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Factors Affecting The Practices Of Iso 9001:2000 Quality Management System In Saudi Business Organizations

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FACTORS AFFECTING THE PRACTICES OF ISO 9001:2000 QUALITY MANAGEMENT SYSTEM IN SAUDI BUSINESS ORGANIZATIONS

by

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ABSTRACT

Since it's release in Dec 2000, there has been a slow movement towards the new version of ISO 9001:2000 by ISO 9000:1994 certified organizations. Of the 561,747 ISO 9000 certified businesses, 167,210 are certified under the new ISO 9001:2000, which is less than 30 % of the total ISO 9000 certified companies. Although many studies have been conducted to understand and assess the practices of ISO 9000:1994 standards, no research has been done to investigate the practices of ISO 9001:2000 in Saudi Arabia.

This study is designed to investigate the implementation practices of the new ISO 9001:2000 standard in Saudi business organizations. The main objectives of this study are to identify the critical factors that lead to successful implementation of the new standard, to determine what barriers have been encountered during implementation, and to identify the most difficult parts of the standard to comply with. It investigates the perceived benefits that Saudi firms have gained from implementing the system and examines the level of knowledge about ISO 9001:2000 and the perceptions of the new standard among the management teams and staff of ISO registered firms. It determines the level of integration between ISO 9001:2000 and other implemented systems. Furthermore, this study aims to investigate the factors that may explain the Saudi organizations' decisions to implement ISO 9001:2000 in their businesses. To accomplish these research objectives, a questionnaire was developed based on an extensive review of related literature and tested for validity and reliability.

The target sample for the study was made up of all ISO 9001:2000 registered sites in Saudi

Arabia up to 31 Dec. 2002, which comprised 131 organizations. A total of 89 completed surveys were received, for a response rate of 72%. Descriptive statistics, measurement of variation, and association, and factor analysis were used in the interpretation of collected data. The major findings are as follows:

86.5% of the total respondents had implemented ISO 9001:2000 as a transition process from previous ISO 9000 standards. 68.5% of the certified sites took less than one year to implement the standard. Most of them were previously certified in one of the ISO 9000:1994 standards. This high percentage indicates that ISO 9001:2000 can be easily implemented in a short time frame. Most of the companies in the study reported the use of external consultants (70.8%), but overall there was a low level of reliance on them, with 64.0% of registered organizations having documented less than 10% participation of external consultants' in implementing the ISO 9001:2000 system.

The top five critical success factors in implementing the ISO 9001:2000 quality management system, in descending order, are as follows: commitment of management, effective internal auditing, commitment of middle management, employee motivation and involvement, resource allocation, and existence of appropriate communication routes. The major hindrances during the implementation of ISO 9001:2000, in descending order, were as follows: lack of employee involvement, difficulties in co-operation among middle managers over quality problems, lack of training programs related to quality, insufficient project time, and lack of customer co-operation.

The most significant reasons for Saudi organizations to implement the system, in descending order, are as follows: top management initiative, quality improvement of internal operations

and processes, customers' requirements, part of the overall quality policy of the organization.

The highest perceived benefits, in descending order, were as follows: development of quality culture, improved customer satisfaction, better communication with customers, increased management commitment, and use of data as a business management tool. Most respondents are highly satisfied with the standard, believe that it is cost effective and would strongly recommend the standard to other firms.

Top managers were the most knowledgeable about the ISO 9001:2000 standard, followed by middle managers, then employees. Findings reveal that level of knowledge about ISO 9001:2000 among organization's people is positively correlated with most of the attainable benefits from implementing the standard.

Based on the findings of this study, many conclusions and recommendations were drawn. In summary, for a successful implementation of ISO 9001:2000 standard, organizations must give great consideration to the people involvement factor, particularly top and middle management's involvement and commitment to quality, employees' motivation and involvement, quality awareness, and ISO 9001:2000 training.

I dedicate this research to my parents

Mesaad and Thanwa.

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CHAPTER ONE: INTRODUCTION

In 1987, the International Organization for Standardization (ISO) developed a set of quality standards known as ISO 9000 as a model for quality assurance and quality management for organizations involved in design, development, production, installation and service. ISO 12 cycle survey reveals that by December 2002, there were more than 561,747 businesses certified in 159 countries [1]. ISO regularly reviews and updates the ISO 9000 standards to maintain their relevance to business needs and expectations. The new version of ISO 9000 standards entitled ISO 9001:2000 was released on December 15, 2000, and included additional clauses covering areas such as customer satisfaction and continuous improvement. December 15, 2003 was the deadline for previously certified companies to transition from one of ISO's 9000:1994 standards to the 2000 version of the standard.

Since its release in December 2000, there has been slow movement toward the new version of ISO 9001:2000 by ISO 9000:1994 certified organizations. Of the 561,747 ISO 9000 certified businesses, 167 210 held certificates for ISO 9001:2000, which is less than 30 percent of the total ISO 9000 certified companies. Throughout the United States, Only 4,587 of the 38,927 active ISO 9000 certificates issued by third-party registrars transitioned to the new ISO 9001:2000 standard as of January 1, 2003 [1]. In December 2001, 705 Saudi businesses were ISO 9000 certified organizations, only six of which were ISO 9001:2000 certified companies [2]. By December 2002, the number of ISO 9000 certified sites decreased to 558 organizations, 131 of which are ISO 9001:2000 certified [1]. Although many studies had

been conducted to understand and assess the practices of the ISO 9000:1994 standards in Saudi Arabia [3,4,5,6,7], no research has been done to study and analyze the implementation practices of the new ISO 9001:2000 standard.

Research Objectives

This study is designed to investigate the implementation practices of the new ISO 9001:2000 standard in Saudi business organizations in order to determine the factors affecting ISO 9001:2000 practices in a Saudi business context. The main objectives of this study are to identify the critical factors that lead to successful implementation of the new standard, to determine what barriers have been encountered during implementation, and to identify the most difficult parts of the standard to comply with. It investigates the perceived benefits that Saudi firms have gained from implementing the system and examines the level of knowledge about ISO 9001:2000 and the perceptions of the new standard among the management teams and staff of ISO registered firms. It determines the level of integration between ISO 9001:2000 and other implemented systems. Furthermore, this study aims to investigate the factors that may explain the Saudi organizations' decisions to implement ISO 9001:2000 in their businesses and to explore whether or not the data contained differences related to the size of an organization, type of ownership, or other factors. The results of this study will be very helpful for further improvement of quality management practices and will provide an authentic image of the current situation of quality management practices in Saudi industry.

Research Questions

1. What are the major gaps between organizations seeking to implement the standard and the requirements of ISO 9001:2000?
2. What are the most difficult elements of ISO 9001:2000 to implement and hence need more resources and attention?
3. What are the factors influencing a successful implementation of ISO 9000:2000 and their significance in the context of Saudi businesses?
4. What are the obstacles and barriers hindering implementation efforts?
5. What is the level of knowledge about the new standard among the management and staff of organizations?
6. What are the perceived benefits of implementing ISO 9001:2000?
7. How do cost savings compare to the costs of implementation?
8. What are the levels of satisfaction that organizations feel towards the standard?
9. Are they willing to recommend the standard to other companies?
10. What are the perceptions of ISO registered firms toward the new standard?
11. What are the reasons that influenced organizations to implement the ISO 9001:2000 standard?
12. What level of integration were companies able to accomplish between ISO 9001:2000 and other implemented systems, if any?

Research Contributions

This study will contribute in several ways:

First, knowledge gained from this study will be valuable to the Saudi government, particularly to the Ministry of Industry and Trade as well as to the private sector. Second, it will be of great help to organizations that are planning to implement ISO 9000:2000; it can serve as a guideline methodology for the top managers of Saudi firms to effectively plan and apply the new standard based on results extracted from Saudi business organizations that have common factors and share similar cultural needs.

Third, the results of this research can benefit the quality practitioners in Saudi Arabia and help them understand the roles they should play during the stages of implementation.

Fourth, the findings of this research will benefit researchers with an empirical study of the implementation of ISO 9000:2000 in Saudi Arabia as a developing country and may lead to further studies in other developing countries.

Fifth, the study will identify significant research issues and offer promising new directions for further research.

Sixth, this study will extend the boundaries of quality management literature.

Limitations of the Study

This Study is limited to Saudi Arabian organizations which have been identified as having implemented an ISO 9000 program. The quality of survey results depends upon the knowledge of its respondents. The survey in this study was designed for the quality managers of the respondent organizations. These individuals were targeted because they were most likely to be knowledgeable about the ISO 9001:2000 implementation practices in their organizations. But since there may be variances in the level of knowledge possessed by the participants, systematic variances in the research results may be introduced. In addition, the survey respondents may have been biased in answering survey questions that require judgment and their subjective responses may not be reflective of the actual situation.

Summary

This study is designed to collect data from ISO 9000 registered organizations. Information about the perception of the new system, implementation practices, adoption reasons, and difficulties encountered will be statistically analyzed. Recommendations and framework guidance will be reported to further facilitate and better utilize the new standard.

CHAPTER TWO: LITERATURE REVIEW

What Is Quality?

There are various definitions of quality. Crosby defines quality as "conformance to specifications." Juran defines quality as “fitness for use,” and there are many other definitions that, overall, have a main factor of satisfying the customer’s needs and expectations.

Quality has evolved from inspection through quality control and quality assurance to TQM. Prior to World War II, approaches to quality were mostly through inspection. After World War II, the opening of world trade and information technologies forced additional refinements to quality tools. This has transformed organizations from inefficiency with heavy reliance on inspection, an autocratic leadership and hierarchical control, to a system of teamwork, paying attention to customer needs and satisfaction, getting quality right the first time, and continuously improving processes. From the 1990s forward, the quality revolution has spread beyond the manufacturing arena to both private and public services, and all kinds of organizations are forced to change their old strategies and management styles and develop better ways to allocate available resources in order to remain competitive [8].

Quazi *et al* [9] report that a study by the Strategic Planning Institute of USA, which was conducted in 1986, found that product/service quality is an important determinant of business profitability. Businesses offering premium quality products and services usually have large market shares, although they usually charge premium prices, and quality is positively and

significantly related to a higher return on investment for almost all kinds of products and services.

Deming pointed out that quality has a chain reaction of positive results: "improving quality leads to costs decrease with less rework and fewer delays which improves productivity and captures the market with better quality and lower price" [10].

Quality Management

Quality management is a philosophy of continuous organizational success through customer satisfaction, based on participation of all employees in continuously improving processes, services, and products.

Quality management principles were first introduced by Dr. Deming and Dr. Juran to help the Japanese in their efforts to rebuild civilian goods and human resources after World War II. In the 1980s, after Japanese products had overrun the USA, US companies started to notice that Japanese-made products were highly competitive and had a higher level of quality. From then on, quality management practices became a major concern for enterprises all over the world [11].

Laszlo [12] highlights that willingness and the ability to change and to improve, based on innovation lessons learned and benchmarking, are necessary components within the quality management approach. Top management’s commitment, involvement and sponsorship of quality are central parts of the success of quality management concepts.

The International Organization for Standardization (ISO) has classified the principles which guarantee a successful implementation of any quality management system into eight quality management principles:

1- Customer focus: Organizations depend on their customers and therefore should understand current and future customer needs, meet customer requirements, and strive to exceed customer expectations.

2- Leadership: Leaders establish unity of purpose and the direction of the organization. They should create and maintain an internal environment in which employees can become fully involved in achieving the organization's objectives.

3- Involvement of people: People at all levels are the essence of an organization, and their full involvement enables their abilities to be utilized for the organization's benefit.

4- Process approach: A desired result is achieved more efficiently when activities and related resources are managed as a process.

5- Systems approach to management: Identifying, understanding and managing interrelated processes as a system contributes to the organization's effectiveness and efficiency in achieving its objectives.

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

7- Factual approach to decision making: Effective decisions are based on analysis of data and information.

8- Mutually beneficial supplier relationships: An organization and its suppliers are interdependent, and a mutually beneficial relationship enhances the ability of both to create value [13].

ISO has built its current ISO 9000:2000 standards based on those quality management principles. The principles of quality management must be deeply rooted in the organizational environment in order to create a climate of open co-operation and highly motivated teamwork

among employees, customers and suppliers. Quazi *et al*. [9] reported that a study of the General Systems Company, Inc. in the USA found that firms with quality management systems in place consistently exceeded industry norms for return on investment.

Total Quality Management

The US Department of Defense defines TQM as continuous improvement activities involving everyone in the organization in a totally integrated effort toward improving performance at every level. This improved performance is directed toward satisfying such cross-functional goals as quality, cost, schedule, mission need, and suitability. Oakland [14] defines TQM as an approach to improving the competitiveness, effectiveness, and flexibility of a whole organization. It is essentially a way of planning, organizing and understanding each activity, and depends on each individual at each level. To achieve this, people need to know what to do, how to do it, have the right tools to do it, and be able to measure performance and receive feedback on current levels of achievement [8]. TQM is concerned with cultural changes in a business as a whole, and with creating missions, visions, and values.

The literature indicates that applying TQM successfully will bring great benefits of continuous improvement of processes, products, and services, enhanced productivity, reduced costs, and increased total customer satisfaction.

Quality award models such as the US's Malcolm Baldrige National Quality Award (MBNQA), the European Quality Award, the Australian Quality Award and the Japanese Deming Prize provide general models for TQM. These models have quickly become prestigious and have resulted in considerable benchmarking among all kinds of firms. They reflect the best interpretations of what quality is and how it can be achieved [15].

For instance, in the MBNQA model there are seven categories that make up the award criteria:

1- Leadership: Examines how senior executives guide the organization and how the organization addresses its responsibilities to the public and practices good citizenship.

2- Strategic planning: Examines how the organization sets strategic directions and how it determines key action plans.

3- Customer and market focus: Examines how the organization determines requirements and expectations of customers and markets.

4- Information and analysis: Examines the management, effective use, and analysis of data and information to support key organization processes and the organization's performance management system.

5- Human resource focus: Examines how the organization enables its workforce to develop its full potential, and how the workforce is aligned with the organization's objectives.

6- Process management: Examines aspects of how key production/delivery and support processes are designed, managed, and improved.

7- Business results: Examines the organization's performance and improvement in its key business areas: customer satisfaction, financial and marketplace performance, human resources, supplier and partner performance, and operational performance. This category also examines how the organization performs relative to competitors [16].

What Is ISO 9000?

ISO refers to the International Organization for Standardization, which was established in Switzerland in 1946 to develop a common set of standards in manufacturing, trade and communications. It is composed of the national standards institutes and organizations of more than 145 countries worldwide. The ISO publishes thousands of technical standards, but the ISO 9000 quality management series is the most famous set of standards having a major impact on international trade.

The word "ISO" as a short form for the International Organization for Standardization was derived from the Greek isos, meaning "equal," which occurs in terms such as “isometric”, “isomorphism” and “isobar” [17].

ISO 9000 Background

In 1959, the U.S. Department of Defense (DoD) established the MIL-09858 quality assurance program. In 1968, the North Atlantic Treaty Organization (NATO) essentially adopted the tenets of the DoD program in establishing the NATO AQAP series of standards.

In 1979, the British Standards Institution ((BSI) developed the first quality assurance standard (BS 5750) intended for commercial and industrial use. This did not include precise specifications. It contained a set of elements which, from extensive research, had been found to exist in all companies which managed to achieve consistency, and continually satisfied their customers.

In the same year, 1979, an ISO technical committee entitled TC 176 for Quality Management and Quality Assurance was approved and, in 1986, this committee had completed its first

listing of standards, which were published in 1987. These standards were known as the ISO 9000 Series. The TC 176 committee was able to take advantage of a substantial base of national experience in both the United Kingdom (BS 5750 standard) and in Canada (CSA Z299 standard). In addition, experience with military quality assurance specifications, such as the NATO AQAP and US MIL-09858 series, enriched the sources from which TC 176 was able to draw [11].

New programs such as QS-9000 and IS0 14000 have been added over the years. QS 9000 was developed by the US automotive industry because it needed a more specific and prescriptive system of standards. QS 9000 includes requirement for time delivery, supplier development programs, and statistical record-keeping far beyond IS0 9000 requirements. Chrysler and General Motors mandated that their suppliers become registered with QS 9000. IS0 14000 was introduced in 1996 to provide a series of global standards for environmental management that deal with environmental audits, labeling, performance evaluations, life-cycle assessment, and terms and definitions [18].

The driving force behind the ever-expanding use of the ISO 9000 standard is the European Economic Union (EU). Part of the 1992 agreement to form the EU was the adoption of ISO 9000 as just one of the standards to be used to facilitate trade between participating nations. ISO 9000 certification is not a risk-free undertaking. The cost of certification can be very high, ranging from $10,000 to $250,000 per company [19].

To ensure that the ISO 9000 series remains relevant, the International Organization for Standardization (ISO) regularly reviews and updates the ISO 9000 standards to maintain their relevance to business needs and expectations. The current version of ISO 9000 is ISO 9000:2000, which replaced the previous version, ISO 9000:1994.

ISO 9000:1994 Overview

ISO 9000:1994 consists of a series of three international standards, ISO 9001, 9002, and 9003. IS0 9001 was the most comprehensive, covering research, design, development, production, shipping, and installation. IS0 9002 was less comprehensive; omitting design and development, it was for companies that produce, install, and service only existing products. IS0 9003 was for companies that perform even fewer functions, such as final inspection and testing.

The standards provided companies with a series of guidelines on how to establish systems for managing quality products and services. Businesses were given standards to use to document practices that affected the quality of their offerings. They could then follow ISO guidelines to become certified. The underlying premise of ISO 9000 certification is that the creation of products and services is the result of a system, the inputs and outputs of which can be measured at various points as the system adds value. IS0 9000 registration documents the procedures in the system, and measures how well they conform to such documentation [18].

Fuentes *et al* [20] point out that implementation and registration of a quality system satisfies two goals. First, the system offers a model and a process for continuous self-assessment against an internationally recognized model that builds the foundation for the development of total quality. Second, the registration allows the company to be recognized for its quality by a third party.

The term “registration” is commonly used in the United States. “Certification” is commonly used in the European Community [11]. An onsite audit by a team from a third party - the registrar - is required in order to register. The purpose of the visit is to evaluate the organization's compliance with the ISO 9000 standard. If the organization's quality system

conforms to the registrar's interpretation of the standard, the company is then registered or certified to any one of the ISO 9000 standards, depending on the type and scope of its business.

ISO 9000:1994 Requirements

Registration for any of the ISO 9000:1994 models requires establishing four levels of documentation:

1- Quality Manual: This document describes the policy and responsibilities of the organization. It should also contain a brief policy statement on each of the individual clause requirements of ISO 9000.

2- Quality Procedures: These documents describe the processes of the organization, and the best practice to achieve success in those processes. Procedures should answer the following questions about each process: Why? Who? When? Where? What? It should be a simple documented management system that provides a single source of advice to all employees on the “best practice” within the organization. These procedures should be as small and simple as possible. The procedures do not need to repeat the elements that would be known to all staff. Quality procedures that should be documented are those which directly affect the quality of the product or service provided. Writing a huge number of procedures may make it difficult for employees to refer to these procedures, and the same is for work instructions.

3- Work Instructions: The work instructions may include design specifications, drawings, operating charts, process sheets, safety requirements or anything else required to correctly perform the task. Work instructions answer in detail the question

"how?" Work instructions are limited to the information that a qualified person would need to perform the task effectively.

4- Quality Records: If the system works, it will generate data, records or other forms of information that make it possible to measure progress and any important trends. If the system is designed well, there will be enough records of information to make effective decisions.

ISO 9000:1994 requirements consist of up to 20 items:

1- Management responsibilities
2- Quality system
3- Contract review
4- Design control
5- Document and data control
6- Purchasing
7- Control of customer-supplied products
8- Product identification and traceability
9- Process control
10- Inspection and testing
11- Control of inspection, measuring and test equipment
12- Inspection and test status
13- Control of nonconforming products
14- Corrective and preventive action
15- Handling, storage, packaging, preservation and delivery
16- Control of quality records
17- Internal quality audits
18- Training
19- Servicing
20- Statistical techniques.

ISO 9000:1994 Criticisms

The results of a survey of 106 ISO 9000 certified firms operating in Hong Kong showed that ISO 9000 led to employee resistance because it was seen as quite a lot of extra work, especially in terms of the preparation of documents outlining all activities at each operational level. Besides, ISO 9000 could lead to loss of flexibility, and the rigid documentation may tend to hinder the ability of a company to change quickly. Most of the responses said that certification serves no useful purpose after a company has been given the ISO 9000 certificate, no matter how certified organizations view the ISO 9000 [21]. The European Union considered that standards should focus more on process and less on elements that built internal bureaucracy and did not promote quality [22].

Juran [23] believes that companies which are at the beginning stages of their quality efforts would find that the ISO 9000:94 standards provide them with basic quality systems. But for companies with good quality systems, the standards often just add costs, delays and burdensome documentation, rather than providing any competitive advantage.

In order to survive in the highest competitive environment, the quality management system standards of ISO 9000:1994 are not enough. Instead, a more proactive quality management system, which is driven by customer satisfaction and rapid response to the market environment, is a necessity.

ISO 9000:2000 the New Version

ISO 9000:2000 was published in December 2000. The new standards have a completely new structure based on the principles of total quality management. ISO 9000:2000 standards provide a more logical sequence of the contents.

The ISO 9000: 2000 Standards consist of four parts:

1- ISO 9000: Quality Management Systems - Fundamentals and Vocabulary

2- ISO 9001: Quality Management Systems - Requirements

3- ISO 9004: Quality Management Systems- Guidance for Performance Improvement

4- ISO 19011: Guidelines on Quality and Environmental Auditing

ISO 9001:2000 can be applied to any type of business, service or industry. With the new standard, the International Organization for Standardization (ISO) decided to eliminate the multiple registration systems of ISO 9001, ISO 9002 and ISO 9003 with separate documents, as in 1994. For the 2000 version, all companies will be registered to ISO 9001:2000, though certain requirements may be excluded, such as design responsibilities. Under ISO 9001:1994, a company which is not responsible for designing its products would have been registered to ISO 9002.

The ISO 9001:2000 standard covers the minimum quality management requirements to be certified. But organizations that seek to continue their journey to TQM should, in addition to ISO 9001:2000, apply the ISO 9004: 2000 Quality Management Systems - Guidance for Performance Improvement, the closest thing to a total quality management, which should lead to efficiency throughout the organization.

Deming stated that quality must be built in at the design stage; ISO 9001:2000 now places more emphasis on quality planning, because an organization can have the most influence on product quality during the planning stage [18].

The new standard attempts to provide changes for a number of facets. ISO 9001:2000 will offer enhanced relevance to the service sector, greater implementation flexibility, a bridge between enhanced quality management and environmental practices such as continuous improvement, and the ISO 14000 environmental management system [24].

