IMPLEMENTATION OF ISO 9000 IN THE PRINTING INDUSTRY PROVIDING WORLD CLASS PRODUCTS OR WINDOW DRESSING

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Implementation of ISO 9000 in the printing industry

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BY SHAUN ROSENSTEIN

DECLARATION

I, SHAUN ROSENSTEIN, hereby declare that this study is my own work and that all sources have been accurately reported and acknowledged, and that this document has not in its entirety or in part been previously submitted for academic examination towards any qualification.

Shaun Rosenstein February 2003

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SUMMARY

This research report is based on a case study. It follows up on the research of a previous study by Muregerera (1996). His thesis was compiled in order to develop a model for a world-class manufacturing organization. For his case study, he chose Omnigraphics. Although his focus was on world class manufacturing principles, he did address Omnigraphics prior to the organization receiving ISO 9000 certification through the SABS. This research report therefore looks at the transformation that Omnigraphics went through, from an organization without a formal quality management system, to one with a functional quality management system. Chapter one defines quality management systems and the benefits of a formal quality management system. Current research is discussed in chapter two together with the benefits and requirements of the ISO system. Chapter three addresses the challenges, which Omnigraphics faced prior to ISO 9000 implementation and the changes that occurred once this organization was certified to ISO 9001. A comprehensive survey was done to identify the actual benefits that suppliers and customers see in dealing with an ISO 9000 listed organization. Chapter four looks at the participants of the survey as well as the questions posed. Chapter five gives the results of the survey in a graphical format as well as an interpretation of the results. The research report also focuses on the new revision of the ISO 9000 series and this is addressed in chapter six. The report closes by reviewing the research and looking at the future of the ISO 9000 series.

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Glossary of terms and Abbreviations

ISO: ISO (International Organization for Standardization) is a worldwide federation of national standards bodies, at present comprising 127 members, one in each country. The object of ISO is to promote the development of standardization and related activities in the world with a view to facilitating international exchange of goods and services, and to developing cooperation in the spheres of intellectual, scientific, technological and economic activity. The results of ISO technical work are published as *International Standards*.

ISO 9000: The ISO 9000 family of standards represents an international consensus on good management practices with the aim of ensuring that the organization can time and time again deliver the product or services that meet the client's quality requirements. These good practices have been distilled into a set of standardized requirements for a quality management system, regardless of what the organization does, its size, or whether it's in the private, or public sector.

ISO 9001: sets out the requirements for an organization whose business processes range all the way from design and development, to production, installation and servicing; for an organization which does not carry out design and development.

ISO 9002: is the appropriate standard, since it does not include the design control requirements of ISO 9001 - otherwise, its requirements are identical.

ISO 9003: is the appropriate standard for an organization whose business processes do not include design control, process control, purchasing or

servicing, and which basically uses inspection and testing to ensure that final products and services meet specified requirements.

ISO 14001: The ISO 14000 series of environmental management standards was developed by the ISO/TC 207 convened in 1993. Its work was based upon previous consultations that had taken place between the ISO and the IEC's (International Electrochemical Commission) Strategic Advisory Group on the Environment (SAGE) which was itself convened in 1991. It set out to create the framework of the fundamental generic elements that would form the basis for a series of internationally recognized environmental standards, which it completed and published in 1996. The ISO 14000 series of standards represents the essential requirements that every enterprise needs to address in order to control and minimize the impact that its operation, and resulting goods and services, has on the environment.

OEM: original equipment manufacturers

P&A: parts and accessories

SABS: South African Bureau of Standards

Dekra: DEKRA-ITS is an independent, internationally operating company in the field of engineering, human resources and safety. The development and implementation of DEKRA-ITS' services are determined by laws and standards on the one hand and by customers and market demands on the other. DEKRA-ITS is a frontrunner in the international auditing and certification market.

TUV: TÜV Rheinland/Berlin-Brandenburg offers certification in accordance with DIN EN ISO 9000ff. The generally valid formulation of this series of standards

makes it possible to apply them to any companies of any size, no matter what type of organizational structure may be involved, in every branch of industry.

CHAPTER 1

1.1. INTRODUCTION

Every type of organization, from raw resource extraction, to manufacturing (of any kind), to the service industry can benefit from a quality-management system. In other words, any organization that wants to develop a framework for maintaining consistent quality can achieve this by identifying the basic quality-management disciplines that an organization must apply to give its customers confidence in the quality of the goods and services it supplies.

A number of South African organizations have over the last few years decided to invest both financial and human resources in implementing one of the ISO 9000 series quality management systems and thereby achieving certification from ISO. These organisations have, through a variety of reasons, decided that this standard will benefit the organization.

The ISO 9000 series is a very well known topic. Since its release by the International Organization for Standardisation, the standard has become extensively accepted in most developed countries such as the United States, United Kingdom and Germany.

The ISO 9000 series of quality management standards was developed by the ISO/TC 176 (ISO Technical Committee 176) since 1979. This body set out to create a framework of the fundamental generic elements that would form the

basis for a series of internationally recognized quality management standards. This task was completed in 1982 and published in 1983.

The ISO 9000 series of standards (ISO, 2000) represents the essential requirements that every enterprise needs to address to ensure the consistent production and timely delivery of its goods and services to the marketplace. These requirements make up the standards that comprise the quality management system, and their generic nature allow for their application in any type of organization.

The aim of this research project is to determine whether organizations are seeing real benefits, financial or other, by having implemented the standard, and whether the standard is actually improving organizational performance in the work place. To achieve this a Cape Town based organization, Omnigraphics, was investigated to determine the results. One however, cannot generalise the results of this research report. This research report would warrant further investigation into other organisations that have implemented ISO 9000.

1.2. LITERATURE STUDY

A number of research reports have addressed the implementation of the ISO 9000 series. These papers have covered many aspects including using the ISO 9000 as a standard for achieving export success (Lungile, 1998), and improving the economic competitiveness of South African agribusiness firms (Turner, 1999), using the tools of the 9000 standards.

One particular thesis (De Villiers, 1997) looked at the cost and benefit of the implementation of an ISO 900 quality system in a polyethylene plant, while another (Botha, 1995) looked at perceptions of workers of a quality standard.

Both authors showed a positive improvement through the implementation of the ISO 9000 series.

The implementation of the ISO 9000 Quality Management Standard Series should therefore provide real improvements for South African organizations and prevent them from just implementing due to pressure, in order to compete in the global market.

The objective of Muregerera's (1996) study was to develop a model for a world-class manufacturing organization. Muregerera (1996:v) chose a Cape Town based organization, Omnigraphics, which was analysed and used in the formulation of the concepts necessary for developing a model. Using a

framework focused on world-class manufacturing principles, he then used this framework to enquire into the operational situation of Omnigraphics with the view of it being considered for world class manufacturing status. The issues of concern that arose were those of "*cultural change conflict, production processes inconsistencies and quality related problems, lack of definite strategy and or vision, and communication across and within the hierarchical levels.*" Muregerera's dominant single concern was the "*we-they*" split between the workers and management.

Lochner's (1982) thesis focused primarily on the importance of human behavior and management style in quality improvement. Although the thesis is quite dated, having been completed in 1982, there are many relevant points made, pertaining to the importance of having a formalized quality management system.

1.3. RESEARCH OBJECTIVES

This study evaluates the success or failure that Omnigraphics, an Ottery, Western Cape based, silkscreen printing company, has had since achieving the ISO 9000 certification and highlighting the organizational changes that have taken place since 1996.

Omnigraphics had previously been used as a case study "*to inquire into the operational situation...in view of it being considered for world class manufacturing*" (Muregerera,1996:36). Muregerera raised various issues of concern during his research, namely, cultural change conflict, quality-related

problems and the "we-they" split between the workers and management. These issues took place prior to Omnigraphics achieving the SABS ISO 9001 certification.

This study is therefore not a duplication of his work but a continuation from a different perspective. It focuses on the results achieved through the quality management systems in the Western Cape, particularly those at Omnigraphics. Since Muregerera's dissertation there have been numerous organizational & process changes at Omnigraphics, including a changed SA environment.

1.4. FURTHER QUESTIONING

In addition to meeting the objectives as stated above, the study also investigated the following key-questions:

Does Omnigraphics benefit from the ISO 9000 series or do the operating conditions remain the same?

In closing the questioning, every organization consists of a number of units or departments, and one needs to determine the benefits or failures across all departments. There may for example, not be any improvement in the sales department, but the production department may be experiencing operational improvements directly related to the implementation of the standard.

The basic goal of quality management is the elimination of failure; eliminating failure both in the concept and in the reality of products, services and processes

(Hoyle,1998:27). Are companies that have implemented the 9000 series eliminating failure and improving their bottom line?

The questions were therefore aimed at all generic or standard departments in most organizations. These being:

Marketing

Sales

Production

Finance / Administration

Research & Development

Quality control / assurance

1.5. RESEARCH AIM

The aim of the research is to provide the following:

1. To determine whether management and industry, make the correct strategic decisions for their business. It seems that often companies are pressurized into having these certifications. Yet when they have achieved certification, more often than not through the investment of large amounts of time and financial resources, they are not actually benefiting from the system.

2. To provide feedback to certification bodies, such as the South African Bureau of Standards, Dekra and TUV on the impact of the ISO 9000 series on organizations in South Africa. With this information certification bodies can help assist companies implement, maintain and really benefit from these management systems.

3. To ultimately use the research as a positive tool in promoting the benefits of the ISO 9000 series. The reader will be able to understand how the implementation of a formal quality management system can assist in positively developing organizations.

1.6. SCOPE OR FOCUS SECTOR

The service and manufacturing sectors in the Western Cape are well established and quite diverse. Omnigraphics is a company that has taken print manufacturing to new levels. It has done so by being the approved supplier of automotive screen printed graphics and emblems to all South African Original Equipment Manufacturers, including, Toyota, Nissan, Delta and Daimler Chrysler.
Using ISO 9001 as a starting point, Omnigraphics is trying to meet the stringent global requirements of these customers.

According to the tenth cycle survey (ISO, 2000), within the printing companies sector, there were 3 299 certified companies globally. The 1998 figure was
1 998. This shows a definite increase in the number of printing companies opting for ISO 9000 certification.

1.7. RESEARCH DESIGN AND METHODOLOGY

1.7.1. Focused Questioning:

Method of investigation: In order to get meaningful feedback, data needed to be collected, analysed and interpreted from internal members of staff, suppliers

and customers of Omnigraphics. This was done through a detailed structured research questionnaire.

Sampling methodology: All statistics and population sampling was done scientifically with the assistance of a statistical consultant. Due to time constraints, financial constraints and respondent convenience, both the e-mail survey and interviewee method of collecting data was used. Questions were answered by both internal members of staff, as well as customers and suppliers of the company under study. In order to remove any biased feedback the researcher avoided quality management feedback. With respect to customers and suppliers, senior employees of those companies were tasked with providing feedback. Questions were focused at all departments of the organization including suppliers and customers.

1.7.2. Research Strategy

Omnigraphics was used as a case study. The approach that was followed, was to sample a number of internal staff, customers and suppliers and, through e-mail questionnaires, to identify the success or failure that the 9000 series has provided. Existing theory was investigated and compared it to Muregerera's previous findings.

1.7.3. Information Access

Contacts were established through Omnigraphics. Interviews were scheduled at times acceptable to the interviewee. The interviews were well formulated and the purpose made clear to the interviewee.

1.8. Research Ethics

Confidentially issues were discussed with interviewees before the interviews took place. Anonymity was discussed with the interviewee. Data collection parameters were established before the interview. These were explained to the interviewee prior to the interview.

1.9. EXPECTED OUTCOMES, RESULTS AND CONTRIBUTION OF THE RESEARCH

Industry in the Western Cape needs to become more competitive and benefit from the implementation of a formal quality management system such as the ISO 9000 series. There has not been any research done on the **success** of the ISO 9000 series in industry. Therefore the aim of the research is to determine whether there are benefits for printing companies to become certified to the ISO 9000 series.

By answering the following general research questions the reader will get an appreciation and understanding of the ISO 9000 series as well as an understanding of why or why not, organizations should implement the ISO 9000 series for strategic advantage.

What is the South African situation?

What are Quality Management Systems?

What is ISO?

What is the ISO 9000 Series?

What are the benefits of this management system?

What is the global reach of ISO 9000?

1.10. OUTLINE AND PLAN OF THE STUDY

The study is divided into seven chapters:

CHAPTER 1: INTRODUCTION TO THE RESEARCH

CHAPTER 2: QUALITY MANAGEMENT SYSTEMS – LITERATURE STUDY

CHAPTER 3: THE CASE STUDY - OMNIGRAPHICS

CHAPTER 4: RESEARCH METHODOLOGY

CHAPTER 5: DATA ANALYSIS AND RESULTS

CHAPTER 6: RECOMMENDATIONS AND THE FUTURE

CHAPTER 7: SUMMARY AND CONCLUSION

CHAPTER 2

2.1. INTRODUCTION

Chapter two begins with defining quality management systems and the benefits of implementing the ISO 9000 management system. The chapter also focuses on current research and gives the reader an overview of the requirements of the ISO 9000 standard.

2.2. DEFINING QUALITY MANAGEMENT SYSTEMS

Organizations throughout the world will ultimately supply products intended to satisfy customers' needs or requirements. Increased global competition has led to increasingly more stringent customer expectations with regard to quality. In order to remain competitive and to maintain good economic performance, organizations need to employ effective and efficient systems. The SABS ISO Code of practice (1994:v) explains, "*that such systems should result in continual improvements in quality and increased satisfaction of the organisations' customers and other stakeholders.*"

Lochner (1982:14) refers to the following scenario dating back half a century ago: "*...when the United States Navy was to build nuclear submarines in the nineteen fifties, they realized the need for a checklist of quality-related requirements during the design and manufacturing phases. This was formalized and imposed on contractors and subcontractors.*" This document was called "*Quality Programme Requirements*," which marked a new era in quality management. Lochner refers

to further examples of these quality systems including the South African Bureau of Standards 0157 Parts 1,2,3 "*Code of Practice for Quality Management Systems.*"

Lochner (1982:15) sums up by saying "*The common aim of these documents is to act as a guide to improvement and a checklist against which to evaluate the quality status of a company.*"

Hoyle (1998) shows how organizations can use systems engineering principles combined with charting techniques to design and develop an integrated quality system that reflects how to run a successful business. Hoyle (1998:x) refers to many types of organizational performance improvement systems such as Business process reengineering and Total Quality Management, "*...but one dominates the field – the ISO 9000 element-based quality system.*" Hoyle (1998:15) further elaborates on the need for ISO 9000 certification: "*The popularity of ISO 9000 and the pursuit of ISO 9000 certification world-wide has created a demand for quality systems in order to give customers confidence that their quality requirements will be met.*" He goes further by saying: "*ISO 9000 certification has become a necessity for trade in some quarters and regardless of the advantages or disadvantages, organizations pursue ISO 9000 certification either because of competition or customer requirement.*"

Hoyle also focuses on the impact quality has on the business. Hoyle (1998:26) states that "*There are several results of a business that need to be managed,*

otherwise a failure in any one of them could jeopardize the business. They are quality, environment, health, safety, human relations and profit. Product quality results from knowing your customers needs and expectations and faithfully meeting them consistently within an organization that promotes leadership and continual improvement as its core values."

