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AN INVESTIGATION INTO THE FACTORS AFFECTING ADOPTION OF NZS/ISO 9000
IN NEW ZEALAND AND THE BENEFITS GAINED BY CERTIFIED COMPANIES

**A THESIS PRESENTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
MASTERS OF TECHNOLOGY IN QUALITY SYSTEMS
AT
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ABSTRACT

It was believed that there was a lack of knowledge of the real factors that hindered or helped ISO 9000 implementation and that many companies set out to gain certification without a clear understanding of what resources are required, the factors that may hinder the implementation of ISO 9000, or the actual benefits they may achieve.

This thesis investigates the factors that affect the implementation of ISO 9000 in New Zealand, and the actual benefits gained. It is the result of personal discussion and correspondence with currently practicing quality consultants, and a survey sent to every certified company whose listing was available and to a random selection of non-certified companies in New Zealand.

Two objectives formed the foundation of this research. The first was to identify the factors that actually affect ISO 9000 implementation in New Zealand companies. This included factors that help and factors that hinder ISO 9000 implementation. The second was to determine the benefits that companies claim to derive from ISO 9000 implementation and certification.

The research was conducted in eight steps:

- i) A literature search was conducted in order to gain an understanding of the types of issues surrounding quality systems implementation and the possible benefits gained.
- ii) Letters were sent to Quality consultants currently practicing in New Zealand asking for their perspective and experience of the factors that affect ISO 9000 implementation and benefits actually gained.
- iii) Development of a self-administered survey questionnaire.
- iv) A pilot trial of the first draft of the survey questionnaire was conducted with intended local certified and non-certified survey recipients.
- v) The survey administered as a mail-out questionnaire directed to company managers. A total of 190 questionnaires were sent to certified companies, and 809 to currently non-certified companies.
- vi) Information collation, tabulation, and storage stage.
- vii) A follow-up survey of one hundred and nineteen companies of a similar distribution throughout New Zealand as the original non-certified sample was conducted to determine the intentions of those companies with regards to ISO 9000 implementation in order to verify that the non-certified survey responses that were received were not biased towards companies with an interest in ISO 9000.
- viii) Analysis and collation of the research findings.

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The factors found that actually affect ISO 9000 implementation in New Zealand companies in order of incidence are:

1. Company culture
2. Management commitment
3. Existing systems
4. Training
5. Complexity of operation
6. Resources
7. The facilitator
8. The market
9. Management practices
10. Degree of realisation of the benefits
11. Communication
12. Responsibility and authority definition
13. Business barriers
14. Customer
15. Magnitude
16. Suppliers
17. Planning
18. Scope

The benefits gained by companies certified to ISO 9000 in New Zealand in order of incidence are:

1. Enhanced existing systems
2. Market improvements
3. Reduction in total costs
4. Training
5. Formalisation of procedures
6. Employee Benefits and Company Culture
7. Communication
8. Definition of Responsibility/Authority
9. Technology
10. Resources
11. Continuous Improvement and TQM¹
12. Product and/or Service Quality

Future benefits expected by certified companies (post-certification) as a result of ISO 9000 implementation and certification, in order of incidence are:

1. Market improvements
2. Continuous improvement and Total Quality Management
3. Reduced total costs
4. Improved management practices
5. Surveillance audits ensuring continued internal compliance to procedures
6. Employee benefits

This study was conducted with the sponsorship of KPMG Peat Marwick in an effort to address the growing need to understand the factors that affect the implementation of ISO 9000, and the benefits to be gained, and is aimed towards gaining better control of the implementation process.

Footnote

1. TQM is an abbreviation for Total Quality Management

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TABLE OF CONTENTS

SECTION	CONTENTS	PAGE
	ACKNOWLEDGMENTS	4
	TABLE OF CONTENTS	6
	LIST OF FIGURES AND TABLES	7
1	INTRODUCTION	10
1.1	Objectives	10
1.2	Method	10
1.3	Responses Received	13
2	LITERATURE SEARCH, AND THE EXPERIENCES OF PRACTICING QUALITY CONSULTANTS IN NEW ZEALAND	14
2.1	Factors that Affect ISO 9000 Implementation	14
2.2	Benefits	28
2.3	Summary of the Factors that Affect ISO 9000 Implementation and Benefits Gained according to a Literature Search and Practicing Quality Consultants in New Zealand	31
3	SURVEY FINDINGS - CERTIFIED AND NON-CERTIFIED COMPANIES	34
3.1	Characteristics of the Survey Respondents	34
3.2	Awareness of ISO 9000	38
3.3	Reasons for Implementing, and Not Implementing, ISO 9000	41
3.4	Factors that Affect Implementation of ISO 9000	45
3.5	Benefits	67
3.6	The Certification Agent	85
3.7	Quality Structure	90
3.8	Total Quality Management	97
3.9	Advice to Companies Considering Certification to ISO 9000	101
3.10	Summary of the Factors that Affect ISO 9000 Implementation and Benefits Gained according to the Certified Companies in New Zealand	108
4	CONCLUSION	118
	REFERENCES	122
	BIBLIOGRAPHY	127
	APPENDICES	128
	APPENDIX 1 LIST OF SURVEY RESPONDENTS	128
	APPENDIX 2 EXAMPLES OF SURVEYS SENT	136
	APPENDIX 3 TABLES OF RESULTS	159

LIST OF FIGURES AND TABLES

TABLES IN TEXT

TABLE No.	TITLE	PAGE
1	Responses Received	13
2	Survey Responses Received	34
3	Reasons for Implementing ISO 9000	41
4	Significant Factors that Help ISO 9000 Implementation	46
5	Significant Factors that Hinder ISO 9000 Implementation	46
6	Factors that Helped and Hindered ISO 9000 Implementation	58
7	Factors that Helped Implementation of ISO 9000 in New Zealand	59
8	Factors that Hindered Implementation of ISO 9000 in New Zealand	59
9	Factors Ranked in Order of Perceived Affect on Implementation	60
10	Ranking Elements of ISO 9000 for Ease of Implementation	64
11	Advice to a Company Considering Certification to ISO 9000	101

FIGURES IN TEXT AND APPENDIX 3

FIGURE No.	TITLE	PAGE
1	Size of Companies	35
2	Age of Companies	35
3	Respondents Title	37
4	Intentions with Regards to ISO 9000 Implementation	39
5	Level of ISO 9000 Sought	40
6	Motives for Implementing ISO 9000	42
7	Proportions of Enlightened (Want to) versus Desperate (Have to/Need to)	43
8	Proportions of Enlightened (Want to) versus Desperate (Have to)	43
9	Factors that Helped or Hindered ISO 9000 Implementation for Certified Companies	47
10	Factors Ranked in order of Perceived Affect on Implementation	60
11	Did Implementation of ISO 9000 conflict with other activities on site?	62
12	Ranking Elements of ISO 9000 for Ease of Implementation	64
13	Significant Benefits from Certification to ISO 9000	67
14	Benefits gained during the Implementation Process	70
15	Future Benefits Expected from ISO 9000	73
16	Problems solved as a result of Implementation of ISO 9000	75
17	Causes of Quality related problems remaining after Certification	78
18	Did Corrective Action, Management Review, etc Actually Improve the Quality of their Product or Service?	82
19	Does Implementation of ISO 9000 Greatly Improve the Company?	83
20	Did the Certification Agency Help?	85
21	Behaviour of the Certification Agency	87
22	Do they have a Quality Assurance Department?	90
23	To whom does the "Quality Assurance Manager" report?	91
24	Who is responsible for Quality?	92
25	Help from a Consultant?	93
26	Who wrote the procedures?	95
27	Who wrote the Procedures versus Number of Employees (Size)	96
28	Do they currently follow Total Quality Management Philosophies?	98
29	Is Certification the beginning of Total Quality Management?	98
30	Future Intentions regarding Quality?	99
31	Advice to a Company Considering Certification to ISO 9000	101
32	Business Classification (in Appendix 3)	162

TABLES IN APPENDIX 3

TABLE No.	TITLE
1	Responses Received
2	Size of Companies
3	Age of Companies
4	Business Line
5	Business Type
6	Location
7	Respondents Title
8	Have Non-Certified Companies Heard of ISO 9000?
9	ISO 9000 Certification Status
10	Time until Certification for Non-Certified Companies intending to implement ISO 9000
11	Reasons for Implementing ISO 9000
12	"The Enlightened (Want to) and the Desperate (Have to/Need to)"
13	Reasons for <u>not</u> Implementing ISO 9000
14	Factors that <u>Help</u> ISO 9000 Implementation
15	Factors that <u>Hinder</u> ISO 9000 Implementation
16	Factors Ranked in order of Perceived Affect on Implementation
17	Did Implementation of ISO 9000 conflict with other activities on site?
18	Ranking Elements of ISO 9000 for Ease of Implementation
19	Benefits from Certification to ISO 9000
20	Benefits gained during the Implementation Process
21	Future Benefits Expected from ISO 9000
22	Problems solved as a result of Implementation/Certification to ISO 9000
23	Causes of Quality related problems remaining after Certification
24	Did Implementation of ISO 9000 Improve the Quality of their Product or Service?
25	Did ISO 9000 Implementation Actually Improve the Company?
26	Did the Certification Agency Help?
27	Behaviour of the Certification Agency
28	Do they have a Quality Assurance Department?
29	To whom does the "Quality Assurance Manager" report?
30	Who is responsible for Quality?
31	Help from a Consultant?
32	Who Wrote the Procedures?
33	Who Wrote the Procedures versus Number of Employees (Size)
34	Have they heard of Total Quality Management?
35	Do they currently follow Total Quality Management Philosophies?
36	Is Certification the beginning of Total Quality Management?
37	Future Intentions regarding Quality
38	Advice to a Company Considering Certification to ISO 9000
39	Follow-up Survey Intentions with Regards to ISO 9000

1 INTRODUCTION

This research provides a quantifiable measure of the factors that affect implementation of ISO 9000, and the benefits gained, in New Zealand.

In the 1980's many companies realised that Quality was a major strategic issue in terms of its ability to serve as a powerful marketing strategy and a tool for product and process improvement. By September 1992 more than 190 companies in New Zealand were registered to ISO 9000, with a current estimate provided by the results of this research indicating that up to as many as seventy five percent of all New Zealand companies are currently in the process of implementing ISO 9000 or considering the implementation of ISO 9000 with the aim of certification within the next five years. As a result there is a growing need for understanding and appreciation of the resources required to implement ISO 9000 and the actual benefits to be gained. This paper examines the factors that hinder and help ISO 9000 implementation and looks at the actual benefits New Zealand companies claimed to have gained.

1.1 OBJECTIVES

Two main objectives formed the foundation of this research. The first was to identify the factors that affect ISO 9000 implementation in New Zealand companies. This included factors that help and factors that hinder ISO 9000 implementation. The second was to determine the benefits from ISO 9000 implementation that companies were actually gaining.

Constraints included firstly the need for confidentiality. It was realised that the strictest of confidentiality must be maintained and anonymity assured to participants in order to protect any information provided which may be commercially sensitive, and to ensure its disclosure.

The second constraint initially was a restriction on funding available for covering expenses such as printing, materials, postage, and travel. This was overcome with the sponsorship by KPMG Peat Marwick, Management Consultants [79].

1.2 METHOD

The research was conducted in eight steps:

1.2.1 Literature Search

An extensive literature search was conducted at the Massey University library in order to gain an understanding of the types of issues surrounding quality systems implementation and the possible benefits being gained. The results of the literature search are given in Section 2.

1.2.2 Perspective's of Practicing Quality Consultants in New Zealand

Initially letters were sent to all currently practicing Quality consultants in New Zealand listed in the Telarc "Quality Services Directory" [80]. Other currently practicing Quality consultants contacted that were not listed in the directory were identified through supervisory assistance and personal discussion and correspondence. The consultants were asked for their

perspective and experience of the factors that affect ISO 9000 implementation and actual benefits gained. This provided a foundation of knowledge based on experience that highlighted the key areas of interest and together with the literature search findings established the foundation for the third part of the investigation.

The analysis of the results of this investigation is given in Section 2 together with the literature search findings.

1.2.3 Questionnaire Design

This involved the planning and formulation of a self-administered survey questionnaire with due consideration of structure, the elimination of bias, unambiguous wording of questions, and rating scales to be used. The questionnaire was constructed using guidelines from three books [72,73,74] and with assistance from Professor M. Earle [75] who reviewed the initial draft.

Two questionnaire formats were constructed. The first was specifically designed for certified recipients and targeted what factors helped and hindered ISO 9000 implementation, and the benefits gained, from their experience. The only variant in this questionnaire format was in Question 5 which varied in scope according to whether the targeted recipient was certified to ISO 9001, ISO 9002, or ISO 9003.