ISO 9001:2000 Requirements

ISO 9001:2000 consists of four major sections: Management Responsibility, Resource Management, Product Realization and Measurement, and Analysis and Improvement and based on a quality management process model approach (Figure 1) issued by the ISO technical committee 176 [25].

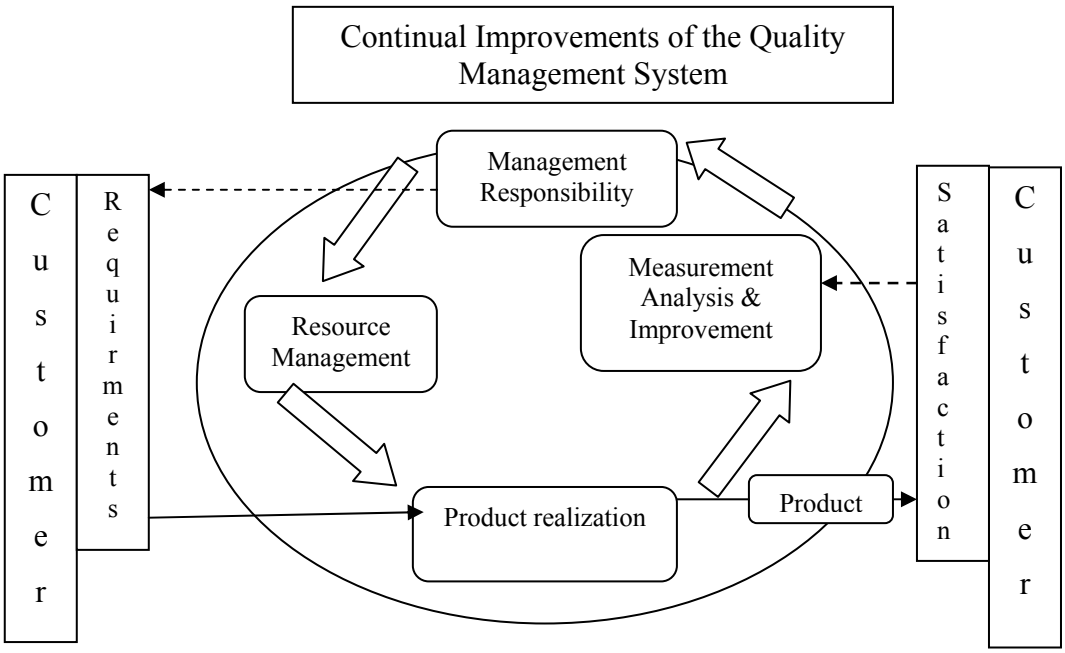

Figure 1: Quality Management Process Model

The ISO 9001:2000 standard structure's 21 elements represent the eight quality management principles as defined by ISO, which are: customer focus, leadership, involvement of people, process approach, system approach to management, continual improvement, factual approach to decision making, and mutually beneficial supplier relationships.

There are eight sections describing the requirements of the ISO 9001:2000 version, within which there are a total of 136 "SHALL" statements that must be applied:

1. Scope
    1.1. General
    1.2. Application
2. Normative references
3. Terms and definitions
4. Quality management system
    4.1. General requirements
    4.2. Documentation requirements
        4.2.1. General
        4.2.2. Quality manual
        4.2.3. Control of documents
        4.2.4. Control of records
5. Management responsibility
    5.1. Management commitment
    5.2. Customer focus
    5.3. Quality policy
    5.4. Planning
        5.4.1. Quality objectives
        5.4.2. Quality management system planning
    5.5. Responsibility, authority and communication
        5.5.1. Responsibility and authority
        5.5.2. Management representative
        5.5.3. Internal communication
    5.6. Management Review
        5.6.1. General
        5.6.2. Review input
        5.6.3. Review output
6. Resource management
    6.1. Provision of resources
    6.2. Human resources
        6.2.1. General
        6.2.2. Competence, awareness and training
    6.3. Infrastructure
    6.4. Work environment
7. Product realization
    7.1. Planning of product realization

7.2. Customer-related processes
    7.2.1. Determination of requirements related to the product
    7.2.2. Review of requirements related to the product
    7.2.3. Customer communication
7.3. Design and development
    7.3.1. Design and development planning
    7.3.2. Design and development inputs
    7.3.3. Design and development outputs
    7.3.4. Design and development review
    7.3.5. Design and development verification
    7.3.6. Design and development validation
    7.3.7. Control of design and development changes
7.4. Purchasing
    7.4.1. Purchasing process
    7.4.2. Purchasing information
    7.4.3. Verification of purchased product
7.5. Production and service provision
    7.5.1. Control of production and service provision
    7.5.2. Validation of processes for production and service provision
    7.5.3. Identification and traceability
    7.5.4. Customer property
    7.5.5. Preservation of product
7.6. Control of measuring and monitoring devices
8. Measurement, analysis and improvement
8.1. General
8.2. Monitoring and measurement
    8.2.1. Customer satisfaction
    8.2.2. Internal audit
    8.2.3. Monitoring and measurement of processes
    8.2.4. Monitoring and measurement of product
8.3. Control of nonconforming product
8.4. Analysis of data
8.5. Improvement
    8.5.1. Continual improvement
    8.5.2. Corrective action
    8.5.3. Preventive action [26].

Comparison between the Two Versions

There are some major changes between the two standards related to a change from a procedural-based system to a process-based system. In ISO 9000:2000 there is a heavy emphasis on customers' satisfaction, performance measurement, continuous improvements, and top management involvement. The ISO technical committee (TC 176), responsible for

revising the old standards, listed the seven most demanded improvements. They were the following:

1- Use simple language and terminology

2- Facilitate integration into one management system

3- Address continuous improvement

4- Use a process model approach to quality management

5- Improve compatibility with other management system standards

6- Address customer satisfaction more strongly

7- Make the standards more business-oriented [27].

The new version of ISO 9001 places emphasis on process management and resource management and has more in common with other quality and excellence models. The term "organization" now replaces "supplier" in ISO 9000:1994, and refers to the facility to which the standards apply. Also, the term "supplier" now replaces the term "subcontractor" in the old version [28].

Grigg and McAlinden [29] pointed out that the closer alignment of ISO 9000:2000 to TQM and other management systems such as the environmental management system ISO 14000 assists companies in the pursuit of their goals.

While many managers are unlikely to have the time to be able to digest the theories and requirements of the MBNQA or EFQM model, ISO 9000 in its revised format can provide a standardized approach to achieving customer driven improvement toward business excellence.

In general, ISO 9001:2000 is more customer-oriented, addresses customer satisfaction criteria in greater detail. While the old standard did implicitly expect organizations to make improvements, the new standard makes this explicit. Specifically, ISO 9001 now requires companies to evaluate the effectiveness and suitability of their quality management systems, and to identify and implement systematic improvements [30].

ISO summarized the changes they have made in the new standard as follows:

1- Structure: The revision of the ISO quality management system standards includes a radical change to the structure of ISO 9001, and has repositioned the 20 elements of the ISO 9001:1994 into five main chapters: quality management system, management responsibility, resource management, product realization and measurement, and analysis and improvement.

2- Process Approach: The standards promote the adoption of a process approach, in contrast to the procedural approach described in the 1994 version.

3- Top Management Role: More emphasis has been placed on the role of top management, which includes its commitment to the development, implementation, improvement and review of the quality management system. In addition, emphasis is also on customer focus, consideration of statutory and regulatory requirements, and the establishment of measurable objectives at relevant functions and levels.

4- Continual Improvement: An enhanced requirement for “continual improvement” has been introduced for the first time in ISO 9001:2000, defining a complete cycle to improve the effectiveness of the quality management system.

5- Application: The concept of exclusions to the requirements of ISO 9001:2000 has been introduced as a way to cope with the wide spectrum of organizations and activities that will be using the new standard.

6- Customer Satisfaction: the requirement for the organization to monitor information on customer satisfaction as a measure of system performance is a new item that has been introduced into ISO 9001:2000.

7- Resources: Emphasis is placed on top management's commitment to make the necessary resources available.

8- Documentation: The number of requirements for documented procedures has been reduced in ISO 9001:2000, and the emphasis placed on the organization's demonstrating effective operation [27].

The Transition Process

The emphasis on process-related structure in the new standard, and its focus on the use of information from the system for continuous improvement, requires companies to initiate a thorough review and revision of their quality processes. Kartha [31] argues that the transition may be easier for organizations that already use a process-oriented approach in their current documentation. Rather than rewriting the documentation, they will need to review the revisions against the current version in order to determine the required changes. The earlier version focused more on consistency and less on process improvement.

December 15, 2003 was the deadline for organizations that were registered to the old standards, ISO 9001, IS0 9002 or IS0 9003, to make the transition to the new revision, ISO 9000:2000.

Studies have indicated that a cultural shift is necessary to ensure successful progress from the 1994 version of ISO 9000, which is based on quality assurance concepts, to quality management concepts that are based on process approach [30].

Tsim *et al*. [32] point out that the first stage of the transition is to review the current quality management system against all the new requirements, especially the four key systems areas, and identify the major gaps. Once the gaps have been identified, the implementation plan can be prepared. The approach of the transition can be considered as a continual improvement process. The stages of the transition therefore include plan- do-check- act strategy.

Since it was released in Dec 2000, there has been a slow movement towards the new version, ISO 9001:2000, on the part of ISO 9000:1994-certified organizations. Of the 561,747 ISO 9000-certified businesses, 167,210 were certified to the new version, ISO 9001:2000, which is less than 30 percent of the total ISO 9000-certified companies [1].

Throughout the United States, only 4,659 of the 36,118 active ISO 9000 certificates issued by third-party registrars were transmitted to the new standard ISO 9001:2000 as of January 1, 2003 [1].

The reasons organizations are not transitioning or not continuing their registrations are not the same for all companies. Green [33] attributes this slow movement toward the new standard to its rigid requirements, one must map work processes, collect data and show continual improvement within the enterprise. The changes from the 1994 models of ISO 9000 to ISO 9001:2000 are quite fundamental and comprehensive. The approach taken to quality and its effect on the organizations is radically different. The challenge that faces organization seeking the transition is to bridge the major gap between the ISO 9000:1994 quality assurance system and the new system that is based on TQM principles.

An organization's culture is believed by many to influence the success or failure of quality improvement program implementation and sustained improvements, because organizational outcomes concerning quality and performance are the result of many complex technical, political, social and behavioral processes operating inside and outside the organizations [34].

There are factors believed to be supporting successful implementation of ISO 9001:2000 standards and factors believed to be working against the certification, and the influence of these factors varies between cultures. To retain the certification through the long term, it is logical that organizations should be committed to the factors supporting certification [34].

In a comparison between ISO 9000:2000 standards and MBNQA, Scott [35] pointed out that both Baldrige criteria and ISO 9000:2000 are customer-, process- and continuous-improvement oriented. ISO 9001:2000 is a detailed document, and technically oriented. In contrast, the Baldrige criteria are results, employee, marketing, financial analysis, strategic planning and heavily top management oriented. There is no requirement or set of requirements to measure the impact of the ISO 9001:2000 system on organizations' financial and profitability results. Also, there is no requirement or set of requirements to measure the impact of the ISO 9001:2000 system on overall strategic planning, or vice versa. In contrast, the Baldrige Award is not internationally recognized as a quality paradigm in the same way that ISO 9000 is.

Related Research

A huge number of investigations have been made into the old ISO 9000:1994 quality models in a number of arenas, such as benefits, critical successful factors, costs and savings, assessment of performance, profitability and comparison with other quality management initiatives.

Several studies have investigated the factors that enhance successful implementation of quality programs such as TQM, ISO 9000 and continuous process improvement [36, 24, and 37].

A number of studies show widespread support for the standard. Kanji [38] found that 85 percent of registered companies had experienced external and internal benefits. The literature also indicates that the key benefits of having ISO 9000 are: improved marketing and customer satisfaction, higher perceived quality, and increased operational effectiveness [30]. A survey conducted by Lloyd's Register Quality Assurance (LRQA), in which more than 400 quality managers and senior managers from different types of industries were interviewed revealed that the certification of ISO 9001 can enable these organizations to improve business and increase and maintain market shares. It also revealed that installation of a quality management system on the basis of ISO 9000 standards could benefit these organizations through the improvement of management control, efficiency, productivity, customer services, staff retention and other factors. Other studies have similarly found that the ISO 9000 quality management system produces benefits [32]. Research also revealed that ISO 9000 certification can provide the building blocks for successful implementation of TQM [39].

Aarts *et al*. [10] point out that studies show differences between anticipated and actual benefits of implementing ISO 9000, with actual benefits being improvements in documentation, standards and quality awareness. Anticipated benefits are: improvements in documentation, standards, quality awareness, market share, customer satisfaction and competitive advantage.

Skrabec *et al* [40] argue that the major cost areas in implementing ISO 9000:1994 are training and surveillance.

The implementation of ISO 9000 has been found to improve customer satisfaction, gain competitive advantages, increase profitability, and improve product and service quality. Research also revealed that ISO 9000 certification can provide the building blocks for successful implementation of TQM [39].

Terziovski *et al* [24] assert that the benefits attributable to ISO 9000:1994 certification were mainly for procedural efficiency and error rates, and less likely to be for market share, staff motivation and costs.

Sarah *et al*. [37] found that companies which went for registration for external reasons such as customers demanding it or to gain market share, were less successful than those which were seeking a much broader-based improvement in performance. The former report less improvement, less value for money and, understandably, are less enthusiastic about the standard.

Another area for research studies is the main obstacles or barriers that companies face in implementing any system. Toensmeier [41] indicates that most of these obstacles are lack of available resources to implement and maintain a quality assurance system based on the ISO

standards, lack of financial capacity to meet the implementation and maintenance costs, lack of time, and a lack of experience amongst managers.

Dale [42] points out that resistance to change is a vital obstacle to employees who feel they are losing influence over decision-making, generally middle managers, whose major role is in supervising others' work and solving problems. Lack of adequate training is a barrier.

There are a number of prime success factors for quality system implementation, such as the commitment of top managers and the involvement and motivation of employees [42]. Literature emphasizes the role of middle managers as motivators and trainers [43]. The studies also highlight the role played by consultants, who bring knowledge of quality philosophies tempered by an awareness and experience of the necessary [20].

Due to the newness of the new standard ISO 9001:2000, there has been little attempt in the literature to study its effects. A unique survey about ISO 9001:2000 was developed by the US Technical Advisory Group (TAG) to ISO/TC 176 as a means of seeking US input on the new ISO 9001:2000 standard and related documents, in a manner similar to the validation process used during their development, to help enhance the value of the ISO 9000:2000 family and to provide useful inputs for future revisions to the ISO 9000 family. TAG has investigated the experiences of 227 US organizations implementing ISO 9001:2000, most having made the transition from ISO 9000:1994. Little or no increase in certification costs was reported, and customer satisfaction, quality of products and services, and improved productivity were revealed as key bottom line improvements of ISO 9001:2000 implementation [44].

In their journey to improve quality and competitiveness, more than 588 Saudi companies have been recognized as ISO 9000-registered companies by 2002 [1], 131 of which are ISO 9001:2000-certified. The Saudi government actively encouraged the use of the latest

technology to ensure that all national production attained such international standards. Very few studies were done about the implementation of quality management systems in different sectors of Saudi Arabian organizations. Kadasah [3] conducted a survey among 83 Saudi firms to define the key priority elements of TQM on which Saudi companies need to focus, and discussed how to effectively implement TQM among Saudi businesses. Jannadi [4] talked about measurement of quality in the Saudi Arabian service industry. Bubshait [5] conducted a survey to evaluate the quality systems of 15 construction contractors in Saudi Arabia in accordance with the ISO 9000:1994 standard. Al-Faraj [6] tackled the practice of quality control techniques in the Saudi Arabian manufacturing sectors. Mezher [7] has conduct a survey among 32 Saudi manufacturing firms to investigate the effectiveness of ISO 9000:1994 costs and benefits on improving the overall quality of a firm and to see if it met expectations. No research has been done to investigate the uses of the new quality management standard ISO 9000:2000 in Saudi Arabia and to identify the barriers that firms encounter in their journey to successfully implement the new standard.

CHAPTER THREE: METHODOLOGY

Introduction

This chapter presents a detailed research methodology. It provides a description of the research design, questionnaire design, description of questionnaire sections, reliability and validity of the test instrument, pilot test, translating and administering the test instrument, population and sample, response rate and data analysis techniques.

Research Design

This study was designed to investigate the implementation practices of the new standard ISO 9001:2000 in Saudi business organizations, in order to determine the sets of factors affecting ISO 9001:2000 in Saudi organizations. The main purposes are to identify the critical factors that lead to a successful implementation of the new standard and what barriers have been encountered when attempting to implement it, to determine what are the most difficult parts of the standard to comply with, to investigate the perceived benefits that Saudi firms have gained from implementing the system, to investigate the level of knowledge about ISO 9001:2000 among organizations' management and staff and the perceptions of ISO registered firms towards the new standard, and to determine the integration level between ISO 9001:2000 and other implemented systems.

Questionnaire Design

A questionnaire instrument was developed to measure the ISO 9001:2000 implementation status of the participating companies, based on an extensive literature review and ISO 9000 test instruments previously performed in other studies [3, 20, 44, 45, 46, 47, 48, 49, 50, and 51]. This generated a number of statements concerning 12 latent constructs aimed to be investigated in the questionnaire:

1- The major gaps between organizations seeking to implement the standard and the requirements of ISO 9001:2000

2- The most difficult elements of ISO 9001:2000 to implement, which hence need more resources and attention

3- The factors influencing a successful implementation of ISO 9000:2000 and their significance in the context of Saudi businesses

4- The obstacles and barriers which hinder the implementation efforts

5- The level of knowledge about the standard among an organization's management and staff

6- The perceived benefits from implementing ISO 9001:2000

7- The cost savings compared to the costs of implementation

8- The level of satisfaction organizations feel towards the standard, and

9- The willingness to recommend the standard to other companies

10- The perceptions of ISO-registered firms towards the new standard

11- The reasons influenced organizations to implement the ISO 9001:2000 standard

12- The integration level, if any, between ISO 9001:2000 and other implemented systems.

Moreover, the study aims to explore whether the data contained differences due to size of organization, consultant participation, or other factors.

Descriptive statistics, measuring of variation, correlation statistics, and factor analysis were used to investigate the above constructs. The descriptive design is chosen because it helps to identify the rank of the measured variables within each construct, and describe the distribution of each variable and the demographic information of ISO 9001:2000 participants' organizations. Descriptive statistics include: frequency distributions, percentages, means, and standard deviations. Measuring of variations is used mainly to test any significant differences between groups or variables. Correlation statistics aim to explain whether and to what extent a relationship exists between various variables. Factor analysis technique aims to detect the structure of the relationships between variables and find underlying categories that best describe the construct.

Questionnaire Sections

The first eleven questions ware designed to investigate the demographic and implementation information of participant organizations. This includes: name of the organization, occupation of the respondent person, type of business, number of employees, type of ownership, time needed to be certified, time passed after registration, previous version of registered standard, type of pre-assessment gap analysis, major gaps identified, and percentage of consultant work in the implementation processes.

Questions 1-12 were designed with the purpose of gaining an understanding about the most difficult parts of the standard to implement. Participants were asked to indicate the most difficult parts from a list of all major clauses of the ISO 9001:2000 quality management system. Questions 10, 11 and 12 were adopted and slightly modified from the study developed by the US Technical Advisory Group (TAG) to the ISO/TC 176 (Technical Committee) of 227 US organizations implementing ISO 9001:2000 [44].

Question 13 was developed to identify the critical factors that lead to a successful implementation of ISO 9001:2000 in Saudi business organizations. Participants are asked to give the level of importance of each factor from a list of 15 factors extracted from the ISO 9001:2000 literature review for a successful ISO 9000 implementation. A five-point Likert Scale was used: (5) very important, (4) important, (3) unsure, (2) low importance, and (1) very low or not important.

Question 14 of the questionnaire was designed to investigate the obstacles encountered by the businesses during the process of implementing ISO 9000:2000. Participants were asked to give the level of importance of each barrier from a list of 10 obstacles extracted from the ISO 9000 literature review.

Questions 15-18 were used to investigate benefits that have been gained by those organizations that implemented ISO 9000:2000. The researcher recognizes that results may not precisely reflect the actual perceived benefits, due to the newness of ISO 9001:2000. The researcher believes that appropriate measuring of perceived benefits needs at least three years of practicing the standard. In Question 15 of the questionnaire, participants were asked to give the level of realized benefit from a list of 15 benefits extracted from the ISO 9000 literature review on a five-point Likert Scale: (5) very high, (4) high, (3) unsure, (2) low, and

(1) very low or not available. In questions 16-18, participants were asked to identify the cost savings from practicing the ISO 9001:2000 standard compared to the implementation costs.

Question 19 was designed to investigate the level of knowledge about the ISO 9001:2000 system among top managers, middle managers and the organization's employees. It was adopted and slightly modified from the study developed by Hung (1999). Participants were asked to evaluate the level of knowledge among those groups on a five-point Likert Scale: (5) very high, (4) high, (3) unsure, (2) low and (1) very low or no knowledge.

Questions 20-22 of the questionnaire were designed to investigate the perception of the quality manager towards the ISO 9001:2000 standard. In Question 20, participants were asked about their agreement with each one of seven disappointments extracted from the literature review. The aim of the other two questions is to explore participants' level of satisfaction towards the ISO 9001:2000 quality management system and how strongly they would recommend the standard to other organizations. Question 21 was adopted from the study developed by Kadasah [3]. Question 22 was adopted from the study developed by Buttle [51].

Question 23 of the questionnaire was designed to explore the main reasons that led Saudi business organizations to register for ISO 9000:2000. Participants were asked to choose from 15 reasons taken from the literature review, the main reasons that had driven the organization to implement the ISO 9000:2000 system.

The last four questions were designed to explore whether there are other quality management systems implemented in the organization and the level of integrating ISO 9001:2000 with these management systems that companies were able to accomplish (Please refer to Appendix C for the survey instrument).

Validity of the Test Instrument

Validity refers to the degree to which the test instrument represents the concept the researcher needs to measure [52].

The test instrument was evaluated for content validity. A measure has a content validity if there is general agreement among experts that the instrument includes items that cover all aspects of the variable being measured [52].

Even though the measurement items of this study were adopted from previously validated instruments, [3, 20, 44, 45, 46, 47, 48, 49, 50, and 51], it was necessary to test the content validity under this study. The questionnaire, along with a copy of the research proposal, was sent to the research committee members and a panel of three Saudi consultants in ISO 9000 quality management systems to review the test instrument and determine how well chosen items represent the defined constructs. Based on the suggested clarifications, revisions, recommendations and criticisms, some modifications have been made to improve the test instrument. One major revision was that two additional items were included to investigate the successful factors of the responding organizations. Another major revision was an additional question included to find out the previous ISO 9000 standard status of the responding organizations.