It will be seen through the literature review that there is a vast amount of literature on the ISO 9000 series, however there has not been much focus on its successes, particularly within South Africa and even more so within the Western Cape.

2.3. BENEFITS OF THE ISO 9000 QUALITY MANAGEMENT SYSTEM

"Formal research conducted during 1995 among organizations certified under the SABS ISO 9000 Registration scheme showed that most organizations benefited a great deal from this scheme" (SABS, 2001:15-16). Some of the benefits identified included, improvement of product and service quality, improvement of the morale of workers and reduction in wasted time. Further benefits were reduction in raw material waste, increase in productivity, decrease in audits done by purchasing companies, decrease in products that do not adhere to quality standards, increase in the production output, improved record keeping, increase in the marketability of the certified company, improvement of financial control, improvement of stock control, decrease in operational down time, improvement

of internal communication, improvement of quality awareness and development of a quality culture.

2.4. CURRENT RESEARCH DONE ON ISO 9000 IMPLEMENTATION

In December 2000 the ISO brought out the tenth cycle of the ISO Survey of ISO 9000 and ISO 14000 certificates. This survey, having started in 1993, aims to identify trends in worldwide implementation of these two familiar standards.

ISO (2000:1) states clearly that: "*This survey does not claim to be exhaustive and the reader should consider the data reported in this survey with care*" by taking into consideration the following:

a. A "small" amount of double counting may have occurred through the use of joint assessments.
b. In order to maintain consistency between approaches for all ten cycles some estimates may have been made.
c. No attempt is made to distinguish between accredited and non-accredited certificates. Certificates may cover single or multiple sites.

According to survey results the success of the ISO 9000 family of standards is still growing. This can be seen in Table 2.1 below.

Table 2.1: World results of ISO 9000 implementation

World results	Jan '93	Sept '93	June '94	March '95	Dec '95	Dec '96	Dec '97	Dec '98	Dec '99	Dec '00
World total	27816	46571	70364	95117	127349	162701	223299	271847	343643	408631
World growth		18755	23793	24753	32232	35352	60698	48548	71796	64988
Number of countries	48	60	75	88	96	113	126	141	150	158

Source: *The 10th cycle of The ISO Survey*. 2000

Up to the end of December 2000, at least 408 631 ISO 9000 certificates have been awarded in 158 countries world-wide. This is an increase of 64 988 ISO 9000 certificates or 15 % over the end of December 1999, when the total stood at 343 643 for 150 countries.

Table 2.2: Regional share of ISO 9000 certifications

Regional share expressed in percent	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6	Cycle 7	Cycle 8	Cycle 9	Cycle 10
Africa / West Asia	3.42	2.73	2.64	2.75	2.65	3.79	3.88	4.47	5.04	4.94
Europe	83.02	81.12	78.73	75.61	72.72	67.58	64.34	61.16	55.36	53.87
Central and South Americas	0.10	0.30	0.68	0.77	0.96	1.05	1.34	1.92	2.61	2.64
North America	4.32	5.61	6.99	7.77	8.15	10.44	11.25	12.34	13.14	11.82
Far East countries	2.46	3.40	4.39	6.29	7.26	11.31	13.38	13.95	16.48	20.05
Australia / New-Zealand	6.69	6.84	6.58	6.81	8.27	5.83	5.80	6.16	7.36	6.68

Source: *The 10th cycle of The ISO Survey*. 2000

Table 2.2 above identifies which regions of the world have the greatest number of certified organizations. Europe with a 53.87 percent share has dominated and continues to dominate as the region with the greatest number of ISO 9000 certified organizations. The Far East with 20.05 percent and North America with 11.82 percent follow respectively.

2.5. THE REQUIREMENTS OF ISO 9000

The ISO 9000 series consists of the following standards:

ISO 9000 – Quality management and quality assurance standards

ISO 9001 – Quality systems model for quality assurance in design, development, production, installation and servicing.

ISO 9002 - Quality systems model for quality assurance in production, installation and servicing.

ISO 9003 - Quality systems model for quality assurance in final inspection and test.

ISO 9004 – Quality systems and quality systems elements and guidelines.

Each of the above standards "*...specify requirements which determine what elements quality systems have to encompass, but it is not the purpose of these International Standards to enforce uniformity of quality systems. They are generic and independent of any specific industry or economic sector*" (SABS,1994:v).

Omnigraphics Industrial is certified to the ISO 9001 standard. This standard consists of twenty elements, and will be illuminated below. The elements start

with 4.1 Management responsibility, and culminate with element 4.20 Statistical techniques, as laid out in the SABS ISO 9001:1994 Code of Practice. The organization must comply with a number of requirements in order to successfully implement all twenty elements. These requirements are described below by Praxiom (2002).

4.1 Management responsibility

4.1.1 Quality policy

Define a policy that describes your organization's attitude towards quality. Your quality policy should:

State a clear commitment to quality.

Recognize customer needs and expectations.

Be actively supported by senior management.

List the quality objectives you want to achieve.

Be understood by everyone in the organization.

Be consistent with your organization's goals.

Be applied throughout your organization.

4.1.2 Organization

Define the organizational structure that you will need in order to manage a quality system.

4.1.2.1 Responsibility and authority

Define quality system responsibilities, give quality system personnel the authority to carry out these responsibilities, and ensure that the interactions between these personnel are clearly specified. And make sure all of this is well documented. This requirement must be met for those who:

Manage quality system work.

Perform quality system work.

Verify quality system work.

More specifically, this quality system requirement must be met for those who:

Control nonconforming products.

Prevent product nonconformities.

Prevent process nonconformities.

Prevent quality system nonconformities.

Identify problems related to the quality system.

Report problems related to the quality system.

Record problems related to the quality system.

Recommend solutions to quality system problems.

Design solutions to quality system problems.

Verify that solutions were implemented.

Evaluate whether solutions were effective.

4.1.2.2 Resources

Identify and provide the resources that people will need to manage, perform, and verify quality system work. Make sure that:

Only trained personnel are assigned.

Managers have the resources they need to verify work.

Internal auditors have the resources they need.

4.1.2.3 Management representative

Appoint a senior executive to manage your quality system and give him or her the necessary authority. This senior executive must ensure that your quality system is developed and implemented. This executive must:

Monitor the performance of your quality system.

Control the performance of your quality system.

Report on the performance of your quality system.

Help improve the performance of your quality system.

Act as your organization's spokesperson on quality.

4.1.3 Management review

Define a procedure that your senior managers can use to review the effectiveness of your quality system.

Quality system reviews should be:

Carried out on a regular basis.

Documented and records should be maintained.

Quality system reviews should ensure that your:

Quality system requirements are being met.

Quality objectives are being achieved.

Quality policy is being applied.

4.2 Quality system

4.2.1 General

Develop a quality system and a manual that describes it. Your quality system should ensure that your products conform to all specified requirements.

Your quality manual should:

State your quality policy.

List your quality objectives.

Provide an overview of your quality system.

Describe the structure of your organization.

Discuss your quality system procedures.

Introduce your quality documents and records.

Teach people about your quality system.

Control quality system work practices.

Guide the implementation of your quality system.

Explain how your quality system will be audited.

4.2.2 Quality system procedures

Develop and implement quality system procedures that are consistent with your quality policy.

Develop your procedures for all areas of your quality system.

Document your procedures, and keep them up to date.

Each procedure should:

Specify its purpose and scope.

Describe how an activity should be carried out.

Describe who should carry out the activity.

Explain why the activity is important to quality.

Describe when and where it should be carried out.

Explain what tools and equipment should be used.

Explain what supplies and materials should be used.

Explain what documents and records should be kept.

Procedures may also refer to detailed work instructions that explain exactly how the work should be done.

4.2.3 Quality planning

Develop quality plans that show how you intend to fulfill quality system requirements. You are expected to develop quality plans for products, processes, projects, and customer contracts.

Your quality plans should list the quality objectives you intend to achieve, and the steps you intend to take to achieve these objectives.

When you construct your quality plan, consider the following questions:

Do you need to purchase any new equipment or instruments, or any new inspection and test tools?

Do you need to carry out any special training in order to fulfill all quality system requirements?

Do you need to improve design, production, testing, inspection, installation, or servicing procedures?

Do you need to improve your quality measurement and verification procedures?

Do you need to develop any new measurement methods or instruments?

Do you need to clarify your organization's standards of acceptability?

Do you need to develop any new documents, forms, reports, records, or manuals?

Do you need to allocate more resources in order to achieve the required levels of quality?

4.3 Contract review

4.3.1 General

Develop and document procedures to coordinate the review of sales orders and customer contracts. Make sure you include the customer in the process of review.

4.3.2 Review

Your contract review procedures should ensure that all contractual requirements are acceptable before you agree to provide products to your customers. Specifically, your procedures should make sure that:

Your customer's order is clearly and completely defined.

When verbal orders are received, make sure that you and your customer agree on what is required.

You have resolved all differences between the original tender or proposal and the final contract or sales order.

Your organization is capable of supplying the products ordered by the customer.

4.3.3 Amendments

Develop procedures, which specify how customer contracts are amended, and which ensure that changes in contracts are communicated throughout the organization.

4.3.4 Records

Develop a record keeping system that you can use to document the review of customer orders and contracts.

4.4 Product development and design

4.4.1 General

Develop and document procedures to control the product design and development process. These procedures must ensure that all requirements are being met.

4.4.2 Design and development planning

Create design and development planning procedures.

Your product planning procedures should ensure that:

Plans are prepared for each design activity or phase.

Responsibility for implementing each plan, activity, or phase is properly defined.

Qualified personnel are assigned to the product design and development process.

Adequate resources are allocated to the product design and development process.

Plans are updated, and circulated to the appropriate participants, as designs change.

4.4.3 Organizational and technical interfaces

Identify the groups who should be routinely involved in the product design and development process, and ensure that their design input is properly documented, circulated, and reviewed.

4.4.4 Design input

Develop procedures to ensure that all design-input requirements are identified, documented, and reviewed; and that all design flaws, ambiguities, contradictions, and deficiencies are resolved. Design input requirements can be classified as follows:

Customer expectations.

Contractual conditions.

Statutory imperatives.

Regulatory requirements.

Environmental constraints.

Safety considerations.

Performance standards.

Functional specifications.

Descriptive prescriptions.

Aesthetic preferences.

4.4.5 Design output

Develop procedures to control design outputs.

Design outputs are usually documents. They include drawings, parts lists, process specifications, servicing procedures, and storage instructions. These types of documents are used for purchasing, production, installation, inspection, testing, and servicing.

Design outputs must be expressed in terms that allow them to be compared with design input requirements.

Design output documents must identify those aspects of the product that are crucial to its safe and effective operation. These aspects can include operating, storage, handling, maintenance, and disposal requirements.

Design output documents must be reviewed and approved before they are distributed.

Design outputs must be accepted only if they meet official acceptance criteria.

4.4.6 Design review

Develop procedures that specify how design reviews should be planned and performed. Design review procedures should:

Be formally documented.

Ensure that reviews are recorded.

Ensure that representatives from all relevant areas are involved in the process of review.

4.4.7 Design verification

Develop procedures that specify how design outputs, at every stage of the product design and development process, should be verified.

These procedures should:

Verify that outputs satisfy design-input requirements.

Ensure that objective evidence is used to verify outputs.

Ensure that all design verifications are recorded.

Ensure that all design documents are verified.

These design verification procedures may also:

Use alternative calculations to verify design outputs.

Use tests and demonstrations to verify outputs.

Compare design outputs with proven designs.

4.4.8 Design validation

Develop procedures that validate the assumption that your newly designed products will meet customer needs. Develop design validation procedures that:

Confirm that your new product performs properly under all real-world operating conditions.

Confirm that your new product will meet every legitimate customer need and expectation.

Ensure that validations are carried out early in the design process whenever this will help guarantee that customer needs will be met.

4.4.9 Design changes

Develop procedures to ensure that all product design modifications are documented, reviewed, and formally authorized before the resulting documents are circulated and the changes are implemented.

4.5 Document and data control

4.5.1 General

Develop procedures to control all the documents and data related to your quality system. These procedures should control:

Internal and external documents and data.

Electronic or hardcopy documents and data.

4.5.2 Document and data approval and distribution

Develop procedures to review, approve, and manage all of your quality system documents and data. These procedures should ensure that:

Only authorized people are allowed to formally approve documents and data prior to distribution.

All documents and data are formally approved before they are distributed throughout the organization.

The accidental use of obsolete documents and data is prevented.

Only current versions of documents and data are available for use.

Documents and data, that are used to maintain your quality system, are available wherever and whenever they are needed.

Documents that are retained for legal or historical purposes should be officially marked as such and segregated from current versions.

4.5.3 Document and data changes

Develop procedures to control changes to documents and data.

These procedures should ensure that changes are:

Justified.

Marked as changes.

Reviewed and approved by the original review and approval groups.

The procedures should also ensure that these review and approval groups have all the information they need to justify their approval.

4.6 Purchasing requirements

4.6.1 General

Develop procedures to ensure that purchased products (including services) meet all requirements. These procedures should control the selection of subcontractors, the use of purchasing data, and the verification of purchased products.

4.6.2 Evaluation of subcontractors

Develop procedures to select, evaluate, monitor, and control your subcontractors (your suppliers). These procedures should define how:

Subcontractors are selected.

Subcontractor performance is monitored.

Subcontractor performance is evaluated.

Subcontractor performance is controlled.

These procedures should ensure that subcontractors are chosen only if they are able to meet your:

Contractual expectations.

Quality assurance requirements.

Make sure that quality records are kept which chronicle the performance of your subcontractors. Your records should identify the acceptable subcontractors and the products and services they provide.

4.6.3 Purchasing data

Develop procedures to ensure that your purchase order documents precisely describe what you want to buy. When appropriate, these procedures should ensure that your purchasing documents:

Use technical specifications and drawings to describe exactly what you want to order.

State the type or grade of product being purchased.

Define product inspection and approval requirements.

Specify process requirements that must be met.

Identify process equipment that should be used.

Describe procedures that should be followed.

Specify technical support service requirements.

Reference the applicable quality system standards.

Are carefully reviewed to ensure that they meet all requirements before they are approved and issued.

4.6.4 Verification of purchased product

Develop procedures that allow you or your customers to verify the acceptability of products you have purchased.

4.6.4.1 Supplier verification at subcontractor's place

When you must verify the acceptability of purchased products at the subcontractor's premises, ensure that your purchase order documents and contracts specify your verification and acceptance requirements and methods.

4.6.4.2 Customer verification of subcontracted product

When your customers wish to verify the acceptability of the products you purchase on their behalf, ensure that they are given this opportunity at both the subcontractors' premises and yours.

4.7 Customer-supplied products

Protect customer supplied products

Develop procedures to control products supplied to you by customers. These procedures should ensure that you:

Examine the product when you receive it to confirm that the right items were shipped without loss or damage.

Prevent product loss, misuse, damage, or deterioration through proper storage and security.