The second questionnaire format was specifically designed for non-certified recipients and targeted what factors were expected to help and hinder ISO 9000 implementation, and the anticipated benefits to be gained. This format contained essentially the same questions as in the questionnaire designed for certified companies but the questions were phrased in the present tense.

The questionnaires investigated the following areas:

Certified companies:

- Level of ISO 9000 adopted
- Factors that helped ISO 9000 implementation
- Factors that hindered ISO 9000 implementation
- Ranking of the elements of ISO 9000 according to ease of implementation
- Problems solved as a result of Quality System implementation
- Causes of Quality Problems that remain after ISO 9000 implementation
- Benefits experienced from ISO 9000 implementation and certification
- Future benefits expected
- Behaviour of, and assistance from, the certification agency used
- Any realisation of improvement as a result of ISO 9000 implementation
- Who is considered responsible for Quality in their company
- Whether a Quality Assurance department existed, and if so where it is placed in the company structure
- How and by whom the Quality system procedures were written
- Whether they acquired help from a consultant
- Reasons for seeking certification
- Whether ISO 9000 was the beginning of Total Quality Management (TQM)

- Future intentions regarding Quality
- Advice they would give to a company considering ISO 9000 implementation
- Any comments in general regarding ISO 9000 or quality improvement in general

Non-certified companies:

- Whether they had heard of ISO 9000
- Intentions with regards to certification to ISO 9000
- Benefits expected
- Factors inherent in their company that would help ISO 9000 implementation
- Factors inherent in their company that would hinder ISO 9000 implementation
- Problems that would be solved as a result of Quality System implementation
- Who is considered responsible for Quality in their company
- Whether they have a Quality Assurance department, and if so where it is placed in the company structure
- Future intentions regarding Quality
- Whether they have heard of TQM
- Did they already have an existing TQM philosophy in place or would implementation of ISO 9000 be the beginning of TQM
- Whether they expect that ISO 9000 would provide any improvement within their company
- Whether they would acquire help from a consultant
- Any comments in general regarding NZS/ISO 9000 or quality improvement in general

1.2.4 Pilot Survey

A trial of the first draft of the survey questionnaire was conducted with local certified and non-certified survey recipients. This was carried out in order to ensure that the scope of the survey was appropriate, to determine whether the questions would in fact be interpreted as intended, and to indicate the possibility of misunderstandings hidden behind apparently sensible answers provided by the respondents.

1.2.5 Final Survey

The survey was administered as a mail-out questionnaire directed personally to company managers where their names were available. A total of 190 questionnaires were sent to certified companies, and 809 sent to currently non-certified companies.

The certified companies were selected from Telarc's "Directory of Registered Suppliers" [76] and the Standards Association of New Zealand's "Buyer's Guide of Quality Assured Suppliers" [77]. Lloyds' single listing was not available.

Non certified companies were selected at random from the 1991 Business Who's Who [78]. Samples of the two final survey questionnaires are provided in Appendix 2.

1.2.6 Data Analysis

The information collation, tabulation, and storage stage. A coding system was constructed in order to categorise the response types, then each of the returned questionnaires coded and

entered onto a data base. The computer package SPSS was used to collate the responses by response type and to perform cross-tabulations on the coded data. The survey results are given in Appendix 3 with the analysis of the results given in Section 3.

1.2.7 Follow-up Interview

A follow-up mail-out questionnaire survey of one hundred and nineteen companies of a like distribution throughout New Zealand as the original non-certified sample (selected at random from the Business Who's Who [78]) was conducted in order to determine the intentions of those companies with regards to ISO 9000 implementation in order to establish with confidence that the non-certified survey responses that were received were not biased towards those companies with an interest in ISO 9000.

1.2.8 Analysis of Findings

Preparation and collation of the research findings.

1.3 RESPONSES RECEIVED

The response rates received were 40% for practicing Quality Consultants, 83% for companies certified to ISO 9001, 46% for companies certified to ISO 9002, 45% for companies certified to ISO 9003, and the lowest from non-certified companies at 25%. Table 1 summarises the response rates by respondent type.

Table 1 Responses Received

Respondent	No. Contacted	No. Responded	Response Rate (%)
Quality Consultants	53	21	40
Companies Certified to ISO 9001	12	10	83
Companies Certified to ISO 9002	159	73	46
Companies Certified to ISO 9003	20	9	45
Non-certified Companies	809	205	25

In addition to the above, 29 companies no longer held their Post Office Box numbers (presumably ceased operation), 26 companies responded to say that they did not have time to respond, and 28 companies responded too late to be included in the survey analysis (in excess of eight weeks). Of the companies that responded too late to be included which 1 company was certified to ISO 9001, 6 companies were certified to ISO 9002, and 21 companies were non-certified. The responses given by these companies were in accordance with the responses included in the survey analysis and would not have altered the results.

2 LITERATURE SEARCH AND THE EXPERIENCES OF PRACTICING QUALITY CONSULTANTS IN NEW ZEALAND

A literature search and correspondence and personal discussion with practicing quality consultants in New Zealand provided the following insight into the factors that help and/or hinder ISO 9000 implementation, and the benefits being gained from of ISO 9000 in New Zealand.

2.1 FACTORS THAT AFFECT ISO 9000 IMPLEMENTATION

2.1.1 Senior Management Commitment

a) Serious commitment

DeAngelis [26], Van Nuland [63], Hendry [65], and Denley [71] state that implementation of ISO 9000 requires serious, visible and consistent commitment from senior management. Furthermore, many consultants [3,5,8,11,12] and authors [39,44,62] suggested that the level of commitment is often reflected in the adequacy of resources provided for implementation of ISO 9000 in terms of provision of time, money, resources for on-going training, and the delegation of responsibility.

Siddins [61] and Wheeler [64] assert that the implementation process must start with senior management, will progress at a rate proportional to their level of commitment, and, as supported by Harrington [31], will stop soon after senior management lose interest in the process. Brooks [69] and Jones [46] have learned the important lesson that senior management can not afford to be lacking in active, enthusiastic and visible commitment. This is exemplified by Sayle [50] when he talks of the "cancer of complacency."

An example cited by Wheeler [64] is that in the event of a dispute between quality and quantity (production), management must be seen to support the quality system and the quality representative if their commitment to quality and the quality system is sincere.

Brooks [69] asserts that unless senior managers are seen to talk, ask and worry about a quality programme it will not be taken seriously by middle management or front line staff. Management must lead the implementation process by providing direction and inspiring motivation.

b) Active involvement

Williams [9,10] states however that it is not the level to which management claims to be committed to ISO 9000 implementation but the degree to which management is seen to be actively involved in the implementation process that is the true test of sincerity. Davies [25] states that people measure the commitment of their leaders not by the brave words their executives use during presentations, etc, they measure it by the changes in behaviour which they actually see demonstrated by their leaders. "The negative, or no-change signals sent out by managers are usually the ones picked up most strongly by their people."

Roth [45] reports that the General Manager must constantly applaud and show interest in employee contributions. Everyone involved will be watching the leader, and if they see any signs of flagging interest, the implementation process will seriously falter.

Harrington [31], Juran [35], Owen [43] and Gryna [67] state that management must be actively and seriously participating and seen to be leading the implementation process, for if people think that management does not care then it is almost certain that no one else will either, simply because if upper managers do not become actively involved, subordinates will conclude that upper management does not give high priority to quality systems implementation. As Bemowski [19] says "management must walk like it talks," and therefore as Mehta [41] states the employees should be "lead by example." Seeing management change first is the most convincing testimony of management's seriousness with regards to ISO 9000 implementation. Bunting [12] has found that if the workforce see lack of management commitment, or ulterior motives, the natural response is "...why should we bother?!"

2.1.2 Management Practices

a) Poor personnel management

Gusscott [3], Mills [8], Melville [11], Keshvara [16] and author DeAngelis [26] acknowledge the existence of poor personnel management including poor communication, lack of employee involvement, and lack of motivation (including employee recognition), lack of progress reporting (feedback), lack of delegation and training, and a lack of management participation and cooperation as factors that hinder implementation of ISO 9000.

Melville [11] explains that there is a change in management attitude purported to be taking place called the "Paradigm Shift". It is a change occurring in conjunction with the movement towards Total Quality Management (TQM). In essence it is a forced and gradual change in management perspective that focuses on a participative approach between management and shop floor personnel where the role of management becomes not one of director or autocratic dictator (as of the current fixation) but one of support and leadership, with the responsibility of providing the shop floor personnel with the resources needed in order to achieve their assigned task well.

DeAngelis [26] states that a lack of recognition of achievements, and of feedback on progress can each foster poor morale and motivation. Gusscott [3] reports that on several occasions he has witnessed cases where management are not giving staff the recognition for work they do correctly and that the only feedback they do get is when they are being reprimanded.

Gusscott [3] makes the observation that often individuals are blamed for mistakes actually attributable to the process upon which they operate or the systems in which they work. Deming [27] and Neave [42] suggest that management should be directing their leadership towards improving the system, not the workers efforts. In blaming individuals for mistakes, management is making the assumption that workers are capable of achieving anything if they so desire, but because most of the trouble comes from the system this only leads to frustration and resentment. Gusscott [3] has found that what quickly occurs is that workers try to conceal problems for fear of reprisal. Neave [42] suggests that when a mistake does

occur management should not look for "those who are responsible" but for those that need attention and help.

Gusscott [3] has observed that another weak area of common management practice, that affects more than the implementation of ISO 9000, is the inability to delegate. Melville [11] and Keshvara [16] state that not only is delegation in some cases practically nonexistent but where it does occur responsibility is usually given without the necessary authority to make decisions. As expounded by Neave [42] the result is either a manager that has a very slow rate of achievement (or alternatively works a lot of overtime), or workers itching to make improvements that they have been delegated the responsibility to make but who are frustrated because they do not have the authority to make the necessary decisions to get things done.

The inability to delegate also signifies a lack of involvement of employees which is paramount to avoiding any "resistance to change" and necessary in order to create ownership of any decisions made or of changes to be introduced (in this case ISO 9000.)

Another apparent difficulty associated with the management of people is the need for cultural sensitivity and understanding when dealing with the attitudes and customs of different ethnic groups.

New Zealand is a multicultural society. However there is a lack of understanding of how different cultures need to be approached differently if they are to be persuaded to participate in the process of quality systems implementation. For example from Keshvara's [16] experience Pacific Islanders work very well in teams, by comparison Europeans are not team oriented, and women work the least well together in teams. Keshvara [16] claims that knowledge of how to approach these different cultures can be of great advantage in creating effective work teams.

b) Poor personal management

Gusscott [3] and Sayle [50] both state that poor personal management such as poor time management, and a failure to keep minutes and action notes at meetings affect the implementation of ISO 9000. Keshvara [16] has observed other areas of management practice that affect the effectiveness of management such as a lack of awareness and understanding of the structure and task of their position in the organisation, and a poor understanding of the strengths and weaknesses of the organisation and its people.

Williams [9] suggests that a lack of process oriented thinking by management has an adverse affect on ISO 9000 implementation. The inability to visualise a process as a series of task elements can hinder quality system implementation and is prevalent when trying to document system procedures.

c) Discipline

Gusscott [3] suggests that another factor that affects implementation of ISO 9000 is a lack of discipline such as allowing untidy work practices and work areas, and in management who do not adhere to current company policies! These practices, particularly the latter, are certainly not conducive to ISO 9000 implementation and certification.

Jennings [6] may have summarised the root cause of the three areas of poor management practice identified above in saying:

"We have such a relatively unsophisticated management population scrambling to implement imposed techniques on a labour force which is already strained to the limit, not only in education and industrial training, but is also economically thinned down, that we are not developing the grass-roots attitudes lower down. This is especially evident in the smaller companies."

2.1.3 Company Characteristics

a) Size

Mills [8] claimed that company size had an affect upon ease of implementation stating that generally the smaller the company the easier ISO 9000 is to "install." As with any exercise the larger the scale of magnitude the more time and effort required.

b) Existing systems

Mills [8], Williams [9,10] and Granahan [30] sited the sophistication of existing systems as being a major contributing factor to ease of implementation. Williams [9,10] states that all companies have quality systems in place whether they realise it or not, but that they exist to varying degrees of adequacy, formalisation and documentation.

However, it is not true to infer that the more sophisticated or advanced the existing system the easier it is to satisfy the requirements of ISO 9000. In fact sophisticated and complex systems need special consideration ie. computer based integrated business management systems. Generally the more simplistic the processing system and the production methods the easier it is to describe on paper and modify in practice.

