such indicator variables had to be removed to ensure reliability and validity. The indicator variables that were relevant to be included in the structural model are reported in Appendix A. However, the initial report of the measurement model before some indicators were eliminated is reported in Appendix B. These tables report the loadings, mean score and the standard deviations for each of the indicator variables.

5.2.1.1 Internal Consistency Reliability

The composite reliability coefficient varies between 0 and 1, with higher values indicating higher levels of reliability. Composite reliability values exceeding 0.70 are regarded as satisfactory (Nunnaly, 1978). The measurement scale showed a high level of reliability. These values give a clue to the degree to which the latent construct is reflected in the indicator values. The values of composite reliability range from 0.81 to 0.91. The values, as presented in the Table 5.5 exceed the recommended value of 0.7; hence the satisfactory level of reliability is achieved.

5.2.1.2 Convergent Validity

For convergent validity, AVE was used. It measures the variance captured by the indicators relative to measurement error. The threshold is to obtain AVE values greater than 0.50. The implication is that the latent construct accounts for more than fifty percent (50%) of the variance in its indicators (Gotz, Liehr-Gobbers & Krafft, 2009). After the revision of the measurement model and elimination of some indicators, the AVE values were in the range of 0.59 and 0.75, exceeding the recommended value of 0.5 which indicates sufficient convergent validity.

Summary of the AVE, Composite Reliability (CR), and the number of indicator items or questions measuring the specific constructs are reported in Table 5.5. Table 5.5 and 5.6 are confirmation that the various assessments of the measurement model for validity and reliability were adhered to. These values were derived after a number of tests done to ensure the achievement of reliability and validity. The results of the first iterations are reported in Appendix B. Some of the indicator variables in the questionnaires were deleted to reach the number of variables as reported in Table 5.5. The values from the loadings and cross loadings for each indicator variables have also been reported in the appendix. Although the principles are general, the researcher discovered that some of the respondents were not familiar with some of the indicator variables, and hence inconsistencies in the responses.

Table 5. 5 Summary of the measurement model variables

Variable	Symbol	AVE	CR	Number of items
Top Management Involvement	TM	0.6335	0.8734	4
Customer Focus	CusF	0.6009	0.8574	4
Involvement of People	InvP	0.6192	0.8902	5
Process Approach	ProAp	0.609	0.886	5
System Approach	SysAp	0.594	0.8974	6
Continuous Improvement	ContImp	0.6342	0.9122	5
Factual Decision Making	FDec	0.6393	0.876	4
Supplier Relationship	SupRel	0.6848	0.8127	2
Market and Competitiveness	MktComp	0.7492	0.8566	2
Product Quality	PdtQua	0.6324	0.8725	4
Operational Performance	OpPerf	0.7442	0.8971	3
Customer Satisfaction	CusSat	0.7363	0.8481	2
Financial Performance	FinPerf	0.6828	0.8115	2

Source: Field of study (2015)

5.2.1.3 Discriminant Validity

The two types of discriminant validity, Fornell-Larcker criterion and the cross-loadings, used in PLS modeling were applied to test for this model. The Fornell-Larcker criterion achieves discriminant validity for each latent variable when its AVE is greater than the squared correlations with all the other latent variables. The results of this test are shown in Table 5.6. The diagonal line in italics and bold are the square roots of the AVE values of the respective variables. These values are supposed to be greater than the correlation between that variable

and all other variables. All indicator variables satisfied the Fornell-Larcker test. Cross-Loadings were also used to eliminate any indicator variable that loaded higher on other constructs than the construct it is intended to measure.

Table 5. 6 Correlation output and Fornell-Larcker test results

	ContImp	CusF	CusSat	FDec	FinPerf	InvP	TM	MktComp	OpPerf	PdtQua	ProAp	SupRel	SysAp
ContImp	***0.80***												
CusF	0.58	***0.78***											
CusSat	0.55	0.69	***0.86***										
FDec	0.79	0.56	0.65	***0.80***									
FinPerf	0.21	0.32	0.30	0.24	***0.83***								
InvP	0.62	0.45	0.36	0.58	0.22	***0.79***							
TM	0.61	0.60	0.61	0.65	0.18	0.64	***0.80***						
MktComp	0.65	0.51	0.58	0.67	0.26	0.47	0.44	***0.87***					
OpPerf	0.62	0.66	0.76	0.66	0.40	0.53	0.66	0.65	***0.86***				
PdtQua	0.54	0.74	0.71	0.59	0.39	0.46	0.58	0.60	0.78	***0.80***			
ProAp	0.74	0.73	0.66	0.78	0.26	0.56	0.69	0.55	0.73	0.70	***0.78***		
SupRel	0.58	0.50	0.61	0.63	0.32	0.41	0.57	0.49	0.55	0.58	0.62	***0.83***	
SysAp	0.69	0.68	0.62	0.71	0.37	0.60	0.70	0.46	0.65	0.61	0.77	0.65	***0.77***

Diagonal elements= square root of AVE; off-diagonal elements=correlation between variables.

Source: Field of study (2015)

KEY:

Symbol	Variable	Symbol	Variable
TM	Top Management Involvement	**SupRel**	Supplier Relationship
CusF	Customer Focus	**MktComp**	Market and Competitiveness
InvP	Involvement of People	**PdtQua**	Product Quality
ProAp	Process Approach	**OpPerf**	Operational Performance
SysAp	System Approach	**CusSat**	Customer Satisfaction
ContImp	Continuous Improvement	**FinPerf**	Financial Performance
FDec	Factual Decision Making		

5.2.2 Structural Model Assessment

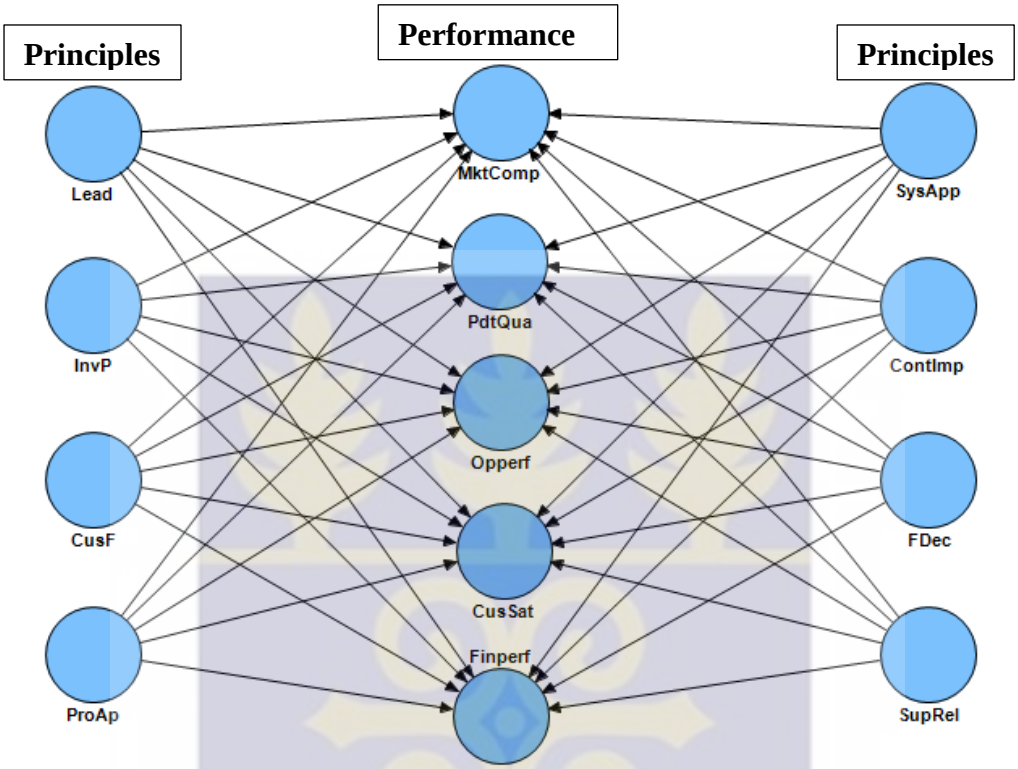
Objective 1: To assess the effect of ISO 9000 Quality Management Principles on firm performance

After the assessment of the measurement model to ensure that all the indicators are worth including in the constructs, the structural model is assessed. The structural model establishes the causal relationships between the exogenous and endogenous variables. This involves the assessment of collinearity, path coefficients and coefficient of determination of the relationships.

The First Model

The study investigated the effect of each of the Quality Management Principles on performance. A regression analysis was done with the PLS-SEM approach. In this analysis, the eight (8) principles were regressed on each of the five (5) performance indicators. This was carried out as separate multiple regression analyses for each performance indicator used as the dependent variable, although the PLS-SEM made it possible for them to be analyzed together. This model is represented in Figure 5.3.

Figure 5. 3 1st Model: The effect of the composite Quality Management Principles on Performance



Source: Field of Study (2015)

The results of the analysis are presented in Table 5.7. This table only reports the path coefficient and the p value for each relationship between the principles and the performance indicators. The path coefficients are the regular font figures and the p values are italicized in parenthesis. For the sake of distinction, significant relationships have their p values highlighted with bold fonts.

Table 5. 7 Results of the 1st Model

	Performance Indicators				
Principle	**Customer Satisfaction**	**Financial Performance**	**Marketing and Competitiveness**	**Operational Performance**	**Product Quality**
Continuous Improvement	-0.2136 *(0.1063)*	0.24 *(0.2724)*	0.2328 *(0.2053)*	0.0203 *(0.8550)*	-0.1104 *(0.2918)*
Customer Focus	0.2205 *(0.1103)*	0.1377 *(0.4403)*	-0.0051 *(0.9741)*	0.1207 *(0.2473)*	0.3458 ***(0.0003)***
Factual Decision Making	0.4005 ***(0.0141)***	0.0928 *(0.6623)*	0.5715 ***(0.0006)***	0.0782 *(0.6313)*	0.3781 ***(0.0133)***
Involvement of People	0.0166 *(0.8876)*	0.0593 *(0.6761)*	0.1493 *(0.2571)*	0.0302 *(0.7295)*	0.0413 *(0.6319)*
Leadership	0.0246 *(0.8749)*	-0.3228 *(0.0768)*	-0.2394 *(0.1755)*	0.0887 *(0.4181)*	0.0929 *(0.3975)*
Process Approach	0.2803 ***(0.0256)***	0.2911 *(0.0597)*	-0.0296 *(0.8415)*	0.2222 ***(0.0203)***	0.2885 ***(0.0068)***
Supplier Relationship	0.0461 *(0.6628)*	0.0858 *(0.5940)*	0.0636 *(0.4901)*	0.1569 *(0.0651)*	0.0605 *(0.5815)*
System Approach	0.119 *(0.4128)*	0.2357 *(0.3384)*	0.148 *(0.4330)*	0.2935 *(0.0704)*	-0.1086 *(0.5363)*

Source: Field of study

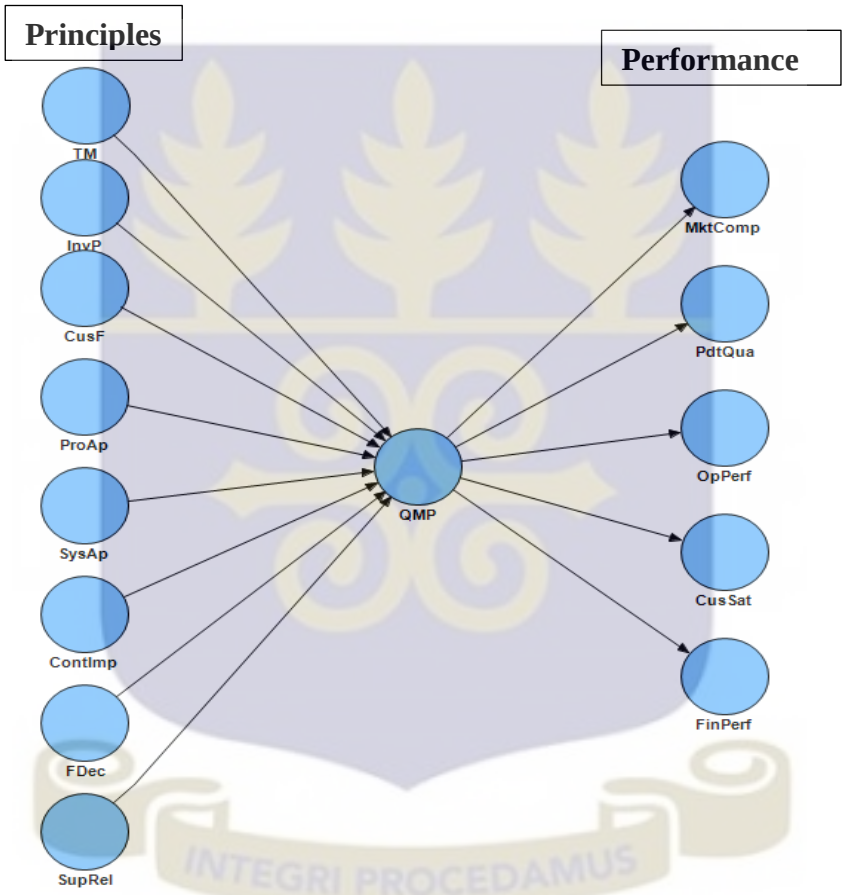
Most of principles showed positive relationships with the performance indicators, although some of them indicated negative impacts. The p values in the results indicated seven (7) significant relationships out of the forty (40) relationships studied. None of the principles showed a significant effect on financial performance as a performance measure.