Record product loss, misuse, damage, or deterioration, and report it to the customer.

Clarify who is responsible for the maintenance and control of the product while it is in your possession.

4.8 Product identification and tracing

Track your products

Develop and document procedures to identify and track products from start to finish. When appropriate, these procedures should make sure that you:

Identify and document products every step of the way from the purchase of supplies and materials through all stages of handling, storage, production, delivery, installation, and servicing.

Trace products or product batches by means of unique identifiers and suitable record keeping.

4.9 Process control requirements

Control production, installation, and servicing Develop procedures to plan, monitor, and control your production, installation, and servicing processes. Your procedures must be documented, and should ensure that each process is:

Approved and performed by qualified personnel.

Monitored and controlled by qualified personnel.

Performed using approved tools and equipment.

Documented using proper record keeping systems.

Carried out within a supportive work environment.

Your procedures should ensure that each process:

Maintains a high standard of workmanship.

Follows your quality plans, policies, and procedures.

Complies with the appropriate standards and codes.

Is monitored by tracking process and product qualities.

Is carried out with well-maintained tools and equipment.

Design a record keeping system that monitors and controls process personnel and equipment.

Make sure that all important process qualities are monitored and recorded.

4.10 Product inspection and testing

4.10.1 General

Develop procedures to inspect, test, and verify that your products meet all specified requirements.

Develop procedures to inspect, test, and verify that incoming products meet all requirements.

Develop procedures to inspect, test, and verify that in-process products meet all requirements.

Develop procedures to inspect, test, and verify that final products meet all requirements.

Ensure that appropriate product inspection and testing records are developed and that these records are properly maintained.

4.10.2 Receiving inspection

Develop procedures that ensure that incoming products are not used until you have verified that they meet all specified requirements.

4.10.2.1 Inspection of incoming products

Your procedures should ensure that incoming products are inspected and approved before they are used or processed. All incoming products must conform to specified requirements.

4.10.2.2 Inspections done by subcontractors

If your subcontractors (your suppliers) carry out some of the required inspections and if they provide you with recorded evidence which demonstrates that their products are, in fact, acceptable, then your procedures should not ask you to repeat these inspections.

4.10.2.3 Use of products prior to inspection

If products must be used prior to inspection, your procedures should tell you to identify and record them so that they can be quickly recalled and replaced if they subsequently do not meet all requirements.

4.10.3 In-process inspection and testing

Develop procedures that ensure that work in process meets all requirements before work is allowed to continue.

Your procedures should ensure that work in process is held up until the required inspections and tests have been completed and until the required inspection reports have been received and approved. (see exception explained below).

Work in process need not be held up if the product must be used right away and if it has been identified and recorded as a product that can be recalled and replaced by a subcontractor if it doesn't meet your requirements.

4.10.4 Final inspection and testing

Develop procedures to ensure that final products meet all requirements before they are made available for sale.

Your procedures should ensure that:

Final products are inspected and approved before they are made available for sale.

Incoming and in process inspections and tests are completed, and that all requirements are met, before the product is made available for sale.

Final products are not released until all relevant quality procedures have been carried out, all documents have been completed, and all approvals have been granted.

4.10.5 Inspection and test records

Develop a record keeping system that your staff can use to document product testing and inspection activities.

Your record keeping system should:

Prove that your products have been formally inspected and tested using authorized procedures.

Show whether your products passed or failed your inspections and tests.

Demonstrate that authorized acceptance criteria were used to decide whether products passed or failed.

Indicate what was done with products that failed your inspections and tests.

Specify who inspected or tested your products, and who authorized their release.

4.11 Control of inspection equipment

4.11.1 General

Develop procedures to control, calibrate, and maintain inspection, measuring, and test equipment used to demonstrate that products conform to requirements.

The amount of measurement uncertainty should be known and should be reasonable given the degree of precision required to establish that the product meets requirements.

In order to prove that your equipment is capable of verifying the acceptability of your products, it should be checked and rechecked on a regular basis.

Every time equipment is checked to ensure that it is capable of verifying that products are acceptable, the results should be properly recorded.

Whenever your customers must confirm that your inspection, measuring, and test equipment is reliable and appropriate, make sure you allow them to do so.

4.11.2 Control procedures

Develop procedures to ensure that your measurement equipment is appropriate, effective, and secure. Your procedures should specify:

What kinds of measurements must be made.

What kinds of measurement methods must be used.

How accurate these measurements should be.

Which quality measurement equipment should be used.

What kinds of environmental conditions are suitable.

How and where your equipment should be stored.

How equipment will be protected from harm.

Develop procedures to calibrate all of your quality oriented inspection, measuring, and test equipment. Your procedures should ensure that:

Calibration methods are clearly defined.

Equipment is calibrated on a regular basis.

Equipment calibration status is clearly shown.

Calibration acceptance criteria are clearly specified.

Equipment is calibrated against official standards.

Calibrations are carried out in a suitable environment.

Calibration documents and records are maintained.

Calibration records are accurate and up-to-date.

Appropriate remedial actions are taken whenever calibration results are found to be unacceptable.

Valid calibration settings are protected from unauthorized adjustment.

Previous calibration results are rechecked whenever equipment is found to be out-of-calibration.

Develop procedures to calibrate hardware and tools used to test and validate your software products.

4.12 Inspection and test status of products

Control the inspection status of your products

Develop procedures to control the inspection status of your products.

These procedures should ensure that:

Each and every product is identified as having passed or failed the required tests and inspections.

The test status of each product is documented and respected throughout the production, installation, and servicing process.

Only products that have passed all tests and inspections are subsequently used or sold to customers (unless an exception is made under section 4.13.2 below).

4.13 Control of nonconforming products

4.13.1 General

Develop procedures to prevent the inappropriate use of nonconforming products.

Make sure these products are:

Identified, evaluated, and documented.

Segregated from products that conform.

Also make sure that everyone is notified when your products do not conform to specified requirements.

4.13.2 Review and disposition of nonconforming products

Develop procedures to control how your nonconforming products are reviewed, reworked, regraded, retested, recorded, and discussed with your customers.

Specify who is responsible for and has the authority to review and dispose of nonconforming products.

Specify how review of nonconforming products must be carried out.

Specify the conditions under which nonconforming products may be reworked, accepted without modification, used for other purposes, or scrapped.

Ensure that your customers are notified when nonconforming products are going to be used with or without modification (when required by contract).

Be sure you record the actual condition of any nonconforming product that is, nevertheless, accepted and used.

Be sure you record a description of the repairs that were made to nonconforming products.

Ensure that repaired or reworked products are re-tested and re-inspected prior to use.

4.14 Corrective and preventive action

4.14.1 General

Develop procedures to correct or prevent nonconformities.

Corrective or preventive actions should eliminate the causes of nonconformity.

Corrective or preventive actions should consider how big the problem is and how much risk is involved.

When corrective or preventive actions indicate that systemic or procedural changes should be made, make sure that these changes are implemented.

Make sure that corrective and preventive actions and changes are properly documented.

Corrective actions may affect:

Software items and products.

Software life cycle processes.

Use configuration management procedures to control corrective actions that affect software items and products.

Use document and data control procedures to control corrective actions that affect software life cycle processes.

4.14.2 Corrective action

Develop procedures to ensure that nonconformities are identified and corrected without delay.

Ensure that:

Nonconformity reports are handled properly.

Customer complaints are handled effectively.

Causes of nonconformity are investigated and recorded.

Corrective actions are promptly implemented.

Corrective actions eliminate causes.

Corrective actions are effective.

4.14.3 Preventive action

Develop procedures to ensure that potential nonconformities are routinely detected and prevented.

Your procedures must:

Use every appropriate source of information to detect Potential nonconformities.

Use sources such as:

Work activities and processes.

Audit results and quality records.

Service reports and customer complaints.

List the steps that make up your preventive measures.

Ensure that effective preventive measures are taken.

Ensure that preventive measures are reported to senior managers.

Ensure that appropriate information about preventive measures is fed back into the management review process (please see section 4.1.3).

Develop preventive actions by identifying and analyzing the root causes of your nonconformities.

Develop preventive actions by identifying and analyzing unfavorable metric levels and trends.

4.15 Handling, storage, and delivery

4.15.1 General

Develop and document procedures to handle, store, package, preserve, and deliver your products.

4.15.2 Handling

Develop product handling methods and procedures that prevent product damage or deterioration.

4.15.3

Storage

Designate secure areas to store and protect products.

Develop procedures which specify how products will be:

Placed into storage.

Removed from storage.

Protected from damage, deterioration, or destruction during storage.

Monitored and evaluated to detect damage or deterioration while in storage.

4.15.4 Packaging

Develop packing, packaging, and marking methods and procedures to protect and control the quality of products and packaging materials.

4.15.5 Preservation

Develop methods and procedures to protect and preserve product quality prior to delivery while the product is still under your organization's supervision and control.

Ensure that products are segregated from one another.

4.15.6 Delivery

Develop procedures to protect your products after final testing and inspection, and during product delivery (when the latter is contractually required).

4.16 Control of quality records

Develop a quality record keeping system

Develop a quality record keeping system, and develop procedures to control it.

Identify the information that should be collected.

Develop procedures to:

Collect and record this information (create records).

File, index, store, and maintain quality records.

Remove, archive, and destroy old quality records.

Protect quality records from unauthorized access.

Prevent records from being altered without approval.

Safeguard records from damage or deterioration.

Your quality record keeping system should:

Show that your quality system is implemented.

Prove that your quality system works properly.

Specify how long old records should be retained.

Allow information to be retrieved without difficulty.

Produce documents that are dated and easy to read.

Permit customers to access records (when required).

Include quality records provided by subcontractors.

4.17 Internal quality audit requirements

Develop internal audit procedures

Develop internal quality audit procedures which:

Determine whether quality activities and results comply with written quality plans, procedures, and programs.

Evaluate the performance of your quality system.

Verify the effectiveness of your corrective actions.

These procedures should also ensure that:

Audit activities are properly planned.

Auditors are independent of the people whose activities are being audited.

Audit results, corrective actions, and corrective action results and consequences are properly recorded.

Audit conclusions are discussed with the people whose activities and results are being audited, and deficiencies are corrected by the managers of the audited areas.

Audit reports are fed back into the quality system review process (see section 4.1.3).

4.18 Training requirements

Develop training procedures

Develop quality-training procedures. These procedures should be properly documented, and must ensure that:

Quality system training needs are identified.

Quality training is provided to those who need it.

People are able to perform quality system jobs.

People have the qualifications they need to do the work.

Accurate and appropriate training records are kept.

Everyone understands how your quality system works.

4.19 Servicing requirements

Develop service procedures

Develop and document quality service procedures.

Your procedures should specify how:

Products should be serviced.

Product service activities are reported.

The quality of product service is verified.

4.20 Statistical techniques

4.20.1 Identification of need

Select the statistical techniques that you will need in order to establish, control, and verify your:

Process capabilities.

Product characteristics.

4.20.2 Procedures

Develop procedures to:

Explain how your techniques should be applied.

Monitor and control how these techniques are used.

Make sure that:

All statistical procedures are documented.

Statistical records are kept.

2.6. UNDERSTANDING ISO 9000 CERTIFICATION

There are a number of certification bodies in South Africa, which give recognition to companies that have properly designed, planned, established and maintained and implemented quality systems that meet the requirements of the ISO 9001.

These certification bodies include SABS, Dekra and TUV. The implementation of a system clearly demonstrates the organizations capability to produce consistently to their buyer's requirements, which leads to a better corporate and quality image.

Benchmarking a quality management system against the ISO 9000 quality assurance standard through third party registration will indicate to customers that the production process / service provision is under professional control. It will also serve as testimony that your product quality is consistent at all times and it will provide assurance and confidence that the quality of the product and /or service is a top priority of the management of the organization. All this is possible because of the independence, impartiality and integrity of the certification body.

2.7. THE AFRICAN SCENARIO

According to the tenth cycle of the ISO Survey of ISO 9000 and ISO 14000 certificates, Africa and West Asia held 4.94 percent of regional ISO 9000 certified organizations (ISO 2000:2). This means that of the 408 631 globally certified organizations, 20 185 were from the Africa and West Asia region.

Table 2.3 Eight greatest ISO 9000 certificate holders within the Africa and West Asia Region.

Countries	Jan '93	Sept '93	June '94	March '95	Dec '95	Dec '96	Dec '97	Dec '98	Dec '99	Dec '00
Egypt			9	16	45	166	344	385	649	468
India	8	73	328	585	1023	1665	2865	3344	5200	5682
Iran					2	97	131	224	259	433
Israel	110	170	279	497	526	1709	2303	3700	4600	6140
Pakistan			1	3	7	22	56	145	194	611
Saudi Arabia	4	10	30	53	98	159	211	280	324	610
South Africa	**824**	**1007**	**1161**	**1369**	**1454**	**1882**	**1915**	**2166**	**3316**	**3454**
United Arab Emirates	3	9	35	45	104	139	314	632	1045	1007
Total certifications all countries	951	1272	1855	2619	3378	6162	8668	12150	17307	20185
Global share in percent	3.42	2.73	2.64	2.75	2.65	3.79	3.88	4.47	5.04	4.94
No. of countries	7	8	16	24	27	37	40	48	49	52

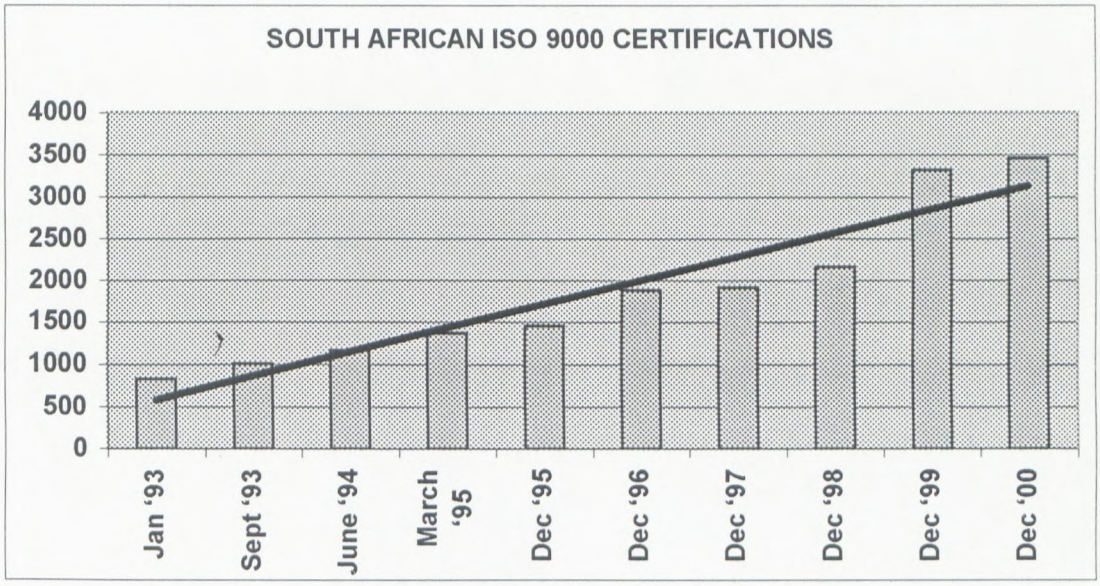
Source: *The 10th cycle of The ISO Survey*. 2000

Fifty-three countries make up the Africa and West Asia region. Table 2.3 shows the eight highest ISO 9000 certificate holders within the Africa and West Asia region. Israel has the highest number of certified organizations with India and South Africa following respectively. It can be seen that within the African region, South Africa has the highest number of ISO 9000 certified organizations.