Pilot Study

The questionnaire was tested through a pilot study. Conducting a pilot study is critical for face validating and improving the test instrument. Wiersma *et al.*[52] asserts that the questionnaire should be tried out with a small group of the same population in a pilot test

before finalizing the questionnaire and starting the survey. In pilot-testing the questionnaire, deficiencies may be discovered that were not observable by simply reviewing the questionnaire. Quality managers of eight ISO 9001:2000-certified organizations located in Jeddah were asked to complete the questionnaire. Three quality managers chose to fill out the Arabic version of the questionnaire and five quality managers chose to fill out the English version. After completing the survey, a face-to-face interview was conducted with each quality manager to gather information about the content, clarity, formatting and any ambiguous or confusing items on the instrument. After careful review of the clarifications, many wording corrections were made to clarify the statements and remove any misunderstandings. Final versions of the test instrument were completed. (Please refer to Appendix C for the survey instrument).

Reliability of the Test Instrument

Reliability refers to the instrument's ability to provide consistent results in repeated use. Reliability can be measured by three methods: 1) internal consistency, 2) test-retest or alternative test method, 3) split-halves method. [53, 54] The most common measure is the internal consistency method; in which individual items of the scale should all be measuring the same construct and highly inter-correlated [53].

The basic measure for internal consistency is Cronbach's coefficient. The generally agreed upon lower limit for Cronbach's alpha is 0.70, although it may decrease to 0.60 in exploratory studies [5].

Using SPSS, an internal consistency analysis was performed to assess the reliability aspects of Likert Scale variables. The Cronbach's alpha range was between 0.6294 and 0.8826. The

summary of the reliability analysis is given in the table below. The alpha values indicate that the test instrument of this study is a sufficiently reliable measure. (Please refer to Appendix D for a complete reliability analysis).

Table 1: Values of Alpha Cronbach Reliability Tests

Construct	No of Items	Alpha Value
Successful implementation factors	14	.7747
Obstacles encountered	10	.8816
Perceived benefits	15	.8867
Knowledge about the standard	3	.6496
Disappointments about the standard	7	.6956
Motives for implementing ISO 9001:2000	14	.6294

Population and Sample

The target population for the study was made up of all ISO 9001:2000-registered sites in Saudi Arabia up to 31 Dec 2002. According to the ISO survey, 131 Saudi organizations were certified to the new version of ISO 9001:2000 up to 31 Dec 2002[1].

There are two reasons for choosing organizations that were certified before 31 December, 2002:

1- The only known population of certified Saudi organizations is contained in the latest survey of certified companies worldwide up to 31 Dec 2002, which was published by ISO [1].

2- Companies that are recently certified may not be able to give sufficient and appropriate responses to some questions such as perceived benefits or disappointment questions.

By May 2003, the researcher has built a database containing 152 Saudi business organizations certified to ISO 9001:2000 from various sources such as websites (qualitydigest.com, worldpreferred.com, internationalqualitysystemdirectory.com, and, gulfdevelopmentcentre.com), quality consultants in Saudi Arabia, newspapers and magazines.

Prior to sending out the survey questionnaires, the researcher had contacted all the quality managers in the certified businesses for three purposes:

1- To identify the organizations which were certified before 31 December 2002.

2- To explain the survey's purpose and seek their approval to participate and,

3- To record the size of each company in terms of number of employees.

A total of 127 sites confirmed that they had been ISO 9001:2000-certified before 31 Dec 2002.

some organizations were found to have different certificates but belong to the same group, and the quality systems in these firms are handled by one quality manager, therefore they were considered as one single organization (seven certificates corresponding to three quality managers). This reduces the actual number of sites in the population to 123. Most quality managers contacted refused to release any information about their organizations' sizes prior to receiving the questionnaire with an official recommendation letter from an educational institute in order to be able to participate in the survey.

The researcher decided to target the whole population instead of using sampling procedures. Each member of the population was included in the sample frame, thereby reducing the sample error to zero. All the quality managers in the targeted businesses constitute the research subjects for this study. The quality managers were selected to participate in this

study because they are the people who usually know best about the ISO system implementation practices in their organizations, and are able to provide the most appropriate responses. Data collection was conducted during November and December 2003.

Translating and Administering the Survey Instrument

The questionnaire was translated into the Arabic language by the researcher, and then it was reviewed and edited with assistance from an English language instructor. The questionnaire then was translated back into English by a different person to ensure that the translated instrument carried the same meaning as the original version. The questionnaire was available in both languages, and respondents had the choice of using either the English or Arabic version of the questionnaire.(please refer to Appendices A, B and C for the recommendation letter, Cover letters, and, questionnaires in Arabic and English).

The questionnaire was faxed or emailed with a cover letter explaining the importance and purpose of the study and requesting the participants' assistance and cooperation. To ensure a high response rate, phone-call follow up was conducted throughout the duration of the survey.

Response Rate

Of the 123 questionnaires sent, 93 completed surveys were returned, giving a 76 percent response rate. In three of the responses, there were a few unclear or uncompleted fields. The researcher contacted the respondents again to verify and answer the uncompleted fields. Four responses were deemed to be unusable due to a large portion of uncompleted data. The

analysis is based on the remaining 89 surveys, giving a response rate of 72 percent. This rate was considered a high response rate, due to contacting participants prior to sending the surveys to get their approval to participate, and there were intensive phone calls to follow up during the data collection period of November and December 2004. The response rate is shown below:

Table 2: Response Rate

Description	Number	Percent
Distributed Questionnaires	123	100
Received Questionnaires	93	76
Usable Questionnaires	89	72

Data Analysis Techniques

Data gathered from the questionnaires was entered into a data file and analyzed using SPSS statistical package ver.11.0. Responses were coded numerically.

Several statistical tests were used to help in interpreting the collected data. They are mainly descriptive statistics, measuring variation, measuring association, and factor analysis.

1- The descriptive design was chosen because it helps to analyze and interpret single variables and rank of the measured variables within each construct, and describe the current demographic information of ISO 9001:2000-registered Saudi organizations. These include frequency scores, percentage, mean values and standard deviation. Cross tabulations are also used to show the distribution of variables to other variables.

2- Measuring of variations was used mainly to test any significant differences between groups or variables. Chi-Square test is useful as a general test to check whether significant differences exist between groups in contingency tables. The difference is considered significant if it is less than or equal to 0.05.

3- Correlation tests aim to explain whether and to what extent a relationship exists between various variables. Correlation is measured using values between +1.0 and -1.0. Correlations close to 0 indicate little or no relationship between two variables, while correlations close to +1.0 (or -1.0) indicate strong positive (or negative) relationships [56]. Davis [57] categorizes the correlation values as follows:

Table 3: Interpretation of Correlation Values

No	Values of correlation	Interpretation
1	From 0.01 to 0.09	negligible correlation
2	From 0.10 to 0.29	low correlation
3	From 0.30 to 0.49	moderate correlation
4	From 0.50 to 0.69	strong correlation
5	From 0.70 or higher	very strong correlation

4- The main purpose of factor analysis is to detect the structure of the relationships between variables and find underlying categories that best describe the construct. Factor analysis was used to reduce two constructs: the important factors for successful implementation of the standard (14 items) and the perceived benefits (15 items) into smaller groups that share common similarities.

CHAPTER FOUR: FINDINGS

Introduction

This chapter presents the data analysis and the research results of the study. A detailed analysis of the responses of participating companies was conducted on a question to question basis. The participants' responses to each questionnaire item were examined using frequency, percentage, mean, and standard deviation. This type of analysis is expected to provide information about the rank of the items within each construct, and, consequently, the level of importance the respondents give to each item within each construct. This chapter also examines the relationships between pairs of variables, such as the size of organizations and the percentage of consultant work. Factor analysis was used to group the items of some constructs into smaller groups that share common similarities.

Organization Sector

Table 4: Classification of Organizations' Business Sectors

Business Type	Frequency	Percent
Manufacturing	63	70.8
Business services/consulting	5	5.6
Education	2	2.2
Hospitality	1	1.1
Transportation	1	1.1
Wholesale/retailing	1	1.1
Engineering services/consulting	7	7.9
Telecommunications	1	1.1
Health care	3	3.4
Others	5	5.6
Total	89	100.0

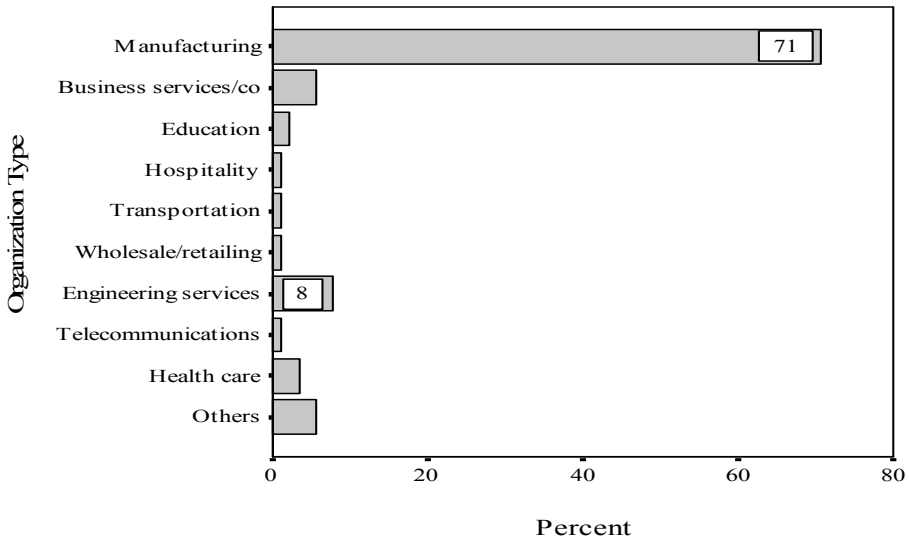

Figure 2: Classification of Organizations' Business Sectors

The results of this question present an industry classification of participating companies. Participants were asked to provide information about their organization's sectors. Manufacturing constitutes the largest portion of respondents, with 70.8 percent of respondents. Non-manufacturing certified businesses constitute 29.2 percent. Among them, engineering services/consulting account for the next largest portion of respondents, with 7.9

percent. Business services/consulting constitute 5.7 percent and other the unlisted categories, including trading, maintenance construction, dairy industry, used cars/spare parts, contracting, and poultry integration constitute 5.7 percent. A Chi – Square test for significant differences reveals that there is a significant difference among the means of the organizations' sectors that are certified to ISO 9001:2000. (Chi Square value = 369.989, df = 9, p = 0.000 < .01)

In spite of the fact that ISO 9001:2000 is also, addressed to the service sector in addition to the manufacturing sector, the manufacturing sector represents the largest portion of respondents, with 70.8 percent of respondents. One possible reason for this is that manufacturing companies are involved in export trading processes that require ISO certification. Another possible reason is a lack of awareness of ISO 9001:2000 and its applications in the service sector.

Organization Size

Companies generally are classified on quantifiable characteristics such as number of employees, annual sales or fixed assets. However, the classification based on the number of employees is most commonly used in management research [57, 39]. In this study, the number of employees is used to measure the size of an organization. Participants were asked to indicate their organization’s size from a list of ranges that were specified in the questionnaire. The Saudi Chambers of Commerce categorized business into three groups: small (1-100 employees); medium (101-300 employees); and large (more than 300 employees).

Table 5: Classification By Organizations Size

Number of Employees	Size	Frequency	Percent
Less than 50	Small	9	10.1
Between 50 – 100	Small	12	13.5
Between 101 - 200	medium	17	19.1
Between 201 - 300	medium	10	11.2
Between 301 - 500	Large	14	15.7
Between 501 - 1000	Large	13	14.6
More than 1000	Large	14	15.7
Total		89	100.0

Figure 3: Size of the Organizations

As can be seen from table 5 above, approximately 24 percent of the certified organizations are categorized as small sized businesses, 30 percent are categorized as medium, and 46 percent are large organizations, of which 30.3 percent are sites with more than 500 employees. Small organizations are clearly lagging behind in their adoption of the standard, while adoption of the standard is greatest in the large-sized organizations. A Chi – Square test for significant differences reveals that there is a significant difference among the means of the organizations' sizes (small, medium, large) that are certified to ISO 9001:2000. (Chi – Square value = 7.101, df = 2, p = .029 < .05).

Organization Size vs. Organization Sector

Table 6: Organization Sector vs. Organization Size

Organization Size		Organization Sector		Total
		Manufacturing	Non Manufacturing	
Small	Count	15	6	21
	%	23.8%	23.1%	23.6%
Medium	Count	23	4	27
	%	36.5%	15.4%	30.3%
Large	Count	25	16	41
	%	39.7%	61.5%	46.1%
Total	Count	63	26	89
	%	100.0%	100.0%	100.0%

As can be seen from the table 23.8 % of the 63 certified manufacturing firms are small sized organizations. 36.5 % are medium and 39.7 % are large organizations. On the other hand, 61.5 % of the 26 service certified sites are large organizations.

Using Chi – Square test, there are no significant differences between organizations sizes in terms of business sectors (Chi – Square value = 4.619, df = 2, P = .099).

Type of Business Ownership

Of the total respondents, 65.2 percent were from to the private sector, followed by joint venture with foreign companies at 28.1 percent, the government sector at 1.1 percent, mixed governmental and private sectors at 2.3 percent and foreign companies operating in Saudi Arabia at 3.4 percent (see table 6 and Figure 4).

Table 7: Classification by ownership type

Type of Ownership	Frequency	Percent
Saudi private	58	65.2
Joint venture with foreign company	25	28.1
Governmental sector	1	1.1
Mixed governmental and private sector	2	2.2
Foreign companies	3	3.4
Total	89	100.0

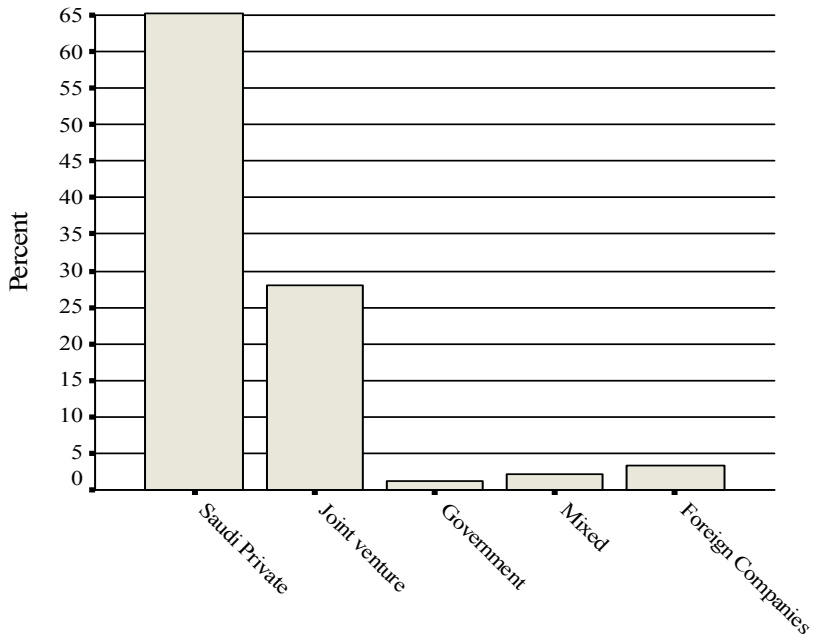

Figure 4: Type of Ownership

The result of Chi- Square testing shows that there is significant difference at p=.01 level between respondent organizations in terms of ownership type, with (Chi-Square value =135.888, df= 4, P=.000).

Type of Ownership vs. Organization Sector

Table 8:Organization Size vs. Type of Ownership

Type of Ownership		Organization Sector		Total
		Manufacturing	Non Manufacturing	
Saudi Private	Count	39	19	58
	%	61.9%	73.1 %	65.2.0%
Joint venture with foreign company	Count	20	5	25
	%	31.7%	19.2%	28.1%
Governmental Sector	Count	0	1	1
	%	0	3.8%	1.1%
Mixed Governmental and Private	Count	2	0	2
	%	3.2%	0	2.2%
Others	Count	2	1	3
	%	3.2%	3.8%	3.4%
Total	Count	63	26	89
	%	100.0%	100.0%	100.0%

As can be seen from the table 61.9 % of the certified manufacturing firms are Saudi private businesses. 31.7 % are joint venture. While, 73.1% of the service sites are Saudi private and 19.2 % are joint venture.

Using Chi – Square test, there are no significant differences between organizations sectors in terms of type of ownership (Chi – Square value = 4.652, df = 4, P = .325)

Type of Previous ISO 9000 Certificate

Participants were asked to describe how they demonstrated compliance with the ISO 9000 standards in the past. Of the total responding companies, 56.2 percent are ISO 9002 certified,

and 30.3 percent are ISO 9001:1994 certified. 13.5 percent demonstrate no previous compliance with ISO standards. None of the respondents obtained ISO 9003. About 86.5 percent have implemented ISO 9001:2000 as a transition process from previous ISO 9000 standards, mostly ISO 9002 (56.2 percent), while just 13.5 percent of respondents had not previously been certified to any ISO 9000:94 standards.

Table 9: Classification by Previous ISO 9000 System

Previous ISO Certificates	Frequency	Percent
ISO 9001:1994	27	30.3
ISO 9002	50	56.2
ISO 9003	0	0
No Previous Certificate	12	13.5
Total	89	100.0

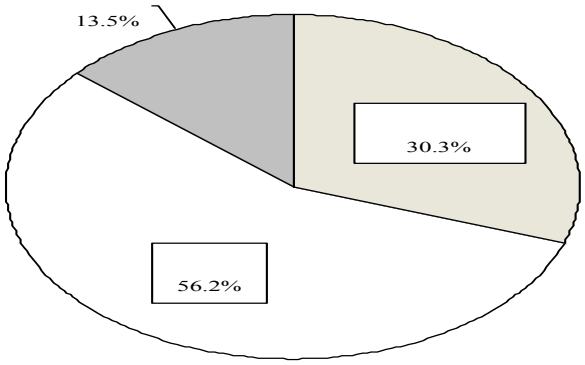

Figure 5: Previous ISO 9000 Systems

The Chi- Square test shows that there is a significant difference at the p=.01 level between respondent organizations according to previous systems type. (Chi-Square value =24.697, df= 2, P=.000).

Previous ISO systems vs. Organization Sector

Table 10: Organization Sector vs. Previous ISO systems

Previous ISO systems		Organization Sector		Total
		Manufacturing	Non Manufacturing	
ISO 9001	Count	21	6	27
	%	33.3%	23.1%	30.3%
ISO 9002	Count	40	10	50
	%	63.5%	38.5%	56.2%
No previous Certificate	Count	2	10	12
	%	3.2%	38.5%	13.5%
Total	Count	63	26	89
	%	100.0%	100.0%	100.0%

63.5 % of the certified participants manufacturing firms were previously ISO 9002 certified while 33.3 % were certified to ISO 9001:1994 standard and only 3.2 % of manufacturing firms had no previous ISO 9000 certificates. On the other hand, 38.5 % of the certified service sites were not previously certified to any ISO 9000 standards.

Chi – Square test shows that there is a significant difference at P = .01 level between organizations sectors in terms of previous ISO 9000 certificate (Chi – Square value = 19.687, df = 2, P = 0.000)

Time Taken To Implement ISO 9001:2000

Participants were asked how long it took their organization to be certified to the current ISO 9001:2000 standard. The findings indicate that implementation of the ISO 9001:2000 system took less than one year for 68.5 percent of certified sites. 28.1 percent took between one and two years to implement the system, while 3.4 percent needed two to three years to get certified.

Table 11: Classification By Time Needed for Implementation

Implementation Period	Frequency	Percent
Less than 1 year	61	68.5
From 1 - Less than 2 years	25	28.1
From 2 - 3 years	3	3.4
Total	89	100.0

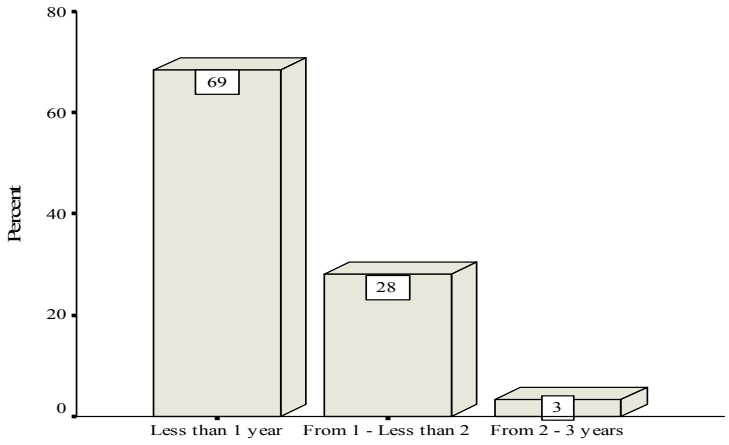

Figure 6: Time Needed to Be Certified

Further Chi-Square testing shows that there is a significant difference at p=.01 level between respondent organizations according to implementation period, where (Chi-Square value =57.798, df = 2, P=.000).

Organization Sector vs. Period of the Implementation

Table 12: Organization Sector vs. Period of the Implementation

Time taken for implementation		Organization Sector		Total
		Manufacturing	Non Manufacturing	
Less than 1 year	Count	45	16	61
	%	71.4%	61.5%	68.5%
From 1 to Less than 2 years	Count	15	10	25
	%	23.8%	38.5%	28.1%
From 2 to 3 years	Count	3	0	3
	%	4.8%	0	3.4%
Total	Count	63	26	89
	%	100.0%	100.0%	100.0%

As can be seen, 71.4 % of the certified manufacturing firms got their certifications in less than one year of implementation. While, 61.5 % of the service sites took the same period of time to be certified

Using Chi – Square test, there is no significant difference between organizations sectors in terms of implementation period (Chi – Square value = 2.907, df = 2, P = 0.234).

To compare the results of the time needed to implement the ISO 9001:2000 standard and the previously installed ISO 9000:94 models, a cross tabulation table was used

Table 13: Cross Tabulation of Time Needed and Previous ISO systems

Time needed until registered	Previous ISO systems			Total
	ISO 9001	ISO 9002	No previous system	
Less than 1 year	18	38	5	61
From 1 - Less than 2 years	9	9	7	25
From 2 - 3 years		3		3
Total	27	50	12	89

As can be seen, most of those who were previously certified to one of ISO 9000 standards got their registration in less than one year (66.7 percent of ISO 9001 firms and 76.0 percent of ISO 9002 firms); however, that was not the case for organizations with no previous system. 58.3 percent of previously uncertified organizations took more than one year to get certified. There was a significant difference between previous ISO 9001, ISO 9002 organizations and those without previous certification in terms of time needed to be certified according to the Chi-Square test, with an margin of error of 0.05 (Chi– Square value = 10.008, 4 df, p= .04).