2.1.4 Organisation for Quality

a) Poor planning

Gusscott [3], Williams [9,10], Granahan [30], and Lofgren [37] argue that planning the implementation strategy carefully is an investment of time that can save wasted effort and resources, and avoid scepticism from the workforce. It can also help ease the implementation process and avoid indecision.

Juran [35] states that strategic quality planning must include quality policies, quality goals (and plans of how to meet those goals), schedule reviews of progress, make allowance for necessary training, an on-going measure of quality and quality improvement, rewards based on performance against goals (essentially to establish a recognition system as supported by Harrington [32]), and fair allocation of resources (expounded by Williams [10], Sayle [50], and Van Nuland [63]). Mehta [41] adds that it is necessary to have a steering committee (supported by Rabbit [62] and Van Nuland [63]), to enforce accountability, and to include the supplier throughout the implementation process.

In addition, Rabbit [62] and Wheeler [64] advise the establishment of guidelines for documentation during the planning stage to assist in the development of documentation. DeAngelis [26] states that employees which volunteer to participate in the implementation process must not be left to operate in a vacuum. Management must provide format, support, and deadlines.

The success of the quality systems' implementation strategy can be measured by the effectiveness of the quality system that is developed. Planning the implementation strategy is time well spent to ensure that anything that may limit the effectiveness of the quality system is addressed as one of the implementation objectives.

b) Poor definition of responsibilities

Several authors [35,50,62,64] state that it is important that everyone knows exactly what their role is in the implementation process and that responsibilities for implementation of the various elements of the standard are defined. Hayes [33] asserts that it is important that these responsibilities are established during the planning stage.

2.1.5 Motivation for Seeking Certification

a) The marketing motive driving certification

Many consultants [1,2,5,10,11] and one author [51] commented that the motive for change can indicate the level of management commitment to the quality systems' effective implementation. Pressure from existing customers, possible exclusion from particular markets, or certification to gain a marketing advantage are motives for ISO 9000 implementation that disregard the opportunity for process and product quality improvement. These motives are founded on the belief that ISO 9000 is an endpoint in itself, primarily to be used as a marketing tool without direct benefits to their company except in making sales to customers that demand certification of their suppliers.

As stated by Mills [8], and several authors [34,36,44], many companies are being market driven into adopting ISO 9000 - and as elucidated by Cook [14] some like the dairy and meat industry will find access to export markets increasingly restrictive without being certified to ISO 9000. As explained by Boehling [20], Chua [23] and Eicher [68] this is because many government agencies and large private sector purchasers both within New Zealand and overseas such as the Ministries of Defence in the UK and Singapore, NATO and the Department of Defence in the USA, and the Dairy Board of this country for example have now made ISO 9000 registration a requirement of their suppliers.

Boehling [20] and Marquardt [38] explain that this cascading effect of ISO 9000 implementation from customer to supplier stems from the rapid implementation of the European Economic Community (EEC) single market arrangement and the development of the EEC July 1985 Product Liability Directive. This directive has been transformed into national law by all EEC and EFTA countries and holds that a manufacturer of a product will be liable if a person is harmed or an object is damaged by a faulty (defective) product. This places pressure on producers to have well documented and implemented quality assurance systems.

Ware [55] argues that as soon as a demand for ISO 9000 arrives in a market, implementation of ISO 9000 virtually becomes unavoidable - and this type of demand is obviously growing rapidly worldwide. Strang [52] states that often as a result the prime objective is to gain certification whereby implementation of ISO 9000 simply becomes an academic exercise conducted in order to satisfy the certification agency and the customer.

Eicher [68] quotes of Shaughnessy, the Chairman of ISO 9000/Technical Committee 176, that if an organisation's only motivation is to get an ISO 9000 certificate "they should forget the whole idea". This is because in his experience applying the necessary discipline within an organisation to satisfy the ISO 9000 requirements more often than not causes major cultural upheavals within the organisation.

Furthermore, as Mills [5] explains, adding to the pressure on suppliers is the situation already encountered where the majority of the suppliers of particular products or services are already certified and therefore have to improve, and prove, their performance beyond the level required of ISO 9000 certification to remain competitive (ie specialty packaging).

Nelligan [7] and Melville [11] noted that although it appears that most seek certification to catch up with or get ahead of competitors in a marketing sense many of those companies that do begin as enlightened (wanting to implement ISO 9000) actually finish up as desperate (having to implement ISO 9000) because the quickly growing demand for ISO 9000.

2.1.6 Perception of the Costs

a) Cost - a deterrent

The costs of certification (initial and on-going) may in fact postpone implementation of ISO 9000, particularly in smaller companies.

Hobbs [13], Keshvara [16] and Willborn [57] state that for small to middle-sized companies ISO 9000 is expensive to implement - for example the implementation of the system may not improve production efficiency sufficiently to provide savings but may cost the company a margin of its profit. Melville [11] claims to have witnessed that for some companies it is a matter of two alternatives - "go broke, or go out of business!" - "go broke" because the company cannot afford the costs of implementation, or "go out of business" if they fail to implement ISO 9000 because their customer will simply change to a supplier that is certified.

Stockwell [51] has discovered amongst food and beverage exporters that although 46% of those companies interviewed were aware of the funding schemes available through the Business Development Board such as the Enterprise Growth Development Scheme only 11% took advantage of these schemes.

b) Expectation of short payback periods

Williams [9] claims that an expectation of quick financial paybacks can be equally discouraging when it becomes apparent that the economic gains from process improvements may take longer than expected to realise.

There is no denying the fact that some cases of very short payback periods exist. However, as expounded by Trenberth [1], MacKenzie [15] and Stockwell [51] there does appear to be a perception that the costs of implementation are large. This perception is the main factor postponing implementation in many companies - particularly smaller companies. Maxwell [17] and Browne [18] argue this point siting PDL's success story as an example of the very short payback periods that can occur, concluding categorically that there can not be a perception in industry at this present time of high costs with no payback when success stories such as PDL's exist.

The fact is that the benefits to be gained can far outweigh any expenditure to achieve and maintain registration. Lofgren [37] and Maass [40] state that when a supplier takes full advantage of its quality system registration it will find that the cost of registration can become a good investment - but it certainly is not a "cheap fix".

2.1.7 Company Culture

a) The ability to engender the right attitude

Mills [8] states that developing the right culture for change is a process of engendering in the personnel a sense of quality and pride in quality work ie. the right first time approach. Hobbs [13] has found that this is necessary because many facets of a quality system can seem pedantic and of little importance even where they are paramount to proving that the system is operating effectively (ie. in terms of traceability and documentation).

Melville [11] asserts that another attitude in some cases that must change is one of "God we have to have meetings" - that meetings are unproductive. Teamwork is a very useful tool to making cooperated decisions, ensuring active employee involvement and input, enhancing communication and dissemination of decisions and ideas, and greatly enhances employee ownership of the developing system. Where the focus becomes teamwork, the meetings have a purpose.

b) Poor industrial relations

Poor industrial relations are not conducive to quality systems implementation. As observed by Gusscott [3] a "we/they" or "management/worker" attitude, or in-house individual competitiveness, until resolved, are likely to hinder implementation and limit the effectiveness of the resultant quality system.

As stated earlier in Section 2.1.4 Organisation for Quality, the effectiveness of the quality system can be thought of as being a measure of the success of the quality systems implementation strategy. If poor industrial relations exist, to overcome the state of poor relations must become one of the objectives of the implementation strategy for until it is resolved it will limit the effectiveness of the quality system.

c) Fear of reprisal

Gusscott [3] suggests that employees not revealing problems for fear of reprisal (management

as well as hourly paid workers) and an environment where there is a reluctance to say that a procedure will not always work, is a culture nurtured by poor people management that hinders the implementation of ISO 9000. This is further explained in 2.1.2 Management Practices.

d) Discipline

Mills [8] has noted that a lack of discipline can significantly slow progress of ISO 9000 implementation and exists because of a lack of accountability, as does Keshvara's [16] observed "fear of writing", or "laziness".

Sayle [50] also cites lack of discipline as a cause of "quality problems" stating major causes such as inadequate examples set by supervisors and managers, demotivating work environments, inflexible management systems, or simply inadequate personal attributes of the person assigned the task.

e) Ethnic difficulties

Mills [5] claims "ethnic difficulties in adopting and maintaining standard procedures". If this is in fact the case then there needs to be special consideration when implementing quality systems in areas of differing ethnic identity. As found earlier in Section 2.1.2 a) Poor personnel management, this view is supported by Keshvara [16] who claims that there is a lack of understanding of how different cultures need to be approached differently if they are to be persuaded to participate in the quality initiatives presented.

2.1.8 Resistance to Being Changed

Although many of the consultants used the expression "resistance to change" they cited examples that more accurately reflect the belief that it is not change that employees resist, it is resistance to being changed.

a) Lack of employee involvement

Many consultants [3,5,8] and authors [26,32,69] have stated that one of the greatest contributors to "employee resistance" is a lack of employee involvement. Actions such as not listening to employees, forcing new procedures and policies into place without first reviewing them with staff or checking that they can be adhered to, or trying to force too much change at once are common actions with repercussions suggestive to management of the employees' refusal to cope with change."

Filmer [2] claims that in many cases management seem to exhibit a reluctance to allow staff to effect their own changes. An example is the all too frequent case of system procedures written by personnel not directly involved with the task or activity being developed. Cook [14] reinforces this point in stating that systems developed by the staff who actually carry out the tasks will always operate better than ones that are imposed. Roth [45] and Hendry [65] state that all stakeholders who are going to be affected by any change must be given the chance to understand and contribute to that change.

Williams [10] reports that in some cases responsibility for implementation and documentation is delegated entirely to an external consultant. In the most extreme case the consultant writes the policy and procedures manual with little or no input from those who operate the system. Often as a result the new systems are imposed upon the people, the employees lack ownership and have little knowledge and understanding of the system. An article in Q-NewZ [66] reports that Telarc's team of quality auditors have noticed some manuals from separate companies that are "almost identical" with only their company names and specific production processes being different. Obviously there was an external factor at play - the quality consultant. The article presents a comparison between a manual developed in-house by those who operate the system and a manual developed by a consultant, asking the reader:

"Which manual is more likely to reflect what is really going on? Which manual is more likely to earn the acceptance and respect of the people? Which manual is likely to be used in practice? Which is more likely to sit on the shelf gathering dust?" Q-NewZ [66].

DeAngelis [26] and Lofgren [37] support this viewpoint suggesting that the documentation should be prepared by those responsible for the activity, not by the quality department or consultant. Burr [22] states that when this is done in natural work groups a very powerful understanding results. The people who prepare the flowcharts understand how all the jobs fit together, how each task depends on other tasks, and how to streamline the operations. They also begin to feel a sense of ownership of the process.

Brooks [69] states that the resistance comes from a basic need we all have to be in control of our lives and that imposing changes to the way people work threatens this need. This is supported by Sargent [49] in his paper entitled "Psychological consistency breeds Quality." Sargent [49] states that if an action leads to change then there is potential for some degree of negative psychological impact of magnitude dependent upon the reason for change, and how well that reason is communicated.

Ryan [47] claims that there are three basic reasons for employees resisting change:

- A lack of opportunity - this is the most common case where the quality initiative such as ISO 9000 is not available to everyone. Ryan [47] claims that as many as 36% of employees do not participate simply because of a lack of full involvement (a claim supported by Owen [43].)
- A lack of motivation to participate - because not all employees are getting the message of the importance of quality improvement (the reasons and need for change).
- Simply unwilling to cooperate - either because they are demotivated by what they perceive as a gap between the companies talk and action on quality, or because they are dissatisfied with the rate of quality improvement achieved to date.

Jennings [6] however is positive in claiming that on the shop floor he sees no employee resistance at all. He suggests quite simply that shop floor people have a lot more common sense than they are generally given credit for, and that they can easily see the benefits, in that it makes life so much clearer and simpler for them day to day. Keshvara [16] corroborates this claim by maintaining that shop floor personnel are generally much more receptive to new ideas than the supervisory levels. Hendry [65] also makes this claim stating that the

workforce seem to positively welcome the idea and quotes an increasingly common pronouncement on the shop floor of "at last someone is asking us how things should be done!"

b) Lack of union involvement

Bunting [12] states that unions can be an ally to ISO 9000 implementation or a strong barrier. It is important to involve union representatives right from the beginning. Representation and consideration of employee interests in the many decisions that will be made early in the implementation process can be gained by involving the union representatives and is essential to assure ownership of the system and to ensure that the system developed is in fact practicable from the operators perspective.