The Second Model

The diagram below portrays how the integrated implementation of the quality management principles affects the performance of firms. For the purpose of making the model simple to achieve understandability, this diagram only represents the structural model (latent variables in the study), ignoring the indicator variables which are reflective of the latent constructs.

Quality Management Principles (QMP), as shown in the diagram, is a construct formed as the composite of the eight principles. QMP is used as an independent variable for the five indicators of performance. For that matter, five relationships are established with respect to the effect of quality management on the five performance indicators. This model is presented in Figure 5.4

Figure 5. 4 2nd Model: The effect of the composite Quality Management Principles on Performance



5.2.2.1 Collinearity Assessment.

This test assesses the strength of collinearity among the quality management principles in the model. Table 5.7 presents the VIF results as it relates to all the other exogenous variables.

Table 5. 8 Collinearity statistics

Variable	Tolerance	VIF
ContImp	0.302	3.31
CusF	0.421	2.375
FDec	0.271	3.696
InvP	0.486	2.057
TM	0.376	2.661
ProAp	0.236	4.242
SupRel	0.498	2.008
SysAp	0.289	3.455

Source: Field of study (2015)

From Table 5.8, all the exogenous variables used in the study did not flout the collinearity assessment. The VIF values were all less than 5, whereas tolerance values all exceeded 0.2. These results do not indicate that multi-collinearity exists.

5.2.2.2 Assessing the Significance and Relevance of the Structural Model Relationships

The results of these relationships are presented in Table 5.9. The first column describes the various relationships between the quality management principle and the performance indicators. The coefficient describes the extent of change in the dependent variable if the independent variable changes. The t-statistic and p value which indicate the levels of significance are reported in the third and fourth columns. The final column reports the coefficient of determination for each of the relationships.

Table 5. 9 Results of the 2nd Model

Path	Coefficient	T Stat	p value	R squared
QMP -> CusSat	0.7114	11.5791	0.0000	0.5061
QMP -> FinPerf	0.3164	3.0915	0.00199	0.1001
QMP -> MktComp	0.6422	10.2122	0.0000	0.4124
QMP -> OpPerf	0.764	18.2291	0.0000	0.5837
QMP -> PdtQua	0.7184	15.1042	0.0000	0.5161

Source: Field of study (2015)

Using the *p* value, at a 5% significance level, quality management principle as a composite of all the eight principles was seen to have significant impact on all the five performance indicators used in the study. Specifically, the coefficients of the effects indicates that quality management affects a firm's operational performance the most (b=0.764), followed by the firm's product quality (b=0.7184). Financial performance seems to be least affected by quality management principles (b=0.3164). The R squared for the individual relationships are also reported. These values show the variations in the respective performance indicators explained by the variations in the implementation of the quality principles. For instance, 58.37% of the variation in operational performance is explained by the variations in the performance of the quality principles. The model seems to predict less of the relationship with financial performance given an R squared value of 10.01%. All the R square values were below 60%, and this indicates that other factors affect these performance indicators other than the QMP as studied. Some of these factors, respective to each indicator, are discussed in the next chapter of the study.

5.3 Objective 2: Comparison of Performance of Certified and Non-certified Firms

The study also sought to check if at all a significant difference exists between certified and non-certified firms on the five performance indicators. Thus, in this analysis, the Mann Whitney U-test was used to assess the differences in the performance of ISO 9000 certified firms and non-certified firms, on the five criteria used in this study. The median rank for Marketing and competitiveness, Product quality, Operational performance, Customer satisfaction and Financial performance, and the significance of the differences are summarized in Table 5.10. A t-test was also taken to check for robustness.

Table 5. 10 Comparison of performance of ISO 9000 Certified and Non-Certified firms

Subscription		MktComp	PdtQua	OpPerf	CusSat	FinPerf
Certified (*n=29*)	Median rank	26	23	23	22	13
Non-certified (*n=56*)		25	19	19	19	12
Mann-Whitney U-Test	Z	-1.952	-4.519	-5.163	-3.839	-1.722
	p value	0.051	0.000	0.000	0.000	0.085
T-Test	T stat	1.427	5.292	6.218	4.140	1.365
	p value	.157	0.000	0.000	0.000	.178

Source: Field of study (2015)

From Table 5.10 the median score for ISO 9000 firms are higher than that of non-certified firms, on all the performance variables studied. ISO 9000 certified firms scored 23, 23, and 22, whereas non-certified firms scored 19, 19, and 19 on Product quality, Operational performance, and Customer satisfaction, respectively. The Z scores are -4.519, -5.163 and -3.839 respectively. These Z values make the differences statistically significant at a 5% alpha level. Meanwhile, the difference between the Marketing and competitiveness, and Financial performance score for certified firms and non-certified firms with Z values of -1.952 and -

1.722, were not statistically significant at a 5% significance level. A check of robustness of the comparison using a parametric t-test also indicated similar results as presented by the U-test.

5.4 Contextual Analysis of Performance of ISO 9000 Certified Firms

Further analyses were made to test whether some firm specific characteristics really matter in the performance of firms with ISO 9000 certification. This part of the analysis done only on certified firms investigates if the industry of operation, the length of years of implementing the standards and the size of the firm distinguish some firms in terms of performance. The Kruskal-Wallis non-parametric test of comparison was used for the industry of operation and the length of years of operations, while the Mann Whitney U test was used to compare the sizes of firms. One sample T-test and one-way ANOVA was also used to check for robustness of the results. The output from the analysis are presented in Tables 5.11, 5.12 and 5.13

5.4.1 Performance Comparison of ISO 9000 Certified Firms across Industries

Based on the results, attempt was made to unravel whether the performance of certified firms differed according to the industry in which the firm operates. Three sectors were generally considered in the analysis; service, manufacturing, and extraction, construction and agriculture. This was done using the Kruskal Wallis test of comparisons, and further confirmed with one-way ANOVA for robustness.

Table 5. 11 Comparison of performance of certified firms across industries

Industry		MktComp	PdtQua	OpPerf	CusSat	FinPerf
Service	n=5					
	Median	25.00	23.00	24.00	21.00	13.00
Manufacturing	n=21					
	Median	26.00	23.00	23.00	23.00	13.00
Extraction, Construction and Agriculture	n=2					
	Median	28.50	21.50	23.50	22.50	13.00
Kruskal Wallis (Sig).		**.393**	**.777**	**.935**	**.285**	**.727**
ANOVA (Sig)		**0.520**	**0.662**	**0.095**	**0.280**	**0.716**

Source: Field of study (2015)

From Table 5.11, at a glance, one industry or the other recorded a higher median score on one or more of the indicators. The extraction, construction and agriculture firms recorded a higher median score in terms of marketing and competitiveness, whereas firms in the service industry made high ranks in the operational performance and were par with manufacturing on the criteria of product quality. Manufacturing firms also recorded a higher median score of 23 on customer satisfaction above service firms (21) and extraction, construction and agriculture. Meanwhile, none of these differences were seen to be significant at a 5% significance level. Similar results were found for both the Kruskal Wallis test and the ANOVA. This implies that the performance of a certified firm does not necessarily depend on the industry in which the firm is operating.

5.4.2 Performance and Length of Years of ISO 9000 Certification

Further analysis was done to ascertain if the length of years for which a firm has remained certified to the ISO 9000 standards has an effect on the firm's performance. This comparison was done using the Kruskal Wallis and ANOVA tests of comparison. Certified firms were categorized into certification for less than 2 years, between 2 and 5 years and above five years. Report of the analysis is presented in Table 5.12.

Table 5. 12 Comparison of certified firms on the length of certification

Length of years		**MktComp**	**PdtQua**	**OpPerf**	**CusSat**	**FinPerf**
	n=7					
0-1.99	Median	27	24	25	24	13
	n=11					
2-4.99	Median	24	22	23	21	13
	n=11					
Above 5 years	Median	26	23	23	22	13
Kruskal Wallis	**Sig.**	**0.059**	**0.794**	**0.315**	**0.174**	**0.672**
ANOVA	**Sig.**	**0.130**	**0.796**	**0.365**	**0.155**	**0.511**

Source: Field of study (2015)

The results obtained from the analysis in Table 5.12 indicate that in all the performance indicators, firms that have been certified for less than 2 years recorded the highest medians, followed by firms that have been certified for more than five years, and finally firms certified between 2 years and 5 years. Although the difference exists, both parametric and non-parametric tests indicated that these differences are not significant at the 5% level of significance. This implies that certified firms enjoy the benefits of certification, irrespective of the number of years they have remained certified.

5.4.3 Performance and the Size of ISO 9000 Certified Firms

Firm size was also considered a factor that would differentiate the performance benefits that certified firms would enjoy from certification. Firms with certification were grouped into two categories depending on the employee strength; small and large firms as categorized in Section 4.5 of Chapter 4.

Table 5. 13 Comparison of certified firms based on sizes

Size of firm		MktComp	PdtQua	OpPerf	CusSat	FinPerf
Small	*n=6*					
	Median	26.5	22	22	21	12.5
Large	*n=23*					
	Median	26	23	24	22	13
Mann-Whitney	**Sig.**	**0.267**	**0.320**	**0.176**	**0.444**	**0.216**
T-test	**Sig**	**0.282**	**0.500**	**0.215**	**0.479**	**0.177**

Source: Field of study (2015)

Output from the analysis presented in Table 5.13 shows that small firms generally have an improved marketability and competitiveness with a median of 26.5, whereas large firms enjoy increased product quality, operational performance, customer satisfaction and financial performance, howbeit, the differences are not statistically significant at an alpha level of 5%, from both parametric and non-parametric tests. The results give the indication that regardless of the size of a firm, the benefits from certification do not differ.

5.5 Motives for Certification

The study sought to find out which motives could have pushed some firms to get certified. Eight of such motives were discussed in Section 2.5. Firms were requested to rate on a Likert

scale the significance of each of the factors in influencing them for motivation, ranging from 1 to 5, with 1 indicating lowest significance and 5 indicating highest significance in that order. The average ratings and the standard deviations for each of the motives have been presented in Table 5.14.

Table 5. 14 Motives for certification

Motives	Median	Mean	Std. Dev.
External motives	***16***	***16.24***	***2.71***
Pressure from competitors	4	3.38	1.43
Building company's image and reputation	5	4.62	0.56
Satisfy external demand pressure from market	4	4	1.07
To facilitate acceptance contracts	4	4.24	0.74
Internal motives	***19***	***18.24***	***2.12***
Continuous improvements	5	4.45	0.63
Provision of quality products and services	5	4.79	0.41
Part of a TQM based strategy	5	4.55	0.63
Need to formalize management systems	5	4.28	1.13
Z and t values	***-3.523***	***4.272***	
Sig	**0.000**	**0.000**	

Source: Field of study (2015)

Averagely, the factor that caused most firms to get certified is the need to provide quality products and services, followed by the need to build a company's image and reputation. The least considered factor that influenced firms to get certified is pressure from competitors. The first four factors are classified under the external motives whereas the last four represent internal motives for certification. Averagely, the internal motives were the strongest force that informed firms' certification. Using the Mann Whitney U-test and T test (applicable to medians and means respectively), the internal motives for certification ranked significantly higher than the external motives.

5.6. Objective 3: Factors accounting for low patronage of the certification in Ghana

It has been obvious, from the figures (ISO Survey, 2013), that there is low patronage of the quality management standards published by ISO 9000. This section inquired of the possible factors that may be the cause for such a situation. In all, 10 factors came up as causes for non-certification. The respondents were required to rank these factors on the scale of 1 to 5, how each factor could be the considerable cause for not certifying, where 1 was the least considered factor and 5 implies that the factor is a main reason for not patronizing. A multi-criteria approach was used to rank these factors after establishing the relative importance weights of each of the factors. The results of the relative importance weights and the ranks have been summarized in Table 5.14.

Table 5. 15 Relative Importance Weights of factors accounting for low patronage of the standard

	Severity of factor							
Factor	**1**	**2**	**3**	**4**	**5**	**Total**	**RIW%**	**Rank**
No knowledge of ISO 9000 standards	19.6	28.6	19.6	19.6	12.5	100	9.58	**7**
It doesn't apply to my firm	21.4	25	25	19.6	8.9	100	9.33	**10**
No remarkable impact on certified firms	19.6	8.9	35.7	26.8	8.9	100	10.27	**4**
Lack of Top management involvement	5.4	17.9	35.7	35.7	5.4	100	11.02	**1**
Resistance to change	17.9	19.6	35.7	21.4	5.4	100	9.59	**6**
Time resource constraint	16.1	17.9	28.6	30.4	7.1	100	10.22	**5**
Financial resource constraint	8.9	17.9	37.5	28.6	7.1	100	10.64	**2**
Human resource constraint	10.7	19.6	35.7	26.8	7.1	100	10.39	**3**
Difficulty in understanding requirements	14.3	28.6	28.6	25	3.6	100	9.54	**8**
Bureaucracy of the process	8.9	37.5	32.1	16.1	5.4	100	9.41	**9**

n=56 responses

Source: Field of study (2015)

From Table 5.15, lack of top management involvement was the most influencing factor for less certification, followed by constraints of financial resources and human resources. These are followed by the fact that firms do not see a remarkable effect of firm certification on certified firms. Although literature has mentioned that the standards are difficult to understand and have some bureaucratic processes, they were less considered a factor for non-certification. They were ranked eighth and ninth respectively. Few firms considered that the standards did not apply to their institution. This was the least ranked reason for not patronizing the standards.