Time after Being Certified

In this question, participants were asked how long their organizations have been registered to ISO 9001: 2000. Findings reveal that more than half of the respondents (53.9 percent) had been certified from one to two years prior to the time of survey, which was conducted in November and December 2003. 31.5 percent of organizations had been certified less than one year, and 13 organizations (4.6 percent) had been certified for two years.

Table 14: Time After Certification

Time since Certified	Frequency	Percent
Less than 1 year	28	31.5
From 1 – Less than 2 years	48	53.9
From 2 – 3 years	13	14.6
Total	89	100.0

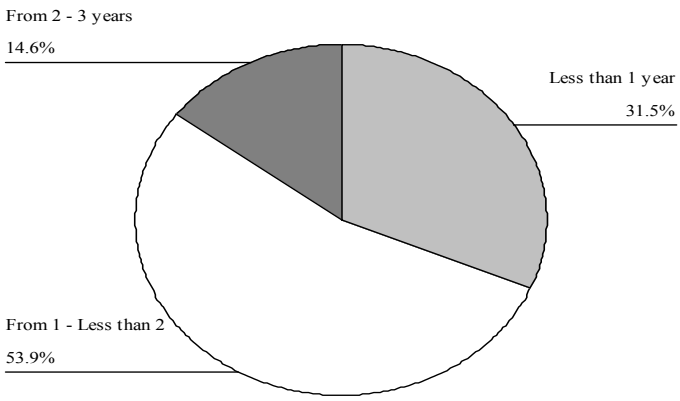

Figure 7 : Time after Certification

Using the Chi-Square test, a 0.000 level of significance was computed, showing that there was significant difference among respondent organizations in terms of certification period, where (Chi-Square value =20.787, df = 2, P=.000).

External Consultants' Participation

What is the percentage of external consultant(s)' participation in the process of implementing ISO 9001:2000?

Table 15: : Percent of External Consultants Participation

External Consultant Participation work	Frequency	Percent
No participation from external consultants	26	29.2
Less than 10%	31	34.8
From 10% - 50 %	22	24.7
From 51% - 80 %	7	7.9
from 81 % - 100 %	3	3.4
Total	89	100.0

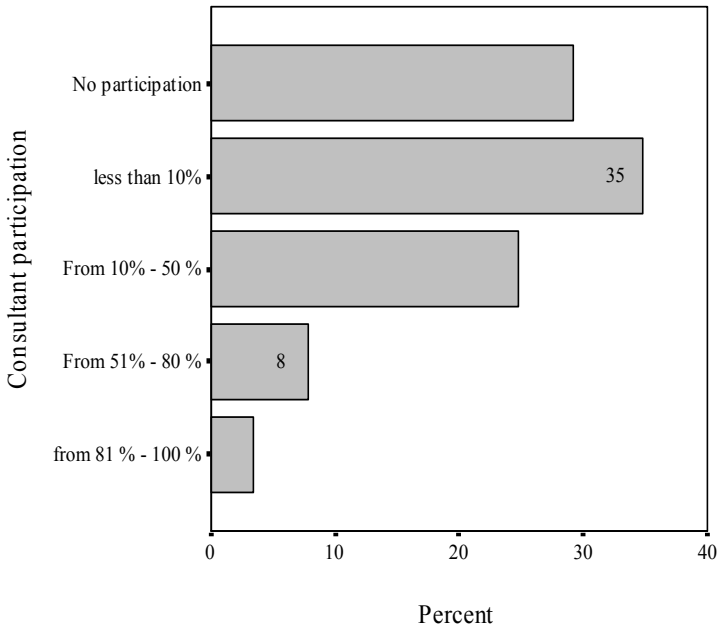

Figure 8: Percentage of Consultants' Participation

Results of this question show that most of the companies in the study use external consultants (70.8 percent), but that overall there is a low level of reliance on them, with 64.0 percent of registered organizations documenting less than 10 percent external consultants, participation in developing the company's ISO 9001:2000 system. 29.2 percent demonstrate

no participation at all from external consultants, and only 11.3 percent use one or more external consultants for more than 50 percent of the implementation work.

The result of the Chi-Square test shows significant difference at the p=.01 level among respondent organizations according to external consultant participation, (Chi-Square value =33.416, df = 4, P=.000).

A cross tabulation table was used to compare previous ISO 9000 system groups in terms of the percentage of consultants' work.

Table 16: Cross tabulation between Percentage of consultants work and previous ISO 9000 systems

Percentage of Consultant work	Previous ISO systems			Total
	ISO 9001:1994	ISO 9002	No previous Certificate	
No participation	9	17		26
Less than 10%	10	18	3	31
From 10% - 50 %	6	10	6	22
From 51% - 80 %	1	5	1	7
from 81 % - 100 %	1		2	3
Total	27	50	12	89

The cross tabulation table shows that all organizations that were not previously ISO 9000 certified needed some kind of consultant's help. This could suggest that organizations with no previous registered standard that seek to implement the new standard should hire an internal or external consultant. On the other hand, there is a risk that without positive involvement, employees may be unfamiliar with and less interested in the new system if a consultant does most of the implementation work. Chi-Square test shows significant differences at P = .05 level among the means of previous organizations systems in terms of the percentage of consultant participation in the implementation process (Chi-Square value =16.941, df = 8 , P=.031).

Organization Sector vs. Percentage of Consultant work

Table 17: Organization Sector vs. Percentage of Consultant Work

Percentage of Consultant Work		Organization Sector		Total
		Manufacturing	Non Manufacturing	
No participation from external consultants	Count	21	5	26
	%	33.3%	19.2%	29.2%
Less than 10%	Count	25	6	31
	%	39.7%	23.1%	34.8%
From 10% - 50 %	Count	12	10	22
	%	19.0%	38.5%	24.7%
From 51% - 80 %	Count	3	4	7
	%	4.8%	15.4%	7.9%
From 81 % - 100 %	Count	2	1	3
	%	3.2%	3.8%	3.4%
Total	Count	63	26	89
	%	100.0%	100.0%	100.0%

Results reveal that 33.3 % of the manufacturing firms were certified to ISO 9001:2000 standard without any external consultants' help and 39.7 % of manufacturing firms used less than 10 % of consultants' participation. This means that 73 % of manufacturing firms have been certified with as low as 10 % of reliance on external participation. On the other hand, only 42.3 % of ISO 9001:2000 service organizations have the same low level of reliance on external help.

Chi – Square test shows no significant difference between organizations sectors in terms of Percentage of consultant work (Chi – Square value = 8.181, df = 4, P = 0.085)

Pre-assessment Gap Analysis

Prior to implementing the ISO 9001:2000 system, a gap analysis is normally conducted to determine the gap between an organization's current system and the ISO 9001:2000 requirements. The gap analysis and closing of identified gaps are important first steps to implementing any quality management system [44]. Gap analysis is usually conducted by qualified people within the organization or by external consultants. In this question, participants were asked to assess the status of their quality management systems prior to implementation of ISO 9001:2000.

Table 18: Types of Gap Analysis

	Frequency	Percent
Gap analysis by the organization	59	66.3
Gap analysis by a consultant(s)	30	33.7
Total	89	100.0

Survey results reveal that 66.3 percent of respondent companies conduct their own pre-assessment gap analysis, while 33.7 percent depend on external consultants to do the job for them. The Chi-Square test indicates that there is a significant difference at the p=.01 level among respondent organizations according to the type of pre assessment gap analysis (Chi-Square value =9.449, df = 1, P=.002).

By way of comparison, a study developed by the US Technical Advisory Group (TAG) of 227 US organizations that implemented ISO 9001:2000 reveals a similar result. The study shows that 68 percent of organizations conducted their own gap analysis, while 23 percent used a consultant to perform the gap analysis [44].

Organization Sector vs. Type of Gap Analysis

Table 19: Organization Sector vs. Type of Gap Analysis

Type of Gap Analysis		Organization Sector		Total
		Manufacturing	Non Manufacturing	
Conducted By Organization	Count	44	15	59
	%	69.8%	57.7%	66.3%
Conducted By Consultants	Count	19	11	30
	%	30.2%	42.3%	33.7%
Total	Count	63	26	89
	%	100.0%	100.0%	100.0%

Results reveal that 69.8 % of the manufacturing firms conducted pre-assessment gap analysis by their own staff while, 30.2 % used external consultants to do the gap analysis for them. On the other hand, 57.7 % of non manufacturing organizations conducted gap analysis by their own staff and 42.3 % used external consultants to do the gap analysis.

Chi – Square test shows no significant difference between organizations sectors in terms of type of gap analysis (Chi – Square value = 1.217, df = 1, P = 0.270)

Major Identified Gaps

This research question aims to investigate the major gaps identified through the pre-assessment gap analysis. Results reveal that the first major nonconformity was customer satisfaction measures at 59.6 percent. Companies that seek ISO 9001:2000 certification must set up tools for measuring customer satisfaction and keep records of these measures to use them for continual improvements. The next major gap is that the organizations objectives are not measurable with 56.2 percent. In ISO 9001:2000 it is no longer acceptable to set up objectives that are not specific, measurable, attainable, realistic, and timed (SMART). The third nonconformity to the standard is continual improvement processes with 46.1 percent,

including collection and analysis of data to identify strengths, weaknesses and opportunities for improvement. The least two nonconformities are objectives not consistent with quality policy and management of outsourced processes.

Table 20: Major identified gaps in the pre assessment gap analysis

Identified Gaps	Frequency (yes answers)	Percent
Customer satisfaction data	53	59.6
Objectives not measurable	50	56.2
Continual improvement process	41	46.1
Collection and analysis of data	34	38.2
Effective control of processes	28	31.5
Documentation gaps	28	31.5
Top management commitment & responsibilities	19	21.3
Exclusions	17	19.1
Record keeping gaps	17	19.1
Objectives not consistent with quality policy	14	15.7
Management of outsourced processes	8	09.0

The (TAG) survey on US organizations implementing ISO 9001:2000 yields similar results. The top five areas of nonconformity in the TAG survey are: customer satisfaction data and assessment, documentation, continual improvement, collection and analysis of data, and non-measurable objectives [44].

Organizations Sectors vs. Major Identified Gaps

Table 21: Organizations Sectors vs. Major Identified Gaps

Major Identified Gaps	Organization Sector		Total	Significant difference
	Manufacturing	Non Manufacturing		
Exclusions	10 15.9 %	7 26.9 %	17 19.1 %	No
Record keeping gaps	7 11.1 %	10 38.5 %	17 19.1 %	Yes Chi = 8.909 P = .003
Effective control of processes	13 20.6 %	15 57.7 %	28 31.5 %	Yes Chi = 11.721 P = .001
Objectives not measurable	36 57.1 %	14 53.8 %	50 56.2 %	No
Collection and analysis of data	20 31.7 %	14 53.8 %	34 38.2 %	Yes Chi = 3.808 P = .044
Management of outsourced processes	5 8.1 %	3 11.5 %	8 9.1 %	No
Documentation gaps	17 27 %	11 42.3 %	28 31.5 %	No
Customer satisfaction data	35 55.6 %	18 69.2 %	53 59.6 %	No
Continual improvement process	25 39.7 %	16 61.5 %	41 46.1 %	No
Objectives not consistent with quality policy	8 12.7 %	6 23.1 %	14 15.7 %	No
Top management commitment	10 15.9 %	9 36.0 %	19 21.6 %	Yes Chi = 4.283 P = .039

The cross tabulation table above shows that there are significant differences between manufacturing and non manufacturing organizations in some of the major identified gaps which are: record keeping gaps, effective control of processes, collection and analysis of data and top management commitment and responsibility. Effective control of process gap was significantly higher in the non manufacturing process with 57.7 percent.

Most Difficult Parts of the Standard to Implement

In this question, participants were asked to identify the most difficult clauses of ISO 9001:2000 that they encountered during the implementation process. The following table summarizes the identified clauses of the ISO 9001:2000 in a percentage rank.

Table 22: ISO 9001:2000 most difficult clauses in the implementation process

ISO 9001:2000 Most Difficult Clauses	Frequency (yes answers)	Percent
Management responsibility	32	36.0
Continual Improvement	31	34.8
Analysis of data	24	27.0
Monitoring and measurement	20	22.5
Management commitment	17	19.1
Resource management	16	18.0
Product realization	14	15.7
Responsibility and authority	13	14.6
Internal communication	12	13.5
Control of measuring and monitoring devices	10	11.2
Documentation requirements	8	9.0
Design and development	7	7.9
Purchasing	7	7.9
Production and service provision	6	6.7
Management Review	4	4.5
Control of nonconforming product	3	3.4

As seen in the table, the most difficult clause to implement is management responsibility with a 36 percent. The continual improvement clauses of the ISO 9001:2000 standards represent 34.8 percent. Analysis of data is third in difficulty with 27 percent. Monitoring and measurement represent 22.5 percent and management commitment represents 19.1 percent.

In a matter of comparison, the TAG survey of US organizations found that the most difficult sub-clauses to implement are customer satisfaction, competence, awareness and training, continual improvement processes and quality objectives [44].

Organizations Sectors vs. Most Difficult Clauses of ISO 9001:2000

Table 23: Organizations Sectors vs. Most difficult Clauses of ISO 9001:2000

Most difficult Clauses	Organization Sector		Total	Significant difference
	Manufacturing	Non Manufacturing		
Management responsibility	22 34.9%	10 38.5%	32 36.0%	No
Continual Improvement	25 39.7%	6 23.1%	31 34.8%	No
Analysis of data	15 23.8%	9 34.6%	24 27.0%	No
Monitoring and measurement	13 20.6%	7 26.9%	20 22.5%	No
Management commitment	8 12.7%	9 34.6%	17 19.1%	Yes Chi = 5.721, P = .017
Resource management	10 15.9%	6 23.1%	16 18.0%	No
Product realization	7 11.1%	7 26.9%	14 15.7%	No
Responsibility and authority	8 12.7%	5 19.2%	13 14.6%	No
Internal communication	5 7.9%	7 26.9%	12 13.5%	Yes Chi = 5.688, P = .024
Control of measuring and monitoring devices	2 3.2%	1 3.8%	3 3.4%	No
Documentation requirements	3 4.8%	5 19.2%	8 9.0%	Yes Chi = 4.710, P = .044
Design and development	6 9.5%	1 3.8%	7 7.9%	No
Purchasing	4 6.3%	3 11.5%	7 7.9%	No
Production and service provision	4 6.3%	2 7.7%	6 6.7%	No
Management Review	1 1.6%	3 11.5%	4 4.5%	No
Control of nonconforming product	4 6.3%	6 23.1%	10 11.2%	Yes Chi = 5.164, P = .033

The table above shows that there are significant differences between manufacturing and non manufacturing organizations in four of the most indicated difficult clauses of ISO 9001:2000 to implement. These four clauses are: management commitment, internal communication,

documentation requirements and control of nonconforming product. The percentage of indicated difficult clauses was higher in non manufacturing organizations in all specified clauses except two: continual Improvement and design and development. Possible reason is because manufacturing firms are more familiar with ISO 9000 standards from previous version than non manufacturing sites.

Critical Factors for Successful Implementation

This research question seeks to identify factors seen to support the successful achievement of ISO 9001:2000 certification. Participants were asked to identify the most important factors in a successful implementation of the ISO 9001:2000 system. A five point Likert Scale was used, ranging from 1 (not important) to 5 (very important). A mean score of 4 or more indicates high agreement that a particular factor is significant for successful implementation of the standard; a score between 3 and 4 (excluding 4) indicates moderate agreement; and a score of less than 3 indicates low agreement.

Table 24: Important factors for successful implementation of ISO 9001:2000

#	Success Factor	Mean	Std. Deviation
1	Top management commitment	4.82	.537
2	Effective internal auditing	4.52	.678
3	Middle management commitment	4.48	.660
4	Employee motivation and involvement	4.43	.657
5	Sufficient ISO training programs	4.32	.653
6	Resource allocation	4.08	.834
7	Existence of appropriate communication routes	4.08	.776
8	Pre-existence of ISO 9000 standards	3.94	1.128
9	Services/support from the certification agency	3.67	1.090
10	Co-operative attitude of suppliers	3.66	.945
11	Co-operative attitude of customers	3.65	.983
12	Availability of ISO published materials	3.53	.830
13	Assistance from the parent company or the partner	3.01	1.255
14	Availability of external consultants	2.95	1.240
Scale: 1 = not important, 2 = Low important, 3 = unsure , 4 = high, 5 = very high important			

Table results show that management commitment has the highest overall rating, with a mean score of 4.82 and 98.9 percent of the respondents indicate that management commitment is a very important or important factor. This high rating indicates that management commitment plays the most significant role in successful implementation of the standard. The smallest standard deviation 0.537 emphasizes this general agreement about the role of management commitment. The role of effective internal auditing has the second highest mean score at 4.52 and 95.5 percent, followed by middle management commitment at a mean score of 4.48, and employee motivation and involvement at 4.43. Resource allocation and existence of appropriate communication routes are fifth with a score of 4.08 each. Conversely, the least valued factors are assistance from the parent company or the partner with a mean score of 3.01, and availability of external consultants with a mean score of 2.95. This is not surprising since 64 percent of participating companies have got their certificates with less than 10 percent of consultants' assistance. One conclusion that could be derived is that the ISO 9001:2000 standard is not complicated, easily understood and implemented with proper training of quality oriented staff.

Organization Sector vs. Critical Factors for Successful Implementation

The following table shows a cross tabulation between manufacturing and non manufacturing organizations in terms of the items that were indicated as very important or important success factors

Table 25: Organization Sector vs. Factors for Successful Implementation

Success Factor	Organization Sector		Total	Significant difference
	Manufacturing	Non Manufacturing		
Top management commitment	62 98%	26 100%	88 99%	No
Effective internal auditing	59 94%	26 100%	85 94%	No
Middle management commitment	61 97%	25 96%	86 97%	No
Employee motivation and involvement	59 94%	24 92%	83 93%	No
Sufficient ISO training programs	58 92%	26 100%	84 94%	No
Resource allocation	53 84%	20 77%	73 82%	No
Existence of appropriate communication routes	55 87%	23 88%	78 88%	No
Pre-existence of ISO 9000 standards	47 % 75	19 % 73	66 74%	No
support from the certification agency	43 68%	19 73%	62 70%	No
Co-operative of suppliers	43 68%	17 65%	60 67%	No
Co-operative of customers	41 65%	18 69%	59 66%	No
Availability of ISO published materials	36 57%	16 62%	52 58%	No
Assistance from the parent company	22 35%	12 46%	34 38%	No
Availability of external consultants	19 30%	16 62%	35 39%	Yes Chi = 13.74, P = .008

Findings show a general agreement between manufacturing and non manufacturing sectors about the importance of human resources effectiveness and training which are represented in the top five success factors. There is a significant difference between sectors in terms of availability of external consultants where 62 % of non manufacturing companies indicated the importance of this factor while only 30 % of manufacturing companies believe it is a success factor in the implementation of ISO 9001:2000.

The factor analysis technique was used to group the items of this construct in order to identify a number of key elements deemed to be critical for a successful implementation of the new standard. It was also used to draw a better understanding about those factors, and to discover areas of improvement for new organizations that desire to implement the ISO 9001:2000 quality management system. A principal component factor analysis was applied with a Varimax rotation method. The Kaiser-Mayer-Olkin (KMO) measure of sampling adequacy was used to measure the adequacy of the sample for factor analysis. Factor analysis is acceptable if the value of KMO is greater than 0.5 [54].

Table 26: Kaiser-Meyer-Olkin & Bartlett's Tests

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.717
Bartlett's Test of Sphericity	Chi-Square	362.255
	df	91
	Sig.	.000

It has been verified that the factor analysis is appropriate (Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.717, Bartlett's Test of Sphericity is highly significant with Chi – Square value = 362.255, at p = 0.000 and degree of freedom= 91).

After five iterations, four factors resulted, and accounted for 60.802 percent of the total variance.

The following table shows the rotated component matrix after excluding loadings less then 0.4.

Table 27: Factor analysis of important success factors

Factors	Components			
	1	2	3	4
Effective internal auditing	.769			
Top management commitment	.761			
Middle management commitment	.736			
Employee motivation and involvement	.702			
Sufficient ISO training programs	.649			
Resource allocation		.744		
Existence of appropriate communication routes		.682		
Assistance from the parent company or the partner		.603		
Co-operative attitude of customers		.581		
Co-operative attitude of suppliers		.498		
Availability of external consultants			.724	
Availability of ISO published materials			.702	
Services/support from the certification agency			.570	
Pre-existence of ISO 9000 standards				.861
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a rotation converged in 5 iterations.				

Factor 1 includes five items: effective internal auditing, top management commitment, middle management commitment, employee motivation and involvement, and sufficient ISO training programs. Note that the five factors are all related to involvement of people, which has been repeatedly documented by a number of studies [21,58 , 59] as the most important factor for all quality management programs. Factor 2 includes five items: resource allocation, existence of appropriate communication routes, assistance from the parent company or the partner, co-operative attitude of customers, and co-operative attitude of suppliers. This grouped factor could be called "Effective Communication Factor". Factor 3, which could be named "ISO 9000 Understanding", includes three items: availability of external consultants, availability of ISO published materials, and services/support from the certification agency. The last factor is one item which is Pre-existence of ISO 9000 standards. This factor was the 8th in rank with a mean score of 3.94.

Barriers Encountered During Implementation

Question 14 of the questionnaire was used to investigate the obstacles encountered by businesses during the process of implementing ISO 9000:2000. Participants were asked to give the level of effect on their implementation efforts for each listed barrier on a five-point Likert scale ranging from (5) very high, (4) high, (3) unsure, (2) low and (1) very low or not available.

Table 28: Major Barriers Encountered During Implementation

Barrier	Mean	Std. Deviation
Lack of employee involvement	2.60	1.175
Difficulties in co-operation among middle managers over quality problems	2.58	1.214
Lack of training programs related to quality	2.53	1.244
Insufficiency of project time	2.45	1.168
Lack of co-operation from customers	2.33	1.031
Standard difficult to interpret	2.29	1.217
Lack of communication routes	2.26	.995
Lack of co-operation from suppliers	2.15	1.029
Lack of top management involvement	2.12	1.321
Lack of external advisers properly qualified.	2.11	1.133
Scale: 1 = very low or not available, 2 = Low, 3 = unsure , 4 = high, 5 = very high		

As can be seen, the highest factor of hindrance to ISO 9001:2000 implementation is lack of employee involvement. The next barriers are, in descending order: difficulties in co-operation among middle managers over quality problems; lack of training programs related to quality; insufficient project time; lack of co-operation from customers; standard difficult to interpret; lack of communication routes; lack of co-operation from suppliers; and least of all, lack of top management involvement and properly qualified external advisers.

Note that the top three barriers are related to human resources factors, bearing in mind that the human resources factor was the most important success factor according to the previous construct.