Roth [45] states that unions resist quality improvement for one of three reasons:

- They have such poor relations with management that they oppose any sort of collaboration
- They don't believe that the employees are capable of representing themselves adequately
- They are afraid of losing their jobs as the implementation process draws management and employees closer together

c) Supervisor resistance

Supervisor resistance. Several consultants [3,7,12,16] and two authors [61,64] stated that resistance at the supervisor and middle management level was a factor that commonly hindered implementation of ISO 9000. Fear of passing on information, data, knowledge, in addition to a fear of divesting power by relegating responsibility are symptoms of resistance from supervisors that appear to stem from a perceived threat of loss of job security and status.

Gusscott [3], Nelligan [7] and Keshvara [16] suggest that those that feel threatened are middle management or supervisors that are fire fighting, or that have their jobs by default (longest employment record) and therefore may actually be incompetent, and/or who have little people skills. Nelligan [7] speculates that perhaps the supervisors need special consideration with more time and training to realise the benefits to be gained from ISO 9000 implementation because of the important role they must play in supporting the quality system.

d) Lack of understanding of the benefits and reasons for change

Sargent [49] and Brooks [69] assert that people want to feel that they are in control of their lives and so it is communication of the benefits and reasons for change that is important. As stated by Gusscott [3], staff see no reason to adhere to a system if they do not see benefits to themselves by doing so, so they must understand the reasons and need for change.

Nelligan [7] has observed that from his experience in the engineering consultancy sector that employees resist the change to Quality Systems in direct proportion to their age and length of time employed, with the push for change usually coming from the younger staff members. In

this case the resistance is due to a reluctance to change in-grained ways, and a lack of understanding of the need for change - "we've done it like this for years just fine, why change?."

Granahan [30] has observed that as quality concepts evolved and benefits became clear the resistance that initially existed lessened, particularly when concerns and problems were discussed and resolved within group discussions.

e) "Flavour of the month" perception

Jennings [6] and Nelligan [7] suggest that another common attitude of the workforce is "we've seen this sort of thing before," "why should it be any different this time" - a "flavour of the month" perception. Gryna [67] puts it cynically as "here comes another one!" Scepticism and apathy are present in most companies - and the workforce are right! Why should this be any different?

Gryna [67] provides some insight into the usual weaknesses of quality improvement implementation programmes that leads to such scepticism:

- upper management did not stay involved
- more work was demanded of all (attendance at meetings, filling out questionnaires, etc)
- no provision was made for the added work load
- the results were not as good as the advocates had promised
- the programme did not last. It was pushed aside to make room for the next programme.

Brooks [69] has observed that often management make a lot of noise about things that they say will happen but that these just do not eventuate. The result is lack of trust. "If senior management is not prepared to follow-through they shouldn't...even think about implementing a quality programme."

f) Lack of management commitment

As found in Section 2.1.1, Bunting [12] makes the observation that if there exists an observable lack of management commitment or ulterior motives, then the natural response from the workforce is "why should we bother?" Nelligan [7] states that sometimes there is a suspicion that it is simply a means of getting more work out of less people, and as observed by Gusscott [3] the workforce will sit back wanting to see management change first.

Melville [11] states that management must be prepared to commit the necessary resources, not the least of which is time. ISO 9000 is a huge devourer of time and the means for time allocation must be resolved at the top. Asking people to do something and yet not providing the extra time necessary poses a conflict for those involved which can lead to disillusionment, frustration, and loss of morale.

2.1.9 Training

a) Quality and ISO 9000 Familiarisation Training - Company-wide

Mills [8], Keshvara [16], Hayes [33], and Rabbit [62] state that familiarisation training regarding quality and ISO 9000 for all employees of all departments is an essential first step in the implementation process to ensure that everyone understands the meaning and requirements of ISO 9000. This initial training must tune into and address the fears of the employees such as:

- What is ISO 9000?
- Why do we need it?
- What are the benefits?
- What will it involve
- How is it going to affect us?

Rabbit [62] claims that when people understand the requirements and reasons for change they are less reluctant to cooperate, and perform more effectively. Staff must use the new methods not simply because they were told to, but because they sincerely believe that they are the best procedures to follow. Lofgren [37], Brooks [69], and Ridings [70] assert that this will happen only if staff see the need to change and understand how the new procedures will benefit them. Rabbit [62] reinforces that the goal is not that they are told, but that they understand, adding that it is only preparation that leads to confidence.

It is Keshvara's [16] experience that if management focus on the employees' awareness and understanding, the people side of quality, then the technical side of ISO 9000 implementation falls into place. Once you have addressed the human concerns then the technical aspects become relatively easy because if people understand the reasoning and justification behind certification to ISO 9000 then they will be more inclined to get involved.

Similarly Cook [14] and Melville [11] advocate that by following familiarisation training of this sort any residual employee resistance soon goes away after the system is initiated, and state that it is gratifying to hear staff say that they do not know how they used to manage beforehand without such a system.

Keshvara [16] points out that it is necessary that training must dispel any preconceived ideas such as the popular belief that ISO 9000 means creating a "paper monster" of procedures and forms. D'Souza [60] confirms this misconception and believes that the concerns regarding documentation can be divided into two basic categories. The first is the feeling that the believed quantities of documentation required is sufficient to discourage the most ardent supplier from proceeding with ISO 9000 implementation, and secondly that the documentation which is necessary could become an obsession in itself and reduce quality management systems to a mere paper exercise. D'Souza [60] illustrates this fear with an observation of a third party auditor that "thought as a rule companies are accumulating far too much paperwork for their own good, or for the good of the quality system, or for the benefit of the auditor."

Keshvara [16] has observed that another common attitude that is paramount when the need

for ISO 9000 and the benefits to be gained have not been "sold" well enough to employees is that ISO 9000 is an unnecessary vexation - "we've been doing nicely up until now, why change?" Changing the in-grained habits of individuals is a challenging task that requires time, motivation, persistence and determination. This is illustrated in an example disclosed by Hobbs [13] where trying to ensure that companies maintain records of training can be a training process in itself, and is difficult to uphold.

Gusscott [3] claims that supervisors not being briefed on tools (methods) for problem solving hinders the implementation process. Roth [45] however rebuts conventional wisdom claiming that from his experience employees already have a pretty good idea of problems that exist, and are usually quick to ferret out solutions. They do not need training in how to identify problems, problem solving and group process techniques. What they need is a chance to perform, someone to keep them on track, a positive response to their requests, and a rapid initial taste of success to convince them that they have indeed been given the power to create change. Eventually individuals and teams will identify their own training needs.

Owen [43] makes the statement that companies are fire-fighting just as much in training as they are in production, and states that training must be anticipated, budgeted for, and planned.

b) Quality and ISO 9000 Familiarisation Training - Management

Quality and ISO 9000 familiarisation training for management needs special consideration. Nelligan [7] comments that there is a frequent perception amongst senior managers that quality management is a destination not a journey and few realise that they are placing an on-going commitment to improvement upon subordinates.

Frequent management misconceptions are:

- quality is something you do when you have the time (Gusscott [3])
- "now that we're registered we can carry on as we used to" (Mills [5])
- you can buy a quality system and tack it on (Mills [5])
- the responsibility for quality resides in the quality department (Harrington [32])
- quality only applies to the technical functions not to departments such as administration, sales, marketing, finance, etc and it definitely does not apply to people and people management (Keshvara [16])

c) Training - the Facilitator

Many consultants [10,11,14,15] and authors [22,64] assert that the Facilitator (the management representative for quality systems) must have a clear understanding of the requirements of the standards, its interpretation, and how to relate them to the industry concerned. Many companies lack the knowledge and understanding of ISO 9000, and do not know where or how to start. An example from Filmer's [2] experience is that many companies require assistance in creating simple documented procedures, and setting quality policies.

Mills [8] states that usually the greater the qualification, training and experience of the

facilitator the easier and less painful the implementation process. That is not to say it will be easy. The quality practitioner with little experience who plagiarises another company's quality manual in an attempt to attain the short term objective of simplicity and achieving certification as quickly as possible has, in the author's opinion, failed to appreciate the reason for quality system implementation and the scope for product and process improvement.

Nelligan [7], Williams [9] and Bunting [12] state that the lack of knowledge and understanding of ISO 9000 and quality systems extends to a lack of knowledge of the systems present in the company already, and confusion of how ISO 9000 relates to Total Quality Management. Filmer [2] claims that in the past this has not been helped by the fact that certification bodies were initially presenting the concepts of ISO 9000 poorly, creating confusion, alarm, and over-complicating the process of certification.

This lack of development of the "nuts-and-bolts" of the Quality Assurance Philosophy concerns Jennings [6] who believes that the small block courses available can only ever be appreciation courses in the main, and thus, as found by Mills [8], consultants are often used to bridge the gap of understanding how Quality Assurance applies to a particular industry or company.

Bunting [12] points out that many Quality Managers in his experience lack the skills of people management advocated in Section 2.1.2 above, often trying to impose systems upon people, with the people subsequently lacking ownership and having little knowledge and understanding of the systems being developed.

Burr [22] effectively summarises by stating that the facilitator needs a thorough understanding of quality systems, a working knowledge of the applicable ISO 9000 standard, an understanding of the assessment process, and good interpersonal skills.

2.1.10 Quality System Maintenance

a) Internal auditing, management review and corrective action

Bunting [12] states that a lack of understanding of the importance of internal auditing as a maintenance tool to ensure the system's on-going effectiveness can hinder implementation of ISO 9000. Internal auditing is often the last area companies address because it takes time, and they have little training and experience and are therefore unsure of its importance.

Bunting [12] claims that what is as equally damaging is the lack of understanding of the important roles corrective action and management review play in improving the systems, processes, and product and service quality.

Mills [5] states that some companies find implementing a quality system relatively easy but maintaining it difficult. This must be viewed in conjunction with the all too common scenario of certification to ISO 9000 being primarily a marketing exercise where the motivation to maintain a formalised quality system is low.

2.2 BENEFITS

The benefits actually gained by companies implementing ISO 9000 that the consultants and literature search identified are as follows.

2.2.1 Marketing

Mills [8] and many authors [20,21,22,37,44,51,54,59,62,65] state that access to specific markets that require ISO 9000 certification is a benefit that is gained from ISO 9000 implementation and certification. This has the effect of a gain in potential customers.

Mills [8], Melville [11] MacKenzie [15] and many authors [20,30,44,51,53,54,57,65] claim that certification to ISO 9000 retains existing customer confidence and satisfaction; therefore retaining their custom.

Mills [8], Keshvara [16] and authors Chua [23] and Gross [24] state that companies gain the reputation and recognition as a preferred supplier to those customers that are already certified.

Mills [8], MacKenzie [15] and many authors [22,30,34,37,38,51,53,54,57,59,62,65] assert that gaining registered supplier status from certification to ISO 9000 provides a competitive advantage.

Mills [8] and many authors [26,62, 65,71] claim that the process of implementation of ISO 9000 enhances relationships with customers and suppliers.

Authors Hockman [34] and SANZ [48] claim that certification to ISO 9000 increases sales/market share.

2.2.2 Improvement of the Process

Mills [8] claims that an increase in the reliability of production is gained.

Melville [11] and authors Dzus [28] and Rayner [44] assert that implementation of ISO 9000 provides confidence that the process can be consistently and uniformly replicated (ie. improved process control with a reduction in variability).

Author SANZ [48] affirms that the company's service performance is improved.

2.2.3 Enhanced Quality Systems

Authors Gross [24], Stockwell [51] and Denley [71] state that more clearly defined and formalised management systems result. Gross [24] adds "God forbid but consistency starts to creep in, let alone an understanding of the whole process."

Mills [8] and Keshvara [16] affirm that the implementation of ISO 9000 gives confidence in

the adequacy of the quality systems.

Melville [11] claims that the ISO 9000 based quality system provides a mechanism by which improvements and changes can be retained - "holding the gains."

Mills [8] and author Granahan [30] profess that the quality systems developed cause a reduction in human error due to the more systematic and analytical approach that results.

2.2.4 Defined Responsibilities

Author Denley [71] states that the implementation of ISO 9000 results in a clearer understanding of 'who' is responsible.

Keshvara [16] and author Gross [24] state that people discover exactly what they are supposed to be doing. (Keshvara [16] finds that it motivates people to put them through a process of explaining what they actually do)

Keshvara [16] claims that re-defining the management structure usually reveals that there are either overlaps in responsibilities or more commonly that there are vacancies where no one is actually held responsible for particular activities.

Authors Rayner [44] and Hendry [65] maintain that the levels of discipline are enhanced. This is due to the introduction of formalised procedures and the definition of responsibility and authority.

2.2.5 Employee Benefits and Company Culture

Many authors [47,57,59,62,64] claim an increase in job satisfaction, motivation, morale, cooperation, and performance of employees, and pride in doing a job right first time that comes from having efficient systems and procedures.