5.6.1 Firms' Intention to Get Certified

Finally, the study inquired of firms' future intention to get certified to the standards. The results indicated that most of the firms have intention to be certified. Forty-six out of the fifty-six non-certified firms included in the study indicated that they will adopt the standards in the future.

Table 5. 16 Firms' future intention to get certified

Response	Frequency	Percent
Yes	46	82.14
No	10	17.86
Total	56	100

Source: Field of study (2015)

CHAPTER SIX

DISCUSSION OF RESULTS

6.0 Introduction

This chapter discusses the results that were presented in Chapter five. It expresses what the analyzed data means in light of existing literature and contextual situations in Ghana. Most importantly, the data is explained to answer the research questions asked in the first chapter of the study.

6.1 Implementation of Quality Management Principles and Firm Performance

The structural equation method was used as a technique to analyze the effect of the implementation of quality management principles on the performance of the firms understudied. These factors have been considered by researchers as the critical success factors, implying that, for a quality philosophy to yield the deserved benefits, these factors need to be well implemented (Kazilunas, 2010; Sohal & Terziovski, 2000; Wahid & Corner, 2009). Chu-Hua and Lu (1997) concluded that some firms are unable to achieve full realization of the benefits of a quality management model because some of the necessary principles to implement are ignored. Firms were assessed on five performance indicators yielding from the implementation of the principles. These five indicators are increased marketing and competitiveness, product quality, operational performance, customer satisfaction and financial performance.

The first Model

From the results of the 1st model, although some of the results were unexpected, it presents an interesting perspective to look at the standards from the Ghanaian context. Continuous improvement, Involvement of people, leadership, supplier relationship and systems approach as ISO 9000 principles were seen to have no significant relationships with all five performance indicators. Also, some negative relationships were realized between some of the principles and the performance indicators. Three (3) out of the seven (7) negative impacts related to marketing and competitiveness as a performance measure. This is possibly because of the fact that the standard is not very popular in the country hence firms have not been able to harness the competitive benefits it comes with. These unexpected results were perceived to be as a consequence of the fact that many of the responding firms are not certified, and for that reason, some of the responses were inconsistent. The analysis was run separately for the certified and non-certified firms. The results indicated an increased number of negatives in both results. This gave the indication that the relatively small sample size for the study could be the accounting factor for such irregularities in the results.

Meanwhile, customer focus, factual decision making and process approaches indicated significant relationships with at least one of the performance indicators. Noticeably, factual decision making had positive significant impacts on customer satisfaction, marketing and competitiveness and product quality, whereas process approach had similar positive significant impact on customer satisfaction, operational performance and product quality. Customer focus had a positive significant impact only on product quality. The results for this study indicate that factual decision and process approach are very important management principles are far as customer satisfaction is required. Factual decision making was seen as the only principle that impacted marketing and competitiveness of firms, whereas process approach significantly impacted on operational performance. In terms of the improvement of

the quality of firm's product, customer focus, factual decision making and process approach were seen to be important principles in achieving this performance.

The Second Model

The results of the analysis showed that the composite implementation of the quality management principles has positive and significant impact on all the performance parameters. This result is supported by Augustyn and Pheby (2000) and in conformance to the claim by Subba, et al., (1997) that the full benefits of the standard can only be gained when the implementation of the principle is done in an integrated manner. The beta coefficients, however, have important information that can be discussed.

The implementation of quality management principles highly impacted on the operational performance of implementing firms (Beta= 0.764). Koc (2007) emphasized that intentional implementation of the standard affects the internal performance of the firm, in terms of its operational activities. This corroborates the study by Poksinska, et al., (2002) and Lipovatz, et al. (1999) that other benefits may well be enjoyed by firms implementing ISO 9000, but the core of the implementation is directed to improving the operational performance of the firms. Lipovatz, et al. (1999) found that the other performance benefits automatically flow from the improved operational performance.

Next to operational performance was the performance on product quality and customer satisfaction in that order with coefficients of 0.7218 and 0.711 respectively. These results, similar to the study by Heras, et al. (2002a), show that certification increased a firm's emphasis on quality. It is quite consequential to realize increased product quality because an output is likely to come out as quality as long as the production system is of good quality. Customer satisfaction is increased when the product is of the right quality, just as some

studies have confirmed (Han, et al., 2007; McGuire & Dilt, 2008; Singh 2008; Sun 2000). The other dimensions of customer satisfaction (flexibility, responsiveness and cost) can similarly be achieved on the merit of increased operational performance (Koc, 2007).

Marketing and competitiveness was less impacted by implementation of ISO 9000 principles with coefficients of 0.642 and the least effect is realized in relation to financial performance. The increase in market share or competitiveness may be flowing from the increased quality of products, or, in the case of certified firms, the publicity gained from association with the standard. The standards are not very popular in Ghana, hence scarcely used as a marketing tool, and therefore its effect on marketing is not really enormous.

Nonetheless, the effect of the principles on the financial position of firms, although statistically significant, was relatively lower. Some studies by Lo, et al. (2013) and Corbett, et al. (2005) concluded that a firm's financial performance increased automatically from improved operational excellence and reduced cost of production, as well as increased marketability and competitiveness. Meanwhile, Rahman (2001) and Naveh and Marcus (2005) did not find ISO 9000 having a significant impact on financial performance. Naveh and Marcus (2005) found out that application of ISO 9000 standard may lead to operational benefits but not necessarily leading to an improvement in financial performance. This is because other factors may be affecting the financial position of a firm other than producing quality products and operational excellence. It will be important to mention that this study was conducted during a period where the country was facing an intense energy crisis, as well as other economic downturns, like the depreciation of the currency and increased borrowing rates (PWC, 2014, Bank of Ghana, 2014). One respondent alluded to this fact although unofficially, by stressing on the effects of the extra costs of fuel and energy due to the consistent power outages in the country. Also, this result may probably be due to the

intensive resource requirement of implementing these principles in the right manner (Jansen, 2008; Gustafsson, et al., 2001; Naveh & Marcus, 2005; Simmons & White, 1999). Rahman (2001) for example, concluded that, as part of the certification process, firms spend a substantial amount of resources for the documentation of their processes. The high costs associated with implementation may also be due to the high fees for calibrating existing equipment and purchasing new machines, consultant and certification audit fees, recruiting competent personnel, training and development (Schiffauerova & Thomson, 2006)

6.2 Comparison of Performance of Certified and Non-certified Firms

The research also sought to find out if the subscription to the standards leads to a higher realization of firms' performance on the five indicators. A Mann-Whitney U-test was performed with the SPSS statistical software. The analysis revealed that certified firms performed better in all respects than non-certified firms. The difference in marketing and competitiveness, and financial performance however was noticed to be insignificant. Heras, et al. (2002b), similarly found no improvements in sales growth when certified and non-certified firms were compared, for most of the years studied, although the sales for certified firms were greater in all instances than non-certified firms. They explained that certification is usually pursued by already successful firms, so increased sales may be realized independent of the certification. Certified firms may not be getting an advantage in marketing and competitiveness from certification possibly because the standards are not very popular in most African countries, including Ghana, and for that matter, purchasing decisions of customers are not necessarily prioritized on certification. These benefits would rather have been enjoyed by firms who have international commercial dealings. However, it seems most of the certified firms studied have the local markets as their main target markets.

Financial performance of certified firms was also seen to be insignificantly different from non-certified firms. This result may be the opposite of the results of Corbett, et al., (2005) and Heras, et al. (2002b). Morris (2006) also discovered there was no significant difference in the financial performance between ISO 9000 certified electronics manufacturers and their non-certified colleagues. This may be flowing from the substantial amount of resources in the documentation of the processes and the high costs associated with implementation, which may be offsetting the financial benefits derived from certification, as discussed in the section above.

A significant result was, however realized on the basis of operational performance, product quality and customer satisfaction. Singels, et al. (2001) found an insignificant difference when firms were compared on improved production process (operational performance) and customer satisfaction. Rahman (2001) however found a significant result in similar comparison on the basis of process control, although no significant results were realized on other performance criteria which included customer management and customer satisfaction and organization performance (financials). Koc (2007) emphasized that intentional implementation of the ISO 9000 standard affects the internal performance of the firms, in terms of their operations. Significant relationships between the quality management principles and operational performance, product quality and customer satisfaction were similarly recorded by Magd (2006), Stevenson and Barnes (2001), Poksinska, et al., (2002). Product quality and increased customer satisfaction are seen as automatic consequence of improved operational performance (Lipovatz, et al., 1999).

In line with the resource based theory, the routines developed through the implementation of the quality management principles may be accounting for why certified firms stand a better chance of improving their operational systems. Comparative to non-certified firms, certified

firms use the standard as an intangible resource that is harnessed to improve on their internal operations, which further translates into other sources of organizational performance (Nair & Prajogo, 2009; Skinner, 1969).

6.3 Performance Comparison of ISO 9000 Certified Firms across Industries.

Firms, irrespective of the industry of operation did not perform differently from firms in other industries. This result contradicts some studies that claimed that ISO 9000 standards were better implemented by manufacturing firms and hence they benefited more from certification than service organizations (Din, et al., 2011; Sharma, 2005; Terlaak and King, 2006). As mentioned by Casadesus, et al. (2001), the assertion above was true during the early years of the standards. Early researchers (Rungtusanatham, et al., 1998; Shrivastava, et al., 2007) which compared firms across industries found a significant difference. This is because, the standard was misconceived as a quality standard meant for only manufacturing setups. However, more recent papers that were found (Sadikoğlu & Zehir, 2008; Shah & Ward; 2003; Sila, 2007) reported no significant difference in the performance of firms from different industries, similar to the report of this study. This implies that, irrespective of the industry, a firm that is dedicated towards implementing the principles will achieve the benefits thereof.

6.4 Performance and Length of Years of ISO 9000 Certification

Performance from certification was also compared on the number of years a firm has remained certified. Hareton, et al. (1999) mentions that it seemed to take a while for the benefits to be observed after implementation and postulated that the longer time it takes a

firm to remain certified, the more the likelihood of realizing its benefits. The results of this study however showed no significant difference, at 5% significance level, in the performance of firms across the years of remaining certified. The rigorous audit procedures a firm goes through before certification makes the firm ready to attain some of these performance benefits even immediately after certification. The median ranks, however, show that firms that have implemented the standard for shorter periods (less than two years) have higher performance on the five indicators. This could possibly be because of the enthusiasm and zeal that is associated with certification to the standards, which comes very strong in the early moments of registration, but complacently reduces over the period. Meanwhile, those who implement it for longer periods also benefit in performance because their production's systems are almost perfectly integrated with the principles of the standards. Lee, et al. (2009) in the study of the service industry similarly showed that there is no significant relationship between experience from certification and performance benefits.

6.5 Performance and the Size of ISO 9000 Certified Firms

The sizes of firms were used as a criterion to compare ISO 9000 certified firms. Varkoi (2010) reasoned that smaller firms do not have the capacity to implement the standards to details and as a consequence do not experience the full breath of the benefits from certification. It is also possible that larger firms may be subscribed to other quality standards that may enforce the intensity of the performance of these firms (Starke, et al., 2012). Terziovski and Samson (2000) and Varkoi (2010) corroborated the conclusions by Powel (1995) and Fisher (1993) that larger companies benefited more than smaller firms in the adoption of ISO 9000. The results of Lee, et al. (2009) however, showed that firm size was not a crucial variable in the performance benefits realized from certification. This study also

found that the size of a firm does not necessarily affect performance, because no significant difference existed between small and large firms.

6.6 Motives for Certification by Ghanaian Firms

The motive most considered by firms for certification was the quest to provide quality products and services. As already established, the ISO 9000, although does not standardize products and services, ensures that the production system and processes are efficient and effective to provide quality products and services. Also, firms considered certification on the basis of building a strong company reputation as the next pressing motive. The IS0 9000 is a world acclaimed standard for quality, hence a firms' association with the standard creates a special quality reputation for the firm. The least considered motive however was the pressure from competitors. This may be flowing from the Ghanaian situation where few firms have subscribed to the standard. From the industrial survey in Section 2.4.2, one organization can be the only certified firm in an industrial sector, hence, there is no competitive pressures to get certified. Assuming most firms in a particular industry are certified, the non-certified firms may be compelled to get certified.