Many studies reported that most organizations in developing countries suffer from lack of employee involvement and participation in quality improvement efforts [10, 15, and 87]. There are many ways to get employees and middle managers involved in the implementation process of ISO 9001:2000 such as changing their attitudes and mindsets toward quality through continuous training and quality awareness programs, allowing employees to participate in quality decisions, fixing the responsibility for quality with the employee, recognizing and reward superior quality performance, creating ongoing quality awareness by mentioning quality in all documentation and encouraging employee involvement through quality circles.

Organization Sector vs. Barriers Encountered During Implementation

Table 29: Organization Sector and Barriers Encountered During Implementation

Barrier	Organization Sector		Total	Significant difference
	Manufacturing	Non Manufacturing		
Lack of employee involvement	16 25%	11 42%	27 30%	No
Difficulties in co-operation among middle managers over quality problems	16 25%	12 46%	28 32%	No
Lack of training programs related to quality	16 25%	10 39%	26 29%	No
Insufficiency of project time	15 24%	8 31%	23 26%	No
Lack of co-operation from customers	11 17%	5 19%	16 18%	No
Standard difficult to interpret	12 19%	6 23%	18 20%	No
Lack of communication routes	8 13%	4 15%	12 13%	No
Lack of co-operation from suppliers	7 11%	3 12%	10 11%	No
Lack of top management involvement	13 21%	5 19%	18 20%	No
Lack of external advisers properly qualified.	10 16%	5 19%	15 17%	No

As can be seen from the cross tabulation table above, the percentages of the encountered barriers in the non manufacturing companies are higher than the percentages in the manufacturing companies especially in the top three barriers which are: lack of employee involvement, lack of middle managers involvement and insufficient training and awareness programs about ISO 9001:2000.

Chi- Square test shows no significant differences among organizations sectors in all of the encountered barriers.

Perceived Benefits

In order to identify benefits that organizations were able to gain from implementing the ISO 9001:2000 system, participants were asked to indicate the level of perceived benefits on a five-point Likert scale ranging from (1) very low or not available to (5) very high. Respondents that achieved a mean value of more than 4.0 are deemed to experience a high level of perceived benefit.

Table 30: Perceived Benefits from Implementing ISO 9001:2000 Standard

Benefit	Mean	Std. Deviation
Development of quality culture	4.12	.736
Improved customer satisfaction	4.07	.823
Better communication with customers	4.03	.790
Increased management commitment to quality	3.99	.846
Use of data as business management tool	3.93	.915
Final product quality improvement	3.89	.994
Improvement of internal organization and operation	3.75	.802
Less rework and waste	3.57	.987
Easier penetration to new markets	3.46	.905
Improved employee-management relationships	3.45	.942
Increased productivity	3.45	.965
Increased employee satisfaction	3.40	.901
Less customer returns	3.36	1.025
Improved suppliers' performance	3.35	.943
Significant reduction in the amount of required documentation	2.94	1.132
Scale: 1 = very low or not available, 2 = Low, 3 = unsure , 4 = high, 5 = very high		

The results reveal that the highest benefit is "development of quality culture" with a mean score of 4.12. "Improved customer satisfaction" ranks second with a mean score of 4.07. The third benefit in rank is "better communication with customers" with 4.03 mean points. "Increased management commitment" and "use of data as business management tool" are next with mean scores of 3.99 and 3.93 respectively. The lowest perceived benefits are "improved suppliers' performance" and "significant reduction in the amount of required documentation".

Organization Sector vs. Perceived Benefits

Table 31: Organization Sector and Perceived Benefits

Benefit	Organization Sector		Total	Significant difference
	Manufacturing	Non Manufacturing		
Development of quality culture	55 87%	19 73%	74 83%	No
Improved customer satisfaction	49 78%	22 85%	71 80%	No
Better communication with customers	52 83%	23 88%	75 84%	No
Increased management commitment to quality	49 78%	21 81%	70 79%	No
Use of data as business management tool	50 79%	20 77%	70 79%	No
Final product quality improvement	44 70%	21 81%	65 73%	No
Improvement of internal organization and operation	48 76%	17 65%	65 73%	No
Less rework and waste	40 63%	14 54%	54 61%	No
Easier penetration to new markets	34 54%	12 46%	46 52%	No
Improved employee-management relationships	34 54%	14 54%	48 54%	No
Increased productivity	34 54%	15 58%	49 55%	No
Increased employee satisfaction	32 51%	13 50%	45 51%	No
Less customer returns	33 52%	13 50%	46 52%	No
Improved suppliers' performance	32 51%	11 42%	43 48%	No
Significant reduction in the amount of required documentation	19 30%	10 38%	29 33%	No

Chi- Square test shows no significant differences between organizations sectors in terms of all specified perceived benefits.

In order to find underlying categories that best describe this construct, the factor analysis technique was used to group the items of perceived benefits. A principal component factor analysis was applied with a Varimax rotation method. After five iterations, four factors resulted, describing 67.807 percent of the total variance. The next table shows the rotated component matrix after excluding loadings less then 0.5.

Table 32: Factor Analysis of Perceived Benefits

Items	Component			
	1	2	3	4
Less rework and waste	.771			
Increased employee satisfaction	.744			
Improvement of internal organization and operation	.734			
Improved employee-management relationships	.716			
Final product quality improvement	.701			
Increased productivity	.626			
Increased management commitment to quality	.616			
Less customer returns	.564			
Improved customer satisfaction		.849		
Better communication with customers		.798		
Development of quality culture		.747		
Improved suppliers' performance		.613		
Use of data as business management tool			.844	
Significant reduction in the amount of required documentation			.560	
Easier penetration to new markets				.786
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a rotation converged in 5 iterations.				

As can be seen from table 20, Factor 1, which could be named "improved productivity benefits", includes 8 items: less rework and waste, increased employee satisfaction, improvement of internal organization and operation, improvement of employee-management relationships, final product quality improvement, increased productivity, increased management commitment to quality, and less customer returns. Factor 2, which could be named "External benefits", contains four elements: improved customer satisfaction, better communication with customers, development of quality culture, and improved suppliers' performance. The "development of quality culture" item could be considered as a productivity benefit as well. Factor

3 includes "use of data as a business management tool" and "significant reduction in the amount of required documentation". These two items are related to the internal procedures and could be named "improved internal procedures". The last factor contains one item and is related to marketing, "easier penetration of new markets". The Kaiser-Mayer-Olkin (KMO) measure of sampling adequacy was used to measure the appropriateness of using factor analysis.

Using of factor analysis was found to be appropriate (Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.764, Bartlett's Test of Sphericity is highly significant with Chi – Square value = 652.563, p = 0.000 and a degree of freedom = 105).

As a matter of comparison, the top five perceived benefits found in a similar study performed in United States by the US Technical Advisory Group to ISO/TC 176 were use of data in business management, increased management commitment, improved customer satisfaction, effective management reviews and improved customer communication.

The researcher recognizes that the results may not precisely reflect the actual benefits due to the newness of ISO 9001:2000. The researcher believes that at least three years of practicing the standard are necessary for appropriate measuring of perceived benefits. Many studies express that companies are better able to appreciate the potential advantages of the ISO 9000 system after some period of working with it. Jones *et al*. [60] pointed out that "from an internal viewpoint it takes time for organizations to reap fully the benefits of the process and to make the system work to their best advantage".

Cost Savings

In this question, participants were asked whether or not they had already documented any cost savings from implementing ISO 9001:2000 systems.

Table 33: Cost Savings

	Frequency	Percent	Cumulative Percent
yes	22	24.7	24.7
no	37	41.6	66.3
Unsure at this point	30	33.7	100.0
Total	89	100.0	

Overall, 24.7 percent of respondents believe implementing ISO 9001:2000 saved them money, while 41.6 percent have not documented any cost savings. A further 33.7 percent think it is too soon to say.

A cross tabulation table was used to compare organizations with different certification time in terms of their documented cost savings.

Table 34: Cross tabulation between Time after registered and Documented cost savings

			Documented cost savings
Time after certification	Less than 1 year	Count	4
		% within documented cost savings	18.2%
	From 1 - Less than 2 years	Count	15
		% within documented cost savings	68.2%
	From 2 - 3 years	Count	3
		% within documented cost savings	13.6%
Total		Count	22
		% of documented cost savings	24.7%

The cross tabulation table shows that 18.2 percent of the 22 organizations that document cost savings were certified less than one year ago. 68.2 percent of respondents who documented cost savings were certified from one to less than two years ago, and 13.6 percent were certified two or more years ago. This could mean that more than one year of practicing the

system is needed before tangible cost savings are documented. The result of Chi-Square testing shows that there is a significant difference between time after certification groups in terms of documented cost savings (Chi-Square value = 14.393, df = 4, P = .006).

Amount of Cost Savings Compared to the Cost of Implementation

Participants who documented positive cost savings were asked to compare the documented cost savings to the cost of implementation.

Table 35: Amount of Cost Savings Compared to Implementation Cost

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	More	15	16.9	68.2	68.2
	Same	2	2.2	9.1	77.3
	Less	5	5.6	22.7	100.0
Total		22	24.7	100.0	
Missing	System	67	75.3		
Total		89	100.0		

68.2 percent of those who documented positive cost savings believe that the cost savings exceeded the implementation costs of the standard. 9.1 percent believe that cost savings are equal to the costs of implementation, while 22.7 percent report that cost savings are still less than the implementation costs.

To compares the amount of cost savings with time after certification, Cross tabulation table was developed:

Table 36 : Cross Tabulation of Cost Savings Compared to Cost of Implementation and Time after Certification

		Time after registered			Total
		Less than 1 year	From 1 - Less than 2 years	From 2 - 3 years	
cost savings compared to cost of implementation	More	1	12	2	15
	Same	1		1	2
	Less	2	3		5
Total		4	15	3	22

As can be seen from the table, 14 out of the 15 sites that documented more cost savings than implementation costs were certified between one and three years ago. This supports the previous conclusion that at least one year of practicing the new standard is needed before any tangible cost savings are documented.

Anticipated Cost Savings in the Future

Table 37 : Anticipated cost savings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	34	38.2	50.7	50.7
	no	8	9.0	11.9	62.7
	Unsure at this point	25	28.1	37.3	100.0
	Total	67	75.3	100.0	
Missing	System	22	24.7		
Total		89	100.0		

Participants who had not documented any cost savings and those who were unsure were asked if they anticipate any cost savings in the future. Results show that 50.7 percent of them anticipate cost savings in the future, 11.9 percent anticipate no cost savings at all, and 37.3 percent still unsure at this moment. Adding the overall percentage of those who anticipate future cost savings (38.2 percent of the total respondents) to those who already documented tangible cost savings (24.7 percent), the total documented or anticipated cost savings become 62.9 percent of participating companies.

Organization Sector vs. Cost Savings

Table 38: Organization Sector and Cost Savings

	Organization Sector		Total	Significant difference
	Manufacturing	Non Manufacturing		
Documented cost savings	15 24%	7 27%	22 25%	No
Anticipated cost savings	22 35%	12 46%	34 38%	No
Total of documented and anticipated cost savings	37 59%	19 73%	56 63%	No

Non manufacturing organizations reveal greater overall percentage of documented and anticipated cost savings than manufacturing organizations. Chi – Square test shows no significant differences among manufacturing and non manufacturing organizations in terms of documented or anticipated cost savings.

Quality Awareness about ISO 9001:2000.

In Question 19, Participants were asked to evaluate the knowledge about ISO 9001:2000 among top managers, middle managers and employees of their organizations. A mean score of 4 or more indicates high level of knowledge, a score between 3 and 4 (excluding 4) indicates moderate level of knowledge and a score less than 3 indicates a low level of knowledge among particular group.

Table 39: Knowledge about ISO 9001:2000 Standard

Knowledge about ISO 9001:2000 among	Mean	Std. Deviation
top managers	4.22	.780
middle managers	3.99	.612
employees	3.48	.827
Over All mean	3.90	.740

As can be seen, ISO 9001:2000 awareness among "top managers" was the highest, with a very high mean score of 4.22. The next most knowledgeable group was "middle managers" with a mean score of 3.99. The least knowledgeable group was "employees" with a mean score of 3.48. The overall mean of quality awareness was relatively high with a mean score of 3.9.

Kendall's tau_b Correlation, which is applied to ordinal data, was used to test the association between knowledge levels among organizations' management and employees. Correlation is measured using values between +1.0 and -1.0. Correlations close to 0 indicate little or no correlation between two variables, while correlations close to +1.0 (or -1.0) indicate strong positive (or negative) correlation [56]. Davis [57] categorizes the correlation values as follows: from 0.70 or higher (very strong correlation), from 0.50 to 0.69 (strong correlation), from 0.30 to 0.49 (moderate correlation), from 0.10 to 0.29 (low correlation), and from 0.01 to 0.09 (negligible correlation).

Table 40: Correlation between the Three Levels of Organizations People

	Kendall's tau_b Correlation	Knowledge about ISO 9001:2000 among		
		employees	middle managers	top managers
employees	Correlation	1.000	.395	.243
	Sig. (1-tailed)		.000	.005
middle managers	Correlation	.395	1.000	.488
	Sig. (1-tailed)	.000		.000
top managers	Correlation	.243	.488	1.000
	Sig. (1-tailed)	.005	.000	

From table 28, an interesting observation is that there are two positive moderate correlations. The first positive moderate correlation is between top managers and middle managers (0.488 significant at P= .01 level,1- tailed). The second positive moderate correlation is between middle managers and employees (0.395 significant at P= .01 level,1- tailed). These findings indicate that the level of knowledge about ISO 9001:2000 among employees is more affected by the middle managers' level of knowledge than to the top managers' level of knowledge

Kendall's tau_b Correlation was used in order to find the correlations between the overall knowledge about the standard and all perceived benefits variables. Moderate positive correlations were found at a significant level of .01 between overall mean knowledge about the standard and the following benefits: increased management commitment to quality (0.423), use of data as a business management tool (0.339), increased productivity (0.367), increased employee satisfaction (0.484), improved customer satisfaction (0.311), development of quality culture (0.307), improved employee-management relationships (0.380), and improved suppliers' performance (0.361). These positive correlations indicate the highly importance of quality awareness and ISO 9001:2000 training among an organizations' people to fully utilize the power of the system (Please see Appendix F).

Organization Sector and Level of Knowledge about ISO 9001:2000

Table 41: Organization Sector and Level of knowledge about ISO 9001:2000

Knowledge about ISO 9001:2000 among	Organization Sector		Total	Significant difference
	Manufacturing	Non Manufacturing		
Top Managers	55 87%	24 92%	79 89%	No
Middle Managers	55 87%	23 88%	78 88%	No
Employees	38 60%	12 46%	50 56%	No

Chi – Square test shows no significant differences among manufacturing and non manufacturing organizations in terms of level of knowledge about ISO 9001:2000 among organization' management and employees.

Disappointments Experienced After Being Certified

In order to identify the level of disappointment experienced after certification, participants were asked to rate their level of disappointment on a five-point Likert- scale ranging from (1) strongly disagree to (5) strongly agree. A mean score of 4 or more indicates high disappointment towards a particular item, a score between 3 and 4 (excluding 4) indicates a moderate level of disappointment, and a score of less than 3 indicates a low level of disappointment towards particular item.

Table 42 : Disappointments Experienced after Certification

Disappointments	Mean	Std. Deviation
Ability to gain market share is not high as expected	2.84	.999
Increased and complex paper work	2.73	1.304
Extensive changes	2.58	1.156
Customers go to suppliers without ISO	2.57	1.167
High costs related with ISO 9001:2000	2.47	1.078
Too difficult to learn and implement	1.92	.869
ISO 9000 useless in our business	1.62	.948

As can be seen from the table, the highest-ranking disappointment is the "ability to gain market share is not high as expected" with a mean score of 2.84. The second disappointment is "increased and complex paper work" with a mean point 2.73. The third and fourth disappointments are "extensive changes" with a mean score of 2.58 and "customers go to suppliers without ISO" with a mean score of 2.57. The fifth-ranking disappointment is "high costs related with ISO 9001:2000" with a mean score of 2.47. Most of the participants strongly disagree or disagree that "ISO 900 system is useless in their business" or that "the standard is too difficult to learn and implement". Overall no item got a mean score above 3 indicating a low level of disappointments towards the standard in all specified items.

Organization Sector vs. Disappointments Experienced After Being Certified

Table 43: Organization Sector and Disappointments Experienced After Being Certified

Disappointments	Organization Sector		Total	Significant difference
	Manufacturing	Non Manufacturing		
Ability to gain market share is not high as expected	16 25%	4 15%	20 22%	No
Increased and complex paper work	24 38%	8 31%	32 36%	No
Extensive changes	15 24%	10 38%	25 28%	No
Customers go to suppliers without ISO	11 17%	8 31%	19 21%	No
High costs related with ISO 9001:2000	12 19%	7 27%	19 21%	No
Too difficult to learn and implement	6 10%	1 4%	7 8%	No
ISO 9000 useless in our business	3 5%	1 4%	4 5%	No

The cross tabulation table shows that the disappointments level of "Ability to gain market share is not high as expected ", "Too difficult to learn and implement" and "ISO 9000 useless in our business" are less in the non manufacturing companies.

Chi –Square test reveal no significant difference between organizations sectors with respect to the disappointments about the ISO 9001:2000 standard.

Level of Satisfaction towards ISO 9001:2000

In this question participants were asked about the level of satisfaction they feel towards the ISO 9001:2000 standard on a five-point Likert scale ranging from (1) very low satisfaction to

(5) very high. Respondents who achieve a mean value of more than 4.0 are deemed to have a high level of satisfaction towards the ISO 9001:2000 system.

Table 44: Level of Satisfaction Towards ISO 9001:2000

		Frequency	Percent	Cumulative Percent
Level of Satisfaction	Very low	0	0	0
	Low	2	2.2	2.2
	Moderate	12	13.5	15.7
	High	51	57.3	73.0
	Very high	24	27.0	100.0
Total		89	100.0	

As can be seen from the table, 84.3 percent of the total participants are very highly or highly satisfied with the standard. 13.5 percent are moderately satisfied and only two sites (2.2 percent) are dissatisfied, one of them from "manufacturing" sector and the other from "business services/consulting" sector. No one indicated a very low satisfaction level.

Organization Sector vs. Level of Satisfaction

Table 45: Organization Sector and Level of Satisfaction

Level of Satisfaction		Organization Sector		Total
		Manufacturing	Non Manufacturing	
low	Count	1	1	2
	%	2%	4%	2.2%
moderate	Count	7	5	12
	%	11%	19%	13.5%
high	Count	33	18	51
	%	52%	69%	57.3%
very high	Count	22	2	24
	%	35%	8%	27.0%

Manufacturing companies present overall higher percentage level of satisfaction about the standard than the non manufacturing companies. Chi – Square test show no significant differences among organizations sectors in terms of level of satisfaction about ISO 9001:2000 standard. The following table shows level of satisfaction in terms of business types

Table 46: Level of satisfaction according to business type

Level of satisfaction according to business type	Frequency	Mean	Std. Deviation
Manufacturing	63	4.21	.699
Business services/consulting	5	3.60	.894
Education	2	4.00	.000
Hospitality	1	4.00	.
Transportation	1	4.00	.
Wholesale/retailing	1	4.00	.
Engineering services/consulting	7	3.71	.488
Telecommunications	1	5.00	.
Health care	3	4.00	1.000
Others	5	3.60	.548
Overall mean	89	4.09	.701

Manufacturing businesses experience the highest level of satisfaction with a mean score of 4.21. More than 98 percent of manufacturing firms indicate a level of satisfaction from moderate to very high and only one firm indicates a low satisfaction level. Second in rank,

engineering services/consulting, which is also related to manufacturing, has a mean score of 3.71 and 71 percent indicate very high level of satisfaction. Business services/consulting companies have a mean score of 3.6 where 4 out of 5 companies are highly satisfied and one shows low satisfaction. The overall satisfaction towards the new standard is high among all respondents with a mean score of 4.09.

Willingness to Recommend ISO 9001: 2000

In order to investigate their willingness to recommend ISO 9001:2000 to other organizations, participants were asked how strongly they would recommend ISO 9001: 2000 to other firms.

Table 47: Willingness to Recommend ISO 9001: 2000

	Frequency	Percent
Strongly recommend	78	87.6
Neither recommend nor discourage	8	9.0
Strongly discourage	3	3.4
Total	89	100.0

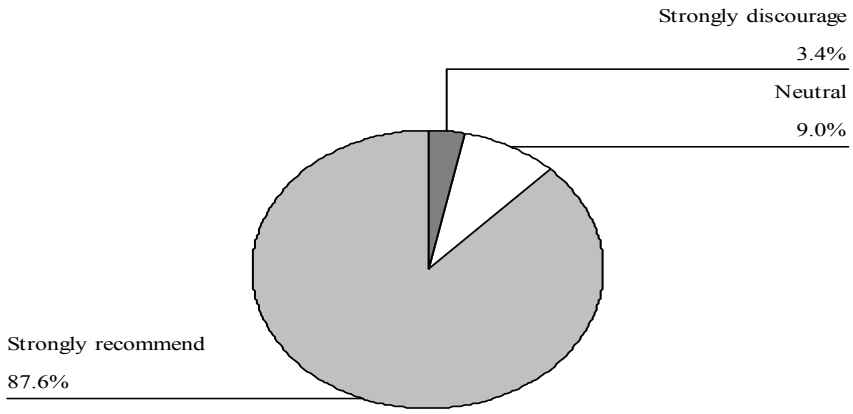

Figure 9: Willingness to Recommend ISO 9001:2000

The data shows a high willingness to recommend ISO 9001:2000 to other organizations. Nearly 88 percent of respondents would strongly recommend the standard to other firms, 9.0 percent would neither recommend nor discourage other firms from implementing the new system, and only 3 sites (3.4 percent) of the whole sample would strongly discourage other firms from implementing the new system.

Organization Sector vs. Willingness to Recommend ISO 9001: 2000

Table 48: Organization Sector vs. Willingness to Recommend ISO 9001: 2000

Recommendation Level		Organization Sector		Total
		Manufacturing	Non Manufacturing	
Strongly discourage	Count	2	1	3
	%	3.2%	3.8%	3.4%
Neither recommend nor discourage	Count	4	4	8
	%	6.3%	15.4%	9.0%
Strongly recommend	Count	57	21	78
	%	90.5%	80.8%	87.6%

The cross tabulation shows that the overall level of recommendation is higher among manufacturing firms. Chi- Square test shows no significant differences between organizations sectors in terms of the willingness level to recommend ISO 9001:2000 to other organizations.

Reasons That Had Driven Organizations to Implement ISO 9001:2000

This question was designed to explore the main reasons that led Saudi business organizations to register for ISO 9000:2000. Participants were asked to choose from fifteen reasons taken from the literature review.