"The SABS (2001:15), *"has listed close on 2500 organizations under the SABS ISO 9000 Registration scheme* Since the survey began in 1993, South Africa has had a continuous year on year increase in the number of certifications."

The graph below illustrates this upward trend in South African certifications.

Graph 2.1: South African certified organisations – Jan 1993 to Dec 2000



Source: *The 10th cycle of The ISO Survey*. 2000

With both local and international customers requiring quality assurance from their supply base one can therefore expect to see this trend continue as South African organizations continue to compete in the global market.

2.8. CONCLUSION

With the SABS being the predominant certification body in South Africa, it was decided by Omnigraphics Industrial to obtain ISO 9001 certification through this body. Omnigraphics however, has gone through a number of organizational and

structural changes which will be addressed in chapter three. This research report focuses on the introduction of ISO 9001 into the Omnigraphics Industrial division, which was accredited by the South African Bureau of Standards in 1998 with the SABS ISO 9001 certification. The Omnigraphics group did however achieve certification via the German Institute Dekra in 1994, however this changed as the organisational structure and product range changed.

CHAPTER 3

3.1. INTRODUCTION

Chapter 3 provides some insight into Omnigraphics, the organization used for the case study. This chapter describes the operations and structure of the organization and how it has changed from pre ISO 9000 certification to post certification. Challenges identified in a previous report are also highlighted.

3.2. OMNIGRAPHICS INDUSTRIAL

The Omnigraphics organization consists of three independent business units. Omnigraphics Industrial is one of these units. Omnigraphics Industrial is an internationally recognised award-winning company specialising in the design and manufacture of decorative and protective self-adhesive components. The company has been in existence for the past 20 years. They supply world-class value-added branding components to the automotive OEM industry as well as to white and brown goods manufacturers, and marketing and promotional companies across the globe.

With state-of-the art screen-printing and die-cutting facilities, design and engineering studios and digital print facilities, they cater for a wide range of clients' requirements. They offer an innovative range of branded emblems and badging in a variety of finishes, textures and effects. Options include Omnicast, an exclusive resin coated emblem process, as well as Injection Moulded and RF Badging. They also produce large-format, screen-printed graphics for the commercial market.

All manufacturing is done at the Cape Town plant. Regional offices in Durban, Port Elizabeth, Pretoria and Johannesburg operate as sales and service centers.

Omnigraphics Industrial is managed by an executive management team, consisting of the Managing Director, Financial Director, International Sales Manager, Plant Manager, Quality Manager and New Product Development Manager. The structure is relatively flat with the aim being to improve communication flow. Appendix A., shows the current Organogram.

The executive management team provides the strategy and direction for the Industrial division by developing a comprehensive business plan annually. The vision and mission are then set for five years. The business plan is compiled with the input from each departmental manager. Each department puts forward its goals and action plans for the following year. The business plan is then presented to the whole organization through a workshop in order to illustrate the organizations future plans.

3.3. OMNIGRAPHICS BEFORE ISO ACCREDITATION

Omnigraphics Industrial achieved ISO 9001 certification through SABS in 1996. Before this the company was known as Omnigraphics. Omnigraphics achieved ISO 9001 through the German certification body, Dekra in 1994. As was previously mentioned this report focuses on the Industrial division and its progress since achieving ISO certification. The Cape Town plant had two separate business units: Automotive signs and advertising. The two units then

came under one roof in Ottery, Cape Town. The organization was managed by six directors: two of them being in the joint Managing Director position. Figure 3.1 shows Omnigraphics current organogram and Figure 3.2, shows the old organogram.

The company employed a total of 120 people. The initial company strategy was to benchmark against the best in the world within their business. There were a number of challenges, which the organization faced at this time. These are discussed in further detail in section 3.4.

3.4. MUREGERERA'S RESEARCH AND FINDINGS

Muregerera (1996), through his research identified a number of issues relating to the operational activities of Omnigraphics. These findings were identified prior to the formation of Omnigraphics Industrial. Muregerera split these issues into three categories, those relating to employees, supervisors and directors.

His findings are as follows:

Employees

At this stage of the organisations growth, namely 1996, the concept of ISO 9000 was new to many employees particularly the operators. So new in fact that "*the workers believe that these are just buzzwords which, like fashion, come and go*" (Muregerera,1996:37). The communication channels at this stage were not very well defined. This consequently caused some confusion within the work force as to the real reason for Omnigraphics achieving ISO 9001 through Dekra.

Employees were not concerned with product or global competitiveness. " *To them when management speak of ISO 9001 and world class manufacturing all they are interested in is their monetary gain from such improvements*" (Muregerera,1996:40). Once again communication channels were not clear. Employees, particularly operators were not explained the real essence of the ISO system.

Supervisors

The Supervisors understanding was also lacking. "*As for the ISO 9001 certification it is taken to be a marketing ploy*" (Muregerera,1996:38-39). Communication at this stage needed vast improvement. Management needed to be more explicit as to the reasons for ISO implementation.

Muregerera did however highlight two global views on quality strategies. "*A good product is a good product and it will sell itself by way of its conformance to the required specifications*" The second view was "*ISO 9001 will make it possible for Omnigraphics to penetrate the European markets*" (Muregerera,1996:39).

Directors

It was made clear to Muregerera (1996:40) that the directors of Omnigraphics were seeking to transform the organisation from its present state of a local producer / manufacturer to a world-class manufacturer with a sustainable world class manufacturing status.

3.4.1. Organisational concerns

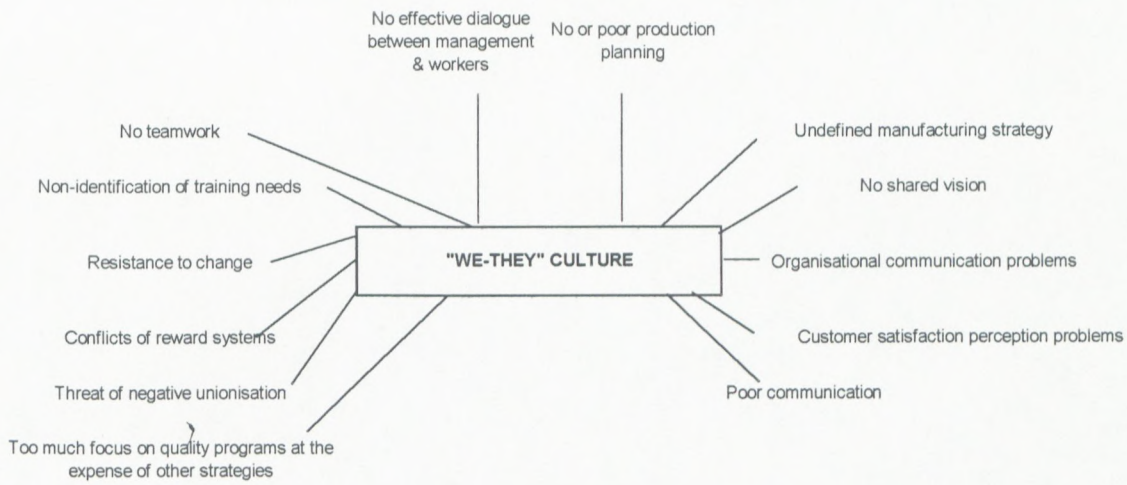
Through interviews and group discussions, Muregerera identified a number of organizational concerns as being the dominant aspects for the success of the organization. These were summarized into a mind map, figure 3.3 below.

Figure 3.3: Mind Map of Organisational Concerns

The organizational concerns were captured through individual interviews with shopfloor workers, supervisors, the production manager, the research and development manager and manufacturing director. The group discussion comprised of managers from marketing, design and engineering, manufacturing, quality auditing, and a workers representative.

Muregerera then put the concerns into a relational diagram shown in Figure 3.4 below. He identified the "we-they" gap as the root problem.

Figure 3.4: Relational Diagram



3.5. THE INFLUENCE OF ISO 9001 ON OMNIGRAPHICS INDUSTRIAL

Once Omnigraphics had split into defined units, Omnigraphics Industrial became a separate business unit. As a supplier to the automotive industry, it needed to comply with various standards. The first of these, as previously mentioned, was ISO 9001 achieved through the SABS in 1996. Omnigraphics had, however, achieved Ford Q101 in 1989, an automotive industry specific certificate that would later fall away to become superceded by Ford Q1. The industrial division focused solely on the automotive screenprinting and omnicast products, including some commercial applications. Window dressing was not an option. If product was to be supplied to the automotive manufacturers, then Omnigraphics

Industrial had to recover from the challenges of the past. Omnigraphics Industrial started by refining its systems and using the system to its advantage. Challenges which were previously identified by Muregerera could be managed through the effective use of the ISO 9001 standard.

A quality policy was defined and passed down to the workforce. An Omnigraphics Industrial quality manual was created covering all the elements of 9001. Procedures and work instructions were created for each department. Product design, purchasing and product tracebility became some key components of the system. Regular internal and external audits assisted in maintaining a proficient and user friendly system. Training needs were identified and employees from all levels were being trained in various spheres of the operation.

3.6. CONCLUSION

Chapter three has identified the various organizational concerns Omnigraphics faced prior to ISO 9000 certification. Chapter four addresses the research methodology which is used to identify whether Omnigraphics has indeed improved performance since certification.

Figure 3.1 – Omnigraphics Current Organogram

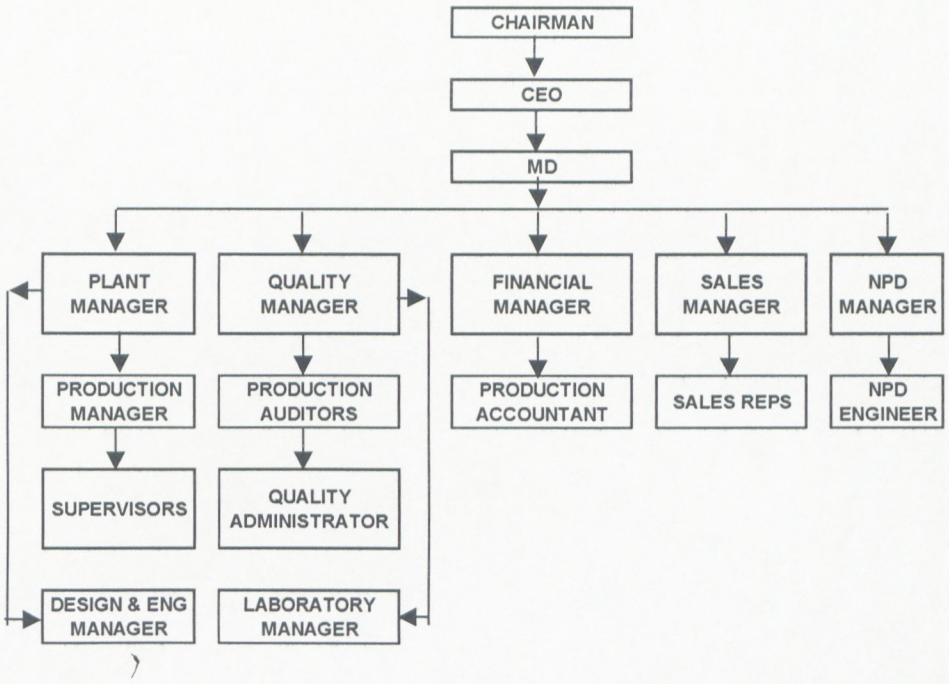
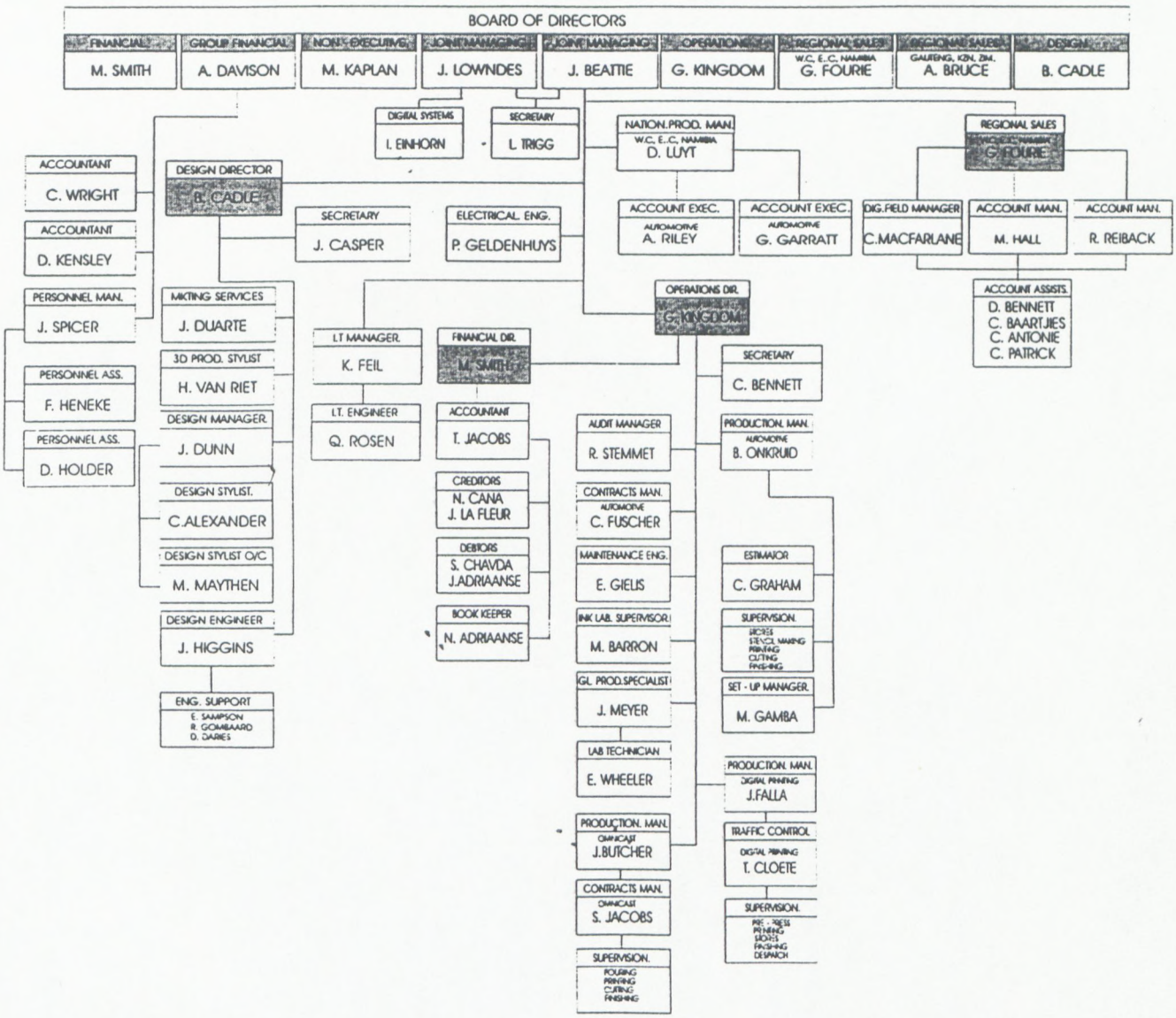


Figure 3.2 – Omnigraphics Old Organogram



CHAPTER 4

4.1. INTRODUCTION

Chapter 4 gives insight into the research approach, including the revisiting of research objectives. The expected contributions of the research are also elaborated on, as well as a description of the research participants. The chapter ends with a review and explanation of the research questions.