Under the classification of the motives, the internal motives dominated the call for certification. Most firms that pursue certification do it on their realization of the need to continuously improve their systems for provision of quality products and services or the need to formalize management systems. There seems to be less external pressure from customers, or competitors to propel firms to get certified. Moreover, in Ghana, most contracts are not awarded on the basis of a firm's subscription to the standards, hence, no urgency for firms to adopt the standards. In line with other papers, the internal motivation to get certified may possibly be the reason why certified firms perform better in the operational performance and

product quality criteria (Gotzamani and Tsiotras, 2002; Poksinska, et al, 2002; Prajogo, 2011). The three constituents of isomorphism by institutional theorists are reflected in the motives of Ghanaian firms to get certified (DiMaggio & Powell, 1983). Meanwhile, the normative force was dominant in influencing firms' intentions to be certified, compared to the mimetic and coercive forces. Instead of considering only superficial (external) needs to get certified, firms in Ghana highly considered the standard as the means to achieving good quality and operational performance. The weaker marketing pressures not calling for certification may possibly be the reason for insignificant difference in the performance of certified and non-certified firms in terms of marketing and competitiveness.

6.7 Factors Accounting for Low Patronage of the ISO 9000 Standards in Ghana

A lot of firms do not have ISO 9000 certification in Ghana. Ten factors were identified and ranked by non-certified firms on how severe each of the factors serves as impediment to certification. Lack of top management involvement was seen as the highly ranked factor that accounts for low patronage of certification. The decision to adopt quality management, amid other factors, is highly a top management's prerogative. The realization by management of the necessity for quality and quality standards is a significant drive that will push a firm to apply for certification (Yahya & Goh, 2001). The data analyzed showed that lack of management's consent to certification seems to be the main cause for non-certification. This could perhaps be that they have not realized the need to get certified, or have not realized the opportunity cost of not being certified (Gotzamani, 2005; Janas and Luczac, 2002).

Resources needed in the implementation and sustenance of the certification is considered the influential reason next to the lack of management's involvement. Jansen (2008) and Simmons and White (1999) elaborated the resource intensiveness of the standards, especially with

respect to time and cost. Firms who may not see the worthwhile of certification may further be discouraged by the resource constraint. Financial resource constraint which ranked second could come in the form of certification audit fees, cost of establishing documentation systems, surveillance fees and the cost of maintaining the system (Hareton, et al., 1999). Human resource requirements for certification ranked third as an inhibiting factor. This may come in the form of recruiting the right number and quality of personnel, and training and developing existing personnel.

Time constraint was rather considered the fifth factor, coming close to firms not seeing any remarkable impact of certification on the certified firms. Lakhe and Mohanty (1994) mentioned that developing nations are synonymous with poor quality products. He stated that most firms are yet to acknowledge the importance of quality production, because they still perceive quality as ancillary and not a necessity for production. This may be because the call for quality has not been made by customers of these firms in developing countries and firms has not realized the urgency to get certified.

Resistance to change and organizational culture is the sixth ranked factor for non-certification. This factor usually stems from the employees' reaction to the consequences that the new standards would bring to their existing work environment (Ofori & Gang, 2001; Beskese & Cebeci, 2001). The implementation of the principle is quite rigorous and sometimes less accommodating on the soft part of employees' attitudes and behaviors (Gotzamani, 2005), hence, it will always face oppositions whenever it is discussed for implementation. Lack of knowledge of the principle was less considered an important factor for non-certification as it ranked seventh. Unlike the observation by Lewis, Pun and Lalla (2005) that there is less knowledge of the standards among firms of Trinidad and Tobago, most of the non-certified firms in Ghana are aware of the standards.

Non-certified firms also indicated that the bureaucratic process and complexity in understanding the principles were also not of much weight as to why they are not subscribing to the standards. The frustrating nature of the process and principles as branded by Lipovatz, et al. (1999) was not seen in most Ghanaian firms. This may possibly be due to the fact that these firms have not attempted certification processes, and therefore may be unaware of these features of the standard. The least considered factor for non-certification among Ghanaian firms is the claim that the standards do not apply to certain firms or industries. Few firms thought the standards were for specific industries other than the industry they operate in. Firms recognized the generality of the standards, irrespective of industry of operations.

Nevertheless, the responses from 46 non-certified firms, out of the total 56 showed an indication to pursue the standards in the near future. These responses may possibly be coming from some explanation the researcher gave about the standards and their realization of its performance implications. Others indicated that plans are already underway to initiate the certification process. Nevertheless, there were still other respondents which did not see their firms registering for the standards in the future. From the respondents, the attitude of management gives no indication of any intention to get certified.

CHAPTER SEVEN

FRAMEWORK FOR ISO 9000 IMPLEMENTATION

7.0 Introduction

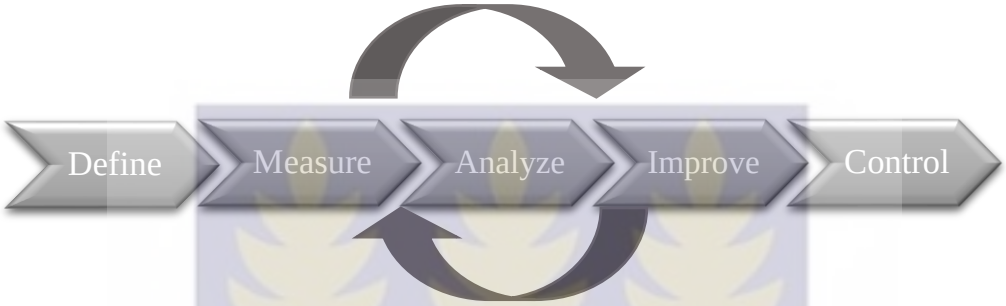
Following the analysis and findings from the data, significant results were realized in the benefits that certified firms have achieved from certification. Meanwhile, more can be done to improve performance, especially on the financial indicator of performance. Uncertified firms, on the other hand, communicated their intentions of getting certified in the future. With these backdrops, two frameworks were developed, one to help certified firms realize improved performance from implementation and the other to guide non-certified firms in the implementation of the standards for the first time. Both frameworks were designed from the Lean Six Sigma models for process improvement and problem solving known as DMAIC, and DMADV. The Six Sigma model has been a very helpful TQM philosophy since its inception by Motorola in 1987. Specifically, the DMAIC is used for process improvement, while the DMADV is used to set up a new process to solve problems. Both models have been known as highly disciplined approaches to reduce variations in a process to achieve the best performance in cost reduction, customer satisfaction and eventually profit increments for an organization.

7.1. DMAIC Framework for Performance Improvement in ISO 9000 Implementation

The first model has five success factors; Define, Measure, Analyze, Improve and Control (DMAIC). This iterative set of steps can help an organization in the line of continuous improvements. Reducing the high cost of implementing the standards, assumed as the factor

that accounts for the low financial performance, is used as an instance to explain the activities entailed in each of the steps that firms have to apply in the DMAIC approach. The same set of steps can be replicated to improve on previous period's performance and also in relation to other facets of the standards that management wants to improve on.

Figure 7. 1 DMAIC Framework for Performance Improvement



7.1.1 Define Phase

The define step provides a detailed description of the existing process that needs to be worked on, or the problem to be solved. This process, being the initiation of the whole approach involves setting up a project team to identify and clarify the current situation. For this example, the problem is the costly implementation of the ISO 9000 principles that eventually erodes the financial gains that come with certification and hence lowering financial performance.

As part of the define step, the project team prepares a project charter; a document for the initialization, planning, executing and controlling of the project. The charter has the title and scope of the project, the statement of the problem, objectives of the project, and resources and personnel required for the activities on the project. A simple example of the project charter is illustrated in Table 7.1. Visual aids like the flow chart and Suppliers, Input, Process, Output and Customers (SIPOC) diagram can aid to define the problem in the right context. The

flowchart is a diagram that describes the steps in a job, operation or a process, while SIPOC is an acronym that defines the linkage among

Table 7. 1: A Sample Project Charter

Project title: Cost reduction in ISO 9000 implementation
Project scope: The implementation phase of the standards
Problem statement: High cost of implementing ISO 9000 principles leads to a low financial performance of the standards.
Project Objective: To reduce cost by eliminating some irrelevant cost factors in the implementation process
Team members: Production manager, Quality manager, Financial manager, external quality auditor

7.1.2 Measure Phase

This phase of the approach assesses the current process by devising a plan to identify and gather data from relevant sources about the process. This backs the claim of the existence of the problem with data from the process. In this instance, cost data is collected from every step of the implementation process and from all cost centers in the process. The use of balance scorecard can be instrumental in this stage. This tool can be used to provide the periodic cost values of cost centers and measured against target values, and red/green or yellow labels are used to prioritize where improvement is needed. Green will signify cost centers that are on or under target; yellow is used for cost centers that are over target, but better than the periods before. Cost centers assigned red need attention because they are spending more than their required targets.

7.1.3 Analyze Phase

The data collected in the measurement phase are critically analyzed in this stage. The analysis stage helps the project team to isolate the real causes of the problems. Not only is the emphasis given to the cost centers labeled red, but plans could similarly be directed to improving cost reduction in the green labeled centers.

This data can be analyzed using some quality management tools like the bar charts to plot the current cost beside the target cost. The cause and effect diagram can be used to trace the root causes of the high cost in the cost centers. One of the main costs is on the documentation of the system. Other costs may include the auditing fees, cost of purchasing new equipment and cost of calibrating existing machines, and cost of hiring new and retaining competent personnel. Other quantitative techniques like regression and scatterplot can be applied in finding relationships and causes of such high costs.

7.1.4 Improve Phase

Realization of the causes of high cost of implementing the principles is followed by a way to improve the situation. This is the phase where creative solutions to problems are developed and tested, usually using pilot techniques. Attention should first be given to costs in the red labeled activities. This will involve the elimination of less relevant steps of the process. Sometimes, for example, an investment of hiring the right caliber of personnel or purchase of the right quality of machines saves the organization a lot of cost, instead of keeping a lot of personnel who may not be productive, yet will be remunerated or obsolete machines that will need constant repairs and recalibration. Some costs may be inevitable, for example, the audit fee and cost of documentation, however, it can be managed so it does not go beyond the target values. One important thing to note is that the improvement strategies should be geared towards the objectives of the project.

7.1.5 Control Phase

The final and probably one of the main strengths of this approach is the control phase. This is the phase of keeping the improved process checked for it to meet the targets consistently. Once an improvement process has been initiated and directed towards solving the problem, such improvement strategies should be standardized and sustained. A module could be created for a real time view of cost positions or weekly or monthly cost of the various activities and cost centers. It should be able to bring to management's notice if cost is exceeding the targets. Institution of sanctions can help to ensure strict adherence to targets.

7.2 The DMADV Approach for ISO 9000 Implementation

This is another model in the Lean Six Sigma approach to quality management production. It is very important in developing a new product or a process new to the company, unlike the DMAIC, that is used for process improvement. The steps involved are the Design, Measure, Analyze, Design and Verify. The Design and Verify in the latter part of the process are the very different concepts in the two approaches. The DMADV approach is also referred to in other quality literature as Design for Six Sigma (DFSS). ISO 9000 non-certified firms can use this five-step approach as a guide in their pursuit of certification.

Figure 7. 2 The DMADV Approach for ISO 9000 Implementation

7.2.1 Define

The decision to take an action on adoption of the ISO 9000 is hinged on a firm's realization of the need of it. The situation can be defined in the light of the need to improve the performance of the organization or to reduce or eliminate some errors and inefficiencies, and that subscription to the standards should be is a necessary tool to achieve increased efficiency and performance.

In the same manner as the DMAIC model, a project team is set and tasked to manage the project of pursuing certification. This team prepares a project charter which specifies the topic and scope of the project, the resources needed, the team members and their respective obligations, the various milestones and the respective completion times. The project team should ideally be constituted by members of all functional departments of the organization, because of the encompassing effect of the ISO 9000 standards on the whole organization.

7.2.2 Measure Phase

This stage of the DMADV approach will concentrate on identifying characteristics critical to the quality of the organization's processes. The current production setting is assessed to know how the processes are performing. It helps to identify which parts of the process need improvements or need to be changed. This can be done by a detailed documentation of the existing process to know all the activities and tasks essential in the production process. These details can be graphically presented in a detailed flowchart diagram, or on the SIPOC diagram. This stage can be used for the detailed documentation of the organization's processes.

7.2.3 Analyze Phase

This phase makes use of the data received from the documentation of the processes. This documentation is analyzed and benchmarked against established targets in the industry or set from best performing firms in the industry, or the ideal targets of the firm. A diagrammatic representation can be made using bar charts. This phase also proposes alternative processes by which the process can be improved.

7.2.4 Design Phase

This is the stage that usually needs more attention in this approach. The firm has to create an environment that is receptive to the adoption of the standards. This is because, the principles of the standards are already stipulated, and for that matter, a firm's responsibility is its ability to inculcate the principles in their operations. Ultimately, this will start with the involvement of top management in the formulation of policies geared towards quality management, if none exists. Moreover, managing the change that the subscription of the standards will bring to the firm is equally important in the design stage. Such activities will include organizing sessions to provide information to all stakeholders about the firm's intention for subscription, as well as training employees on the principles of the standards. Securing the right number and caliber of human resource as well as the right machines and equipment are done in this stage. Because of the technicalities in the principles of the standards, this phase might call for external assistance from people with expertise, usually from the certification bodies. The principles are then carefully implemented at this stage, with the sole objective of bridging the gap that exists between the current processes and the documented processes of production.