Authors Chua [23], Willbom [57] and Rabbit [62]) claim an increase quality consciousness and a sense of quality of workmanship.

Author Stratton [53] states that better industrial relations are developed between management and shop-floor personnel

Mills [8] claims that companies gain an internal commitment to quality.

Author Hendry [65] asserts that documentation of the systems and procedures helps the employees to understand their job better.

2.2.6 Communication

Many authors [23,26,61,71] claim an improvement in internal communication.

Author Ryan [47] claims that better communication between management and shop-floor personnel is gained which is consistent with Stratton's [53] claim of enhanced industrial relations.

2.2.7 Cost Savings

Keshvara [16] and many authors [19,20,22,23,26,44,59, 62,71] claim that implementation of ISO 9000 causes a reduction in waste and rework.

Keshvara [16] and many authors [19,22,26,44,59] state that fewer customer returns and warranty claims occur after the implementation of ISO 9000 (ie. more satisfied customers).

Keshvara [16] and many authors [48,51,53, 62] claim an increase in productivity and efficiency, and state that ISO 9000 provides the strategies and procedures to achieve "right first time."

Author Denley [71] claims that improved efficiencies are gained through the development and review of procedures; the process of which highlights inconsistencies.

Author Maass [40] claims lower costs through the reduction of incoming inspection and testing.

Many authors [20,22,28,29,37,38, 56,57,58,62] claim fewer time-consuming, disruptive, and costly audits by customers, regulatory bodies, other assessment agencies and consumer groups as a result of the certification to ISO 9000.

Authors Bemowski [19] and DeAngelis [26] state that "ISO 9000 has helped ensure that its customers, rather than defective product, come back."

2.2.8 Training

Authors Burr [22], DeAngelis [26] and Rabbit [62] assert that training is easier, faster, and more comprehensive.

Authors Boehling [20], Chua [23] and Stockwell [51] state that implementation of ISO 9000 provides a foundation for Total Quality Management.

2.3 SUMMARY OF FACTORS THAT AFFECT ISO 9000 IMPLEMENTATION AND BENEFITS GAINED IN NEW ZEALAND ACCORDING TO A LITERATURE SEARCH AND PRACTICING QUALITY CONSULTANTS.

2.3.1 Factors that Affect ISO 9000 Implementation

Senior Management Commitment

- serious commitment
- active involvement

Management Practices

- poor personnel management
- poor personal management
- discipline

Company Characteristics

- size
- existing systems

Organisation for Quality

- poor planning
- poor definition of responsibilities

Motivation for Seeking Certification

- the marketing motive driving certification

Perception of the Costs

- cost - a deterrent
- expectation of short payback periods

Company Culture

- the ability to engender the right attitude
- poor industrial relations
- fear of reprisal
- discipline
- ethnic difficulties

Resistance to being Changed

- lack of employee involvement
- lack of union involvement
- supervisor resistance
- lack of understanding of the benefits and reason for change
- "flavour of the month" perception
- lack of management commitment

Training

- Quality and ISO 9000 Familiarisation Training - Company-wide
- Quality and ISO 9000 Familiarisation Training - Management
- Training - the Facilitator

Quality System Maintenance

- Internal auditing, management review and corrective action

2.3.2 Benefits Gained from ISO 9000 Implementation and Certification

Marketing

- Access to specific markets that require ISO 9000 certification
- Creation of existing customer confidence and satisfaction
- Reputation and recognition as a preferred supplier
- Competitive advantage with registered supplier status
- Enhanced relationships with customers and suppliers
- Increased sales/market share

Improvement of the Process

- Reliability of production
- Confidence that the process can be consistently and uniformly replicated
- Improved service performance

Enhanced Quality Systems

- More clearly defined and formalised management systems
- Confidence in the adequacy of the quality systems
- Provides a mechanism by which improvements and changes are retained - "holding the gains"
- Reduction in human error - a more systematic and analytical approach

Defined Responsibilities

- Clearer understanding of who is responsible
- People discover what exactly they are supposed to be doing
- Eliminating overlaps and variances in the management structure
- Enhanced levels of discipline

Employee Benefits and Company Culture

- Increased job satisfaction, motivation, morale, cooperation, performance, and pride in doing a job right first time that comes from efficient systems and procedures
- Increased quality consciousness, and a sense of quality of workmanship
- Better industrial relations between management and shop-floor personnel
- Internal commitment to quality
- Helps employees understand their job better

Communication

- Improved internal communication
- Better communication between management and shop-floor personnel

Cost Savings

- Less waste and rework
- Reduced costs through the reduction of incoming inspection and testing
- Fewer customer returns and warranty claims (more satisfied customers)
- Increased productivity and efficiency, and mechanisms in place to achieve "right first time"
- Improved efficiencies through the development and review of procedures which highlights inconsistencies
- Fewer audits by customers, regulatory bodies, other assessment agencies and consumer groups
- "ISO 9000 has helped ensure that its customers, rather than defective product, come back."

Training

- Easier, faster, and more comprehensive training
- Foundation for Total Quality Management

3 SURVEY FINDINGS - CERTIFIED AND NON-CERTIFIED COMPANIES

This section analyses the survey findings the results of which are tabulated in Appendix 3.

3.1 CHARACTERISTICS OF THE SURVEY RESPONDENTS

As outlined in Section 1.3 the response rates received ranged from 25% for non-certified companies to 83% for companies certified to ISO 9001. The extremely high response rate from companies certified to ISO 9001 and relatively low response rate from non-certified companies suggests that the response rate may reflect the level of interest the companies have in ISO 9000. This has the implication that the responses received from non-certified companies could be biased towards those companies with an interest in ISO 9000 and hence not a true representation of the population of non-certified companies in New Zealand. However a follow-up survey of 118 companies of a like distribution throughout New Zealand indicates that the non-certified responses received are not biased towards those companies with an interest in ISO 9000 on the basis that there is a significant correlation between the intentions with regards to implementation of ISO 9000 of both samples ($r^2 = 0.918$), and a Chi-square analysis indicating no significant difference between the two distributions ($\chi^2 = 7.9$, $df = 5$, $p >> 0.05$). See Tables 9 and 39 of Appendix 3.

The intentions of the non-certified respondents are depicted in Figure 4 of Section 3.2.1.

Table 2 below shows the response rates for each level of certification compared to the average number of employees (size of the company) and the average years of operation (age of the company). See Table 1 of Appendix 3.

Table 2 Survey Responses Received

Response	No. Responded (Companies)	Response Rate (%)	Average No. of Employees	Average Years of Operation
Companies Certified to ISO 9001	10	83	144	41
Companies Certified to ISO 9002	73	46	155	34
Companies Certified to ISO 9003	9	45	151	28
Non-Certified Companies	205	25	114	34

The average size of the companies that responded ranges from 144 to 155 employees for certified companies, to 114 employees for non-certified companies. The average size of the non-certified companies is significantly less to that of certified companies with greater than 99.5% confidence ($\chi^2 = 38.01$, $df = 4$, $p < 0.005$), which leads to the conclusion that in general the larger companies have taken the lead with regards to implementation of ISO 9000.

This is exemplified in Figure 1 below which clearly shows that the majority (70%) of Certified companies are larger companies in the range of fifty to five hundred employees, whereas the majority (68%) of non-certified companies are small companies with employees numbering between one and fifty. See Table 2 of Appendix 3.

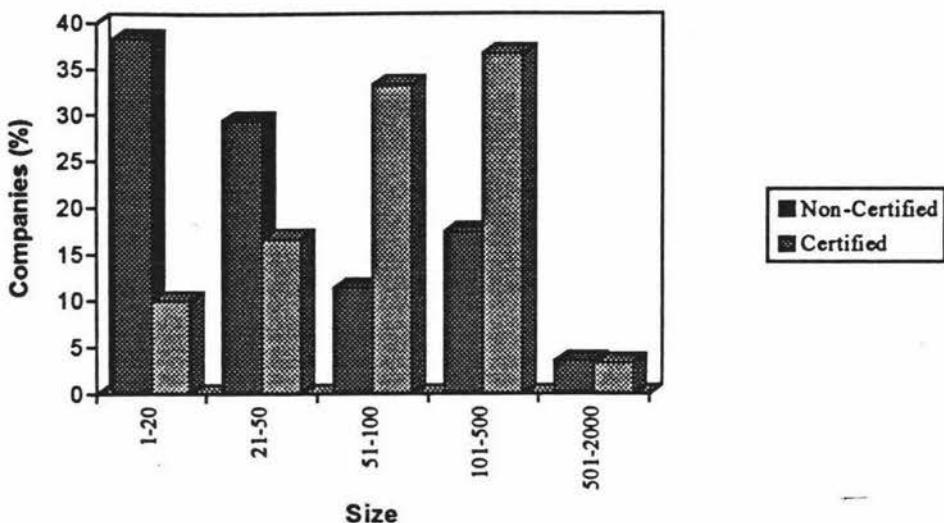


Figure 1 Size of Companies

The average age distribution of Certified and the Non-Certified companies are very similar with no significant difference found ($\chi^2 = 3.87$, df = 4, $p < 0.01$). Therefore the age of a company has no relationship to whether or not the company will implement ISO 9000. Figure 2 clearly shows the similar distribution of the companies by age. See Table 3 of Appendix 3.

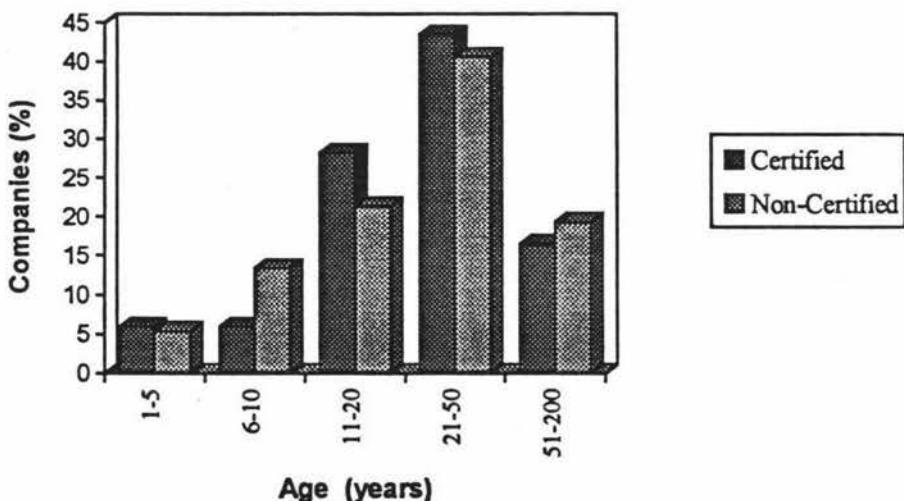


Figure 2 Age of Companies

Of the Certified companies the most responses (16%, 14 companies) were from companies manufacturing fabricated metal products, followed by 10% manufacturing paper and paper products, 9% manufacturing electrical machinery, 8% in "other manufacturing industries, 8% manufacturing plastic products, and 6% from the non-dairy food industry. Four companies (6.7% of the responses) could be classified as service industries of which two provided

research (analytical) services, two provided sanitary (cleaning) services, one provided telecommunication services, and one consultancy (education). Details of the response rates for each industry type are given in Tables 4 and 5, and Figure 32 of Appendix 3.

By location 41% of the Certified respondents resided in Auckland, 11% in Wellington, 7% in Christchurch, and 9% in Hamilton - a more detailed breakdown of the location of certified and non-certified companies is provided in Table 6 of Appendix 3. This provided a fair representation of the distribution of certified companies throughout New Zealand with a significant correlation between the distribution of certified respondents and the distribution of all currently certified companies in New Zealand ($r^2 = 0.997$), and with a Chi-square analysis indicating no significant difference between the two distributions ($\chi^2 = 15.38$, df = 31, $p >> 0.50$).

The Non-Certified companies provided a stronger representation of the service industry with 13 companies (14.4% of the responses) providing services such as wholesale and retail trade, transportation/freight, telecommunications, sanitary (cleaning) services, education, research, and personal services. The main respondents in order of incidence were 11% manufacturing plastic products, 10% manufacturing non-dairy foods, 8% manufacturing fabricated metal products, 6% from the printing and publishing industry, 6% manufacturing building materials and providing ancillary building services, 6% from other manufacturing industries. As shown in Figure 32 this provided a fair representation of the currently non-certified companies in New Zealand.

However it appears that there is an over-representation of non-certified companies that manufacture non-dairy food products, plastic products, fabricated metal products, and of printing and publishing companies. It also appears that there may be an under-representation of companies in the retail trade sector of industry and companies that manufacture building materials and provide ancillary building services. However, as determined from Table 4 of Appendix 3, 65% of all the businesses as classified in the 1993 New Zealand Yearbook [82] are represented in the survey and survey analysis.