4.2. RESEARCH OBJECTIVES

The original research objectives were to determine either the success or failure that Omnigraphics, an Ottery, Western Cape based, silkscreen printing company, has had, since achieving the ISO 9000 certification and highlight the organizational changes that have taken place since 1996.

A simple survey method was used to gather data from various participants. From the data, one would be able to conclude whether the implementation of ISO 9000 has caused the organization to be more or less successful.

4.3. EXPECTED CONTRIBUTION OF THE RESEARCH

As was previously mentioned in Chapter One, (1.9), not much research has been done on the success of the ISO 9000 series in industry, particularly within the printing Industry in the Western Cape. In order for local organizations to become more competitive they need to make strategic decisions with regards to implementing formal management systems. The intention of this research report

is to serve as a guide in making the correct decision when deciding on whether or not to implement a formal quality management system.

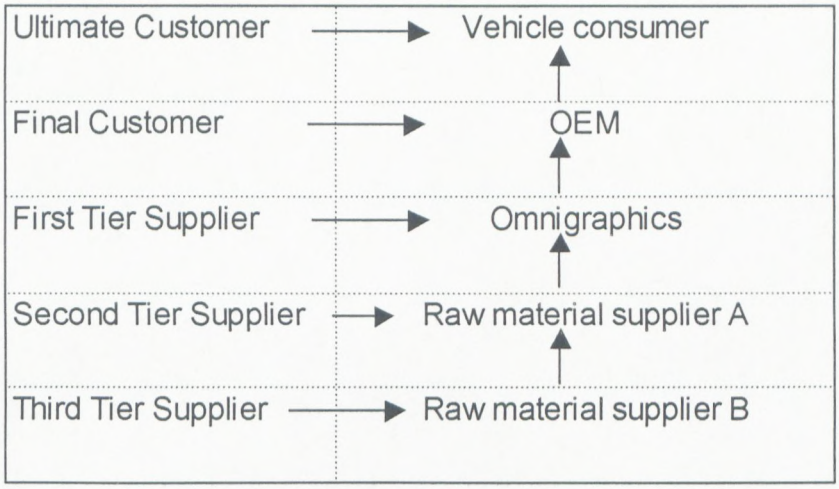
4.4. RESEARCH PARTICIPANTS

In order to obtain an accurate picture of the effect ISO 9000 has had on Omnigraphics and other industries, the complete supply chain had to be surveyed. This included the supplier of raw materials, the organization and the final customer.

The raw material supplier would supply "unconverted" products to their customer, in this case Omnigraphics. One may notice that "shop floor" employees were not surveyed. Instead the supervisors were surveyed. It is these supervisors that are the link for ensuring operators carry out their duties effectively. It is essential that "buy in" comes from the supervisors, for it is these individuals who make things happen on the shop floor. The organization in the supply chain would be the "middle man" or converting agent. This is the organization that transforms raw materials into finished goods or final product. The final customer would be the customer of the "middle man" or converting organization. In this case study it would be the OEM's (Ford, Toyota, Daimler-Chrysler) or any other commercial customer.

In order to get a better understanding of the supply chain dynamic see Figure 4.1 below.

Figure 4.1: Automotive supply chain



It is important to note that within the Automotive industry, suppliers are categorized as first tier, second tier or third tier and so forth. As Omnigraphics supplies directly to the OEM's, it is considered as a first tier supplier. Omnigraphic's raw material supplier will, therefore, be considered as a second tier supplier.

In order to get significant feedback on the approach towards ISO 9000, a total of thirteen individuals from various segments of the supply chain, were surveyed

.

Figure 4.2 below, shows which individuals along the supply chain have been part of the survey.

Figure 4.2: Survey participants

Ultimate Customer	Vehicle consumer ↑	Not Applicable			
Final Customer	OEM ↑	Engineer	Senior Supplier Technical	Supplier Technical Assistant	
First Tier Supplier	Omnigraphics ↑	Contracts Manager	Laboratory Manager	Financial Manager	Supervisor & Storeman
Second Tier Supplier	Raw material supplier A ↑	QA Manager	Sales Manager	International Sales Manager	
Third Tier Supplier	Raw material supplier B	Technical Manager	Sales Manager		

4.5. RESEARCH QUESTIONS

In order to get effective survey data a simple questionnaire was sent to the three survey groups. The questions were modified according to the target group.

Group One consisted of those five employees at the first tier supplier, namely, Omnigraphics.

The questionnaire for Group One can be seen below in Table 4.1.

Table 4.1: Group One questionnaire

ISO 9000 SURVEY - 2002

Date	
Department	
Position	
Male / female	
Years in company	

Please complete the questions below. Bold the applicable answer ie: **YES** or **NO**

Omnigraphics Employees

Do you understand ISO9001?	YES	NO
Do you see benefit having ISO9001?	YES	NO
Have you seen positive change with implementing ISO9001?	YES	NO
Has ISO9001 made manufacturing simpler?	YES	NO

Group Two consisted of those employees at second tier suppliers. Two second tier organizations were surveyed. Three individuals were surveyed at this level. Group Three consisted of those employees at third tier suppliers. Two third tier organizations were surveyed. Three individuals were surveyed at this level. The questionnaire for group two and group three can be seen below in Table 4.2.

Table 4.2: Group Two and Group Three questionnaire

ISO 9000 SURVEY - 2002

Date	
Department	
Position	
Male / female	
Years in company	

Please complete the questions below. Bold the applicable answer ie: **YES** or **NO**

Supplier

Is your business currently ISO 9000 registered?	YES	NO
Is ISO 9001/2 a mandatory requirement for your supply base?	YES	NO
Do you see improved service from ISO 9001/2 certified companies?	YES	NO
Would you implement ISO 9001/2?	YES	NO
Is it easier to deal with an ISO 9001/2 certified company?	YES	NO

Group Four consisted of those employees at customer organisations. Two customer organizations were surveyed. Three individuals were surveyed at this level. The questionnaire for group four can be seen below in Table 4.3.

Table 4.3: Group Four questionnaire

ISO 9000 SURVEY - 2002

Date	
Department	
Position	
Male / female	
Years in company	

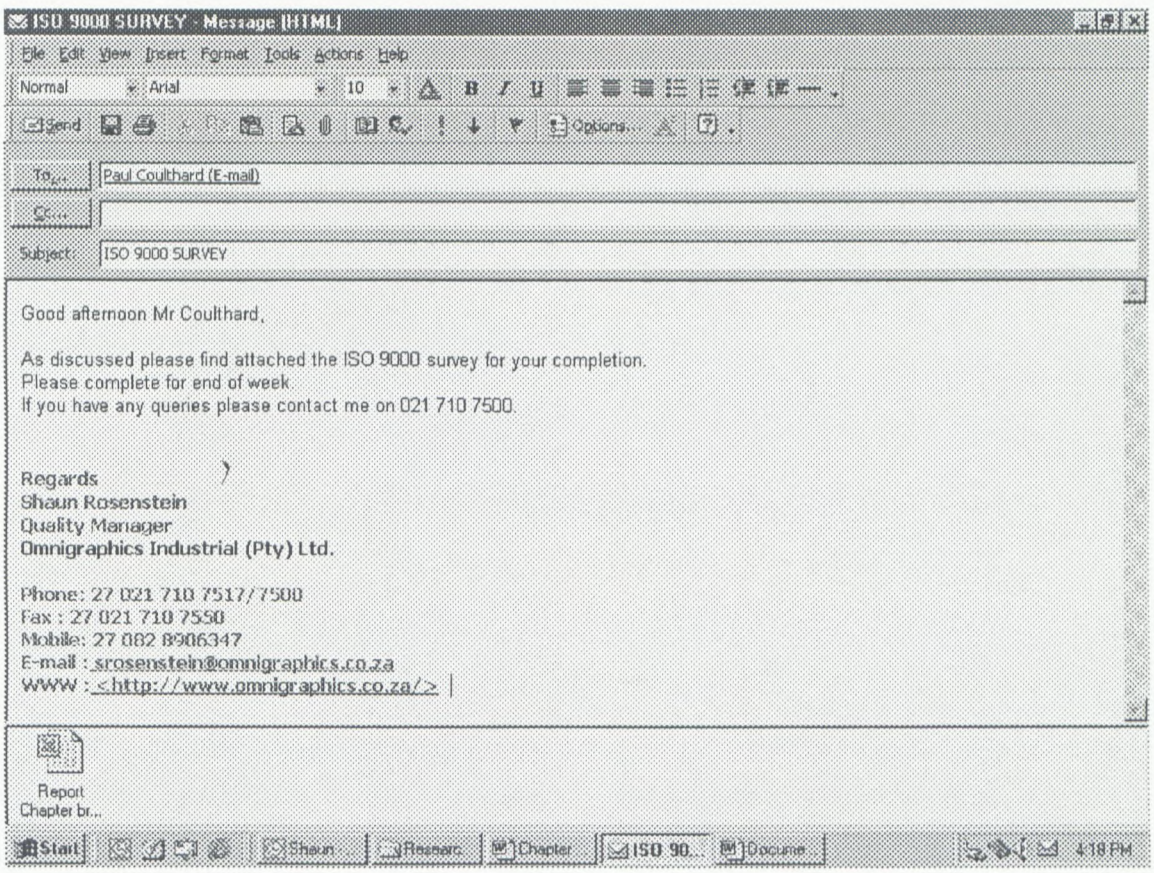
Please complete the questions below. Bold the applicable answer ie: **YES** or **NO**

Customer

Is your business currently ISO 9000 registered?	YES	NO
Is ISO 9001/2 a mandatory requirement for your supply base?	YES	NO
Do you see improved service from ISO 9001/2 certified company?	YES	NO
Would you implement ISO 9001/2?	YES	NO

After formulating the survey, the questionnaire was then sent to the recipients via electronic mail. This format can be seen in the screen shot below (Figure 4.3).

Figure 4.3: Electronic mail questionnaire format



4.6. RESEARCH ANALYSIS

Once the surveys had been send out to the respective recipients and completed, they were then returned. These surveys were analysed and interpreted by charting results from each sector.

4.7. CONCLUSION

Chapter four looks at the results of the Omnigraphics employee survey and the results of the customer and supplier surveys.

CHAPTER 5

5.1. INTRODUCTION

Chapter five describes the results and analysis of the questions posed in chapter four. It also looks at the influence ISO 9001 implementation has had on Omnigraphics in tackling the organizational challenges identified in chapter three.

5.2. ANALYSIS AND INTERPRETATION OF DATA

The questions posed to various individuals along the supply chain were used to gauge their attitude toward the ISO 9000 system. Four groups were targeted for interviewing. These were: the first tier supplier or group one, the second tier supplier or group two and the third tier supplier or group three. The final customer was group four.

The graphs below are used to illustrate the results of these interviews. Further analysis is added under each graph.

5.3. GROUP ONE RESULTS AND ANALYSIS

Group one were those employees interviewed at the first tier supplier, namely Omnigraphics. The following individuals were interviewed:

The Design and Engineering Manager

The Financial Manager

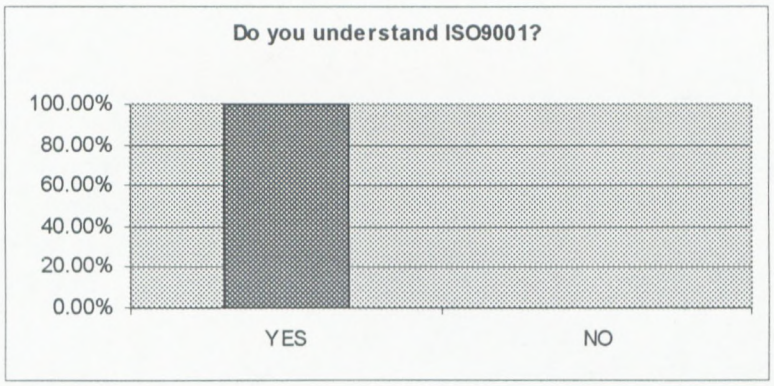
The Production Supervisor

The Laboratory Manager

The Stores Supervisor

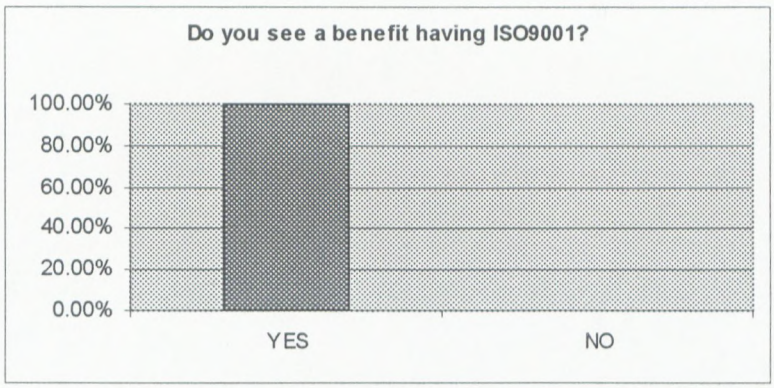
For the questions posed see chapter 4, table 4.1.

Graph 5.1: Question 1



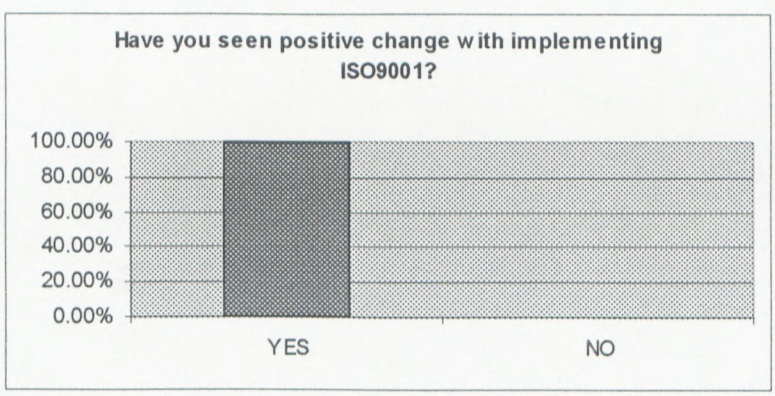
The question above was used to determine if the employees had a general understanding of the ISO 9000 system. One hundred percent of the interviewees gave a yes response to this question. This response was based on all employees having been exposed to ISO 9000 through internal training programs. This training usually happened during the employees induction period. The degree of understanding was dependent on the time these individuals had been employed at Omnigraphics, and the departments they had worked in. Those who were more production orientated, as well as those who were part of the quality auditing function, tended to have a better understanding of the ISO 9000 system.