7.2.5 Verify Phase

This stage is an assessment stage after the implementation of the principles. The designed process should perform the functions they are intended for. This will involve periodic data collection to compare the processes as they were before and as they are after certification. The auditors of the certifying bodies serve as external auditors for the processes. Line graphs can be used to present the performance of the process before and after certification. Embedded in this stage is close supervision of implementation and the control of activities that will be perceived to inhibit the realization of the performance from the standards.

7.3 Conclusion

The two approaches are proposed for process improvement and for first time implementation of the ISO 9000 respectively. Although certified firms are performing better than non-certified firms, the DMAIC approach if resorted to can lead to improvements in their performance as time goes on. The process can be used to target any improvements that the firm wants to pursue, in a similar manner as described here. Non-certified firms can implement the standards using the DMADV approach and consistently improve their processes using the DMAIC approach.

CHAPTER EIGHT

SUMMARY, RECOMMENDATION, IMPLICATIONS, LIMITATIONS AND CONCLUSION

8.1 Summary of Findings

The demands for quality and quality production necessitated the need for investigating into the effect of ISO 9000 quality management standards. The need for quality highly called for at this moment when Ghana has signed an Economic Partnership Agreement (EPA) with the European Union. This agreement is intended to facilitate international trade between Ghana and other European countries. However, the insistence for international standards, mainly with respect to quality, makes it necessary to bring to notice the level of certification in the country. If firms in Ghana want to benefit from the agreement, then they should be encouraged to certify to some of these standards. There are no statutory policies that oblige firms to get certified to such standards as ISO 9000; nonetheless, a study that brings out the benefits of certification will serve as motivation for non-certified firms to push for certification. Moreover, beyond the conclusion that there is less certification in developing countries, there is the need to ascertain the factors that account for the low patronage of the certification.

A survey of 85 firms was done on how well the ISO 9000 quality management principles are implemented and their effect on performance. Out of the total number, 29 were certified firms and 56 were non-certified firms. Both groups were assessed on the same principles and performance indicators. Structural Equation Modeling-PLS was used to ascertain the effects of the principles on performance. The quality management principle was seen to have a significant effect on all five indicators of performance. These indicators were marketing and

competitiveness, operational performance, product quality, customer satisfaction, and financial performance of firms. Meanwhile, the impact of the quality management principle was greater on operational performance, product quality and customer satisfaction in that order. Marketing and competitiveness and financial performance were least affected by these principles.

The study also sought to distinguish the performance of certified firms from non-certified firms by comparing the two groups on the performance indicators, using Mann-Whitney U-test, a non-parametric equivalent of a t-test. Certified firms performed significantly on operational performance, product quality and customer satisfaction. Insignificant differences existed for marketing and competitiveness and financial performance.

In search of the factors that account for the low patronage of certification, ten factors were identified. These ten factors were ranked with respect to their severity as considered for non-certification. Lack of top management involvement and consent came up as the most considered factor, followed by resource (financial and human) constraint. The least considered factor was the notion that the standards do not apply to the industry from which a firm operates. The other factors included the difficulty in understanding the standards and the bureaucratic nature of the certification process, resistance to change from employees and the perception of no remarkable impact of the standard on certified firms and some firms claimed they have no knowledge of the standards. Meanwhile, most of the non-certified firms declared their intentions to get certified in the future.

Another contribution of this study was the framework for performance improvement for certified firms and an implementation framework for yet to certify firms. These frameworks were designed using the Lean Six Sigma approaches, DMAIC and DMADV. These steps, when adhered to, can help certified firms to derive the most benefit from certification and

enjoy its benefits. Uncertified firms can also pursue the certification by following the steps in the DMADV model.

8.2 Implications of the Study

This study is significant to three important strands; research, practice and policy.

8.2.1 Implication for Research

This study, as earlier indicated, adds up to the deficient studies on ISO 9000 implementation in African countries. It is an extension of the effects of the quality management principles on firm performance on the African continent. Contrary to the previous studies in Africa that did not realize a clear effect of the principles and performance, this study revealed significant positive impact of the principles on performance, and even significant differences in the performance of certified and non-certified firms. It thus makes an important contribution to the research area in the African context. The model developed at the end of the study can be used or modified for an African cross-country study.

8.2.2 Implications for Practice

One aim for this study was to bring to light the situation of the standards in Ghana and to encourage non-certified firms to apply for subscription. Certification can help firms to better their economic activities with international communities. As the study revealed a significant positive impact of the principles on performance, firms in Ghana and other developing countries are motivated to get certified. Using the developed framework, Ghanaian and other African non-certified firms and firms in the stages of implementation can reap the benefits derived from certification. The framework can serve as a guide for firms who want to pursue certification not just in Ghana, but firms in the African sub-region.

8.2.3 Policy Implications

Policy makers can make use of the findings of the study to institute some policies that could benefit the parties involved. Inasmuch as some non-certified firms are aware of the ISO 9000 standards, there is the need for intensive publicity that will emphasize on the positive effects of getting certified. Certifying bodies like the Ghana Standards Authority (GSA), Societe General du Suveilance (SGS) and Bureau Veritas should invest in publicizing the gains to be derived from the standards for it to become a household name for quality production.

The government, although cannot make it mandatory for firms to get certified, can make policies that will enhance firms' interest in certification. For instance, an enactment can be made in line with the Procurement Act to emphasize the need to be certified as a condition for bidding for government contracts. In that regard, it becomes advantageous for firms to get or remain certified.

A quality based awards can also be instituted in the country by organizations like the Association of Ghana Industries or Ghana Club 100, to recognize quality achievements by firms. This will inspire some firms also to pursue quality principles and in that light certify to the ISO 9000 standard. The ISO community is also introduced to the factors that are accounting for low patronage. Programmes like the twining relationships that are rolled out to help publicize the standards in developing countries, could be effective if policies will be geared towards addressing the factors for non-certification. This can help increase patronage of the standards.

The level of certification in Ghana is quite insignificant. It should be recommended for an increased government involvement. This is because the need for certification has gone beyond the benefits for just firms or industries only, but to the national level due to the fact

that Ghana has signed into the Economic Partnership Agreement. A statutory backing to subscribe, like it is for food products, could be introduced for quality management systems.

8.3 Recommendation and Future Research Gaps

The study revealed that firms enjoy performance benefits from implementing the ISO 9000 principles. The implication was however less in terms of marketing and competitiveness, and financial performance. The researcher recommends that firms take advantage of the positive publicity that is associated with the certification to promote the sales of their products. Moreover, firms should consider expanding the boundaries of their markets in terms of exporting their products especially to ISO 9000 accepted jurisdictions. With regards to the improvements on financial performance, firms that intend to certify and remain certified should give concentration to the management of the cost of implementing the principles of the standards. Usually, financial performance is the bottom line that firms consider in making investments in such decisions. The results of the study although meant to induce non-certified firms to consider certifying for the standard, should not be the sole reason for pursuing such a journey. Firms should realize the need for improving their internal operations in the pursuit of quality before certifying to the standards. With this motive, certifying firms will eventually reap the other performance benefits associated with certification.

Given the availability of data, a study of firm performance over a number of years of certification would be helpful than a cross-sectional study which gives a snapshot of the position of the firms on these indicators. This is because usually, the causal link cannot be concretely established in cross-sectional studies. A more conclusive result could be realized if data on firms are collected over a number of years and assessed.

Moreover, the study only concentrated on firm specific reasons for non-certification. It did not gather data from certifying bodies in relation to the factors that, in their perspective, may be accounting for less certification. This may give a different view to looking at the problem of non-certification.

8.4 Limitations of the Study

The study was carried amid a number of restrictions and limitations. Primary of these is the unavailability of secondary data on implementation of the principles and most especially the performance indicators, like data on operational performance, customer satisfaction and financial performance. Availability of this data would have been very much helpful. Management's perception ranked on a Likert scale rather provides subjective opinions on firms' performance. A panel secondary data, for instance, might provide vivid information as to the effect on performance of the implementation of these principles. Meanwhile, there is no database to get such data on firms.

A greater sample size could have made the study more interesting. Unfortunately, the population of certified firms numbered 49, even if all were used for the study, it will still be limited for some statistical techniques for analysis. Moreover, due to resource constraint the study could only restrict its jurisdiction to the Accra and Tema metropolis.

Further to this, given a longer time range, a case study could be a very good alternative to approach this study. Some firms can be selected from the few certified firms and their approach to the ISO 9000 is well studied. This would enable a deeper and richer insight into the reasons why firms in Ghana choose to implement the ISO 9000 or the reasons why some other firms choose not to pursue certification.

8.5 Conclusion

Although certain principles are common to all firms to implement, certification to ISO 9000 standards intensifies a firm's investment and practice of management principles geared towards quality. More importantly, the implementation of these principles comes with some advantages that firms who are not certified may be losing. Such advantages include, but not restricted to improvements in operational performance, product quality, customer satisfaction, competitiveness and financial performance. The principles in the ISO 9000 standards were seen to have significant effects on all five performance indicators. Significant differences also existed in the performance of certified firms and that of non-certified firms in terms of operational performance, product quality and customer satisfaction, but an insignificant difference in terms of marketing and competitiveness, and financial performance.

Uncertified firms should, on the basis of this study, consider the option of getting certified, especially, in this era of global economic systems with erased borders for trade. Some reasons were ranked according to how they cause some firms not to certify to the standard. Primary among these factors were lack of top management's consent and involvement, and this was followed by resource (human and financial) constraint. Most of the non-certified firms indicated their interest in future pursuit of certification. In lieu of that, a model, has been developed that both certified and non-certified can use in the pursuit of certification to realize the best of performance from certification.

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APPENDICES

Appendix A: Measurement Model output

Table 5.5 Factor Loadings, Convergent Validity (AVE), CR and Cronbach's Alpha (CA) for Quality Management Principles

Factors		Loadings	Mean	Std. Dev.
Top management Involvement (AVE=0.63; CR= 0.91; CA=0.88)				
Communication of quality policies to factory floor	TM2	0.77	4.12	0.81
Provision of required resources, training and freedom to act	TM 3	0.78	4.02	0.82
Regular review of quality objectives	TM 4	0.86	4.11	0.91
Provides inspiration, encouragement and recognition to staff	TM 8	0.77	4.01	0.85
Customer Focus(AVE= 0.60; CR= 0.86; CA= 0.78				
Analysis of customer needs and expectations	CUSF1	0.82	4.11	0.77
Communication of customer needs throughout the organization	CUSF2	0.74	4.00	0.83
About half customer complaints are solved	CUSF5	0.76	4.01	0.94
Feedback from internal customers are also sought	CUSF6	0.77	4.04	0.82
Involvement of People (AVE=0.62; CR= 0.89; CA=0.85				
Staff understands the importance of their roles and contribution	InvP1	0.75	4.15	0.82
Implementation of quality ideas generated by staff	InvP2	0.74	3.82	0.93
Staff responsibility to make the right component at the first time	InvP4	0.81	4.02	0.90
Staff accepts ownership of problems they cause	InvP6	0.76	3.84	0.92
Staff accepts responsibility to solve the problems caused	InvP7	0.86	3.94	0.88
Process Approach (AVE=0.61; CR= 0.89; CA=0.84				
Proper packaging of materials	ProAp4	0.80	4.25	0.80
Proper storage of materials	ProAp5	0.79	4.25	0.75
Standards operating procedures and process flow charts	ProAp6	0.76	3.92	1.00
Charts and graph to measure and monitor quality	ProAp7	0.72	3.87	1.00
Effective maintenance of production equipment	ProAp11	0.83	4.04	0.88

Systems Approach (AVE=0.59; CR= 0.90; CA=0.86)				
A structured system to efficiently achieve corporate goals	SysAp1	0.77	4.08	0.95
Clearly defined roles and responsibilities	SysAp2	0.76	3.98	0.82
Effective measurement and evaluation plan	SysAp3	0.88	4.00	0.91
Coordination among functional departments	SysAp4	0.72	4.18	0.77
Flow charts for routing activities	SysAp6	0.74	3.84	0.90
Strong internal customer/supplier relationship	SysAp7	0.75	4.19	0.79
Continuous Improvements (AVE=0.63; CR= 0.91; CA=0.88)				
An organization-wide approach	ContImp1	0.76	3.85	1.01
Plan-Do-Control-Act	ContImp3	0.81	3.56	1.07
Regular preparation of progress reports on quality	ContImp4	0.77	3.94	1.00
Monitoring potential improvement areas	ContImp5	0.80	4.16	0.83
Conduct cause and effect analysis for non-conformance	ContImp6	0.85	3.87	1.03
Training in the methods and tools for continual improvements	ContImp7	0.78	3.94	0.93
Factual Decision Making (AVE=0.64; CR= 0.88; CA=0.81)				
Decisions are made with facts balanced with experience and intuition	FDec1	0.78	4.16	0.80
Accurate and reliable information and facts	FDec2	0.88	4.15	0.88
Records of past decisions and their justification	FDec3	0.80	4.04	0.93
Provision of analyzed data to those who need them	FDec5	0.73	3.81	0.97
Mutually Beneficial Supplier Relationship(AVE=0.68; CR= 0.81; CA=0.54)				
Established supplier relationships	SupRel1	0.85	4.12	0.82
Fulfilling the needs and expectations of suppliers	SupRel2	0.80	4.13	0.77