Table 49: Reasons that driven organizations to implement ISO 9001:2000

Reasons	Frequency	Percent
Top management initiative	64	71.9
Quality improvement of internal operations	56	62.9
Customers' requirements	55	61.8
Part of overall quality policy	47	52.8
Quality improvement of final products	46	51.7
Corporate image	44	49.4
Future customer demand	40	44.9
Entry to foreign markets	39	43.8
Improvement of internal communication	29	32.6
Introduction to TQM	27	30.3
Cost reductions	25	28.1
Something competitors had already implemented	14	15.7
Capturing workers' knowledge	9	10.1
Supplier's requirements	6	6.7

The results show that the most significant reasons for Saudi organizations to implement the system are top management initiative (71.9 percent), quality improvement of internal operation and processes (62.9 percent), and customers' requirements (61.8 percent). Other reasons in descending order of significance are: part of overall quality policy (52.8 percent); quality improvement of final products (51.7 percent); corporate image (49.4 percent); future customer demand (44.9 percent); entry to foreign markets (43.8 percent); and improvement of internal communication (32.6 percent). The two least significant reasons are capturing workers' knowledge (10.1 percent) and supplier's requirements (6.7 percent).

A Chi-Square test was used to examine whether significant differences exist between organizations' sizes in terms of driven reasons. No significant differences were observed except with the "corporate image" motive.

For more analysis, a cross tabulation table was used to compare "corporate image" motive and organizations' sizes:

Table 50: Cross tabulation between corporate image motive and size of the organizations

Reason for implementing ISO		Size of the organizations			Total
		Small	Medium	Large	
Corporate image	Yes	8	9	27	44
	No	13	18	14	45
Total		21	27	41	89

As can be seen from the table, 65 percent of large organizations believe that corporate image is a main reason behind the decision to implement ISO 9001:2000. 33 percent of medium size organizations and 38 percent of small organizations believe that corporate image is a main reason behind the decision to implement ISO 9001:2000. A Pearson Chi-Square test indicates that there is a significant difference (at p = .05 level) between organizations' sizes and the "corporate image" reason for implementation (Chi-Square value = 8.302, df = 2, P = .016).

As a matter of comparison, a survey performed in Sweden found that the most significant certification motive for Swedish industry is ''corporate image'' with 83 percent of respondents. Quality improvement was the second-ranking motive (81 percent, followed by marketing advantage (66 percent), customer pressure (53 percent), and cost reductions (38 percent) [59]. Another study on ISO 9000 certified organizations in the UK found that demand from future customers for ISO 9000 was the major reason for pursuing ISO 9000 certification [51].

Organization Sector vs. Reasons for Seeking to Implement ISO 9001:2000

Table 51: Organization Sector vs. Reasons for Seeking to Implement ISO 9001:2000

Reason	Organization Sector		Total	Significant difference
	Manufacturing	Non Manufacturing		
Top management initiative	43 68%	21 81%	64 72%	No
Quality improvement of internal operations	36 57%	20 77%	56 63%	No
Customers' requirements	40 64%	15 58%	55 62%	No
Part of overall quality policy	32 51%	15 58%	47 53%	No
Quality improvement of final products	34 54%	12 46%	46 52%	No
Corporate image	28 44%	16 62%	44 49%	No
Future customer demand	25 40%	15 58%	40 45%	No
Entry to foreign markets	29 46%	10 39%	39 44%	No
Improvement of internal communication	16 25%	13 50%	29 33%	Yes Chi = 5.072, P = .024
Introduction to TQM	18 29%	9 35%	27 30%	No
Cost reductions	14 22%	11 42%	25 28%	No
Something competitors had already implemented	11 18%	3 12%	14 16%	No
Capturing workers' knowledge	3 5%	6 23%	9 10%	Yes Chi = 6.792, P = .017
Supplier's requirements	4 6%	2 8%	6 7%	No

Chi – Square test shows significant difference between organizations sectors with respect to the of motives that had driven organizations to implement ISO 9001:2000 in two motives the improvement of internal communication and the capturing of workers' knowledge.

Implemented Management Programs Other Than ISO 9001: 2000

In this question, participants were asked if their companies implement any management program other than ISO 9001: 2000.

Table 52: Other management programs

	Frequency	Percent	Cumulative Percent
yes	38	42.7	42.7
no	51	57.3	100.0
Total	89	100.0	

42.7 percent answered yes to this question while 57.3 percent stated that no management program other than ISO 9001:2000 is implemented in their organizations.

A cross tabulation table was developed to compare previous ISO 9000 systems and other management programs.

Table 53: Cross tabulation of Previous ISO 9000 systems and other Management programs

Previous Systems	Other Management programs		
	yes	no	Total
ISO 9001	12	15	27
ISO 9002	24	26	50
No previous ISO 9000	2	10	12
Total	38	51	89

The table shows that 44 percent of previous ISO 9001 organizations have another management program in addition to ISO 9001:2000. 48 percent of previous ISO 9002 organizations have management programs other than ISO 9001:2000. Only two sites (16 percent) of companies with no previous ISO 9000 system have implemented other management programs in addition to the ISO 9001:2000 system. One of these two companies implements the Environmental Management Standard (ISO 14001). The second company implements the Hazard Analysis and Critical Control Point Program (HACCP).

For further analysis of this variable, a cross tabulation table was developed to show the percentage of consultant work used for implementation of other management programs:

Table 54:Cross tabulation of percentage of consultant work with other management programs

Percentage of Consultant work	Management programs		Total
	yes	no	
No participation from external consultants	16	10	26
Less than 10%	14	17	31
From 10% - 50 %	8	14	22
From 51% - 80 %		7	7
from 81 % - 100 %		3	3
Total	38	51	89

62 percent of organizations that were certified to ISO 9001:2000 without any external help, have another implemented management program. 44 percent of sites that implemented ISO 9001:2000 with less than 10% consultants' participation have a management program other than ISO 9001:2000. 36 percent of those who needed from 10% to 50 % of external help to implement ISO have a management program other than ISO 9001:2000. Companies that implemented ISO 9001:2000 with more than 50% participation from external consultants have no installed programs other than ISO 9001:2000. According to a Chi-Square test, there is a significant difference between organizations with different percentage of external participation in terms of other implemented management programs with an error of 0.01. (Chi–Square value = 11.661, 4 df , p= .01).

Other Implemented Management Programs

Participants who answered yes to the previous question were asked to indicate the other management programs they are implementing. A frequency analysis of their answers is presented in the following table:

Table 55: list of implemented management programs

Management program	Frequency	Percent
ISO 14001	17	19.1
Total Quality Management	16	18.0
Quality Control Circles	7	7.9
Business Process Reengineering	4	4.5
HACCP	3	3.4
Malcolm Baldrige National Quality Award	1	1.1
Lean Manufacturing	1	1.1
MRP2	1	1.1
TickIT	1	1.1
Balance Score Card	1	1.1
Habits of Excellence	1	1.1
Total	53	1.1

The Environmental Management System ISO 14001 is the most frequently implemented program in addition to ISO 9001:2000, with a frequency of 17 organizations and a percentage of 19.1 of the total respondents. The second highest frequency was for TQM with 16 organizations and 18 percent of total respondents. The other programs, in descending order, are Quality Circles with 7.9 percent, Business Process Reengineering with 4.5 percent, and Hazard Analysis and Critical Control Point HACCP with 3.4 percent. Each of the following programs is implemented by one site (1.1 percent): Malcolm Baldrige National Quality Award (MBNQA), Lean Manufacturing, Manufacturing Resources Planning (MRP2), Software Management Program (TickIT), Balance Score Card, and Habits of Excellence program. Data shows that six organizations implement more than one management system in addition to ISO 9001:2000.

Ability to Integrate Quality Management Systems with ISO 9001:2000

In order to investigate the ability to integrate the ISO 9001:2000 standard with other implemented management systems, participants were asked if they were able to integrate the ISO 9001:2000 system with the other management systems in their organizations.

Table 56: Ability to integrate quality management systems with ISO 9001:2000

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	35	39.3	92.1	92.1
	no	3	3.4	7.9	100.0
	Total	38	42.7	100.0	
Missing	System	51	57.3		
Total		89	100.0		

More than 92 percent of the 38 organizations that apply other management programs in addition to ISO 9001:2000 are able to integrate ISO 9001:2000 with other implemented management programs. Only 7.9 percent are not able to integrate the standard with their implemented management programs.

Level of Integration

Those who apply other management systems were asked to indicate the level of integration they were able to reach from integrating ISO 9001:2000 with other management systems.

Table 57: Level of Integration

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Low	3	3.4	7.9	7.9
	low	2	2.2	5.3	13.2
	Medium	6	6.7	15.8	28.9
	high	19	21.3	50.0	78.9
	very high	8	9.0	21.1	100.0
	Total	38	42.7	100.0	
Missing	System	51	57.3		
Total		89	100.0		

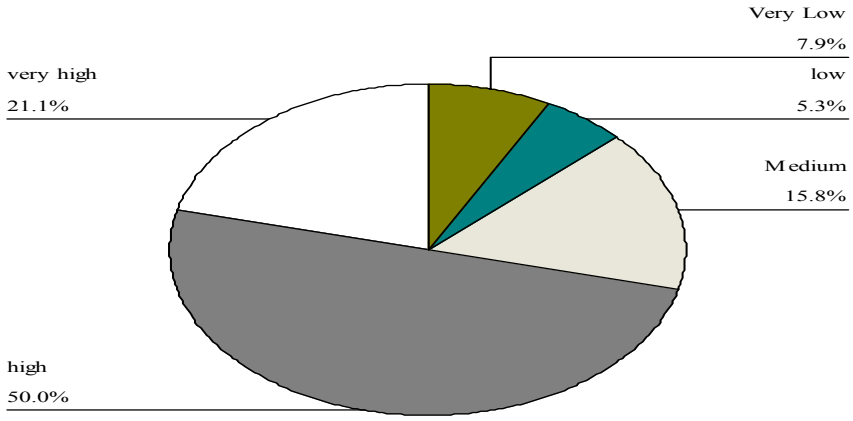

Figure 10: Percentage of Integrating ISO 9001:2000 & other management Systems

Participants express a reasonable level of integration. 71.1 percent indicate a high or very high level of integration. The mean score of level of integration among those 38 organizations is 3.71 out of 5, which indicates a relatively high level of integration. This finding supports the ISO's statement that ISO 9001:2000 is compatible with other management systems.

Organization Sector vs. Other Implemented Management Systems

Table 58: Organization Sector vs. Other Implemented management Systems

Other Management Programs	Organization Sector		Total	Significant difference
	Manufacturing	Non Manufacturing		
Availability of other management programs	32 51%	6 23%	38 43%	Yes Chi = 5.779, P = .019
Ability to Integrate with ISO 9001:2000	29 91%	6 100%	35 92%	No

There is a significant difference between organizations sectors in terms of availability of other management programs in addition to ISO 9001:2000 system. The cross tabulation table shows that 51 percent of manufacturing firms have one or more management systems other

than ISO 9001:2000 while it is 23 percent in the non manufacturing sites. Both sectors present very high level of integrating ISO 9001:2000 with the other implemented management systems.

CHAPTER FIVE: CONCLUSION

This chapter provides a summary and conclusions of the research. The first section presents an overview of the study. The second section provides an overall summary of the findings and conclusions. Section three presents the limitations of the study and recommendation for future research.

Overview of the Study

In spite of many studies which have been conducted to understand and assess the practices of ISO 9000:1994 standards, no research has been done to investigate the practices of ISO 9001:2000 in Saudi Arabia. This study was designed to determine the sets of factors affecting ISO 9001:2000 practices in Saudi business organizations.

Twelve latent constructs were aimed to be investigated in this study:

1- The major gaps between organizations seeking to implement the standard and the requirements of ISO 9001:2000

2- The most difficult elements of ISO 9001:2000 to implement which hence need more resources and attention

3- The factors influencing a successful implementation of ISO 9000:2000 and their significance in the context of Saudi businesses

4- The obstacles and barriers which hinder the implementation efforts

5- The level of knowledge about the new standard among organizations' management and staff

6- The perceived benefits from implementing ISO 9001:2000

7- The cost savings compared to the costs of implementation

8- The level of satisfaction organizations feel towards the standard

9- The willingness to recommend the standard to other companies

10- The perceptions of ISO registered firms towards the new standard

11- The reasons influencing organizations to implement the ISO 9001:2000 standard

12- The integration level between ISO 9001:2000 and other implemented systems, if any.

A questionnaire instrument was developed to investigate the 12 latent constructs of the research, based on extensive review of ISO 9000:94 and ISO 9000:2000 literature and test instruments, previously performed in other studies. The questionnaire was reviewed for technical and content validity by the dissertation committee members and three consultants in ISO 9000 quality management systems. Based on their suggested clarifications, revisions, and recommendations, some modifications have been made to improve the test instrument. The questionnaire was pilot tested by quality managers of eight certified companies. Many wording corrections were done to clarify the statements and remove any misunderstandings. Final versions of the test instrument were completed. The target population for the study was made up of all ISO 9001:2000 registered sites in Saudi Arabia up to 31 Dec. 2002, which comprised 131 organizations (ISO 12 cycle survey, 2003). The researcher decided to target the whole population instead of using sampling procedures. The quality managers in the targeted businesses constituted the research subjects.

The questionnaire was faxed or emailed with a cover letter explaining the importance and purpose of the study. To ensure a high response rate, phone calls follow-up were conducted throughout the duration of the survey. Data collection was conducted during November and December 2003.

A total of 93 responses were received, constituting 76% of the total population; 89 surveys were deemed usable, constituting 72% of the population.

Data gathered from the questionnaire was entered into a data file and analyzed using SPSS statistical package ver.11.0. Responses were coded numerically. Several statistical tests were used to help in interpreting the collected data. They are mainly descriptive statistics, measuring of variation, measuring of association, and factor analysis. Comparisons have been made between the research results and findings of some previous studies of ISO 9000 and other quality management systems conducted in various countries.

Summary of the Findings

In summary, the major findings from the study are:

Manufacturing firms constitute the largest portion of certified organizations, with 70.8 percent of respondents. Non-manufacturing certified businesses constitute 29.2 percent.

A proportion of approximately 24% of the certified organizations are categorized as small-sized businesses, 30% are categorized as medium, and 46% are large organizations, of which 30.3% are sites with more than 500 employees.

86.5% of the total respondents had implemented ISO 9001:2000 as a transition process from previous ISO 9000 standards.

68.5% of the certified sites took less than one year to implement the standard. Most of them were previously certified to one of the ISO 9000:1994 standards. This high percentage gives an indication that ISO 9001:2000 is not a complex system and can be easily implemented in a short time frame.

Most of the companies in the study have used external consultants (70.8%), but overall there was a low level of reliance on them, with 64.0% of registered organizations having documented less than 10% of external consultants' participation in implementing the ISO 9001:2000 system.

The first major gap identified through the pre-assessment gap analysis is "customer satisfaction measures. The second major gap is "organization's objectives not measurable." The third identified gap is "continual improvement processes." The fourth gap is "collection and analysis of data." The least two nonconformities were "objectives not consistent with quality policy" and "management of outsourced processes."

Similar results has been revealed by the TAG survey of 227 US organizations implementing ISO 9001:2000, where the top five areas of nonconformity were: customer satisfaction data and assessment, documentation, continual improvement, collection and analysis of data, and non-measurable objectives (Liebesman, 2002).

The most difficult clause of the standard is "management responsibility." ISO 9001:2000 requires top management to provide objective evidence of its commitment to the development and implementation of ISO 9001:2000, and continual improvement of its effectiveness by communicating to the organization the importance of meeting customer requirements, establishing the quality policy of the organization, ensuring that quality objectives are established, conducting management reviews, and ensuring the availability of

resources (ISO 9001:2000, 2000). The continual improvement clauses of the ISO 9001:2000 standards represent the second most difficult part. The improvement part of the system consists of corrective, preventive, and continual improvement clauses. According to ISO 9001:2000, organizations must continually improve the effectiveness of ISO 9001:2000 system through the use of the quality policy; quality objectives audit results, analysis of data, corrective and preventive actions, and management review (ISO 9001:2000, 2000). Data analysis was third in difficulty. ISO 9001:2000 requires the organization to determine, collect and analyze appropriate data to demonstrate the suitability and effectiveness of its quality management system, and to determine where continual improvement of the effectiveness of the quality management system can be made. The main areas of the system to which data analysis should be applied are: customer satisfaction, conformity to product requirements, characteristics and trends of processes and products, including opportunities for preventive action (ISO 9001:2000, 2000).

The top five critical success factors in implementing ISO 9001:2000 quality management system are in descending order, management commitment, effective internal auditing, middle management commitment, employee motivation and involvement, resource allocation, and existence of appropriate communication routes. Conversely, the least valued factors are assistance from the parent company or the partner and availability of external consultants. This is not surprising, since 64% of the participating companies got their certificates with less than 10% of consultants' assistance. One conclusion that could be derived is that ISO 9001:2000 standard is not a complicated system, but is easily understood and implemented with proper training of quality oriented staff. By grouping the 14 items of the important factors for successful implementation of ISO 9001:2000 construct using factor analysis technique, four factors resulted. Factor 1 includes five items: effective internal

auditing, top management commitment, middle management commitment, employee motivation and involvement, and sufficient ISO training programs. Those five factors are all related to the involvement of people, which has been repeatedly documented by a number of studies as the most important factor for all quality management programs [21,58 , 59]. In fact "involvement of people" is one of the eight quality management principles that ISO 9000:2000 is based on. Factor 2, which could be called "effective communication," includes five items: resource allocation, existence of appropriate communication routes, assistance from the parent company or the partner, co-operative attitude of customers, and co-operative attitude of suppliers. Factor 3, which could be called "ISO 9000 understanding," includes three items: availability of external consultants, availability of ISO published materials, and services/support from the certification agency. The last factor is pre-existence of ISO 9000 standards.

The highest factor of hindrance to ISO 9001:2000 implementation is lack of employee involvement. Other barriers in descending order were: Difficulties in co-operation among middle managers over quality problems, lack of training programs related to quality, insufficiency of project time, and lack of co-operation from customers. Note that the top three barriers are related to employee and management involvement, bearing in mind that the people involvement factor was the most important success factor from the previous finding.

The highest perceived benefits, in descending order, are development of quality culture, improved customer satisfaction, better communication with customers, increased management commitment, and use of data as a business management tool. The lowest perceived benefits were improved supplier performance and significant reduction in the amount of required documentation. Using factor analysis to group the 16 items of perceived benefits, four factors resulted. Factor 1, which could be called "improved productivity

benefits," includes eight items: less rework and waste, increased employee satisfaction, improvement of internal organization and operation, improved employee-management relationships, final product quality improvement, increased productivity, increased management commitment to quality, and fewer customer returns. Factor 2, which could be called "communication benefits," contains four elements: improved customer satisfaction, better communication with customers, development of quality culture, improved supplier performance. Factor 3, which could be called "improved processes," includes two items: use of data as a business management tool, and significant reduction in the amount of required documentation. The last factor contains one item related to marketing: "easier penetration to new markets." As a matter of comparison, the top five perceived benefits found in a similar study performed in the United States by the US Technical Advisory Group to ISO/TC 176 were: use of data in business management, increased management commitment, improved customer satisfaction, effective management reviews, and improved customer communication. The researcher recognizes that findings may not precisely reflect the actual benefits, due to the newness of ISO 9001:2000. The researcher believes that appropriate measuring of perceived benefits needs at least three years of practicing the standard. Many studies have expressed that companies after some period of working with ISO 9000 system are better able to appreciate its potential advantages. (Jones *et al*. 1997) pointed out that "it takes time for organizations to reap fully the benefits of the process and to make any quality management system work to their best advantage."

A total of 62.9% of the participated companies have documented or anticipated cost savings from implementing ISO 9001:2000 system; 81.8% of respondents who documented cost savings got their certifications at least one year ago. This could mean that more than one year

of practicing the system is needed before tangible cost savings could be documented. 68.2% believe that documented cost savings exceeded the implementation costs of the standard.

Top managers were the most knowledgeable group about ISO 9001:2000 standard, followed by middle managers, then employees. The overall mean of quality awareness was relatively high, with a mean score of 3.9.

Findings show a moderately positive correlation between top managers and middle managers, and another moderately positive correlation between middle managers and employees.

Moderately positive correlations were found at a significance level of .01 between the overall mean knowledge about the standard and the following benefits: increased management commitment to quality, use of data as a business management tool, increased productivity, increased employee satisfaction, improved customer satisfaction, development of quality culture, improved employee-management relationships, and improved supplier performance. These positive correlations indicate the crucial importance of quality awareness and ISO 9001:2000 training among the organization's people to fully utilize the potential of the ISO 9001:2000 system.

The top five disappointments about the standard, in descending order are: ability to gain market share is not high as expected, increased and complex paperwork, extensive changes, customers go to suppliers without ISO 9000 certificate, and high costs related with ISO 9001:2000. Overall no disappointment item got a mean score above 3, indicating a low level of disappointment towards the standard in all specified items.

Findings reveal that ISO 9001:2000 certification has provided significant benefits for participant companies. 84.3% of the total participants are very highly or highly satisfied with

the standard; 13% had moderate satisfaction, and only two sites (2.2%) were dissatisfied. No one indicated a very low satisfaction level. Respondents show a high willingness to recommend ISO 9001:2000 to other organizations; nearly 88% of the respondents would strongly recommend the standard to other firms.

Findings reveal that the most significant reasons for Saudi organizations to implement the system, in descending order, are: top management initiative, quality improvement of internal operation and processes, customers' requirements, part of overall quality policy, quality improvement of final products, corporate image, and future customer demand. The least two reasons in rank are capturing workers' knowledge and supplier's requirements. Note that the highest two reasons were related to the internal quality issues, which indicate that organizations have become quality oriented and seek registration to improve their quality management system more than just for marketing purposes. Perceived benefits reflect this finding, since the top perceived benefits were related to organizational quality improvement, as discussed before.

At P = .01 significant difference, 62% of organizations that were certified to ISO 9001:2000 without any external help have another implemented management program; 44% of sites that implement ISO 9001:2000 with less than 10% of consultants' participation have another management program in addition to ISO 9001:2000. Thirty-six percent of those who needed from 10% to 50% external help have a management program other than ISO 9001:2000, whilst companies that implemented ISO 9001:2000 with more than 50% participation from external consultants have no installed program other than ISO 9001:2000.

More than 92% of the 38 organizations that apply another management program in addition to ISO 9001:2000 expressed some ability to integrate ISO 9001:2000 with other programs. 71.1% of organizations that implement management programs in addition to ISO 9001:2000

indicated a high or very high level of integration. This finding supports the ISO organization statement that ISO 9001:2000 is compatible with other management systems.

Conclusions

1- In spite of ISO 9001:2000 is addressed to the service sector as well as the manufacturing sector, the manufacturing sector still represents the largest portion of respondents. One possible reason is that manufacturing companies are involved in export trading processes that require an ISO certificate. Lack of ISO 9001:2000 awareness and its applications and benefits to the service sector might be another reason.