Graph 5.2: Question 2



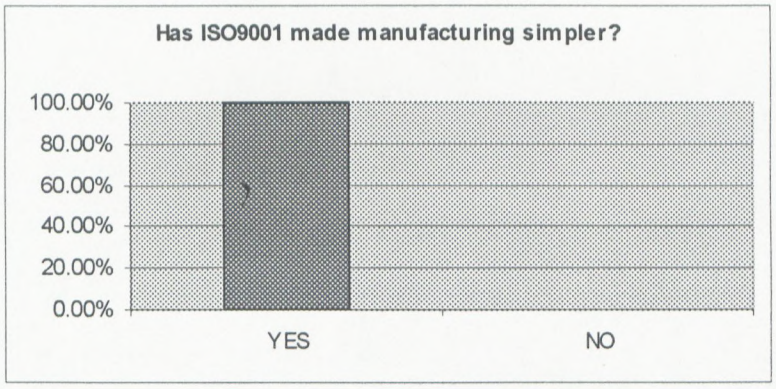
Question two was a general question which was designed to determine whether the ISO 9000 system has had an influence on the way the various departments functioned, and whether these individuals have seen any benefit using the system. One hundred percent of the interviewees responded with a yes. Each department had been influenced in some way or another by the implementation of ISO 9000. These changes could have been through the implementation of formalized procedures, or work instructions, or through new processes.

Graph 5.3: Question 3



Question three was primarily focused at those employees who had been employed before the company achieved certification. One hundred percent of the interviewees responded with a yes. This indicated that they had all seen a positive change in the company through the implementation of the ISO 9000 system. Most indicated that the formalized system provided a structured environment within which to manufacture.

Graph 5.4: Question 4



This question was primarily aimed at the production departments but also included the supporting departments such as finance. One hundred percent of the interviewees responded with a yes. As per question three above, all of the interviewees indicated that the formalized system provided a structured environment within which to manufacture.

5.4. GROUP TWO RESULTS AND ANALYSIS

Group Two were those employees interviewed at second tier suppliers. Two second tier organizations were surveyed. Second tier organizations would be those that supply first tier organizations with raw materials or partially complete components. The second tier organization below is internationally established and supplies raw material to the first tier organization.

The following individuals were interviewed:

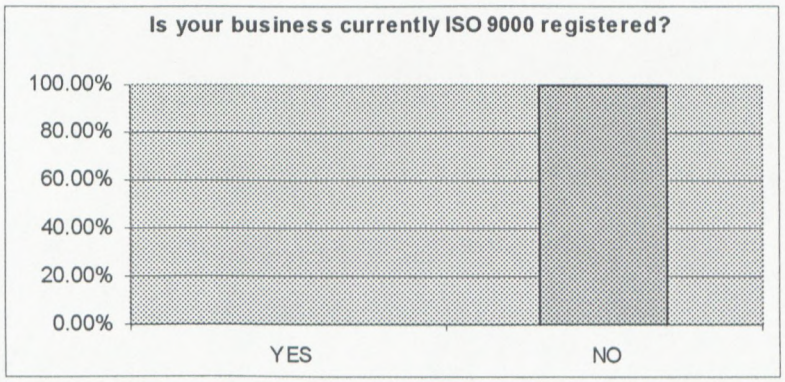
The Technical Manager

The Sales Manager

The International Sales Manager

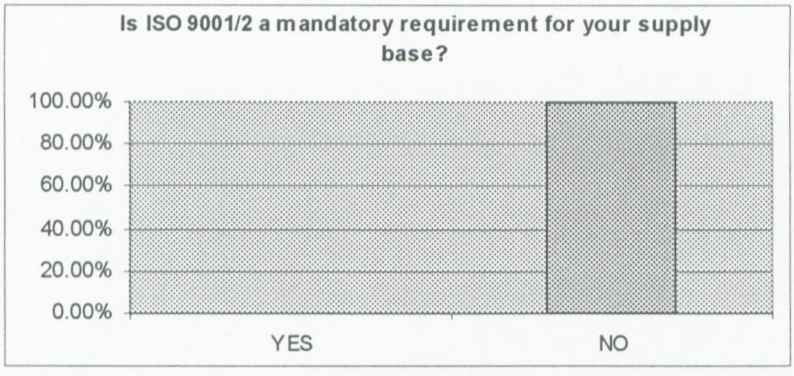
For the questions posed see chapter 4, table 4.2.

Graph 5.5: Question 1



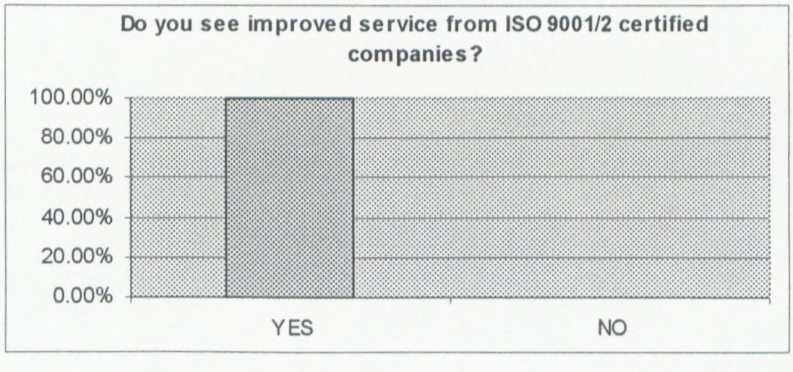
Neither of the second tier organizations were registered to the ISO 9000 standard.

Graph 5.6: Question 2



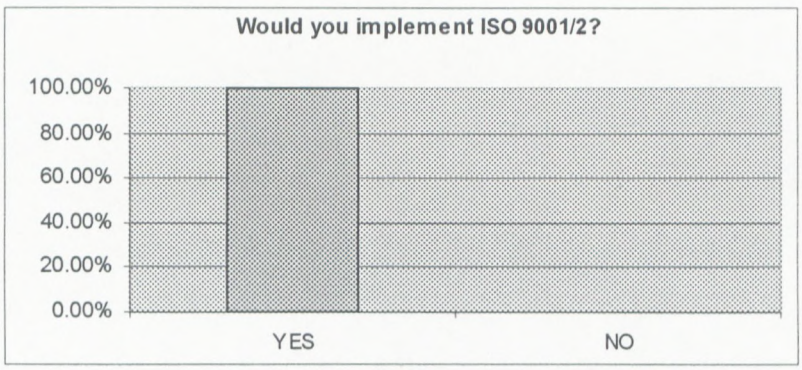
One hundred percent of the interviewees responded with a no to the question above. Neither of the second tier organizations requires that their suppliers have ISO 9001/2.

Graph 5.7: Question 3



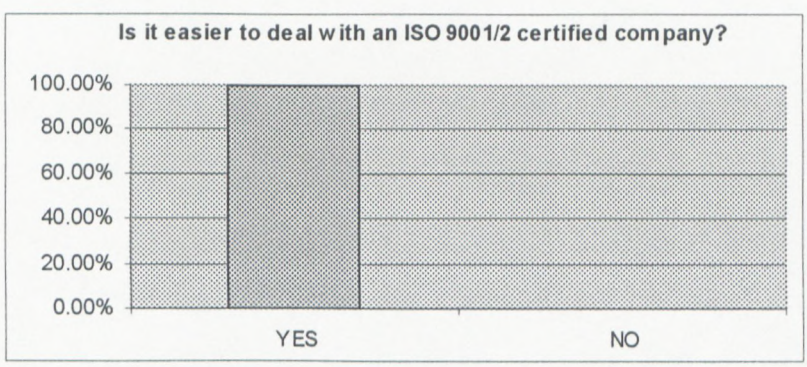
Although it is not a requirement for sub-suppliers to the second tier suppliers to have ISO 9000, those that do seem to provide better service overall.

Graph 5.8: Question 4



One of the organizations stated that they were considering implementation of a formal quality management system in the near future, while the other organization was still contemplating the benefit of implementing a formal quality management system.

Graph 5.9: Question 5



This question was for both the sub-suppliers and customers. In both instances the second tier suppliers indicated that it is easier to deal with organizations certified to ISO 9000.

5.5. GROUP THREE RESULTS AND ANALYSIS

Group Three consisted of those employees interviewed at third tier suppliers. One third tier organization was surveyed. Third tier organizations would be those that supply second tier organizations with raw materials or partially complete components. The third tier organization below is internationally established and supplies raw material to the second tier organization.

The following individuals were interviewed:

The Technical Manager

The Sales Manager

For the questions posed see chapter 4, table 4.2.

Third tier organizations had the same results as second tier organizations. These organizations may be "lower" down the supply chain but also see the benefits of having a formal quality management system, as well as dealing with sub-suppliers and customers who have formal quality management systems.

5.6. GROUP FOUR RESULTS AND ANALYSIS

Group Four consisted of those employees at customer organisations. Two customer organizations were surveyed.

The following individuals were interviewed:

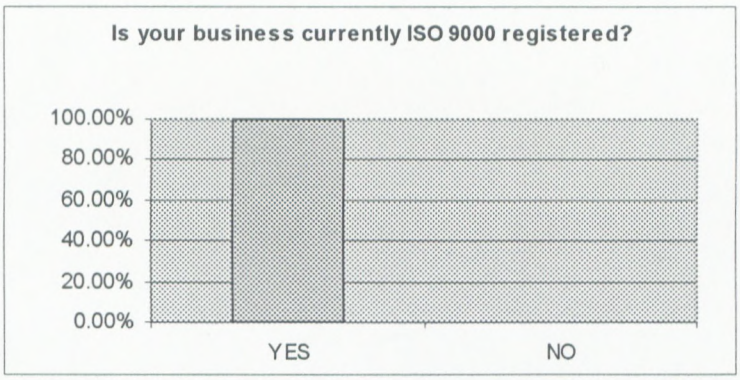
The Product Engineer

The Supplier Technical Assistance Engineer

The Senior Supplier Technical Assistance Engineer

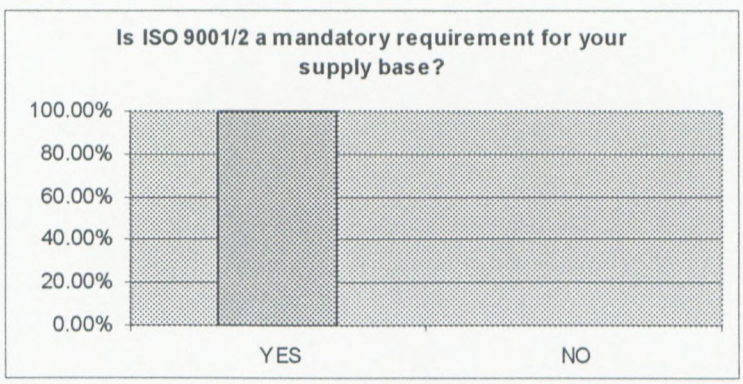
For the questions posed see chapter 4, table 4.3.

Graph 5.10: Question 1



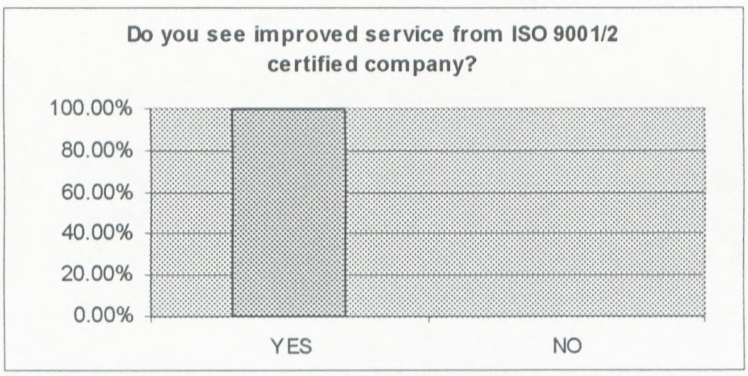
One hundred percent of the interviewees responded with a yes to the question above. Both organizations were certified to ISO 9001. All OEMs in South Africa must have a formal quality management system in place.

Graph 5.11: Question 2



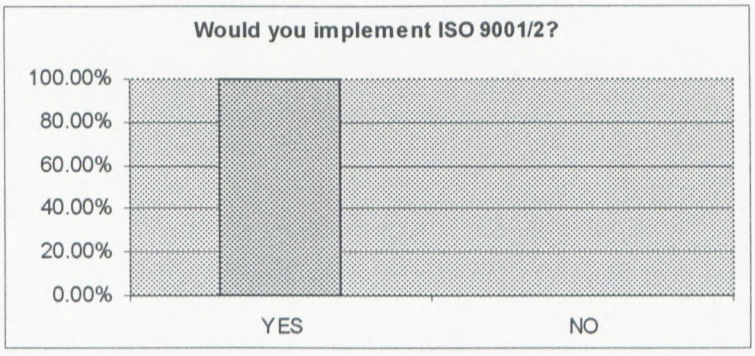
One hundred percent of the interviewees responded with a yes to the question above. Both organizations required suppliers to have a formal quality management system such as ISO 9001 or 9002.

Graph 5.12: Question 3



One hundred percent of the interviewees responded with a yes to the question above. Both organizations indicated that they received improved service from suppliers who have ISO 9001 or 9002. Many of the OEMs have Supplier Technical Assistants (STA) or Supplier Quality Assistants (SQA) who support the first tier suppliers in developing effective quality management systems.

Graph 5.13: Question 4



This question was posed in the event that the individual being interviewed left the organization and started his / her own company. One hundred percent of the

interviewees responded with a yes to the question above. All interviewees indicated that they would implement a formal quality management system.

5.7. RESULTS SUMMARY

A total of thirteen individuals were interviewed from four groups, representing various levels of the supply chain. The results from group one, which represented the first tier supplier or Omnigraphics, showed that having ISO 9001 is essential for the organizations growth and supply status to the automotive industry. The results also showed that having a formal quality management system assists with daily operational activities. Group two and group three represented second and third tier organizations respectively. Although neither had current certified quality management systems in place, both were committed to establishing formal systems. Both tiers recognized the improved service received from organizations with formal quality management systems. Group four consisted of customer organizations. The results illustrated that it was mandatory for suppliers to have an established quality management system. They also highlighted the improved service received from suppliers with formal quality management systems.

For some second and third tier organizations, implementing the ISO 9000 standard will take some strategic decisions and time. However, results above show the improved performance and benefits that are central in assisting these second and third tier organizations in making the correct decisions.

5.8. OMNIGRAPHICS AFTER ISO CERTIFICATION

Chapter three, section 3.3 describes the influence ISO 9001 had on Omnigraphics Industrial.

The relational diagram, (Fig 3.2) in chapter three, shows that before the implementation of ISO 9001 a "we-they" culture had existed. This seemed to be the biggest challenge or concern that the organization had to work through. Listed below are the issues faced by Omnigraphics as well as the effect ISO 9001 has had on eliminating these challenges. By implementing the twenty elements of ISO 9000 most of the causes of the "we-they" culture could be solved.