Table 5.6 Factor Loadings, Convergent Validity (AVE), Composite Reliability (CR) and Cronbach's Alpha (CA) for the performance indicators

		Load	Mean	Std. Dev
Marketing and Competitiveness (AVE=0.75; CR= 0.86; CA=0.67)				
Enhanced corporate image	MktComp1	0.86	4.21	0.79
Increased competitiveness	MktComp4	0.87	4.24	0.75
Product Quality (AVE=0.63; CR= 0.87; CA=0.81)				
Product defects are reduced	PdtQua1	0.89	4.18	0.77
Products quality has improved	PdtQua2	0.76	4.25	0.69
Customer complains about product defects have reduced	PdtQua3	0.76	4.05	0.80
Reduction of reprocessing	PdtQua5	0.75	3.95	0.80
Operational Performance (AVE=0.74; CR= 0.90; CA=0.83)				
Improvement in communication	OpPerf2	0.83	4.13	0.77
Improvement in operating procedures	OpPerf3	0.87	4.13	0.78
Enhanced productivity	OpPerf5	0.89	4.06	0.82
Customer Satisfaction (AVE=0.74; CR= 0.85; CA=0.64)				
Response to complaints have increased	CusSat2	0.87	4.05	0.79
Improved loyalty of customers	CusSat5	0.84	3.76	0.92
Financial Performance (AVE=0.68; CR= 0.81; CA=0.54)				
Reduced operating costs	FinPerf1	0.84	4.12	0.84
Increased profitability	FinPerf3	0.82	4.00	0.82

Appendix B: Measurement Model before elimination of some items

Factor Loadings, Convergent Validity (AVE), CR and Cronbach's Alpha (CA) for Quality Management Principles

		Load	Mean	Std. Dev.
Leadership (AVE=0.49; CR= 0.88; CA=0.85)				
Established clear quality vision and policies	Lead1	0.67	4.39	0.67
Communication of quality policies to factory floor	Lead2	0.73	4.12	0.81
Provision of required resourcess, training and freedom to act	Lead3	0.73	4.02	0.82
Regular review of quality objectives	Lead4	0.79	4.11	0.91
Approval of quality awareness programmes	Lead5	0.67	3.96	0.89
Evaluation of results to check for improvements	Lead6	0.72	4.13	0.91
A clear organizational chart of company's structure	Lead7	0.57	4.12	0.88
Provides inspiration, encouragement and recognition to staff	Lead8	0.71	4.01	0.85
Customer Focus(AVE= 0.46 ; CR= 0.85; CA= 0.79				
Analysis of customer needs and expectatios	CUSF1	0.80	4.11	0.77
Communication of customer needs throughout the organization	CUSF2	0.69	4.00	0.83
Linking organizational goals to customer needs and expectation	CUSF3	0.67	4.19	0.75
Regualr visits to customers for feedback	CUSF4	0.30	3.84	1.01
About half customer complaints are solved	CUSF5	0.76	4.01	0.94
Feedback from internal customers are also sought	CUSF6	0.75	4.04	0.82
improved communication with customers	CUSF7	0.65	4.14	0.77
Involvement of People (AVE=0.51; CR= 0.89; CA=0.86				
Staff understands the importance of their roles and contribution	InvP1	0.70	4.15	0.82
Implementation of quality ideas generated by staff	InvP2	0.74	3.82	0.93
Existence of quality circles, problem solving groups and project teams	InvP3	0.55	3.67	1.10
Staff responsibility to make the right component at the first time	InvP4	0.79	4.02	0.90
Training and development of employees	InvP5	0.68	3.94	0.93
Staff accepts ownership of problems they cause	InvP6	0.74	3.84	0.92

Staff accepts responsibility to solve the problems caused	InvP7	0.79	3.94	0.88
Free sharing of knowledge and experience	InvP8	0.69	3.95	0.83
Process Approach (AVE=0.53; CR= 0.92; CA=0.91				
Use of statistical process control	ProAp1	0.57	3.62	1.06
Interconnection, interrelation and sequence of processes	ProAp2	0.67	4.07	0.81
Proper handling of materials	ProAp3	0.69	4.21	0.85
Proper packaging of materials	ProAp4	0.74	4.25	0.80
Proper storage of materials	ProAp5	0.76	4.25	0.75
Standards operating procedures and process flow charts	ProAp6	0.78	3.92	1.00
Charts and graph to measure and monitor quality	ProAp7	0.75	3.87	1.00
Effective processes to resolving external customer complains	ProAp8	0.69	3.94	0.84
Effective implementation of process flow inspections	ProAp9	0.81	3.79	0.95
Effective documentation of quality manuals and procedures	ProAp10	0.77	4.08	0.90
Effective maintenance of production equipment	ProAp11	0.74	4.04	0.88
Systems Approach (AVE=0.57; CR= 0.90; CA=0.87)				
A structured system to efficiently achieve corporate goals	SysAp1	0.76	4.08	0.95
Clearly defined roles and responsibilities	SysAp2	0.74	3.98	0.82
Effective measurement and evaluation plan	SysAp3	0.86	4.00	0.91
Coordination among functional departments	SysAp4	0.72	4.18	0.77
Proper scheduling	SysAp5	0.71	4.15	0.87
Flow charts for routing activities	SysAp6	0.73	3.84	0.90
Strong internal customer/supplier relationship	SysAp7	0.73	4.19	0.79
Continuous Improvements (AVE=0.61; CR= 0.91; CA=0.89)				
An organization-wide approach	ContImp1	0.77	3.85	1.01
Effective quality circles and small groups	ContImp2	0.69	3.74	1.09
Plan-Do-Control-Act	ContImp3	0.82	3.56	1.07
Regular preparation of progress reports on quality	ContImp4	0.76	3.94	1.00
Monitoring potential improvement areas	ContImp5	0.78	4.16	0.83

Conduct cause and effect analysis for non-conformance	ContImp6	0.85	3.87	1.03
Training in the methods and tools for continual improvements	ContImp7	0.78	3.94	0.93
Factual Decision Making (AVE=0.58; CR= 0.87; CA=0.82)				
Decisions are made with facts balanced with experience and intuition	FDec1	0.73	4.16	0.80
Accurate and reliable information and facts	FDec2	0.85	4.15	0.88
Records of past decisions and their justification	FDec3	0.81	4.04	0.93
Analysis and Synthesis of results from survey	FDec4	0.66	3.79	1.01
Provision of analyzed data to those who need them	FDec5	0.77	3.81	0.97
Mutually Beneficial Supplier Relationship(AVE=0.68; CR= 0.81; CA=0.54)				
Estabiiished supplier relationships	SupRel1	0.85	4.12	0.82
Fulfilling the needs and expectations of suppliers	SupRel2	0.80	4.13	0.77

Factor Loadings, Convergent Validity (AVE), Composite Reliability (CR) and Cronbach's Alpha (CA) for the performance indicators

Marketing and Competitiveness (AVE=0.29; CR= 0.60; CA=0.0.57)				
Enhanced corporate image	MktComp1	0.78	4.21	0.79
Improved sales growth	MktComp2	0.02	4.51	0.67
Increase in market share	MktComp3	0.58	4.08	0.88
Increased competitiveness	MktComp4	0.87	4.24	0.75
Improved recognition by international community	MktComp5	0.00	4.29	0.80
Increase in business with foreign markets	MktComp6	0.24	3.93	0.81
Product Quality (AVE=0.59; CR= 0.88; CA=0.82)				
Product defects are reduced	PdtQua1	0.86	4.18	0.77
Products quality has improved	PdtQua2	0.76	4.25	0.69
Customer complains about product defects have reduced	PdtQua3	0.73	4.05	0.80
Obsolete stocks are reduced	PdtQua4	0.71	4.14	0.83
Reduction of reprocessing	PdtQua5	0.76	3.95	0.80
Operational Performance (AVE=0.60; CR= 0.88; CA=0.83)				

Better documentation of procedures	OpPerf1	0.72	4.16	0.72
Improvement in communication	OpPerf2	0.80	4.13	0.77
Improvement in operating procedures	OpPerf3	0.83	4.13	0.78
Reduced material wastage and defective rates	OpPerf4	0.63	4.06	0.89
Enhanced productivity	OpPerf5	0.85	4.06	0.82
Customer Satisfaction (AVE=0.45; CR= 0.76; CA=0.63)				
Complaints have reduced	CusSat1	-0.02	4.52	0.65
Response to complaints have increased	CusSat2	0.83	4.05	0.79
Improved identification of customer requirements	CusSat3	0.77	4.13	0.78
Improved inclusino of requirements in product design	CusSat4	0.70	3.96	0.85
Improved loyalty of customers	CusSat5	0.68	3.76	0.92
Financial Performance (AVE=0.49; CR= 0.74; CA=0.48)				
Reduced operating costs	FinPerf1	0.72	4.12	0.84
Reduced warranty and compensation	FinPerf2	0.65	4.09	0.85
Increased profitability	FinPerf3	0.73	4.00	0.82

Summary of the measurement model variables

Variable	Symbol	AVE	Composite Reliability	Cronbach Alpha	Number of Items
Continuous Improvement	ContImp	0.6057	0.9146	0.8914	7
Customer Focus	CusF	0.4611	0.8503	0.7919	7
Customer Satisfaction	CusSat	0.4451	0.7585	0.6321	5
Factual Decision Making	FDec	0.5839	0.8745	0.8205	5
Financial Performance	FinPerf	0.4908	0.7424	0.4798	3
Involvement of People	InvP	0.511	0.8922	0.8618	8
Top Management Involvement	TM	0.4911	0.8846	0.8512	8
Market and Competitiveness	MktComp	0.2947	0.5957	0.5692	6

Operational Performance	OpPerf	0.597	0.8799	0.8291	5
Product Quality	PdtQua	0.5885	0.8768	0.8244	5
Process Approach	ProAp	0.53	0.9249	0.9104	11
Supplier Relationship	SupRel	0.6849	0.8128	0.5415	2
System Approach	SysAp	0.5656	0.9007	0.8712	7

Correlation output and Fornell- Larcker test results

	ContImp	CusF	CusSat	FDec	FinPerf	InvP	Lead	MktComp	OpPerf	PdtQua	ProAp	SupRel	SysAp
ContImp	*0.78*												
CusF	0.56	*0.68*											
CusSat	0.53	0.72	*0.67*										
FDec	0.81	0.62	0.68	*0.76*									
FinPerf	0.34	0.36	0.45	0.39	***0.70***								
InvP	0.70	0.54	0.45	0.66	0.37	***0.71***							
Lead	0.70	0.71	0.65	0.69	0.30	0.70	*0.70*						
MktComp	0.64	0.55	0.66	0.69	0.44	0.52	0.56	*0.54*					
OpPerf	0.65	0.66	0.78	0.69	0.49	0.60	0.71	0.74	*0.77*				
PdtQua	0.52	0.71	0.73	0.63	0.50	0.54	0.65	0.67	0.79	*0.77*			
ProAp	0.79	0.77	0.72	0.82	0.35	0.71	0.81	0.64	0.76	0.68	*0.73*		
SupRel	0.57	0.53	0.59	0.64	0.43	0.50	0.61	0.49	0.55	0.57	0.66	***0.83***	
SysAp	0.70	0.74	0.66	0.72	0.44	0.67	0.76	0.56	0.70	0.66	0.82	0.67	*0.75*

Diagonal elements= square root of AVE; off-diagonal elements=correlation between variables.