2- Small organizations are lagging behind in their adoption of the standard, while adoption of the standard is greatest in the large-sized organizations. High costs of implementation and expensive consultants' fees might be one reason preventing small organizations from widely adopting the standard.

3- The high percentage of certified sites in less than one year gives an indication that ISO 9001:2000 is not a complex system and can be easily implemented in a short time frame.

4- Organizations seeking to implement the new standard, particularly those with no previous ISO 9000:94 certificate, had better get some kind of help from external consultants to get a shortcut and effective path to the certification and, consequently, decrease the time and costs of the implementation. On the other hand, there is a risk that letting the consultants do most of the implementation work without a positive

involvement from the employees may make them unfamiliar with the new system and less interested.

5- Most of the difficult clauses to comply with and the most of the identified gaps in the gap analysis are the new requirement elements of ISO 9001:2000 over the previous ISO 9000:94 systems such as measurable objectives, customer satisfaction, collection and analysis of data, continual improvement. In ISO 9001:2000 it is no longer acceptable to set up objectives that are not SMART (specific, measurable, attainable, realistic, and timed). Companies seeking ISO 9001:2000 system must develop tools to measure customer satisfaction and keep records of these measures, analyze collected data for continual improvements.

6- People involvement is the most critical factor for successful implementation of ISO 9001:2000. People involvement involves: top management commitment and involvement, middle management commitment and involvement, employees motivation and involvement, effective internal auditing, and continuous quality awareness and training.

7- The highest factor of hindrance to ISO 9001:2000 implementation is lack of employees' involvement. This finding confirms results of previous studies that most organizations in developing countries suffer from lack of employees' involvement and participation in quality improvement efforts [10, 15, and 87].

8- This indicates the importance of the human resources factor in the implementation process. Therefore, to implement ISO 9001:2000 effectively and successfully, an organization's employees and middle managers must be highly motivated, properly trained, and deeply involved in the implementation processes.

9- There are many ways to make the employees and the middle managers involved in the implementation process of ISO 9001:2000 such as changing their attitudes and mindsets toward quality through continuous training and quality awareness programs, allowing employees to participate in quality decisions, recognizing and reward superior quality performance, creating ongoing quality awareness by mentioning quality in all documentation and encouraging employees involvement through quality circles.

10- The best perceived benefits from implementing ISO 9001:2000 come from the new requirements clauses of ISO 9001:2000 such as improved customer satisfaction, better communication with customers, increased management commitment and use of data as a business management tool.

11- Findings reveal the importance of awareness and training about ISO 9001:000 system among organizations' management and employees and its positive correlation and direct effects on the benefits gained from the implementation.

12- Research findings show that the level of knowledge about ISO 9001:2000 among employees is more affected by middle managers' level of knowledge than by top managers' level of knowledge. This could suggest that more awareness about the ISO 9001:2000 standard among middle managers would reflect positively on employees and top managers as well.

13- Participants strongly disagree that ISO 900 system is useless in their business or the standard is too difficult to learn and implement.

14- Most respondents believe that ISO 9001:2000 standard to be cost effective.

15- There is an overall high satisfaction level about ISO 9001:2000 standard among registered organizations and high willingness to recommend the standard to other firms.

16- The high ability to integrate ISO 9001:2000 with other implemented management systems confirms the ISO organization statement that ISO 9001:2000 is compatible with other management systems.

17- In conclusion, for a successful implementation of ISO 9001:2000 standard, organizations must give great consideration to the people involvement factor, particularly top and middle management involvement and commitment to quality, employees' motivation and involvement, quality awareness, and ISO 9001:2000 training.

Limitation of the Study and Areas for Future Research

This is an exploratory study answering important questions about 12 latent constructs of the research. More explanatory studies are needed to delve deeply into each construct of this study.

This study is limited to Saudi Arabian organizations which have been identified as having implemented an ISO 9001:2000 program. Other developing countries could be surveyed using the same instrument.

The reliability and validity tests and the analysis were performed based on 89 organizations only. The sample size used in this study is considered small. The results of the study should, therefore, be treated with caution.

The survey of this study was addressed to the quality managers of the respondent organizations. More research could be done to include top management, employees, suppliers and customers.

Future research could be conducted to measure and evaluate the performance of organizations with ISO 9001:2000 before and after certification.

The ISO 9001:2000 system is based on the eight quality management principles of TQM. It is important to study to what extent the performance of ISO 9001:2000 certified organizations reflect TQM principles.

Future research could be conducted to study the current ISO 9001:2000 consultation practices, its pros and cons, and recommendations to improve its effectiveness.

APPENDIX A : RECOMMENDATION LETTER

Kingdom of Saudi Arabia
GENERAL ORGANIZATION FOR TECHNICAL, EDUCATION AND VOCATIONAL TRAINING
COLLEGE OF TECHNOLOGY, JEDDAH

الكلية التقنية بمحافظة جدة

المملكة العربية السعودية
المؤسسة العامة للتعليم الفني والتدريب المهني
الكلية التقنية بمحافظة جدة

(إلى من يهمه الأمر)

تفيد الكلية التقنية بمحافظة جده بأن الأستاذ / محمد مساعد العسيري هو أحد منسوبيها المبتعثين للولايات المتحدة الأمريكية في مجال هندسة الجودة ، وأنه قد حضر للمملكة لجمع المعلومات الميدانية المتعلقة برسالة الدكتوراه عن نظام الأيزو ٢٠٠٠ :٩٠٠٠ وأثره على منظمات الأعمال .

وبناءً على طلبه أعطي هذا التعريف لتقديمه إلى الجهات التي يرغب توزيع الاستبيانات عليها لمساعدته والتعاون معه فيما يخدم المصلحة العامة .

والله ولي التوفيق ،،،،

عميد الكلية التقنية بمحافظة جده

د. عبد السلام بن سعيد الغامدي

م / ل

الرقم : التاريخ : المرفقـات :
ص.ب : ١٧٦٠٨ - جـدة ٢١٤٩٤ المملكة العربية السعودية - هـاتف : ٦٣٧٠٣٨٧ / ٦٣٧٧٥٠٦ - فـاكس : ٦٣٧٨٣٧٦
P. O. Box 17608 - Jeddah 21494 Saudi Arabia - Tel. : 6370387 / 6377506 - Fax : 6378376

APPENDIX B: COVER LETTERS FOR THE QUESTIONNAIRES

Dear Quality Manager:

Thank you for donating your valuable time to completing this survey. Your reply will provide beneficial information to identify and investigate the factors affecting the adoption and implementation of ISO 9000 quality management system in Saudi business organizations which hopefully can provide valuable information to enhance the quality management practices in Saudi Arabia.

This questionnaire consists of 27 questions and has been designed so that you can complete it very quickly and easily. It takes approximately 20 minutes. Please make every effort to answer every question to ensure the usability of the survey.

Since your complete honesty is critical for the accuracy of the results, **you can be absolutely sure that all of the information you provide is strictly confidential, and no individual organizations will be identified**. The answers you provide will be added in with other responses into a combined database so that no single business response can be identified.

The success of this study is dependent upon a high rate of return for which your participation is essential.

Please send back the completed survey to Fax # **02 6648613** or Fax # **02 6680958** Jeddah

Your reply will provide me with the data I need to successfully complete my Doctoral dissertation, for which I am truly grateful. If you have any questions regarding this study, please feel free to call me at mobile # 055687283 or by e-mail at mhmdasiri@yahoo.com

Sincerely,

Mohammad Asiri
Department of Industrial Engineering and Management Systems
College of Engineering
University of Central Florida.
Orlando, Florida.
USA.

بسم الله الرحمن الرحيم

اخي مدير الجودة .

أشكر لكم تبرعكم بوقتكم الثمين لإكمال الإستبانة المرفقة والتي ستخدم البحث العلمي الذي أقدمة لنيل درجة الدكتوراة في الهندسة الصناعية تخصص إدارة الجودة. إن تعبئتكم لهذة الإستبانة سيقدم فوائد قيمة لهذا البحث الذي غرضة تحديد وتحليل العوامل الموثرة سلباً أو إيجاباً في تطبيقات نظام الجودة العالمي الأيزو 9001:2000 في المملكة العربية السعودية والذي نأمل بدورة أن يقدم معلومات قيمة تساعد في تطوير وتحسين تطبيقات ادارة الجودة في المملكة.

لقد صممت الإستبانة بطريقة تمكنكم من الإجابة عليها بسهوله وفي وقت معدله 20 دقيقة ان شاء الله.
أرجو ان يتم الإجابة على جميع الأسئلة حيث أنها مترابطة وعدم الإجابة على شيء منها يؤدي الى فقدانها لقيمتها العلمية.
إن ألدقة التامة والأمانة العلمية مهمة جداً للإجابة على هذا الإستبانة علماً بأنني أضمن لكم تماماً السرية المطلقة للمعلومات المقدمة وأتعهد لكم بأنها لن تستخدم الإ في هذا البحث العلمي وبطريقة تحليلية وتجميعية كمية تجعل من المستحيل التعرف على شركتكم بأي حال من الأحوال.

أن الفائدة العلمية المرجوة من هذا البحث لن تحقق الا بوجود معدل استجابة عالي جداً ولذلك أعول كثيراً على استجابتكم وتعبئتكم لهذا الاستبانة وإرسالها على الفاكس رقم : 02 6648613 جـدة

وللإجابة على أي تساؤل ، أرجوا الا تتردوا في الإتصال بي على جوال رقم : 055687283 أو البريد الإلكتروني :

mhmdasiri@yahoo.com

شاكراً لكم سلفاً كريم تجاوبكم .

محمد مساعد العسيري

جامعة وسط فلوريدا

كلية الهندسة

قسم الهندسة الصناعية

APPENDIX C: SURVEY QUESTIONS IN ENGLISH AND ARABIC

1. What is your organization name:

2. What is your Job title:

3. Which of the following best describes your organization?

☐ Manufacturing
☐ Business services/consulting
☐ Education
☐ Government
☐ Hospitality
☐ Transportation
☐ Wholesale/retailing
☐ Engineering services/consulting
☐ Telecommunications
☐ Finance/banking
☐ Health care
☐ Insurance
☐ Utilities
☐ Other (please specify) .....

4. What is the number of employees in your organization?

☐ Less than 50 ☐ Between 50 – 100 ☐ Between 101 – 200 ☐ Between 201 – 300 ☐ Between 301 – 500 ☐ Between 501 – 1000 ☐ More than 1000.

5. What type of ownership is your business?

☐ Saudi private
☐ Joint venture with foreign company
☐ Governmental sector
☐ Mixed governmental and private sector (no foreign involvement or joint venture)
☐ Other (please specify) …….....

6. How long did it take your organization to be certified to your current ISO 9001:2000 standard?

☐ Less than 1 year. ☐ From 1 - Less than 2 years. ☐ From 2 - 3 years.

7. How long have you been registered to ISO 9001: 2000 ?

☐ Less than 1 year. ☐ From 1 - Less than 2 years. ☐ From 2 - 3 years.

8. In the past, how did you demonstrate compliance with the ISO 9000 standards?

☐ Accredited ISO 9001:1994 registration

☐ Accredited ISO 9002:1994 registration

☐ Accredited ISO 9003:1994 registration

☐ Did not demonstrate/document compliance with any of these standards

☐ Other (please specify) …….

9. What is the percentage of external consultant(s)' participation in the process of implementing ISO 9001:2000 ?

☐ Less than 10% . ☐ From 10% - 50 %. ☐ From 51% - 80 %

☐ from 81 % - 100 % ☐ No participation from external consultants .

10. How did you assess the status of your quality management system prior to implementation of ISO 9001:2000 ?

☐ Gap analysis by the organization

☐ Gap analysis by a consultant

☐ Other (please specify) …….

11. What were the major gaps identified? (Check all that apply)

☐ Exclusions ☐ Documentation gaps

☐ Record keeping gaps ☐ Customer satisfaction data

☐ Effective control of processes ☐ Continual improvement process

☐ Objectives not measurable ☐ Objectives not consistent with quality policy

☐ Collection and analysis of data ☐ Top management commitment & responsibilities

☐ Management of outsourced processes.

☐ Other (please specify) ……..

12. Please check parts of the standard that are the most difficult to implement? (You may indicate more than one clause)

☐ Documentation requirements (quality manual, control of documents and control of records)

☐ Management commitment (customer focus, quality policy and planning)

☐ Management responsibility (Quality objectives, Quality management system planning)

☐ Responsibility and authority

☐ Internal communication

☐ Management Review

☐ Resource management (Provision of resources, human resources, infrastructure and work environment

□ Product realization (Planning, Customer-related processes, customer communication

☐ Design and development

☐ Purchasing (purchasing process, information, verification of purchased product)

☐ Production and service provision (control, validation of processes, identification and treasbility and customer property)

☐ Control of measuring and monitoring devices

☐ Monitoring and measurement (Customer satisfaction, internal audit)

☐ Control of nonconforming product

☐ Analysis of data

☐ Improvement (Continual improvement, Corrective action and Preventive action)

13. Please Circle the level of importance of the following factors for a successful ISO 9001: 2000 implementation?	Very important	important	Unsure	Low importance	Very low or not important
Pre-existence of ISO 9000 standards	5	4	3	2	1
Top management commitment	5	4	3	2	1
Middle management commitment	5	4	3	2	1
Effective internal auditing	5	4	3	2	1
Sufficient ISO training programs	5	4	3	2	1
Availability of ISO published materials	5	4	3	2	1
Availability of external consultants	5	4	3	2	1
Employee motivation and involvement	5	4	3	2	1
Resource allocation	5	4	3	2	1
Existence of appropriate communication	5	4	3	2	1
Co-operative attitude of customers	5	4	3	2	1
Co-operative attitude of suppliers	5	4	3	2	1
Services/support from the certification	5	4	3	2	1
Assistance from the parent company or the	5	4	3	2	1
Others(please	5	4	3	2	1

14. Please circle the Level of obstacles faced by your organization in obtaining ISO 9001: 2000	Very high	high	Unsure	low	Very low or not available
Lack of top management involvement	5	4	3	2	1
Difficulties in co-operation among middle managers over quality problems	5	4	3	2	1
Lack of employee involvement	5	4	3	2	1
Lack of communication routes	5	4	3	2	1
Lack of co-operation from customers	5	4	3	2	1
Lack of training programs related to quality	5	4	3	2	1
Lack of external advisers properly qualified.	5	4	3	2	1
Lack of co-operation from suppliers	5	4	3	2	1
Insufficiency of project time	5	4	3	2	1
Standard difficult to interpret	5	4	3	2	1
Other(please specify)……	5	4	3	2	1

15. Please circle the Level of perceived benefits from implementing ISO 9001: 2000 system?	Very high	high	Unsure	low	Very low or not available
Improved customer satisfaction	5	4	3	2	1
Development of quality culture	5	4	3	2	1
Final product quality improvement	5	4	3	2	1
Better communication with customers	5	4	3	2	1
Significant reduction in the amount of required documentation	5	4	3	2	1
Improvement of internal organization and operation	5	4	3	2	1
Improved employee-management relationships	5	4	3	2	1
Less rework and waste	5	4	3	2	1
Improved suppliers' performance	5	4	3	2	1
Easier penetration to new markets	5	4	3	2	1
Less customer returns	5	4	3	2	1
Increased employee satisfaction	5	4	3	2	1
Increased management commitment to quality	5	4	3	2	1
Use of data as business management tool	5	4	3	2	1
Increased productivity	5	4	3	2	1
Other(please specify)……	5	4	3	2	1

16. Have you documented any cost savings to your company from implementation of ISO 9001:2000?

☐ Yes ☐ No ☐ Unsure at this point

17. If "Yes", how do the cost savings compare to the cost of implementation?

☐ More ☐ Same ☐ Less

18. If "No" or "Unsure", do you anticipate any cost savings in the future?

☐ Yes ☐ No ☐ Unsure at this point

19. Please circle the level of knowledge about the ISO 9001:2000 system in your organization?	Very high	High	Unsure	low	Very low or no knowledge
Among your organization's employees.	5	4	3	2	1
Among the middle managers.	5	4	3	2	1
Among the top managers.	5	4	3	2	1

20. Please circle your level agreement to the disappointments experienced after being certified to ISO 9001: 2000 system	Strongly Agree	Mildly Agree	Unsure	Mildly Disagree	Strongly disagree
Increased and complex paper work	5	4	3	2	1
High costs related with ISO 9000	5	4	3	2	1
Customers go to suppliers without ISO	5	4	3	2	1
ISO 9000 useless in our business	5	4	3	2	1
Too difficult to learn and implement	5	4	3	2	1
Ability to gain market share is not highas	5	4	3	2	1
Extensive changes	5	4	3	2	1
Other ……..	5	4	3	2	1

21. What is the level of satisfaction you feel to ISO 9001:2000 ? (please circle one number only) 1 is the lowest and 5 is the highest satisfaction

(low satisfaction 1 2 3 4 5 High satisfaction)

22. How strongly would you recommend ISO 9001: 2000 to other firms like yours?

☐ Strongly discourage

☐ Neither recommend nor discourage

☐ Strongly recommend.

23. The main reasons that had driven your organization to implement ISO 9000? (You may indicate more than one reason)

☐ Top management initiative

☐ Customers' requirements

☐ Supplier's requirements

☐ Part of overall quality policy

☐ Future customer demand

☐ Introduction to TQM

☐ Quality improvement of final products

☐ Entry to foreign markets

☐ Corporate image

☐ Improvement of internal communication

☐ Capturing workers' knowledge

☐ Cost reductions

☐ Quality improvement of internal operations

☐ Something competitors had already implemented.

☐ Other (Please specify):…….

24. Is your company conducting any management programs other than ISO 9001: 2000?

☐ Yes ☐ No

25. If yes what are the other management programs in your organization?

☐ TQM (Total Quality Management)

☐ QCC (Quality Control Circles)

☐ BPR (Business Process Reengineering)

☐ MBNQA (Malcolm Baldrige National Quality Award)

☐ ISO 14001

☐ Others (……)

26. Were you able to integrate your ISO 9001:2000 system with the other management systems in your organization?

☐ Yes ☐ No

27. If yes please circle the level of integration of ISO 9000 system with your other management systems?

(Low level of integration 1 2 3 4 5 High level of integration)

1. ما اسم منشأتكم : .....

2. ما مسمى وظيفتكم في المنشأة.....

3. ضع علامة صح (√) على أدق ما يصف نشاط منشأتكم مما يلي :

□ تصنيع
□ خدمات إدارية إستشارية
□ تعليم
□ حكومي
□ فندقة وسياحة
□ نقل ومواصلات
□ بيع جملة / قطاعي
□ خدمات هندسية استشارية
□ إتصالات
□ خدمات بنكية / مالية
□ رعاية صحية
□ تأمين
□ خدمات عامة
□ أخرى (حدد) : .....

4. كم عدد الموظفين بالمنشأة؟

□ أقل من 50 □ بين 50- 100 □ بين 101 – 200 □ بين 201 - 300 □ بين 301 - 500
□ بين 501 – 1000 □ أكثر من 1000

5. ما نوع منشأتكم من حيث الملكية ؟

□ منشأة سعودية خاصة
□ منشأة حكومية
□ منشأة مشتركة بين القطاع الحكومي والقطاع الخاص
□ رأس مال وطني مع رأس مال أجنبي مشترك
□ أخرى (حدد):.....

6. كم استغرقتم من الزمن في التحضير للحصول على شهادة الأيزو 9001:2000 ؟

□ أقل من سنة واحدة □ من سنة – أقل من سنتين □ من سنتين – 3 سنوات

7. كم مضى من الزمن منذ حصولكم على شهادة الأيزو 9001:2000 ؟

□ أقل من سنة واحدة □ من سنة – أقل من سنتين □ من سنتين – 3 سنوات.

8. في الماضي هل طبقت منشأتكم أحد مقاييس الجودة التالية :

□ حصلت على شهادة الجودة الأيزو 9001:1994

□ حصلت على شهادة الجودة الأيزو 9002:1994

□ حصلت على شهادة الجودة الأيزو 9003:1994

□ لم تحصل على أي من شهادات الجودة السابقة

□ أخرى (حدد): .....

9. كم النسبة المئوية لمشاركة الأستشاري الخارجي في العمل على تطبيق نظام الأيزو 9001:2000 ؟

□ أقل من 10% □ من 10% – 50% □ من 51% – 80% □ من 81% – 100%
□ لم يشترك إستشاري من خارج المنشأة في العمل على تطبيق النظام.

10. كيف تم التقييم المبدئي لنظام إدارة الجودة في منشأتكم قبل البدء في العمل على تطبيق نظام الأيزو 9001:2000 ؟

□ تم تحليل الفجوة(Gap analysis) من قبل المنشأة نفسها
□ تم تحليل الفجوة(Gap analysis) من قبل الإستشاري
□ أخرى (حدد): .....

11. ماهي أهم الفجوات التي تم التعرف عليها نتيجة التقييم المبدئي لنظام المنشأة ؟

□ الإستثناءات من نظام الأيزو 9001:2000
□ فجوات المحافظة على مراقبة السجلات
□ عدم وجود نظام تحكم فاعل في العمليات الإنتاجية.
□ نقص أو عدم وجود أهداف مقاسة
□ نقص أو عدم وجود تجميع وتحليل للبيانات والمعلومات
□ إدارة ومتابعة العمليات الموكلة لمنشأت خارجية
□ فجوات التوثيق الكتابي
□ نفص أو عدم وجود بيانات عن رضاء العملاء
□ نقص أو عدم وجود عمليات تطوير مستمر
□ الأهداف غير متجانسة مع سياسة الجودة للمنشأة
□ نقص أو عدم وجود إلتزام بالجودة من الإدارة العليا
□ أخرى (حدد): .....

12. أرجو وضع علامة صح (√) على بنود نظام الأيزو 9001:2000 التي كانت الأصعب عند العمل على تطبيق النظام.(يمكنك تحديد أكثر من بند)

□ متطلبات التوثيق (دليل الجودة، التحكم بالوثائق والتحكم بالسجلات).
□ إلتزام الإدارة بالجودة (التركيز على العميل ، سياسة الجودة ، التخطيط)
□ مسئولية الإدارة (أهداف الجودة ، تخطيط نظام إدارة الجودة)
□ المسئوليات والصلاحيات.
□ الإتصال الداخلي.
□ مراجعة الإدارة.
□ إدارة الموارد (مراقبة والتحكم في الموارد ، الموارد البشرية ، البنية التحتية للمنشأة ، بيئة العمل).
□ فهم المنتج (التخطيط، العمليات المتعلقة بالعميل ، التواصل مع العملاء).
□ التصميم والتطوير.
□ المشتروات (عملية الشراء ، المعلومات ، تدقيق صحة المواد المشتراة).
□ الإنتاج ومراقبة الخدمة (التحكم ، تدقيق فاعلية العمليات، التعرف ومتابعة المواد الموردة من قبل العميل).
□ التحكم في أدوات القياس والمراقبة.
□ المراقبة والقياسات (رضاء العملاء ، المراجعة الداخلية).
□ التحكم في المنتجات غير المطابقة.
□ تحليل البيانات.
□ التحسين والتطوير (التحسين المستمر ، الإجراءات التصحيحية والإجراءات الوقائية).