No effective dialogue between management and workers

The ISO 9001 system assists with spreading the long and short-term strategy of the organization, which assists with all levels understanding the direction in which the organization is moving. The 9001 standard states that, "*The suppliers management with executive responsibility shall define and document its quality policy...*" It goes further, "*The supplier shall ensure that this policy is understood, implemented and maintained at all levels of the organization.*" (1994:2)

Omnigraphics has developed a quality policy that is understood throughout the organization. Each employee understands the need for quality products and service. The quality management system has acted

as a common platform from which all employees, both new and old can work from.

No or poor production planning

The 9001 standard has a number of clauses, which relate to the planning element of production. Contract review, clause 4.3, looks at the product or service from the customers perspective. What are the required specifications? How will information be fedback to the customer so as to keep them informed of progress?

Design control, clause 4.4, focuses on design and development planning, reviewing the design and verification of the design.

Omnigraphics has developed a formal approach to managing contracts. Cross functional teams, made up of various individuals from different departments, are brought together to ensure that the product can be manufactured on time and to the correct specifications.

Undefined manufacturing strategy

ISO 9001 gives clear guidelines on the establishment of an effective manufacturing process. The Quality system, clause 4.2, found in the ISO 9001 standard, places most of its emphasis on quality planning. Section 4.2.3, focuses on strategic elements of manufacturing such as quality plans, resources such as equipment and specific skills as well as clarification of standards of acceptability.

Omnigraphics has developed a quality plan or control plan, which defines the various stages of manufacturing and the key characteristics to be focused on. It also identifies the control techniques to eliminate any non conforming products.

No shared vision

The quality policy, clause 4.1.1, of the ISO 9001 standard ensures that the organisations vision is defined and that the organizations commitment to quality is established and understood by all.

Omnigraphics has an established quality policy that is explained to all employees. This policy describes the organizations commitment to manufacturing quality products and to exceed customer expectations.

Organisational communication problems and Poor communication

The ISO 9001 standard can only be implemented effectively when all role players understand what their contribution entails. Management should take all necessary measures to ensure that its quality policy is understood, implemented and reviewed, at all levels of the organization. Communication is improved using training workshops, monthly management reviews and shop floor feedback sessions.

Omnigraphics uses an annual training schedule, which covers various levels of training. The training assists in improving the understanding of quality for all employees and helps bridge the communication gaps.

Customer satisfaction perception problems

Contract review, as was explained above, ensures that the customers requirements are adequately defined and that the process is capable of producing the product to the correct specification. By achieving this, the customer will have a high level of confidence in the supply organization.

Too much focus on quality programs at the expense of other strategies

The ISO 9001 is more than a quality program; it is a system, which incorporates all elements of the organization with the ultimate aim of achieving organizational objectives. ISO 9004-1 (v:0.2) explains this principle. "In order to meet its objectives, an organization should ensure that the technical, administrative and human factors affecting quality of its products will be under control....All such control should be orientated towards the reduction, elimination and, most importantly, prevention of nonconformities."

Omnigraphics uses the quality management system tools such as procedures and work instructions to define the correct way in which work should be performed. If employees understand the correct way of operating then there will be a reduction in non conforming products and a positive effect on the bottom line.

Threat of negative unionization

The implementation of the ISO 9001 system aims at making the operating environment as user friendly as possible. Clear work instructions should be explained to the operators who are then able to perform their jobs effectively. An employee who has been trained and is given clear work instructions is able to perform the job better. Coupled to this is the organizational openness, which is recommended by the standard. A work force that is kept up to date with organizational direction and strategy will be at an advantage and feel part of the process of transformation.

As was mentioned above, Omnigraphics offers training and clear operational guidelines to assist employees to do their jobs more efficiently.

Conflicts of reward systems

The ISO guideline 9004-01 (18.3.4:21), states, "*Where appropriate, objective and accurate means of measuring quality achievements should be developed. These may be publicized to let personnel see for themselves what they, as a group or as individuals, are achieving. Recognition of performance should be provided.*" This clause is highlighting the importance of recognized performance appraisal systems in order to make accurate and fair performance evaluations.

Omnigraphics has clear operational measurables which are displayed on a daily basis. All employees can therefore see their current performance levels and improve where necessary through support and guidance.

Resistance to change

In order to minimize the resistance to change there needs to be openness between management and workers. The guideline document, ISO 9004-1 (1994:21), states that, "*Motivation of personnel begins with their understanding of the tasks they are expected to perform and how those tasks support the overall activities.* " Understanding what is expected and why it should be done, assists in reducing the resistance to change.

Omnigraphics has a clear induction program which explains what is required of all new employees. Permanent staff undergo regular revision groups, focusing on operational fundamentals. This helps in reducing the fear and stress of change.

Non – identification of training needs

ISO 9001 also places emphasis on training of personnel. Element 4.18 in the ISO 9001 standard (1994:10), requires "*the supplier to establish and maintain documented procedures for identifying training needs*". The guideline document, ISO 9004-1 (1994:20), states: "*Appropriate training should be provided to all levels of personnel within the organization performing activities affecting quality.*"

Omnigraphics has a clear annual training programme which identifies each departments training needs and the appropriate service provider.

No teamwork

The ISO 9000 system is not a system for the workers or shop floor personnel only, it is a company wide system, one that pulls together all resources to ensure a final product, which meets and exceeds the customers expectations.

The standard aims at creating a team approach, which involves members from marketing, design, testing and shipping. The cross-functional team approach allows for a range of ideas and solutions.

Through training and regular workshops all employees at Omnigraphics understand the importance of working as a team. Without the full commitment of all members, customer requirements would not be met.

The implementation of ISO 9001 has assisted Omnigraphics with overcoming a number of organizational challenges. With manufacturing being a dynamic environment the quality system needs to be constantly modified to meet with the changing needs of the customer and technology.

5.9. CONCLUSION

Chapter six looks at the eight quality management principles on which the quality management system standards of the revised ISO 9000:2000 series are based. It then looks at the new 9000:2000 series and finally a simple model for improvement.

CHAPTER 6

6.1. INTRODUCTION

Chapter 6 looks at the new ISO 9001:2000 system. The old standard terminates on the 15 December 2003 where-after it will be replaced by the new standard. Therefore within the context of this study it is imperative to start by looking at the eight principles and the associated benefits. The chapter then looks at the future of ISO 9000. It then focuses on the new series and finally addresses the systemic requirements of ISO 9001:2000, which are described by simply elaborating on each element. The eight principles and systemic requirements are presented primarily as individual points, in order to enable the reader to use the report as a checklist for preparation of implementing the new standard, within the company context.

6.2. THE EIGHT QUALITY MANAGEMENT PRINCIPLES

There are eight quality management principles on which the quality management system standards of the revised ISO 9000:2000 series are based. These principles can be used by senior management as a framework to guide their organizations towards improved performance. The principles are derived from the collective experience and knowledge of the international experts who participate in ISO Technical Committee ISO/TC 176, quality management and quality assurance, that is responsible for developing and maintaining the ISO 9000 standards.

Below follows the eight principles as described by the ISO (2003). It also gives examples of the benefits derived from their use and of actions that managers typically take in applying the principles to improve their organizations' performance.

Principle 1 Customer focus

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

Key benefits:

Increased revenue and market share obtained through flexible and fast responses to market opportunities.

Increased effectiveness in the use of the organization's resources to enhance customer satisfaction.

Improved customer loyalty leading to repeat business.

Applying the principle of customer focus typically leads to:

Researching and understanding customer needs and expectations.

Ensuring that the objectives of the organization are linked to customer needs and expectations.

Communicating customer needs and expectations throughout the organization.

Measuring customer satisfaction and acting on the results.

Systematically managing customer relationships.

Ensuring a balanced approach between satisfying customers and other interested parties (such as owners, employees, suppliers, financiers, local communities and society as a whole).

Principle 2 Leadership

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

Key benefits:

People will understand and be motivated towards the organization's goals and objectives.

Activities are evaluated, aligned and implemented in a unified way.

Miscommunication between levels of an organization will be minimized.

Applying the principle of leadership typically leads to:

Considering the needs of all interested parties including customers, owners, employees, suppliers, financiers, local communities and society as a whole.

Establishing a clear vision of the organization's future.

Setting challenging goals and targets.

Creating and sustaining shared values, fairness and ethical role models at all levels of the organization.

Establishing trust and eliminating fear.

Providing people with the required resources, training and freedom to act with responsibility and accountability.

Inspiring, encouraging and recognizing people's contributions.

Principle 3 Involvement of people

People at all levels are the essence of an organization and their full involvement enables their abilities to be used for the organization's benefit.

Key benefits:

Motivated, committed and involved people within the organization.

Innovation and creativity in furthering the organization's objectives.

People being accountable for their own performance.

People eager to participate in and contribute to continual improvement.

Applying the principle of involvement of people typically leads to:

People understanding the importance of their contribution and role in the organization.

People identifying constraints to their performance.

People accepting ownership of problems and their responsibility for solving them.

People evaluating their performance against their personal goals and objectives.

People actively seeking opportunities to enhance their competence, knowledge and experience.

People freely sharing knowledge and experience.

People openly discussing problems and issues.

Principle 4 Process approach

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

Key benefits:

Lower costs and shorter cycle times through effective use of resources.

Improved, consistent and predictable results.

Focused and prioritized improvement opportunities.

Applying the principle of process approach typically leads to:

Systematically defining the activities necessary to obtain a desired result.

Establishing clear responsibility and accountability for managing key activities.

Analysing and measuring of the capability of key activities.

Identifying the interfaces of key activities within and between the functions of the organization.

Focusing on the factors such as resources, methods, and materials that will improve key activities of the organization.

Evaluating risks, consequences and impacts of activities on customers, suppliers and other interested parties.

Principle 5 System approach to management

Identifying, understanding and managing interrelated processes as a system contributes to the organization's effectiveness and efficiency in achieving its objectives.

Key benefits:

Integration and alignment of the processes that will best achieve the desired results.

Ability to focus effort on the key processes.

Providing confidence to interested parties as to the consistency, effectiveness and efficiency of the organization.

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

Structuring a system to achieve the organization's objectives in the most effective and efficient way.

Understanding the interdependencies between the processes of the system.

Structured approaches that harmonize and integrate processes.

Providing a better understanding of the roles and responsibilities necessary for achieving common objectives and thereby reducing cross-functional barriers.

Understanding organizational capabilities and establishing resource constraints prior to action.

Targeting and defining how specific activities within a system should operate.

Continually improving the system through measurement and evaluation.

Principle 6 Continual improvement

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

Key benefits:

Performance advantage through improved organizational capabilities.

Alignment of improvement activities at all levels to an organization's strategic intent.

Flexibility to react quickly to opportunities.

Applying the principle of continual improvement typically leads to:

Employing a consistent organization-wide approach to continual improvement of the organization's performance.

Providing people with training in the methods and tools of continual improvement.

Making continual improvement of products, processes and systems an objective for every individual in the organization.

Establishing goals to guide, and measures to track, continual improvement.

Recognizing and acknowledging improvements.

Principle 7 Factual approach to decision making

Effective decisions are based on the analysis of data and information

Key benefits:

Informed decisions.

An increased ability to demonstrate the effectiveness of past decisions through reference to factual records.

Increased ability to review, challenge and change opinions and decisions.

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

Ensuring that data and information are sufficiently accurate and reliable.

Making data accessible to those who need it.

Analysing data and information using valid methods.

Making decisions and taking action based on factual analysis, balanced with experience and intuition.

Principle 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

Key benefits:

Increased ability to create value for both parties.

Flexibility and speed of joint responses to changing market or customer needs and expectations.

Optimization of costs and resources.

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

Establishing relationships that balance short-term gains with long-term considerations.

Pooling of expertise and resources with partners.

Identifying and selecting key suppliers.

Clear and open communication.

Sharing information and future plans.

Establishing joint development and improvement activities.

Inspiring, encouraging and recognizing improvements and achievements by suppliers.

There are many different ways of applying these quality management principles. The nature of the organization and the specific challenges it faces will determine how to implement them. Many organizations will find it beneficial to set up quality management systems based on these principles.

6.3. THE NEW ISO 9000:2000 SERIES

The main reason for the year 2000 revision to the ISO 9000 standards is to give users the opportunity to add value to their activities and to improve their performance continually by focusing on the major processes within the organization.

Extensive surveys were performed on a world-wide basis to understand the needs of all users of the quality management system standards. The new

revisions took into account previous experience with quality management system standards (1987 and 1994 editions) and emerging insights into generic management systems. They resulted in a closer alignment of quality management systems with the needs of organizations and better reflect the way organizations run their business activities.

ISO directives also specify that standards be periodically revised to ensure that those standards are current and satisfy the needs of the global community.

The American Society for Quality (2003), stated that "*The major reasons for the year 2000 revisions of the standards include emphasizing the need to monitor customer satisfaction, meeting the need for more user-friendly documents, assuring consistency between quality management system requirements and guidelines, promoting the use of generic quality management principles by organizations, and enhancement of their compatibility with ISO 14001.*"

6.4. A MODEL FOR IMPROVEMENT

The ISO 9000:2000 series provides a model for improvement. Praxiom (2002) states that, "*The new ISO 9001 standard, is less prescriptive than the old standard. In general, the new standard tells you what to do not how to do it.*

This is particularly evident when you look at how many times procedures are required. When you compare the old and the new standard."

ISO uses a *process approach* to quality management. While the process approach is not new, the increased emphasis ISO now gives to it is new.

a quality management system can be thought of as a single large *process* that uses many *inputs* to generate many *outputs*. This large process is, in turn, made up of many smaller processes. Each of these processes uses inputs from other processes to generate outputs which, in turn, are used by still other processes.

ISO 9001:2000 Quality Management System is made up of at least 21 processes.

These 21 processes are listed below:

1. Quality Management Process
2. Resource Management Process
3. Regulatory Research Process
4. Market Research Process
5. Product Design Process
6. Purchasing Process
7. Production Process
8. Service Provision Process
9. Product Protection Process
10. Customer Needs Assessment Process
11. Customer Communications Process
12. Internal Communications Process
13. Document Control Process
14. Record Keeping Process
15. Planning Process
16. Training Process

17. Internal Audit Process
18. Management Review Process
19. Monitoring and Measuring Process
20. Nonconformance Management Process
21. Continual Improvement Process

In order to develop a quality management system that meets the new ISO 9001:2000 standard, you must create or modify each of the above processes. This means you must:

1. Develop each process.
2. Document each process.
3. Implement each process.
4. Monitor each process.
5. Improve each process.

Each process uses *inputs* to generate *outputs*, and all of these processes are interconnected using these *input-output relationships*. The output from one process becomes the input for other processes.

general types of inputs/outputs:

- Products
- Services
- Information
- Documents
- Reports

- Records

ISO 9001:2000 Quality Management system is made up of many processes, and these processes are *glued together* by means of many input-output relationships. These input-output relationships turn a simple list of processes into an *integrated system.*

In order to have a successful system one needs to make sure that the systemic requirements of ISO 9001:2000 are met. There are five requirements. These are Systemic (element 4), Management (element 5), Resource (element 6), Realisation (element 7) and Remedial (element 8). Praxiom (2002), describes these below in more detail.