Cross Loadings for each of the constructs and their indicator variables

	ContImp	CusF	CusSat	FDec	FinPerf	InvP	Lead	MktComp	OpPerf	PdtQua	ProAp	SupRel	SysAp
ContImp1	0.766	0.395	0.364	0.542	0.323	0.522	0.520	0.402	0.447	0.316	0.612	0.433	0.592
ContImp2	0.692	0.287	0.326	0.494	0.291	0.425	0.397	0.365	0.392	0.230	0.454	0.319	0.441
ContImp3	0.815	0.366	0.380	0.601	0.192	0.475	0.530	0.439	0.473	0.310	0.638	0.441	0.494
ContImp4	0.758	0.454	0.404	0.574	0.255	0.581	0.556	0.460	0.470	0.471	0.594	0.529	0.565
ContImp5	0.776	0.567	0.419	0.733	0.245	0.627	0.585	0.568	0.510	0.461	0.709	0.479	0.601
ContImp6	0.850	0.487	0.534	0.737	0.284	0.521	0.585	0.653	0.655	0.508	0.693	0.378	0.541
ContImp7	0.782	0.458	0.403	0.668	0.291	0.634	0.581	0.501	0.510	0.433	0.582	0.538	0.594
CusF1	0.399	0.796	0.610	0.472	0.309	0.396	0.483	0.472	0.478	0.535	0.588	0.383	0.494
CusF2	0.443	0.691	0.460	0.406	0.144	0.500	0.550	0.408	0.444	0.532	0.510	0.217	0.501
CusF3	0.395	0.674	0.498	0.503	0.244	0.366	0.560	0.348	0.432	0.431	0.509	0.339	0.504
CusF4	0.191	0.301	0.178	0.168	0.300	0.137	0.194	0.143	0.249	0.158	0.280	0.066	0.269
CusF5	0.470	0.760	0.603	0.479	0.241	0.298	0.533	0.479	0.509	0.608	0.614	0.530	0.600
CusF6	0.422	0.754	0.536	0.472	0.394	0.456	0.500	0.428	0.597	0.570	0.584	0.388	0.583
CusF7	0.276	0.653	0.417	0.354	0.086	0.338	0.477	0.203	0.335	0.363	0.495	0.519	0.518
CusSat1	-0.065	-0.053	-0.022	-0.084	0.203	0.029	-0.081	-0.022	-0.006	0.055	-0.043	-0.024	-0.017
CusSat2	0.432	0.643	0.830	0.503	0.296	0.351	0.631	0.513	0.641	0.616	0.603	0.548	0.594
CusSat3	0.511	0.523	0.766	0.601	0.370	0.399	0.491	0.609	0.675	0.623	0.562	0.503	0.526
CusSat4	0.279	0.509	0.698	0.479	0.394	0.231	0.316	0.402	0.480	0.493	0.495	0.369	0.397
CusSat5	0.335	0.467	0.680	0.440	0.306	0.370	0.462	0.430	0.523	0.435	0.483	0.290	0.441
FDec1	0.645	0.445	0.552	0.727	0.409	0.535	0.612	0.583	0.542	0.477	0.602	0.606	0.629
FDec2	0.654	0.567	0.605	0.846	0.262	0.571	0.634	0.596	0.654	0.585	0.710	0.503	0.618
FDec3	0.653	0.504	0.537	0.807	0.308	0.484	0.554	0.534	0.501	0.506	0.669	0.519	0.591
FDec4	0.592	0.461	0.420	0.661	0.269	0.415	0.425	0.418	0.430	0.441	0.555	0.423	0.418
FDec5	0.537	0.373	0.460	0.767	0.237	0.494	0.375	0.464	0.486	0.347	0.558	0.367	0.446
FinPerf1	0.201	0.268	0.291	0.244	0.723	0.280	0.191	0.290	0.338	0.383	0.194	0.210	0.356

	ContImp	CusF	CusSat	FDec	FinPerf	InvP	Lead	MktComp	OpPerf	PdtQua	ProAp	SupRel	SysAp
FinPerf2	0.372	0.241	0.352	0.396	0.645	0.340	0.299	0.397	0.424	0.396	0.327	0.374	0.292
FinPerf3	0.136	0.251	0.289	0.170	0.730	0.138	0.130	0.238	0.251	0.266	0.211	0.321	0.275
InvP1	0.455	0.412	0.310	0.498	0.260	0.704	0.467	0.400	0.443	0.470	0.492	0.394	0.494
InvP2	0.496	0.383	0.288	0.406	0.205	0.744	0.552	0.361	0.397	0.265	0.492	0.299	0.554
InvP3	0.519	0.361	0.152	0.389	0.234	0.551	0.416	0.237	0.296	0.195	0.421	0.215	0.433
InvP4	0.554	0.385	0.274	0.492	0.348	0.791	0.519	0.318	0.414	0.365	0.520	0.314	0.495
InvP5	0.629	0.388	0.337	0.505	0.316	0.679	0.571	0.361	0.435	0.491	0.556	0.516	0.513
InvP6	0.426	0.323	0.304	0.368	0.284	0.742	0.427	0.384	0.378	0.398	0.376	0.279	0.419
InvP7	0.500	0.290	0.321	0.488	0.206	0.789	0.490	0.443	0.421	0.313	0.457	0.301	0.421
InvP8	0.438	0.501	0.484	0.565	0.239	0.690	0.543	0.391	0.557	0.460	0.666	0.445	0.516
Lead1	0.441	0.541	0.466	0.488	0.203	0.293	0.671	0.362	0.478	0.467	0.501	0.322	0.466
Lead2	0.502	0.551	0.539	0.519	0.150	0.435	0.728	0.398	0.496	0.463	0.666	0.493	0.618
Lead3	0.429	0.424	0.407	0.495	0.221	0.615	0.729	0.301	0.429	0.410	0.532	0.459	0.462
Lead4	0.585	0.550	0.564	0.618	0.259	0.643	0.793	0.530	0.681	0.555	0.650	0.412	0.648
Lead5	0.561	0.464	0.384	0.417	0.320	0.509	0.667	0.374	0.426	0.483	0.586	0.485	0.557
Lead6	0.520	0.535	0.485	0.497	0.237	0.434	0.718	0.504	0.502	0.503	0.530	0.410	0.478
Lead7	0.492	0.369	0.317	0.419	0.077	0.473	0.572	0.305	0.391	0.288	0.560	0.428	0.511
Lead8	0.347	0.498	0.401	0.399	0.174	0.545	0.707	0.291	0.486	0.396	0.517	0.475	0.534
MktComp1	0.570	0.362	0.458	0.574	0.299	0.450	0.469	0.783	0.503	0.420	0.508	0.479	0.424
MktComp2	-0.029	-0.118	-0.074	-0.144	0.290	-0.077	-0.038	0.017	-0.009	-0.010	-0.128	-0.048	-0.061
MktComp3	0.288	0.377	0.487	0.345	0.453	0.285	0.375	0.581	0.563	0.516	0.386	0.221	0.374
MktComp4	0.535	0.479	0.532	0.581	0.351	0.410	0.435	0.871	0.612	0.598	0.505	0.367	0.466
MktComp5	0.020	-0.126	-0.084	-0.039	-0.076	-0.017	-0.027	0.003	-0.090	-0.107	-0.058	-0.081	-0.051
MktComp6	0.116	0.143	0.216	0.052	0.202	0.021	0.017	0.243	0.223	0.122	0.126	-0.017	0.062
OpPerf1	0.569	0.456	0.461	0.553	0.203	0.455	0.537	0.464	0.724	0.498	0.561	0.323	0.518
OpPerf2	0.498	0.544	0.626	0.529	0.396	0.594	0.643	0.532	0.804	0.629	0.622	0.542	0.614

	ContImp	CusF	CusSat	FDec	FinPerf	InvP	Lead	MktComp	OpPerf	PdtQua	ProAp	SupRel	SysAp
OpPerf3	0.529	0.570	0.656	0.599	0.427	0.464	0.554	0.693	0.831	0.665	0.636	0.477	0.583
OpPerf4	0.325	0.388	0.606	0.364	0.352	0.247	0.359	0.451	0.634	0.525	0.410	0.352	0.359
OpPerf5	0.543	0.569	0.679	0.595	0.496	0.491	0.588	0.678	0.849	0.728	0.657	0.418	0.577
PdtQua1	0.465	0.671	0.681	0.553	0.405	0.465	0.585	0.617	0.756	0.863	0.666	0.506	0.533
PdtQua2	0.371	0.583	0.540	0.474	0.356	0.391	0.500	0.450	0.569	0.764	0.532	0.469	0.515
PdtQua3	0.351	0.426	0.627	0.383	0.475	0.365	0.442	0.619	0.626	0.734	0.424	0.442	0.412
PdtQua4	0.308	0.401	0.454	0.460	0.324	0.382	0.398	0.404	0.518	0.707	0.401	0.334	0.494
PdtQua5	0.460	0.578	0.493	0.510	0.385	0.447	0.531	0.476	0.554	0.759	0.531	0.419	0.577
ProAp1	0.584	0.427	0.412	0.553	0.342	0.509	0.463	0.426	0.402	0.331	0.572	0.394	0.378
ProAp10	0.656	0.539	0.663	0.679	0.305	0.533	0.627	0.503	0.581	0.543	0.770	0.453	0.647
ProAp12	0.507	0.612	0.592	0.627	0.337	0.521	0.568	0.483	0.585	0.607	0.740	0.568	0.674
ProAp2	0.562	0.531	0.355	0.502	0.121	0.524	0.656	0.431	0.526	0.378	0.672	0.426	0.598
ProAp3	0.485	0.584	0.478	0.475	0.284	0.456	0.564	0.496	0.540	0.558	0.695	0.478	0.559
ProAp4	0.492	0.548	0.587	0.553	0.274	0.489	0.587	0.469	0.624	0.584	0.741	0.540	0.588
ProAp5	0.495	0.542	0.513	0.571	0.256	0.551	0.537	0.437	0.588	0.609	0.760	0.439	0.603
ProAp6	0.641	0.670	0.515	0.669	0.224	0.530	0.639	0.488	0.559	0.491	0.778	0.478	0.564
ProAp7	0.721	0.528	0.525	0.694	0.294	0.540	0.561	0.496	0.565	0.450	0.750	0.387	0.598
ProAp8	0.517	0.547	0.468	0.466	0.068	0.374	0.511	0.277	0.395	0.241	0.688	0.486	0.568
ProAp9	0.710	0.617	0.598	0.693	0.228	0.611	0.757	0.521	0.623	0.491	0.812	0.582	0.708
SupRel1	0.567	0.399	0.459	0.599	0.384	0.411	0.504	0.503	0.490	0.485	0.556	0.853	0.521
SupRel2	0.368	0.488	0.515	0.454	0.322	0.418	0.514	0.286	0.419	0.458	0.529	0.802	0.593
SysAp1	0.559	0.551	0.442	0.514	0.453	0.530	0.587	0.388	0.537	0.553	0.618	0.522	0.764
SysAp2	0.520	0.667	0.516	0.501	0.289	0.621	0.656	0.473	0.565	0.484	0.650	0.512	0.738
SysAp3	0.583	0.612	0.577	0.584	0.326	0.521	0.659	0.412	0.547	0.521	0.694	0.592	0.863
SysAp4	0.541	0.467	0.439	0.569	0.247	0.565	0.546	0.283	0.403	0.440	0.554	0.503	0.724
SysAp5	0.500	0.529	0.512	0.520	0.391	0.469	0.566	0.551	0.612	0.554	0.578	0.512	0.712

	ContImp	CusF	CusSat	FDec	FinPerf	InvP	Lead	MktComp	OpPerf	PdtQua	ProAp	SupRel	SysAp
SysAp6	0.503	0.583	0.466	0.591	0.222	0.485	0.576	0.367	0.455	0.391	0.644	0.404	0.726
SysAp7	0.500	0.476	0.511	0.522	0.358	0.368	0.424	0.420	0.502	0.504	0.545	0.453	0.726

Appendix C: A copy of the questionnaire used for data collection

UNIVERSITY OF GHANA BUSINESS SCHOOL

QUESTIONNAIRE

An Investigation into the Level of ISO 9000 Certification as a TQM Concept in Ghana.

Dear respondent, this is an academic survey questionnaire which is aimed at collecting data on the level of ISO 9000 certification in Ghana. This study forms part of the requirements leading to the award of Master of Philosophy in Operations Management at the University of Ghana Business School. Your kind and objective responses will significantly contribute to the topic. I would appreciate you taking the time to complete this survey. It should take about ten minutes of your time to complete. Any information provided is strictly for academic purposes and would be treated with the utmost anonymity and confidentiality. Thank you for your help.

Section A: Background Information

1. Please, indicate your position in the company at the moment

☐ General Manager
☐ Plant Manager
☐ Operations Manager
☐ Quality Manager
☐ Production Floor Supervisor
☐ Member of the quality department
☐ Other

2. What is the principal nature of your organization's business

☐ Services
☐ Manufacturing
☐ Extraction, Construction and Agriculture
☐ Other, specify ……..