Note from Table 4 of Appendix 3 that companies including principally those manufacturing paper and paper products, professional/specialised equipment, petroleum and coal products, the dairy industry, industrial chemicals, basic metal manufacturing, and plastic products have a greater proportion of certified companies than their representation in the New Zealand industrial population. This shows that these industries have taken the lead with certification to ISO 9000. An hypothesis for why these industries have preceded with certification is that external pressure has been placed upon the companies such as the Dairy Board's insistence that all Dairy companies in New Zealand (and their primary suppliers) implement ISO 9000, market pressure upon suppliers of packaging in the case of the Pulp & Paper industry, and the requirement for Engineering companies to be certified to ISO 9000 in order to be eligible to submit a tender for work on the ANZAC Frigate project for example.

The persons by position that responded to the survey differed significantly between certified and non-certified companies ($\chi^2 = 39.1$, df = 8, $p < 0.01$). The significant differences were between the Quality Manager, the General Manager, and Director, as shown in Figure 3. For the certified companies almost half of the respondents were Quality Managers whereas for non-certified companies Quality managers comprised of only one-sixth of the respondents

with the majority being either General Managers or Directors. This observation coincides with the fact that the majority of non-certified companies are small companies that do not have a separate "Quality Assurance Department" and of which only one-sixth have a single individual solely designated as the "Quality Manager," as found in Section 3.7. In 4% of the non-certified companies the task of responding to this questionnaire was delegated to various "other" individuals such as Secretaries, Accountants, or Sales Managers. See Table 7 of Appendix 3.

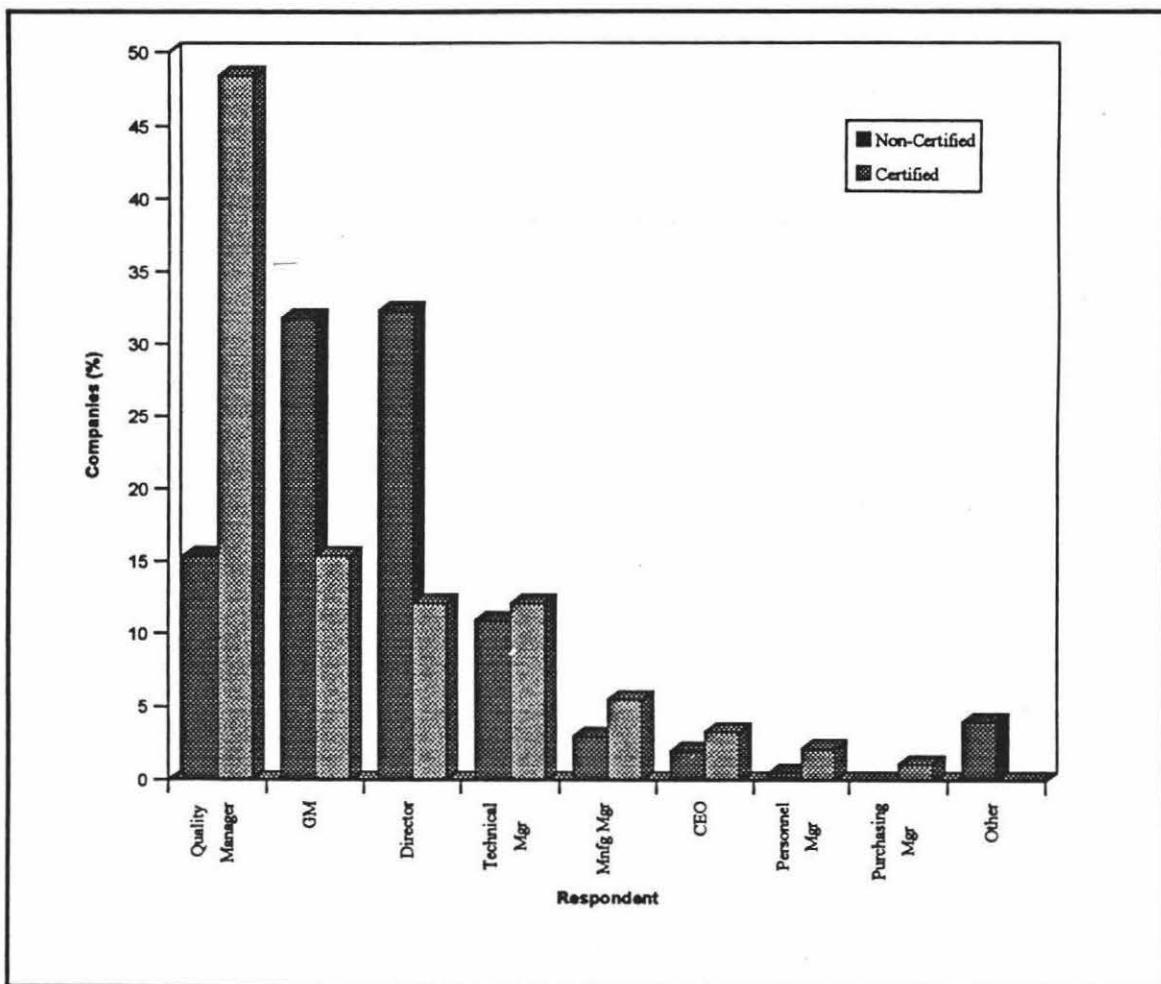


Figure 3 Respondents Title

3.2 AWARENESS OF ISO 9000

Of the 205 non-certified companies that responded only 12 companies had not heard of ISO 9000. That is 94% of companies had heard of ISO 9000 which indicates a very high level of awareness. See Table 8 of Appendix 3. The follow-up survey confirmed the high awareness with 89% of the companies having heard of ISO 9000. See Table 39 of Appendix 3.

Of all of the companies unaware of the existence of ISO 9000, 9 companies (73%) had between 1 and 20 employees, 2 companies (18%) had between 21 and 50 employees, and 1 company (9%) had between 51 and 100 employees. All of the non-certified companies that had more than 100 employees (41 companies) had heard of ISO 9000, and of these only one company had no intention of implementing ISO 9000.

All 12 companies that had not heard of ISO 9000 were more than 5 years old, with 1 company (9%) between 6 and 10 years old, 6 companies (55%) between 11 and 20 years old, 3 companies (27%) between 21 and 50 years old, and 1 company (9%) between 51 and 200 years old.

The size distribution of non-certified companies that had not heard of ISO 9000 is significantly different to the size distribution of the non-certified respondents as a whole ($\chi^2 = 34.8$, df = 4, p << 0.005 ie. a significant difference at a confidence level greater than 99.5%). This appears to be due to the disproportionately large number of non-certified companies that have not heard of ISO 9000 that have fewer than 20 employees.

Similarly the age distribution of the non-certified companies that had not heard of ISO 9000 is significantly different to the age distribution of the non-certified respondents as a whole ($\chi^2 = 27.4$, df = 4, p << 0.005). The major contribution to this difference is the disproportionately large number of non-certified companies between the ages of 11 and 20 years that have not heard of ISO 9000.

This suggests that the majority of non-certified companies that have not heard of ISO 9000 are relatively small companies with fewer than 20 employees and aged between 11 and 20 years. This should be the target market of any campaign intending to promote the awareness of ISO 9000.

As found below in Section 3.8, only non-certified companies of similar characteristics (fewer than 20 employees and more than 10 years old) had not heard of Total Quality Management. This suggests that these companies are stagnating with respect to business development. This is possibly due to ignorance caused by a disconnection from journals, trade fairs, and other industrial media, disinterest caused by the current climate of cost reduction, or neglect caused from currently small and geographically protected market niches. It is recommended that the reasons why these companies are lacking in business development should form the basis of further research, and specifically why these companies are not receiving exposure to external business development information and trends.

3.2.1 Intentions of Non-Certified Companies with regards to ISO 9000 Certification

At the time of this study 11% of the certified companies that responded were certified to ISO

9001, 79% to ISO 9002, and 10% to ISO 9003.

Of the non-certified companies 9% were in the process of preparing for certification to ISO 9001, 39% to ISO 9002, and only 1% to ISO 9003. In addition to these a quarter of the non-certified companies were seriously considering certification - essentially intending to implement ISO 9000 within the next five years - and nearly an equal number (26%) had no intention of becoming certified at all. Figure 4 shows the relative proportions of the non-certified companies intentions with regards to implementation of ISO 9000. See Table 9 of Appendix 3.

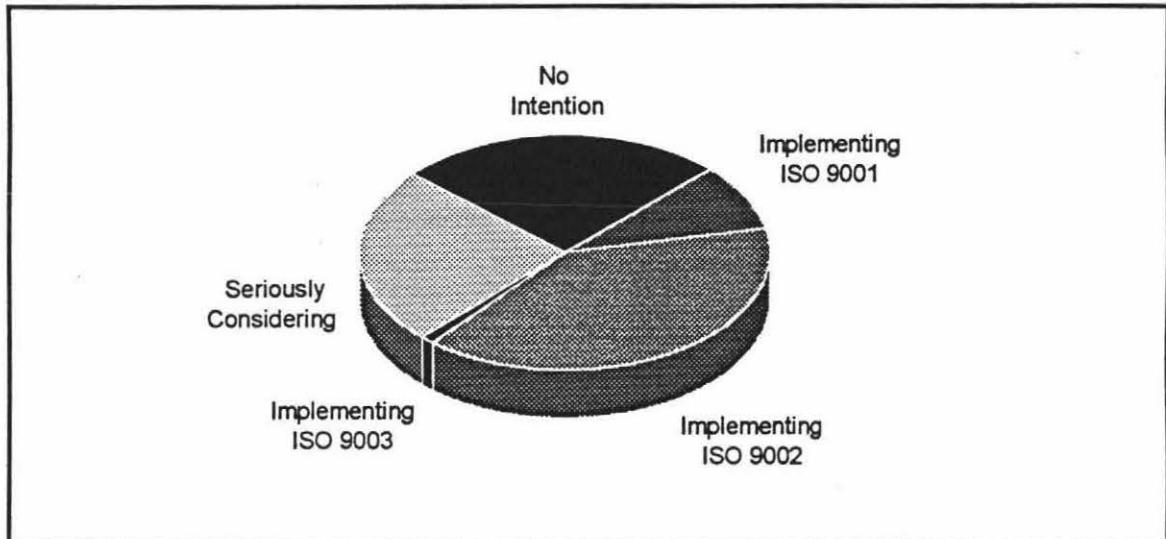


Figure 4 Intentions with regards to ISO 9000 Implementation

This information has two interesting implications:

- 1) Up to as many as half of all the currently non-certified companies in New Zealand are working towards ISO 9000 certification. Furthermore when the 25% who are seriously considering certification are taken into account the potential number of companies seeking certification totals three quarters of the companies in New Zealand.
- 2) There is a definite trend away from certification to ISO 9003. Of those companies currently implementing ISO 9000 19% are working towards ISO 9001, 79% to ISO 9002, and 2% to ISO 9003. As shown in Figure 5 below, this marks a significant decrease in the numbers seeking certification to ISO 9003 with a proportionate increase in numbers adopting ISO 9001. This suggests a realisation of the limited value to be gained from implementation of ISO 9003.

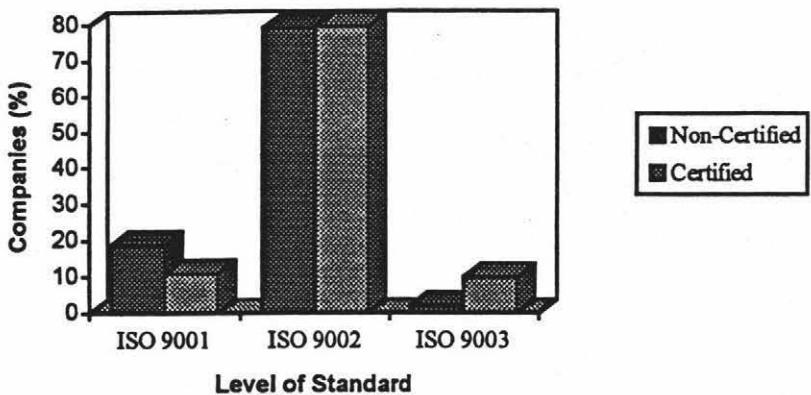


Figure 5 Levels of ISO 9000 Sought

As shown in Table 10 of Appendix 3 approximately a quarter each of the non-certified companies intending to implement ISO 9000 anticipate that they will gain certified status within 6 months, within 6 to 12 months, or within 1 to 2 years respectively. A further 6% of non-certified companies anticipate a likely certification date of between 2 to 5 years, with another 9% of the companies with the intention of implementing ISO 9000 and gaining certification as soon as possible/practicable subject to the availability of resources.