4 Systemic Requirements

4.1Establish your quality system

Develop the quality management system

Identify the processes that make up your quality system.

Describe the quality management processes.

Implement the quality management system

Use quality system processes.

Manage process performance.

Improve the quality management system

Monitor process performance.

Improve process performance.

4.2 Document your quality system

4.2.1 Develop quality system documents

Develop documents to implement your quality system.

Develop documents that reflect what your organization does.

4.2.2 Prepare quality system manual

Document the procedures.

Describe how your processes interact.

Define the scope of the quality system.

4.2.3 Control quality system documents

Approve documents before distributing them.

Provide the correct version of documents at points of use.

Review and re-approve documents whenever they are updated.

Specify the current revision status of the documents.

Monitor documents that come from external sources.

Prevent the accidental use of obsolete documents.

Preserve the usability of the quality documents.

4.2.4 Maintain quality system records

Use your records to prove that requirements have been met.

Develop a procedure to control the records.

Ensure that the records are useable.

5 Management Requirements

5.1 Support quality

Promote the importance of quality

Promote the need to meet customer requirements.

Promote the need to meet regulatory requirements.

Promote the need to meet statutory requirements.

Develop a quality management system

Support the development of a quality system.

Formulate the organization's quality policy.

Set your organization's quality objectives.

Provide quality resources.

Implement the quality management system

Provide resources to implement the quality system.

Encourage personnel to meet quality system requirements.

Improve the quality management system

Perform quality management reviews.

Provide resources to improve the quality system.

5.2 Satisfy your customers

Identify customer requirements

Expect the organization to identify customer requirements.

Meet the customers' requirements

Expect the organization to meet customer requirements.

Enhance customer satisfaction

Expect the organization to enhance customer satisfaction.

5.3 Establish a quality policy

Define the organization's quality policy

Ensure that it serves the organization's purpose.

Ensure that it emphasizes the need to meet requirements.

Ensure that it facilitates the development of quality objectives.

Ensure that it makes a commitment to continuous improvement.

Manage the organization's quality policy

Communicate the policy to your organization.

Review the policy to ensure that it is still suitable.

5.4 Carry out quality planning

5.4.1 Formulate your quality objectives

Ensure that objectives are set for functional areas.

Ensure that objectives are set at organizational levels.

Ensure that objectives facilitate product realization.

Ensure that objectives support the quality policy.

Ensure that objectives are measurable.

5.4.2 Plan your quality management system

Plan the development of the quality management system.

Plan the implementation of the quality management system.

Plan the improvement of the quality management system.

Plan the modification of the quality management system.

5.5 Control your quality system

5.5.1 Define responsibilities and authorities

Clarify responsibilities and authorities.

Communicate responsibilities and authorities.

5.5.2 Appoint management representative

Oversee the quality management system.

Report on the status of the quality management system.

Support the improvement of the quality management system.

5.5.3 Support internal communications

Ensure that internal communication processes are established.

Ensure that communication occurs throughout the organization.

5.6 Perform management reviews

5.6.1 Review quality management system

Evaluate the performance of the quality system.

Evaluate whether the quality system should be improved.

5.6.2 Examine management review inputs

Examine audit results.

Examine product conformity data.

Examine opportunities to improve.

Examine feedback from customers.

Examine process performance information.

Examine corrective and preventive actions.

Examine changes that might affect the system.

Examine previous quality management reviews.

5.6.3 Generate management review outputs

Generate actions to improve the quality system.

Generate actions to improve the products.

Generate actions to address resource needs.

6 Resource Requirements

6.1 Provide quality resources

Identify quality resource requirements

Identify resources needed to support the quality system.

Identify resources needed to improve customer satisfaction.

Provide quality system resources

Provide resources needed to support the quality system.

Provide resources needed to improve customer satisfaction.

6.2 Provide quality personnel

6.2.1 Use competent personnel

Ensure that the personnel have the right experience.

Ensure that the personnel have the right education.

Ensure that the personnel have the right training.

Ensure that the personnel have the right skills.

6.2.2 Support competence

Define acceptable levels of competence.

Identify training and awareness needs.

Deliver training and awareness programs.

Evaluate effectiveness of training and awareness.

Maintain a record of competence.

6.3 Provide quality infrastructure

Identify infrastructure needs

Identify building needs.

Identify workspace needs.

Identify hardware needs.

Identify software needs.

Identify utility needs.

Identify equipment needs.

Identify support service needs.

Provide needed infrastructure

Provide needed buildings.

Provide needed workspaces.

Provide needed hardware.

Provide needed software.

Provide needed utilities.

Provide needed equipment.

Provide needed support services.

Maintain the infrastructure

Maintain the buildings.

Maintain the workspaces.

Maintain the hardware.

Maintain the software.

Maintain the utilities.

Maintain the equipment.

Maintain the support services.

6.4 Provide quality environment

Identify needed work environment

Identify factors needed to ensure products meet requirements.

Manage needed work environment

Manage factors needed to ensure products meet requirements.

7 Realization Requirements

7.1 Control realization planning

Plan product realization processes

Define product quality objectives and requirements.

Identify product realization needs and requirements.

Develop product realization processes

Develop product realization documents.

Develop product realization record keeping systems.

Develop methods to control quality during product realization.

7.2 Control customer processes

7.2.1 Identify customers' product requirements

Identify the requirements that customers want the organization to meet.

Identify the requirements that are dictated by the product's use.

Identify the requirements that are imposed by external agencies.

Identify the requirements that the organization wishes to meet.

7.2.2 Review customers' product requirements

Review requirements before accepting orders from customers.

Maintain a record of the product requirement reviews.

Control changes in product requirements.

7.2.3 Communicate with your customers

Develop a process to control communications with customers.

Implement the customer communications process.

7.3 Control product development

7.3.1 Plan design and development

Define the product design and development stages.

Clarify design and development responsibilities and authorities.

Manage interactions between design and development groups.

Update the design and development plans as changes occur.

7.3.2 Define design and development inputs

Specify product design and development inputs.

Record product design and development input definitions.

Review product design and development input definitions.

7.3.3 Generate design and development outputs

Create product design and development outputs.

Approve design and development outputs prior to release.

Use design and development outputs to control product quality.

7.3.4 Carry out design and development reviews

Perform product design and development reviews.

Record product design and development reviews.

7.3.5 Perform design and development verifications

Carry out product design and development verifications.

Record product design and development verifications.

7.3.6 Conduct design and development validations

Perform product design and development validations.

Record product design and development validations.

7.3.7 Manage design and development changes

Identify changes in product design and development.

Record changes in product design and development.

Review changes in product design and development.

Verify changes in product design and development.

Validate changes in product design and development.

Approve changes before they are implemented.

7.4 Control purchasing function

7.4.1 Control purchasing process

Ensure that purchased products meet requirements.

Ensure that suppliers meet requirements.

7.4.2 Document product purchases

Describe the products being purchased.

Specify the requirements that must be met.

7.4.3 Verify purchased products

Verify purchased products at the organizations own premises.

Verify purchased products at suppliers' premises (when required).

7.5 Control operational activities

7.5.1 Control production and service provision

Control production and service processes.

Control production and service information.

Control production and service instructions.

Control production and service equipment.

Control production and service measurements.

Control production and service activities.

7.5.2 Validate production and service provision

Prove that special processes can produce planned outputs.

Prove that process personnel can produce planned results.

Prove that process equipment can produce planned results.

7.5.3 Identify and track your products

Establish the identity of the products (when appropriate).

Maintain the identity of the products (when appropriate).

Identify the status of the products (when appropriate).

Record the identity of the products (when required).

7.5.4 Protect property supplied by customers

Identify property supplied to the organization by the customers.

Verify property supplied to the organization by the customers.

Safeguard property supplied to the organization by the customers.

7.5.5 Preserve your products and components

Preserve products and components during internal processing.

Preserve products and components during final delivery.

7.6 Control monitoring devices

Identify monitoring and measuring needs

Identify the monitoring and measuring that should be done.

Select monitoring and measuring devices

Select devices that meet your monitoring and measuring needs.

Calibrate monitoring and measuring devices

Perform calibrations.

Record calibrations.

Protect monitoring and measuring devices

Protect the devices from unauthorized adjustment.

Protect the devices from damage or deterioration.

Validate monitoring and measuring software

Validate monitoring and measuring software before using it.

Revalidate monitoring and measuring software when necessary.

Use monitoring and measuring devices

Use devices to ensure that the products meet requirements.

8 Remedial Requirements

8.1 Perform remedial processes

Plan remedial processes

Plan how remedial processes will be used to assure conformity.

Plan how remedial processes will be used to improve the system.

Implement remedial processes

Use remedial processes to demonstrate conformance.

Use remedial processes to improve quality management system.

8.2 Monitor and measure quality

8.2.1 Monitor and measure customer satisfaction

Identify ways to monitor and measure customer satisfaction.

Monitor and measure customer satisfaction.

Use customer satisfaction information.

8.2.2 Plan and perform regular internal audits

Set up an internal audit program.

Develop an internal audit procedure.

Plan the internal audit projects.

Perform regular internal audits.

Solve problems discovered during audits.

Verify that problems have been solved.

8.2.3 Monitor and measure quality processes

Use suitable methods to monitor and measure your processes.

Take action when the processes fail to achieve planned results.

8.2.4 Monitor and measure product characteristics

Verify that product characteristics are being met.

Keep a record of product monitoring and measuring activities.

8.3 Control nonconforming products

Develop a procedure to control nonconforming products

Define how nonconforming products should be identified.

Define how nonconforming products should be handled.

Identify and control the nonconforming products

Eliminate or correct product nonconformities.

Prevent the delivery or use of nonconforming products.

Avoid the inappropriate use of nonconforming products.

Re-verify nonconforming products that were corrected

Prove that corrected products now meet requirements.

Control nonconforming products after delivery or use

Control events when you deliver or use nonconforming products.

Maintain records of nonconforming products

Describe the product nonconformities.

Describe the actions taken to deal with nonconformities.

8.4 Analyze quality information

Define quality management information needs

Define the information the organization needs to evaluate the quality system.

Define the information the organization needs to improve the quality system.

Collect quality management system data

Monitor and measure the suitability of the quality system.

Monitor and measure the effectiveness of the quality system.

Provide quality management information

Provide information about the customers.

Provide information about the suppliers.

Provide information about the products.

Provide information about the processes.

8.5 Make quality improvements

8.5.1 Improve quality management system

Use the audits to generate improvements.

Use the quality data to generate improvements.

Use the quality policy to generate improvements.

Use the quality objectives to generate improvements.

Use the management reviews to generate improvements.

Use the corrective actions to generate improvements.

Use the preventive actions to generate improvements.

8.5.2 Correct actual nonconformities

Review the nonconformities.

Figure out what causes the nonconformities.

Evaluate whether the organization needs to take corrective action.

Develop corrective actions to prevent recurrence.

Take corrective actions when they are necessary.

Record the results that the corrective actions achieve.

Examine the effectiveness of the corrective actions.

8.5.3 Prevent potential nonconformities

Detect potential nonconformities.

Identify the causes of potential nonconformities.

Study the effects of potential nonconformities.

Evaluate whether the organization needs to take preventive action.

Develop preventive actions to eliminate causes.

Take preventive actions when they are necessary.

Record the results that the preventive actions achieve.

Examine the effectiveness of the preventive actions.

6.5. CONCLUSION

If a quality management system is implemented and addresses the requirements above, then the system will have a high degree of success based on the correct implementation methodology.

Omnigraphics has recently put into place a project plan to address the new requirements of the ISO 9000:2000 standard. Implementation is scheduled for July 2003. The new standard will be audited and certified by an accredited body such as the SABS.

The final Chapter 7, sums up the research report with a brief look at the future of the ISO 9000 series and the keys for successful implementation.

CHAPTER 7

7.1. INTRODUCTION

Chapter 7 sums up the research report with a brief look at the future of the ISO 9000 series and the keys for successful implementation.

7.2. REVIEWING THE RESEARCH REPORT

This research report has covered a number of aspects relating to ISO 9000 and how it has influenced the way business is conducted in today's organizations.

Chapter one addressed the research topic, objectives and aim. It also laid out the research design and methodology.

Chapter two dealt with the literature review which focused on quality management systems, defining them, the benefits and research done on ISO 9000 implementation.

Chapter three focused on the organization under study, namely, Omnigraphics. The aim was to give the reader in site into Omnigraphics prior to ISO 9000 certification and the influence of ISO 9000 on the organization.

Chapter four addressed the research methodology. Key focal topics were research objectives, participants, the research questions and research analysis.

Chapter five primarily looked at data analysis and the results of the survey.

It also showed how Omnigraphics changed after ISO 9000 implementation.

Chapter six looked at the future of quality management systems and gave an in depth look at the requirements of the new standard.

7.3. THE FUTURE OF THE ISO 9000 SERIES

According to the 11th cycle of The ISO Survey of ISO 9000 and ISO 14000 Certificates (ISO, 2002), up to the end of December 2001, at least 510 616 ISO 9000 certificates had been awarded in 161 countries and economies, an increase of 101 985 certificates (+24,96%) over the end of December 2000, when the total stood at 406 631 in 157 countries. This is by far the highest increase recorded in all 11 cycles of the ISO survey carried out since January 1993. Of the ISO 9000 total, 44 388 were certificates of conformity to ISO 9001:2000. The revised standard therefore accounted for 43,53% of certificates awarded in 2001 and 8,70% of the overall total. These results show a clear trend in the popularity in the ISO 9000 series and a positive acceptance for the new revision, namely, ISO 9001:2000.

7.4. THE KEYS TO SUCCESSFUL IMPLEMENTATION

Implementing ISO 9001 is beneficial in two areas. Obviously the business and its systems will improve, often leading to significant cost savings. Staff working under the system should feel more motivated and involved.

Secondly, ISO 9001 gives assurance to outside bodies that a business is aware of quality at all levels. Attaining the standard can provide a first step in product certification, as well as present the company to the world market as 'one that means quality.'

Here4business (2003), states that: "*ISO9001 must become an integral element of management and will not operate as a separate entity.*" The first step for most

businesses is establishing a quality system for the standard required. The keys to a successful implementation will include:

Customer focus

Leadership

The involvement of people

A process approach

A system approach to management

Continual improvement

A factual approach to decision making

Mutually beneficial supplier relationships

Here4business (2003), goes further saying that: *"Literature is available to help implement the standard, although many businesses choose to appoint a consultant. Specialists with ISO9001 consultants' experience can help speed the process and avoid pitfalls. Some companies start by installing one section of the system for one aspect of the business."*

7.5. CONCLUSION

The ISO 9000 quality management system is only as effective as the team that manages it. In order for implementation to be successful, managers responsible for the role out of the system must make sure that they train employees to understand the benefits of the system.

A work force that is informed will support the system and make it a functioning and integrated part of the organization.

The quality management system should work for the organization; the organization should not work for the quality management system.

In closing, one must note, that although Omnigraphics, was investigated to determine the results, these cannot be generalised. This research report would warrant further investigation into other organisations that have implemented ISO 9000. In this instance it was found to be suitable for this organisation.

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