3. What is the average number of employees in your firm …….

4. Type of firm ownership

☐ Sole proprietorship
☐ Limited Liability
☐ Partnership
☐ Publicly owned

5. How many years have your firm been in existence

☐ 0-4.99 years
☐ 5-9.99 years
☐ 10 years and above

Section B: Quality management principles

Direction: Indicate your level of agreement/disagreement to these statements (1: completely disagree; 5: completely agree)

		1	2	3	4	5
	6. *Leadership:*					
a.	Top management has established a clear quality vision and quality policy.					
b.	Top management successfully communicates the quality policy/objectives and vision to the factory floor.					
c.	Top management provides staff with the required resources, training and freedom to act with responsibility and accountability.					
d.	Top management regularly reviews the quality objectives of each department					
e.	Top management approves quality awareness programs for employees and suppliers					
f.	Top management evaluates results to check for improvements					
g.	Top management has designed a clear organizational chart which outlines company's structure and line of communication.					
h.	Top management inspires, encourages and recognizes staff contributions.					
	7. *Involvement of Employees:*					
a.	The staff understands the importance of their contribution and role in the organization.					
b.	The organization implements quality improvement ideas generated by plant employees.					
c.	There are quality circles, problem solving groups and project teams in the organization.					
d.	The staff consider it a responsibility for making the right component at first time.					
e.	The organization invests in the training and development of employees.					
f.	The staff accept ownership of problems and their responsibility for solving them.					
g.	The staff accept the responsibility for solving such problems.					
h.	The staff freely share knowledge and experience.					
	8. *Customer focus:*					
a.	The organization analyzes customer needs and expectations.					
b.	Customer needs and expectations are communicated throughout the organization.					
c.	The organization is dedicated to link corporate goals and customer needs and expectations together.					

d.	Sales persons make regular visits to customers for their feedback.					
e.	About half of customer complaints are solved.					
f.	Feedback and expectation of internal customers are also sought regularly.					
g.	The organization has improved its communication with customers.					
	9. *Process Approach*					
a.	The organization uses statistical process control.					
b.	There exists a well-established interconnection, interrelation and sequence of processes.					
c.	Materials are properly handled.					
d.	Materials are properly packaged.					
e.	Materials are properly stored.					
f.	The organization has standard operating procedures and process flow charts on all work stations.					
g.	The organization has charts and graphs to measure and monitor quality.					
h.	The organization has in place an effective process for resolving external customers' complaint.					
i.	The organization effectively implements various process flow inspections.					
j.	The organization maintains an effective documentation of quality manuals and procedures.					
k.	Production equipment is well maintained according to the available maintenance plan.					
	10. *System approach to management:*					
a.	The organization structures a system to achieve corporate goals in the most effective and efficient way.					
b.	The quality policy and individuals' roles and responsibilities are clearly explained to all departments for achieving common objectives and reducing cross-functional barriers.					
c.	By measurement and evaluation, the organization improves the quality management system continuously.					
d.	There exists coordination among the departments in the organization.					
e.	The organization properly schedules its work orders.					
f.	The organization follows a flow chart to ensure consistency in routing activities.					
g.	There exists a strong internal customer/supplier relationship.					
	11. *Continual improvement:*					

a.	An organization-wide approach is used to continuously review and improve the quality management system.					
b.	Effective quality circle teams and small groups are used to solve quality problems.					
c.	The organization uses Plan-Do- Control-Act cycle for the processes in the plant.					
d.	The organization regularly prepares and reviews progress reports of quality objectives.					
		1	**2**	**3**	**4**	**5**
e.	The organization monitors potential improvement areas or critical processes.					
f.	The organization conducts cause and effect analysis for non-conformance processes.					
g.	The organization provides staff with training in the methods and tools of continual improvement.					
	12. *Factual approach to decision making:*					
a.	Management makes decisions and takes actions based on factual analysis, balanced with experience and intuition.					
b.	The organization endeavors to ensure the information and facts for decision making are sufficiently accurate and reliable.					
c.	The organization keeps records of past decisions made and justification for such decisions.					
d.	The organization has a system to analyze and synthesize results from surveys to aid decision making.					
e.	The organization provides data and the analyzed results to those who need them.					
	13. *Mutually beneficial supplier partnerships:*					
a.	The organization establishes supplier relationships that balance short-term gains with long-term considerations.					
d.	The organization fulfils the needs and expectation of suppliers.					

Section C: Performance Indicators

This section describes how the firm's performance has been affected as a result of the implementation of the above principles.

Direction: Indicate your level of agreement/disagreement to these statements (1: completely disagree; 5: completely agree)

		1	2	3	4	5
	14. ***Marketing and competitiveness***					
a.	This organization is enjoying an enhanced company's corporate image					
b.	This organization is enjoying an improved sales growth					
c.	This organization has achieved an increase in market share					
d.	This organization has achieved increased competitiveness					
e.	The organization has gained an improved recognition by international community					
f.	The organization has realized an increase in businesses with foreign markets					
	15. ***Product quality improvements***					
a.	Product defects are reduced					
b.	Products quality has improved					
		1	**2**	**3**	**4**	**5**
c.	Customer complaints about products defects have reduced					
d.	Obsolete stocks are reduced					
e.	Reprocessing of products have reduced					
	16. ***Operational Performance***					
a.	This organization enjoys better documentation of procedures					
b.	There has been an improvement in communications among the company's personnel					
c.	There has been an improvement in the company's operating procedures					
d.	The organization has reduced material wastage and defective rate					
e.	The organization is enjoying an enhanced company's productivity					
	17. ***Customer satisfaction***					
a.	Customer complaints have reduced					
b.	Response to customer complaints have improved					
c.	Identification of customer requirements has improved					

d.	There is an improved inclusion of customer requirements in product design					
e.	Customers are loyal to the company					
	18. ***Financial benefits***					
a.	Operating costs of the company has reduced					
b.	Warranty compensations have reduced					
c.	Company's profitability has increased					

19. Is the organization subscribed to ISO 9000 quality standards?

☐ Yes, If yes, answer **Section D only** ☐ No**,** If No, answer **Section E only**

SECTION D: ISO 9000 Firms

20. How long has your organization been subscribed to ISO 9000

☐ 0-1.99 years ☐ 2-4.99 years

☐ Above 5 years

21. Is the company subscribed to any other quality standard?

☐ Yes ☐ No

22. If yes, indicate which quality standard your organization is subscribed to

……

Motives for Certification

Direction: Rank the following factors as reasons for applying for certification on a scale between the scale of 1-5, where 1 means 'least considered factor' and 5 implies 'most considered factor'.

	23. Motives	**1**	**2**	**3**	**4**	**5**
a.	Pressure from competitors.					
b.	Improve company's image and reputation.					
c.	Satisfy external demand pressures from the market.					
d.	To facilitate quality acceptance contracts with customers.					
		1	**2**	**3**	**4**	**5**
e.	Continuous process improvements.					
f.	Provision of better processes and products.					
g.	Part of a TQM based strategy.					
h.	Need to formalize management systems.					

24. Do you plan to maintain the certification in the future?

☐ Yes ☐ No

25. Would you recommend to a company in your sector to subscribe to ISO 9000 certification?

☐ Yes ☐ No

26. Is your company applying the TQM philosophy?

☐ Yes ☐ No

27. If yes, how long has the company been applying the TQM philosophy?

☐ 0-1.99 years ☐ 2-4.99 years

☐ Above 5 years

SECTION E: Non-ISO 9000 Firms

Direction: Express your level of importance associated to these factors between the scale of 1-5 as reasons for not applying for certification, where 1 means least considered factor and 5 means the most considered factor.

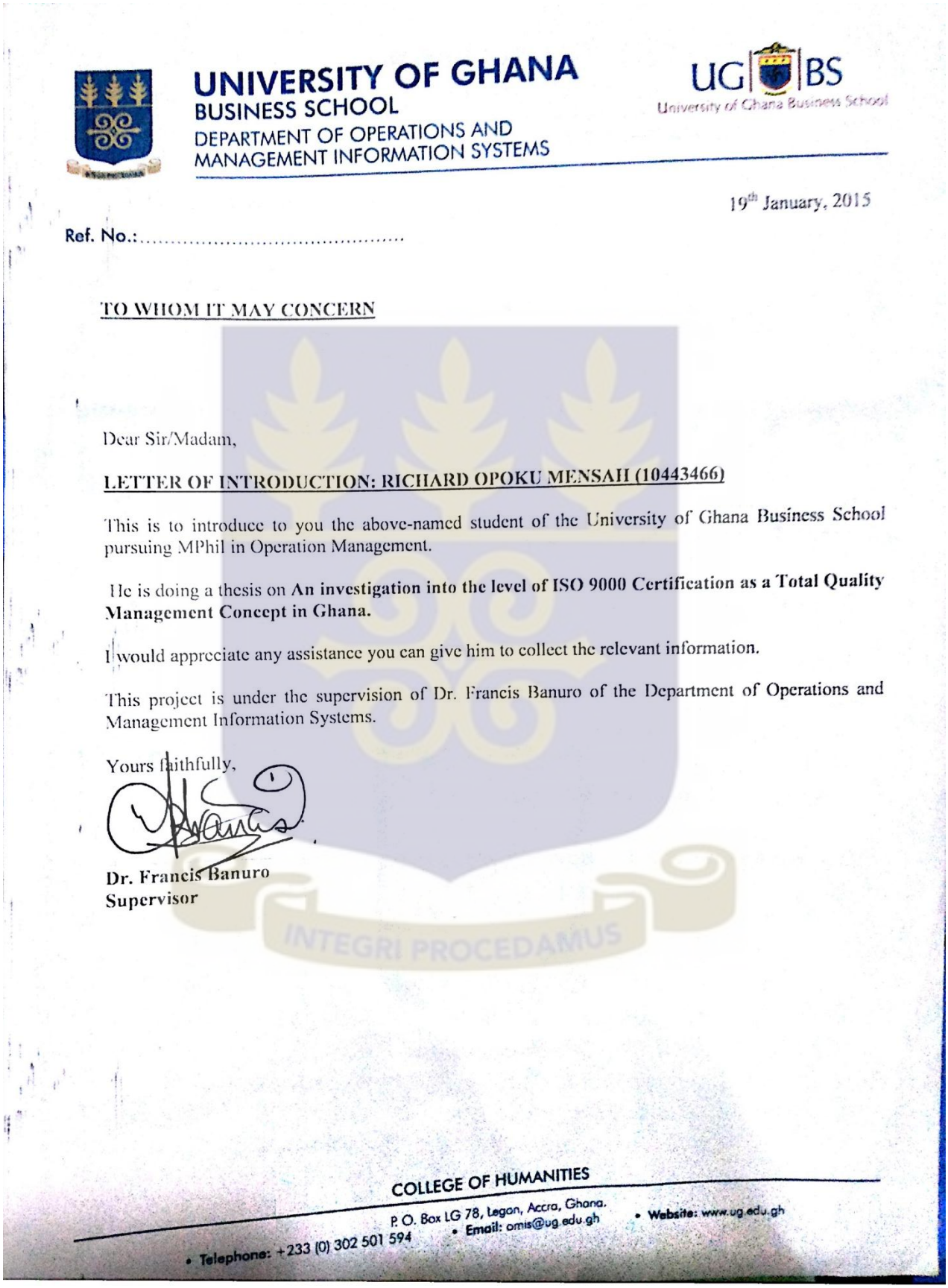
	28. Factor	**1**	**2**	**3**	**4**	**5**
	The organization has no knowledge of ISO 9000 standards					
	The ISO 9000 standards doesn't apply to my firm					
	I see no remarkable impact of the standards on the certified firms					
	The firm lacks top management involvement for certification					
	Resistance to the change of the organizational culture					
	Time resource constraint					
	Financial resource constraint					
	Human resource constraint					
	Difficulty in understanding the requirements					
	Bureaucracy of the process					

29. 29. If there is any other factor that accounts for not applying for certification, please state below……

30. Does your firm intend to get certified to ISO 9000 standards in the future?

☐ Yes ☐ No

Appendix D: An introductory letter from the OMIS Department for data collection



UNIVERSITY OF GHANA
BUSINESS SCHOOL
DEPARTMENT OF OPERATIONS AND
MANAGEMENT INFORMATION SYSTEMS

UGBS
University of Ghana Business School

19th January, 2015

Ref. No.:.....

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

LETTER OF INTRODUCTION: RICHARD OPOKU MENSAH (10443466)

This is to introduce to you the above-named student of the University of Ghana Business School pursuing MPhil in Operation Management.

He is doing a thesis on **An investigation into the level of ISO 9000 Certification as a Total Quality Management Concept in Ghana.**

I would appreciate any assistance you can give him to collect the relevant information.

This project is under the supervision of Dr. Francis Banuro of the Department of Operations and Management Information Systems.

Yours faithfully,

Dr. Francis Banuro
Supervisor

COLLEGE OF HUMANITIES
P. O. Box LG 78, Legon, Accra, Ghana.
• Telephone: +233 (0) 302 501 594 • Email: omis@ug.edu.gh • Website: www.ug.edu.gh

Appendix E: An example of a responding firm's letter of consent for data collection

GOLDEN TREE

COCOA PROCESSING COMPANY LTD.

A FREE ZONE ENTERPRISE.
Private Post Bag, Tema - Ghana Tel: 233 - 303 - 202926 / 202914 / 206375 / 212153 Fax: 233 - 303 - 206657 / 204411 / 212154
E-mail: info@goldentreeghana.com

Date 30th January, 2015

Your Ref:
Our Ref: ADM/CPC/HRM/5

The Supervisor
Department of Operations and Management
Information Systems
University of Ghana Business School
P. O. Box LG 78
Legon - Accra

Attention: Dr. Francis Banuro

Dear Sir,

RE: LETTER OF INTRODUCTION: RICHARD OPOKU MENSAH (10443466)

We acknowledge receipt of your letter on the above-mentioned subject dated 19th January, 2015.

Management is pleased to inform you that approval has been granted for (Mr. Richard Opoku Mensah) a student of your Institute pursuing MPhil in Operation Management to write his thesis at Cocoa Processing Company on the topic ***"An investigation into the level of ISO 9000 Certification as a Total Quality Management Concept in Ghana."***

Kindly be informed that Management of the Company will expect a copy of the report on the study.

The student is kindly requested to contact our **Human Resource/Training and Development Officer** for the necessary assistance.

You can always count on our cooperation.

Yours faithfully,

J. EKOW RHULE
AG. HUMAN RESOURCE MANAGER
For: DEPUTY MANAGING DIRECTOR (F&A)

cc: Deputy Managing Director (F&A)
Deputy Human Resource Manager
Human Resource/Training & Dev. Officer
Mr. Richard Opoku Mensah