Intending to implement ISO 9000 but unsure when are 9% of the non-certified companies, and another 7% in a category designated as "other." These "others" intend to implement ISO 9000 but only when one of the following occurs:

- when forced to because their customer insists
- when their parent company insists
- when they know more about the standards
- when determined from a preliminary audit and cost/benefit analysis

3.3 REASONS FOR IMPLEMENTING, AND NOT IMPLEMENTING, ISO 9000

3.3.1 Reasons for Implementing ISO 9000

The reasons given for implementing ISO 9000 fell into eight categories with these categories able to be clearly grouped into three distinct motives:

- They had to implement ISO 9000
- They needed to implement ISO 9000
- They simply wanted to implement ISO 9000

Table 3 shows the motives for implementing ISO 9000 and the respective groupings of the reasons for implementing ISO 9000. See Table 11 of Appendix 3.

Table 3 Reasons for Implementing ISO 9000

Motive	Reason	Certified		Non-Certified	
		(%)	Total	(%)	Total
Have to	Competitors doing it	1.2		2.8	
	Customers want it	34.1		22.7	
	Corporate management demand it	8.5	44	4.3	30
Need to	Need to improve existing systems	13.4		5.7	
	Need market credibility	30.5	44	46.1	52
Want to	General desire to improve	20.7		19.9	
	Realise the benefits	25.6		41.1	
	Can foresee probable future requirement	8.5	55	12.8	74

Those companies that had to implement ISO 9000 were forced to because their corporate management demanded they do so, because their competitors had an advantage in that they were already certified, or because of pressure from customers. For the currently certified companies customer pressure had been the single greatest force driving them to certification.

Those companies that felt they needed to implement ISO 9000 did so in an attempt to try and improve inefficient operating systems, or to enhance their market credibility.

Companies that wanted to implement ISO 9000 either wanted to as part of their improvement strategy, because they realised the benefits internally and externally from doing so, or simply because they anticipated the likely requirement for ISO 9000 in their targeted markets in the future.

As illustrated in Figure 6 there is a significant difference between certified and non-certified companies with respect to the motives for certification ($\chi^2 = 5.56$, $df = 2$, $p > 0.092$, ie. a significant difference at the 90% confidence level.) The explanation for this difference is that there is a definite shift away from having to implement ISO 9000, to wanting to implement it. Increasing numbers of companies are wanting to take advantage of the benefits that accrue from the process of implementing ISO 9000 and from attaining registered supplier status.

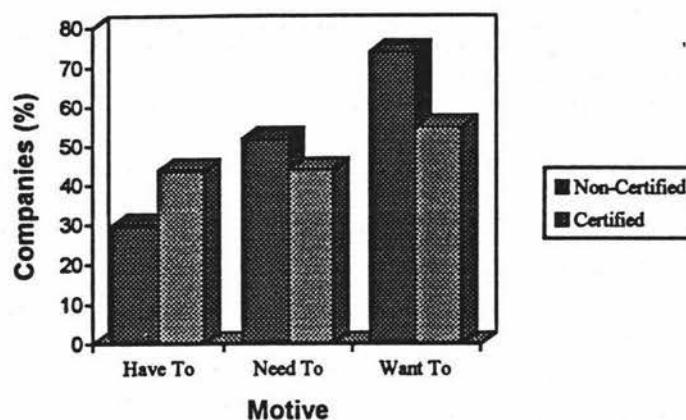


Figure 6 Motives for Implementing ISO 9000

Contrary to the author's initial belief the reasons for seeking certification could not be clearly divided into two distinct categories titled the "enlightened" and the "desperate". These are terms used by the Ministry of Commerce in a video titled "The Enlightened and the Desperate" [81] which presents a contrast between the attitudes of "enlightened" and "desperate" companies with regards to their motive for implementation of ISO 9000.

However in an effort to make this useful comparison reasons 1 to 5 could be considered to most closely represent the "desperate" companies, and reasons 6, 7 and 8 the "enlightened" companies. The rationale for this being that reasons 1 to 5 constitute companies that had no alternative but to implement ISO 9000, whereas reasons 6, 7 and 8 were self motivated before any requirement was realised.

Following this classification the principle reason for implementation of ISO 9000 for the "enlightened" companies is the realisation of the benefits to be gained. The desperate companies are more driven by the market to either provide credibility to the company and its products in the marketplace, or to satisfy existing customer requests for certification.

Figure 7 shows the relative proportions of the "enlightened" and "desperate" for this classification which appears to indicate that there may be a move towards voluntary implementation of ISO 9000 ie an increasing number of "enlightened" companies.

However a Chisquare test reveals no significant difference between certified and non-certified companies with regards to the proportion of "enlightened" versus "desperate" companies ($\chi^2 = 2.45$, $df = 1$, $p < 0.01$).

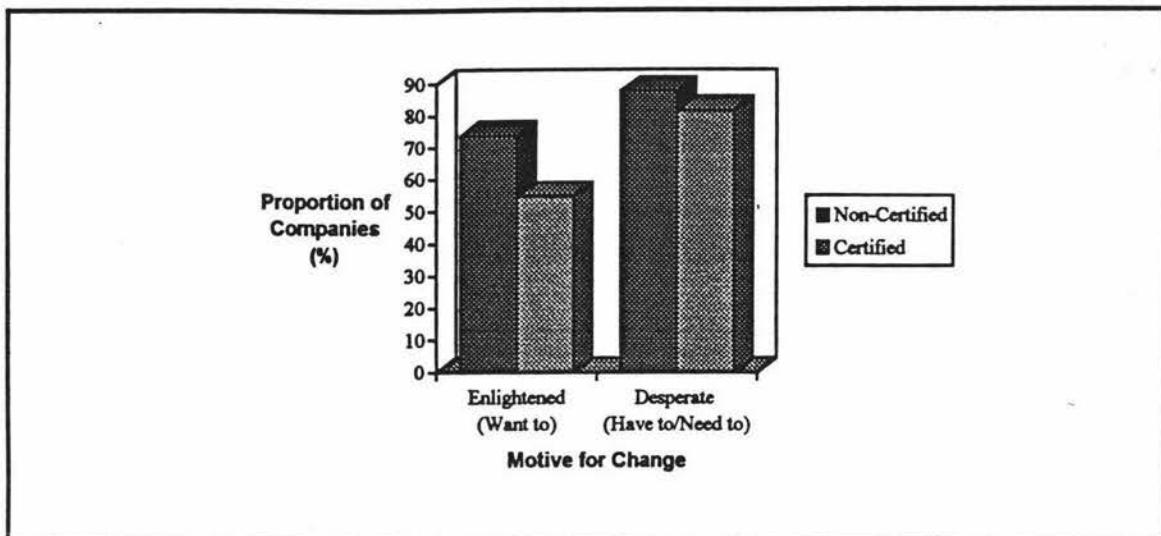


Figure 7 Proportions of Enlightened (Want to) versus Desperate (Have to/Need to)

However, removing those companies that need to implement ISO 9000 and hence reclassifying the "desperate" companies as those that have to implement ISO 9000 because of an imposed requirement does yield a significant difference at the 97.5% confidence level ($\chi^2 = 5.33$, df = 1, p < 0.025). The proportion of "enlightened" versus the "desperate" under this classification is shown below in Figure 8. See Table 12 of Appendix 3.

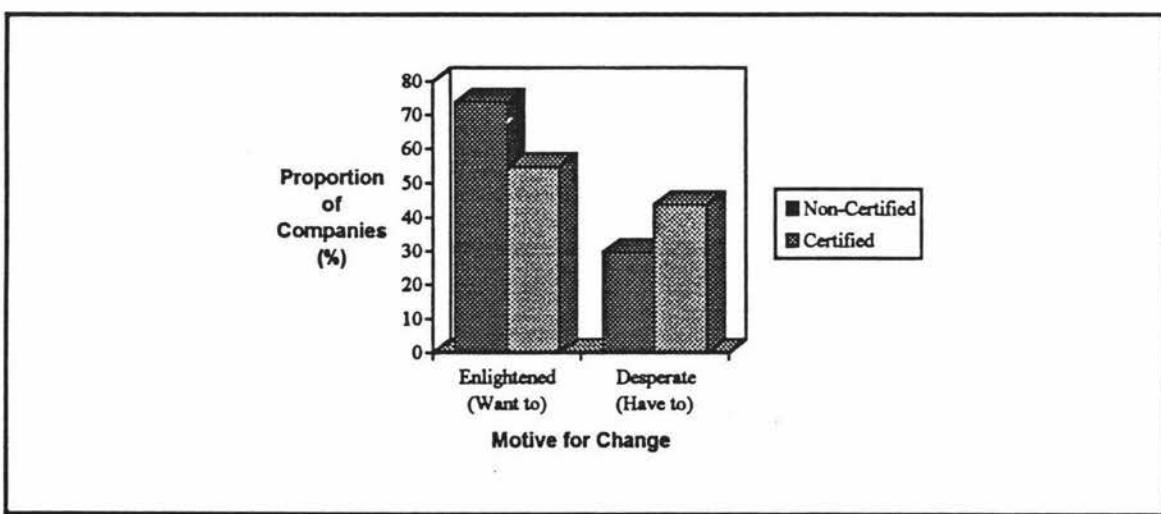


Figure 8 Proportions of Enlightened (Want to) versus Desperate (Have to)

It is the author's belief that the latter classification of "Enlightened" and "Desperate" companies is more accurate with companies that need to implement ISO 9000 falling between the two nonconnective categories.

Therefore defining "Enlightened" companies as those that want to implement ISO 9000 and "Desperate" companies as those that have to implement ISO 9000 because of an imposed requirement, leads to the conclusion that there is a definite increase in the proportion of "Enlightened" companies implementing ISO 9000 in New Zealand, or alternatively that the "Desperate" companies implement ISO 9000 more quickly which leaves more "enlightened" companies in the currently non-certified category.

3.3.2 Reasons for Not Implementing ISO 9000

Fifty two (26%) of the non-certified companies had no intention of implementing ISO 9000. The reasons given by these companies for not implementing ISO 9000 were (See Table 13 of Appendix 3):

- 17 companies (33% of the non-certified companies with no intention of implementing ISO 9000) said they did not know enough about ISO 9000 to consider certification
- 14 companies (27% of the non-certified companies) said the costs of implementation outweigh the benefits to be gained
- 12 companies (23% of the non-certified companies) believe that they do not need certification either because their standards of quality were already high (ie. the automotive industry) or that their customers do not require it
- 8 companies (15% of the non-certified companies) believed that ISO 9000 did not apply to them. Reasons given were that they believed that it was not relevant to them, that it was for exporters only, that it was applicable to large volume/low variety processors only, or that it was outside the scope of their companies' technology
- 1 company (2% of the non-certified companies) believed that the ISO 9000 standards will change and gave this as a reason for not bothering with implementation of the current standard

In general the reasons for not implementing ISO 9000 are founded on misconceptions due to a lack of understanding of the concept of ISO 9000 based quality systems and the rapidly increasing momentum towards certification, and a lack of appreciation of the benefits to be gained.

3.4 FACTORS THAT AFFECT IMPLEMENTATION OF ISO 9000

The response to two open-ended questions addressing the companies experiences or perceptions of what factors help and hinder ISO 9000 implementation yielded the results in Sections 3.4.1.1 to 3.4.1.4. Certified companies were presented with two questions asking what factors helped and hindered ISO 9000 implementation respectively. Non-certified companies were asked what characteristics of their company would help and hinder implementation of ISO 9000 if implemented at the current point in time. Most companies gave more than one answer, hence the total response rate exceeds 100% in total. See Tables 14 and 15 of Appendix 3.

3.4.1 Factors that Help and/or Hinder ISO 9000 Implementation

- The factors that helped and/or hindered implementation of ISO 9000 for certified companies are given below.

3.4.1.1 Factors that Help and/or Hinder ISO 9000 Implementation

The factors that helped and/or hindered implementation of ISO 9000 for certified companies are given in Tables 4 and 5 and shown in Figure 9.