13. الرجاء عمل دائره على الرقم الذي يمثل مستوى أهمية كل عامل من العوامل التالية في إنجاح تطبيق الأيزو 9001:2000	مهم جداً	مهم	غير متأكد	قليل الأهمية	قليل الأهمية جداً أو عديم الأهمية
وجود نظام جودة أيزو 9000 سابق في المنشأة	5	4	3	2	1
إلتزام الإدارة العليا بالجودة	5	4	3	2	1
إلتزام الإدارة الوسطى بالجودة	5	4	3	2	1
مراجعات داخلية فعالة	5	4	3	2	1
برامج كافية للتدريب على نظام الأيزو	5	4	3	2	1
توفر مواد منشورة عن نظام الأيزو	5	4	3	2	1
وجود مستشارين خارجيين للمساعدة في تطبيق النظام	5	4	3	2	1
تفاعل الموظفين ومشاركتهم في تطبيق النظام	5	4	3	2	1
توفر الموارد اللازمة وتوزيعها	5	4	3	2	1
وجود خطوط اتصال تنظيمية واضحة وسليمة	5	4	3	2	1
تعاون العملاء	5	4	3	2	1
تعاون الموردين	5	4	3	2	1
خدمات / معاونة من المؤسسة المانحة للشهادة	5	4	3	2	1
مساعدة المنشأة الأم أو الشريك الخارجي	5	4	3	2	1
أخرى (حدد):.....	5	4	3	2	1

14. الرجاء عمل دائره على الرقم الذي يمثل مستوى العقبات التي واجهتكم أثناء العمل على تطبيقية الأيزو 9001:2000	عالي جداً	عالي	غير متأكد	ضعيف	ضعيف جداً أو غير موجود
عدم تفاعل ومشاركة الإدارة العليا في عملية التطبيق	5	4	3	2	1
صعوبة تعاون الإدارة الوسطى لحل مشاكل الجودة	5	4	3	2	1
عدم تفاعل ومشاركة الموظفين في عملية التطبيق	5	4	3	2	1
عدم وجود قنوات اتصال تنظيمية واضحة	5	4	3	2	1
عدم وجود تعاون من قبل العملاء	5	4	3	2	1
عدم وجود برامج تدريب خاصة بالجودة	5	4	3	2	1
عدم كفاءة الإستشاري الخارجي	5	4	3	2	1
عدم وجود تعاون من قبل الموردين	5	4	3	2	1
عدم وجود وقت كافي لتطبيق النظام	5	4	3	2	1
صعوبة تفسير بنود النظام وتطبيقها على المنشأة	5	4	3	2	1
أخرى (حدد):.....	5	4	3	2	1

15. الرجاء عمل دائره على الرقم الذي يمثل وجود كل فائدة ناتجة عن تطبيق الأيزو 9001:2000 من كل مما يلي :	عالي جداً	عالي	غير متأكد	ضعيف	ضعيف جداً أو غير موجود
تحسن رضاء العملاء	5	4	3	2	1
نمو ثقافة الجودة بالمنشأة	5	4	3	2	1
تحسن جودة المنتج النهائي	5	4	3	2	1
تواصل أفضل مع العملاء	5	4	3	2	1
إنخفاض ملحوظ في كمية الوثائق المطلوبة	5	4	3	2	1
تحسن النظام الداخلي والعمليات	5	4	3	2	1
تحسن العلاقة بين الإدارة والموظفين	5	4	3	2	1
انخفاض هدر الموارد وإعادة العمل	5	4	3	2	1
تحسن أداء الموردين	5	4	3	2	1
سهولة الدخول الى أسواق جديدة	5	4	3	2	1
إنخفاض نسبة إرجاع الزبائن لمنتجات الشركة	5	4	3	2	1
زيادة رضاء الموظفين	5	4	3	2	1
زيادة إلتزام الإدارة بالجودة	5	4	3	2	1
إستخدام البيانات كأداة لإدارة العمل	5	4	3	2	1
زيادة الإنتاجية	5	4	3	2	1
أخرى (حدد):.....	5	4	3	2	1

16. هل ثبت لديكم أي توفير في النفقات ناتج عن تطبيق نظام الأيزو 9001:2000 ؟

□ نعـم □ لا □ غير متأكد الآن

17. إذا كانت الإجابة " نعم " كيف ترى توفير النفقات الذي تم لكم بالمقارنة مع تكاليف تطبيق نظام الأيزو 9001:2000 ؟

□ أكثر □ متساوي □ أقل

18. إذا كانت الإجابة " لا " هل تتوقع أن يكون هناك توفير للنفقات مستقبلاً ناتج عن تطبيق النظام ؟

□ نعـم □ لا □ غير متأكد الآن

19. الرجاء عمل دائره على الرقم الذي يمثل مستوى معرفة واستيعاب نظام الجودة الأيزو 9001:2000 في منشأتكم من قبل الآتي :	عالي جداً	عالي	غير متأكد	ضعيف	ضعيف جداً أو غير موجود
أ – من قبل العاملين بالمنشأة	5	4	3	2	1
ب- من قبل الإدارة الوسطى بالمنشأة	5	4	3	2	1
ج- من قبل الإدارة العليا بالمنشأة	5	4	3	2	1

20. الرجاء عمل دائره على الرقم الذي يمثل مستوى موافقتك لوجود مخيبات الأمل التالية بعد النجاح في تطبيق الأيزو 9001:2000	موافق جداً	موافق	غير متأكد	غير موافق	غير موافق جداً
زيادة وتعقد الأعمال الكتابية	5	4	3	2	1
إرتفاع كلفة تطبيق نظام الأيزو 9000	5	4	3	2	1
الزبائن يتعاملون مع موردين غير حاصلين على شهادة الأيزو	5	4	3	2	1
الأيزو 9000 غير ذات جدوى في طبيعة عمل المنشأة	5	4	3	2	1
الأيزو 9000 صعبة في التعلم والتطبيق	5	4	3	2	1
إمكانية إكتساب أسواق جديدة ليس بالمستوى المتوقع	5	4	3	2	1
حصول تغييرات كثيرة على نحو متسع	5	4	3	2	1
أخرى (حدد):.....	5	4	3	2	1

21. مامستوى رضاكم عن نظام الأيزو 9001:2000 ؟ (أرجو عمل دائرة على أحد الأرقام التالية حيث الرقم 1 يمثل أقل الرضا ورقم 5 يمثل أعلى الرضا).

رضا أعلى 5 4 3 2 1 رضا أقل

22. مامدى إمكانية توصيتكم وتشجيعكم للمنشآت الأخرى بتطبيق نظام الأيزو 9001:2000 ؟

□ أثبطهم عن تطبيقة بشدة.

□ لن أثبط ولن أشجع.

□ أشجعهم على تطبيقه بشدة.

23. ماهي الأسباب الرئيسية التي دعت منشأتكم لتطبيق نظام الأيزو 9001:2000 ؟ (يمكن إختيار أكثر من سبب)

□ مبادرة الإدارة العليا
□ متطلبات العملاء
□ متطلبات الموردين
□ جزء من سياسة شاملة للجودة

□ متطلب مستقبلي للعملاء
□ مقدمة لتطبيق إدارة الجودة الشاملة
□ لتحسين جودة المنتج النهائي
□ لدخول أسواق خارجية
□ لتحسين صورة المنشأة
□ تحسين الإتصالات الداخلية.
□ لتوثيق خبرات ومعلومات الموظفين
□ لتقليل التكاليف والخسائر
□ لتحسين جودة العمليات الداخلية
□ لحصول المنشأت المنافسة على شهادة الأيزو 9000 مسبقاً
□ أخرى (حدد): .....

24. هل تطبق منشأتكم أي برامج لإدارة الجودة غير الأيزو 9001:2000 ؟

□ نـعـم □ لا

25. إذا كانت الإجابة نـعم ، ماهي برامج الجودة الأخرى المطبقة في منشأتكم

□ إدارة الجودة الشاملة (TQM)
□ حلقات مراقبة الجودة (Quality Control Circles)
□ عمليات إعادة الهندسة (Business Process Reengineering)
□ جائزة مالكولم بالدريج للجودة (Malcolm Baldrige National Quality Award)
□ الأيزو 14001
□ أخرى (حدد): .....

26. هل أستطاعت منشأتكم أن تدمج وتكامل بين نظام الأيزو 9001:2000 ونظم إدارة الجودة الأخرى لديكم ؟

□ نـعـم □ لا

27. إذا كانت الإجابة نـعم، أرجو تحديد مستوى هذا التكامل بوضع دائرة على أحد الأرقام التالية :

أعلى مستوى للتكامل 5 4 3 2 1 أدنى مستوى للتكامل

APPENDIX D: RELIABILITY ANALYSIS - SCALE (ALPHA)

Successful implementation factors

1.	ISOSTND3	Pre-existence of ISO 9000 standards
2.	MNGCOM3	Top management commitment
3.	MIDMNG3	Middle management commitment
4.	INTAUDT3	Effective internal auditing
5.	ISOTRIN3	Sufficient ISO training programs
6.	PUBMTRL3	Availability of ISO published materials
7.	EXTCONS3	Availability of external consultants
8.	EMPMOTV3	Employee motivation and involvement
9.	RESCALL3	Resource allocation
10.	COMROUT3	Existence of appropriate communication r
11.	CUSTATT3	Co-operative attitude of customers
12.	SPPATT3	Co-operative attitude of suppliers
13.	CERTAGN3	Services/support from the certification
14.	PARTNER3	Assistance from the parent company or th

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	55.0562	41.1218	6.4126	14

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
ISOSTND3	51.1011	35.8419	.2970	.7730
MNGCOM3	50.2360	38.2278	.3948	.7644
MIDMNG3	50.5730	37.3156	.4188	.7609
INTAUDT3	50.5393	36.7058	.4832	.7563
ISOTRIN3	50.7416	36.6938	.5086	.7551
PUBMTRL3	51.5506	35.8184	.4382	.7571
EXTCONS3	52.1011	35.2965	.2938	.7758
EMPMOTV3	50.6292	37.5996	.3849	.7632
RESCALL3	50.9775	36.0904	.4363	.7576
COMROUT3	50.9775	36.8404	.3932	.7615
CUSTATT3	51.4270	34.1565	.5152	.7486
SPPATT3	51.4157	34.3820	.5194	.7486
CERTAGN3	51.3933	35.1277	.3737	.7639
PARTNER3	52.0674	34.9045	.3086	.7749

N of Cases = 89.0 N of Items = 14 Alpha = .7747

Barriers to successful implementation

.1	MNGINV4	Lack of top management involvement
.2	MIDMNG4	Difficulties in co-operation among middl
.3	EMPLINV4	Lack of employee involvement
.4	COMROUT4	Lack of communication routes
.5	CUSTCOP4	Lack of co-operation from customers
.6	TRINPRG4	Lack of training programs related to qua
.7	EXTADVS4	Lack of external advisers properly quali
.8	SUPPCOP4	Lack of co-operation from suppliers
.9	PRJTIME4	Insufficiency of project time
.10	DIFINTR4	Standard difficult to interpret

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	23.4157	64.8138	8.0507	10

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
MNGINV4	21.2921	51.5728	.6057	.8711
MIDMNG4	20.8315	51.3008	.6925	.8638
EMPLINV4	20.8202	50.9446	.7448	.8599
COMROUT4	21.1573	54.7932	.6133	.8705
CUSTCOP4	21.0899	55.8555	.5123	.8768
TRINPRG4	20.8876	52.0554	.6245	.8692
EXTADVS4	21.3034	53.2137	.6244	.8691
SUPPCOP4	21.2697	56.1765	.4916	.8781
PRJTIME4	20.9663	51.7375	.6971	.8636
DIFINTR4	21.1236	54.2459	.5067	.8781

Reliability Coefficients

N of Cases = 89.0 N of Items = 10 Alpha = .8816

Perceived Benefits Question

.1	CUSTSTS5	Improved customer satisfaction
.2	DEVCULT5	Development of quality culture
.3	FINLPRD5	Final product quality improvement
.4	CUSTCOM5	Better communication with customers
.5	DOCRDCT5	Significant reduction in the amount of r
.6	IMPVOP5	Improvement of internal organization and
.7	EMPRESH5	Improved employee-management relationshi
.8	LESWAST5	Less rework and waste
.9	SUPPRVM5	Improved suppliers' performance
.10	NEWMRK5	Easier penetration to new markets
.11	CUSTRTR5	Less customer returns
.12	EMPLSAT5	Increased employee satisfaction
.13	MNGCOM5	Increased management commitment to qual
.14	DATATOL5	Use of data as business management tool
.15	PRODCTV5	Increased productivity

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	54.7753	73.4717	8.5716	15

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
CUSTSTS5	50.7079	66.0273	.5060	.8813
DEVCULT5	50.6517	67.7978	.4236	.8843
FINLPRD5	50.8876	62.8736	.6099	.8768
CUSTCOM5	50.7416	66.1711	.5196	.8809
DOCRDCT5	51.8315	66.8235	.2901	.8934

IMPVOP5	51.0225	66.6586	.4713	.8826
EMPRESH5	51.3258	62.0858	.7076	.8725
LESWAST5	51.2022	61.3904	.7179	.8718
SUPPRVM5	51.4270	63.2474	.6226	.8763
NEWMRK5	51.3146	67.2863	.3613	.8873
CUSTRTR5	51.4157	62.6775	.6002	.8773
EMPLSAT5	51.3708	62.8723	.6850	.8738
MNGCOM5	50.7865	63.8971	.6550	.8754
DATATOL5	50.8427	65.7250	.4660	.8830
PRODCTV5	51.3258	62.2676	.6742	.8739

N of Cases = 89.0 N of Items = 15 Alpha = .8867

Knowledge about the Standard

1. KNOWLGE1 Knowledge among organization's employee
2. KNOWLGE2 Knowledge among middle managers
3. KNOWLGE3 Knowledge among the top managers

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	11.6966	2.9410	1.7149	3

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
KNOWLGE1	8.2135	1.4425	.4097	.6373
KNOWLGE2	7.7079	1.6182	.6085	.4027
KNOWLGE3	7.4719	1.5475	.4049	.6310

Reliability Coefficients

N of Cases = 89.0 N of Items = 3 Alpha = .6496

Disappointments About The Standard

1. CMPLX6 Increased and complex paper work
2. HICOST6 High costs related with ISO 9000
3. NOCUSTM6 Customers go to suppliers without ISO
4. USLESS6 ISO 9000 useless in our business
5. DIFCLT6 Too difficult to learn and implement
6. MRKTSHR6 Ability to gain market share is not hig
7. EXCHNG6 Extensive changes

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	16.7416	20.3302	4.5089	7

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
CMPLX6	14.0112	14.1931	.4518	.6496
HICOST6	14.2697	15.0401	.4940	.6377
NOCUSTM6	14.1685	16.3917	.2728	.6987

USLESS6	15.1236	15.2914	.5588	.6263
DIFCLT6	14.8202	16.2400	.4762	.6492
MRKTSHR6	13.8989	16.9101	.2949	.6883
EXCHNG6	14.1573	15.7932	.3483	.6778

N of Cases = 89.0 N of Items = 7 Alpha = .6956

1.	TPMNG7	Top management initiative
2.	CUSTRQS7	Customers' requirements
3.	SUPPRQS7	Supplier's requirements
4.	OVRALL7	Part of overall quality policy
5.	FUTNEED7	Future customer demand
6.	INTRTQM7	Introduction to TQM
7.	QLTYFIN7	Quality improvement of final products
8.	FOREIGN7	Entry to foreign markets
9.	IMAGE7	Corporate image
10.	INTRCOM7	Improvement of internal communication
11.	KNOWLDG7	Capturing workers' knowledge
12.	COSTRDC7	Cost reductions
13.	INTROPR7	Quality improvement of internal operatio
14.	COMPTIT7	Something competitors had already implem

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	22.3708	6.8950	2.6258	14

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
TPMNG7	21.0899	6.4691	.0964	.6377
CUSTRQS7	20.9888	6.2158	.1808	.6255
SUPPRQS7	20.4382	6.3853	.3501	.6080
OVRALL7	20.8989	6.2965	.1375	.6337
FUTNEED7	20.8202	5.8309	.3369	.5975
INTRTQM7	20.6742	6.2449	.1889	.6233
QLTYFIN7	20.8876	6.0100	.2567	.6123
FOREIGN7	20.8090	6.1336	.2074	.6212
IMAGE7	20.8652	6.0043	.2589	.6120
INTRCOM7	20.6966	5.5546	.5033	.5678
KNOWLDG7	20.4719	6.1839	.4107	.5975
COSTRDC7	20.6517	5.8432	.3879	.5900
INTROPR7	21.0000	5.6591	.4327	.5800
COMPTIT7	20.5281	6.7748	-.0072	.6466

N of Cases = 89.0 N of Items = 14 Alpha = .6294

APPENDIX E: SAUDI ISO 9001:2000 PARTICIPATING ORGANIZATIONS

ORGANIZATION NAME	ORGANIZATION NAME
Abdullah Bin Saedan Real Estate Co	Al Nakhil Paper Industries Co
SAPPCO-Saudi Plastic Products Company Limited	AL NOOR Specialist Hospital
Abdullah Abbar & Ahmed Zainy Company	Al Wahah Desert Cooler
Abdullah Ali Al Wakeel & Brothers Co.	Al-Babtain Trading Company
Abdullah Hashim Industrial Gases & Equipment Co. Ltd	Alfanar Electrical Systems
Abudawood Industrial Co Ltd	Alfowzan Group
Advanced Electronics Co. Ltd	Alhada Water Company Ltd
Al Zamil Heavy Industries Ltd	Alhamrani Industrial Group- Jeddah
AI-Jubail Petrochemical Co	Alhamrani Industrial Group - Jubail
Al Aqsa Private Schools	Allied Maintenance Company
Al Bayda Steel Works Factory	Al Muhaidib Metal Industries
Al Bilad Catalyst Co. Ltd	Arabian Gulf Oil Co Ltd
Al Khorayef Industries Co.	Arabian Metals Co NAPCO Group CO
Al Manhal Water Factory Company Ltd.	Arabian Petrochemical Company (petrokemya)
Arabian Rockbits & Drilling Tools Co.	Gulf Allied Industrial Services Ltd
Arabian Thermal Aire Industries Co. Ltd	Gulf Packaging Industries Ltd

Baaboud Trading and Shipping Agencies Ltd	Heba Fire Fighting Equipment Manufacturing
Baghlaf Al Zafer Factories Co. Ltd Head Office & Factory (jeddah Site.	Industrial Marketing Centre Al Othman
Beit AL Etisalat	Initial Saudi Arabia Ltd
Ciba Speciality Chemicals Masterbatch Ltd.	International Paint Saudi Arabia Ltd
Coldstores Group of Saudi Arabia	International Ports Services Company Ltd.
Cooperheat Saudi Arabia Co Ltd	JBCMC Jeddah Beverage Can Making Co Ltd
D W I Dermabit Waterproofing Industries Co Ltd	Jeddah Cable Company
Dallah Hospital	Kanoo Terminal Services Ltd
Dar Aleiman	Mediserv
Dar Al-uloom Schools-Hoffouf	Metito Arabia Industries Ltd
El-ajou Group - Technical Services	MK Cable Management Limited
General Automotive Co- AUTOSTAR.	Mohammed A.al-swailem Co. Ltd
National Factory for Air Conditioners Co.	Savola Edible Oils (SEO)
Oasis Ameron Ltd.	SETE Technical Services, S.A
National Pipe Co Ltd	STEPCO-STEEL PRODUCTS COMPANY LIMITED
National Refrigeration Company	Supreme Foods Co. Ltd (Dabbagh Group Food & Agriculture Portfolio)
Nesma & Alfadl Contracting Co Ltd	T.NAGADI PCF
Olayan Descon Industrial Company Limited	The Marketers for Trade
Riyadh Metal Parts Factory	The Saudi Modern Factory Co

SABIC IBN RUSHD	United Diagnostics Industry (UDI)
SABIC IBN SINA	United Industrial Company For Paints
SABIC SAMAD	Zuhair Fayez Association
SABIC SHARQ	Bond Strand Ltd. (BSL)
Saudi Arabian Fabricated Metals Industry Ltd.	ARABIAN FIBERGLASS INSULATION COMPANY LIMITED (AFICO
Saudi Industrial Gas Co. Ltd	Capital Steel Production Factory
Saudi Steel Pipe Co. Limited	Ar-Razi Saudi Methanol Company Ltd
Yamama Saudi Cement Co. Limited	Al-Amoudi Beverage Factory Co.
Zamil Steel Industries	Saudi Aramco Mobil Refinery Company Ltd

APPENDIX F: KENDALL'S TAU_B CORRELATION BETWEEN KNOWLEDGE ABOUT THE STANDARD AND PERCEIVED BENEFITS

			over all mean knowledge
Kendall's tau_b	Improved customer satisfaction	Correlation Coefficient	.311
		Sig. (2-tailed)	.000
	Development of quality culture	Correlation Coefficient	.307
		Sig. (2-tailed)	.001
	Final product quality improvement	Correlation Coefficient	.262
		Sig. (2-tailed)	.003
	Better communication with customers	Correlation Coefficient	.208
		Sig. (2-tailed)	.021
	Significant reduction in the amount of required documentation	Correlation Coefficient	.141
		Sig. (2-tailed)	.100
	Improvement of internal organization and operation	Correlation Coefficient	.284
		Sig. (2-tailed)	.001
	Improved employee-management relationships	Correlation Coefficient	.380
		Sig. (2-tailed)	.000
	Less rework and waste	Correlation Coefficient	.332
		Sig. (2-tailed)	.000
	Improved suppliers' performance	Correlation Coefficient	.361
		Sig. (2-tailed)	.000
	Easier penetration to new markets	Correlation Coefficient	.220
		Sig. (2-tailed)	.013
	Less customer returns	Correlation Coefficient	.220
		Sig. (2-tailed)	.011
	Increased employee satisfaction	Correlation Coefficient	.484
		Sig. (2-tailed)	.000
	Increased management commitment to quality	Correlation Coefficient	.423
		Sig. (2-tailed)	.000
	Use of data as business management tool	Correlation Coefficient	.339
		Sig. (2-tailed)	.000
	Increased productivity	Correlation Coefficient	.367
		Sig. (2-tailed)	.000

Correlation is significant at the .01 level (2-tailed).

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