Table 4 Significant Factors that Help ISO 9000 Implementation

Certified Companies		Non-Certified Companies	
Factor	%	Factor	%
Existing systems	54	Existing systems	51
Culture	45	Culture	48
Management Commitment	44	Management Commitment	24
Complexity of Operation	24	Market	16
Market	19	Training	13
Management practices	17	Complexity of Operation	11
Realise benefits	15	Realise benefits	9
Training	15	Management Practices	6
The Facilitator	11	Communication	5
Communication	6	Customers/Suppliers	4
Customers	8	Resources	2
Resources	5	External Assistance	2
Responsibility & Authority definition	3	Responsibility & Authority definition	1
Planning	2	The Facilitator	1

Table 5 Significant Factors that Hinder ISO 9000 Implementation

Certified Companies		Non-Certified Companies	
Factor	%	Factor	%
Culture	46	Resources	51
Training	28	Culture	23
Resources	26	Training	21
Management Commitment	22	Complexity of Operation	20
The Facilitator	16	Existing systems	16
Complexity of Operation	14	Management Commitment	11
Business Barriers	10	Magnitude	10
Responsibility & Authority definition	8	The Facilitator	8
Communication	8	Communication	7
Magnitude	8	Customer	7
Existing systems	8	Business Barriers	5
Suppliers	3	Responsibility & Authority definition	5
Customers	1	Market	3
Scope	1	Inertia	2

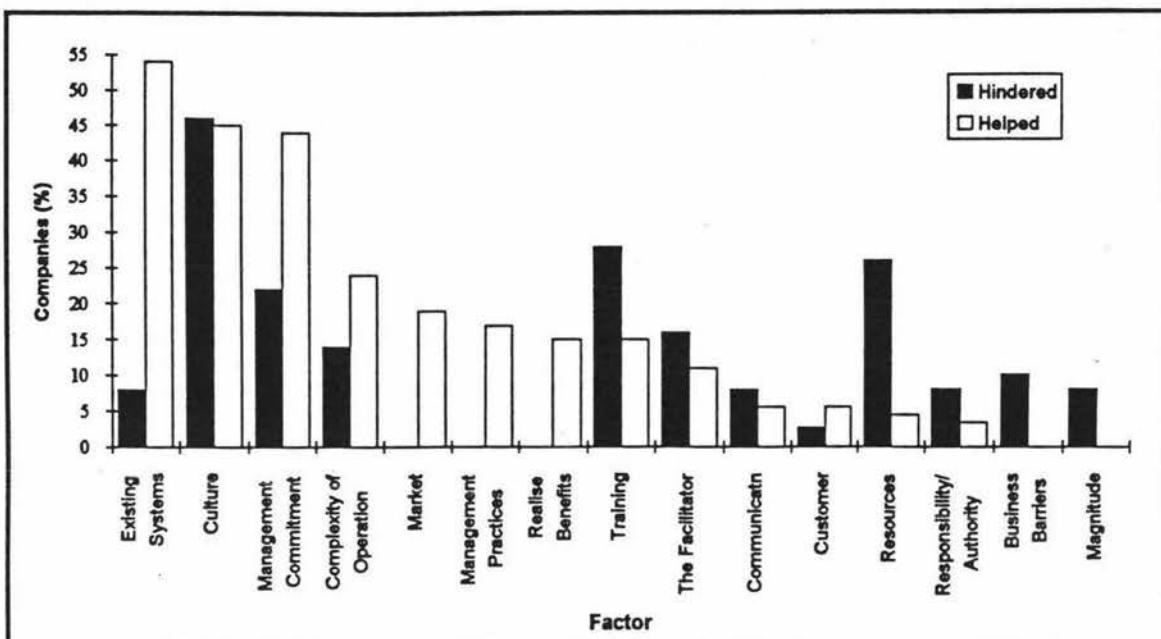


Figure 9 Factors that Helped or Hindered ISO 9000 Implementation for Certified Companies

Existing systems. Existing systems were regarded as having **helped** implementation of ISO 9000 by a majority (54%) of certified companies. This was the single greatest factor found by certified companies to have helped implementation and included the following:

- Twelve companies stated that they had existing systems in place that satisfied the requirements of the standards but did not state whether these were documented. Examples given include quality control systems and standards (5 companies), job instructions, stringent engineering practices, internal procedures and discipline associated with the aircraft industry, and policies. Eleven companies stated that they had existing systems in place that satisfied the requirements of ISO 9000 that were documented. Examples given included quality control standards, record keeping systems, comprehensive manufacturing standards, and written work instructions. Five companies stated that they had existing systems in place that satisfied the requirements of ISO 9000 but were not documented (28 companies)
- Already registered to other quality standards. These included having Telarc registered laboratories (3 companies), Ford Q101 (2 companies), NZS 5845 (1 company), NZS 5401:1982 (1 company), AS 2210 for safety footwear and military specifications (1 company), licensed by the American Petroleum Institute (API) to produce line pipe to API 5L (1 company), the New Zealand Standards Mark (1 company), and other unnamed regulatory compliances (2 companies) (9 companies)
- "Already had a Total Quality Management programme running based on Kaizen" (1 company)

Inadequacies of existing systems **hindered** implementation for 8% of the certified companies. Particular inadequacies stated include:

- Lack of formalised procedures (1 company)
- Procedures not documented (1 company)
- Non-existent control of the distribution of documentation and no structured

- documentation hierarchy (1 company)
- Introduction of Total Quality Management before ISO 9000 hindered progress as the systems were difficult to integrate (1 company)

In summary having existing systems that satisfied the requirements of ISO 9000, being registered to other quality standards or having an established Total Quality Management system was the single greatest factor that helped the implementation of ISO 9000. A lack of formalised and adequately documented systems and attempting to trying to superimpose ISO 9000 over an existing Total Quality Management framework, both hinder the implementation of ISO 9000.

Culture. The culture of the company helped implementation of ISO 9000 for 45% of the certified companies. This included:

- Existing quality consciousness. Twenty two companies stated that they already had a history of quality improvement, customer focus, and quality systems and had a committed workforce committed to quality. Two companies specifically made reference to existing Total Quality Management strategies. (23 companies)
- Cooperation of staff. Nine companies credited the ease of implementation of ISO 9000 to the willingness of staff to change. Reasons given include the acceptance of key staff of the need for ISO 9000, the calibre and loyalty of staff, a commitment to quality improvement, and a willingness not to prejudge the system (9 companies)
- Involvement of all employees at all levels of the organisation in the documentation process and decision making (6 companies)
- Stable industrial relations (1 company)
- Internal discipline (1 company)
- Good understanding by staff of the intentions/direction of the company (1 company)

The culture of the company hindered implementation of ISO 9000 for 46% of the certified companies. This was the single greatest factor found by certified companies to have hindered implementation. This included:

- Resistance to being changed. Several companies discovered a lack of full staff acceptance to the extent that management believed that some staff were deliberately not complying to "agreed" systems. Three companies stated that there was complacency due to a disbelief that ISO 9000 was here to stay - the "flavour of the month" syndrome. Two companies acknowledged that there was a fear of change and one company noted that a lack of involvement of employees led to a lack of ownership of the systems developed. One small company explained that the relative success of informal systems adopted throughout their company meant that staff could not see any benefits from having formalised procedures. (20 companies)
- Older employees that had been in the company for many years found the need to change particularly difficult to accept (6 companies)
- Lack of commitment (2 companies)
- Lack of discipline. One company added that the poor attitude of factory supervisors who initially only saw ISO 9000 as an additional workload hindered its implementation (2 companies)
- Poor industrial relations - "a them and us attitude" (2 companies)
- Conservatism (1 company)

Companies in which the culture helped the implementation of ISO 9000 tend to be characterised by those which have an existing level of quality consciousness and value their employees as contributing members of the company. Companies that actively promote the involvement of all employees in business development initiatives create a willingness of employees to cooperate in the process of change which in turn fosters good industrial relations, discipline, and an understanding by all employees of the intentions/direction of the company; all of which facilitate the implementation of ISO 9000.

Those companies in which the culture hindered implementation of ISO 9000 tend to be characterised by those in which the employees are seen by management to resist any form of change. This will in most cases be due to a failure on behalf of management to communicate the reasons and need for change and the benefits to be gained, but is not helped by a climate of poor industrial relations and lack of discipline.

Management Commitment. Management commitment helped 44% of the certified companies with implementation of ISO 9000. This included:

- Commitment from top management such as the Managing Director, Chief Executive Officer (CEO) and General Manager. Visible signs of top management commitment were stated by four companies by the use of key words such as "driven by the CEO," "support and encouragement from the General Manager," "drive and enthusiasm," and "ongoing commitment." Five companies stated that top management had implemented policies that insisted upon the implementation and certification to ISO 9000 not as an option but as a minimum. Two companies stated that the commitment of the General Manager was due to having witnessed the positive effects of implementation of ISO 9000 in other companies in which they had worked. One company claimed top management commitment as measured by visibility at staff meetings at all levels, a signed quality policy, and allowance for implementation of ISO 9000 in the annual budget. One company stated the establishment of a corporate quality assurance team to assist in quality systems implementation as evidence of top managements' commitment to quality (21 companies)
- Commitment from middle management. Five companies added that management were already committed to quality and quality improvement through previous knowledge of the advantages of certification to ISO 9000 and exposure to other quality improvement initiatives. (15 companies)
- Management that are dedicated to maintaining the leading position in the marketplace and that are committed to the implementation of ISO 9000 as a means of achieving this objective (1 company)

A lack of management commitment hindered implementation of ISO 9000 for 22% of certified companies. This included:

- Lack of understanding by management of the need for ISO 9000. Four companies added that management had either a poor attitude towards quality or were not committed to quality (5 companies)
- Old management styles with entrenched attitudes and authoritarian policies (4 companies)
- Middle and lower management initially resisted the concept of changing to formalised systems. In each case this was alleviated when the benefits began to be realised or were

- properly explained and understood. One company added the confession "perhaps we didn't sell the concept well enough initially" (3 companies)
- Impatience of middle management for returns/benefits (1 company)
- Lack of recognition and commitment by management of the time and resources required (1 company)
- Implementation of ISO 9000 was not prioritised initially in all locations within the company (1 company)

Clearly commitment by management to the implementation of ISO 9000 is contingent upon their knowledge of ISO 9000 and their understanding of the need for change, and the benefits to be gained. It is apparent that the level of management commitment is measured by the degree of their active involvement in and leadership of the implementation process.

Complexity of Operation. The complexity of the operation helped implementation of ISO 9000 for 24% of the certified companies. This included having:

- A small company in terms of number of employees. Two companies added that being a small company enables easier communication and facilitated implementation of ISO 9000. (9 companies)
- A relatively simple process that is easily documented (5 companies)
- A high technology based operation. This included a high degree of automation and data based computer systems for control for which although their integrity needs to be proven they are relatively easy systems to document and control (4 companies)
- A relatively new plant (2 companies)

The complexity of the operation hindered implementation of ISO 9000 for 14% of the certified companies. This included:

- A complex range of products and end user needs (1 company)
- The complexity of production systems (1 company)
- Short lead times and a high service requirement meant a need for flexibility to be built into the developed systems (1 company)
- Some systems still in the process of being developed and established (1 company)
- A large company in terms of the number of employees and processes - the larger the company the more complex the systems that need to be controlled (1 company)
- inadequate or no inspection and measuring and test equipment ie. no objective quality verification (1 company)

The next two statements appear to be founded upon erroneous interpretations of the standards in that ISO 9000 does not require an operation to be efficient, and that having a large product range does not characterise a special process:

- Inefficient layout of plant (1 company)
- A very large product range (in excess of 150 products) therefore a huge burden of special processes to document (1 company)

In summary, the smaller the company and the less complex the production/service provision process the easier it is to implement ISO 9000. A high degree of automation and having a recently built manufacturing plant appear to help the implementation process.

Market. Pressure from the marketplace helped to provide the motivation to gain certification for 19% of the certified companies. This included:

- Access to markets. Particularly for those companies that are export orientated, and those that operate in high quality/high performance areas of markets have found that it is now imperative to attain certification to ISO 9000 in order to gain access to key markets, such as Europe and specialty plastic packaging, and that certification must form part of their marketing strategy (8 companies)
- Pressure from existing customers of which certification to ISO 9000 forms part of their supplier approval programme (5 companies)
- Enhanced competitive position by either providing a competitive advantage or alleviating a present disadvantage. One company added that one of the motivating factors for certification to ISO 9000 was to combat increased competition from importers (3 companies)

As found above in Section 3.3, pressure from the marketplace provides the motivation towards implementation of ISO 9000 for a large proportion of companies. ISO 9000 can provide access to markets, satisfaction of customers that require ISO 9000 certification of their suppliers, and can enhance competitive position.

Management Practices. Particular attitudes and practices of management were seen to have helped implementation of ISO 9000 by 17% of certified companies. These included:

- The belief that the employees are important, and involvement of them in decision making (5 companies)
- A positive management and board attitude (2 companies)
- An aim to improve operating efficiencies in all areas (1 company)
- An existing structured system of meetings, leadership, and review (1 company)
- A dynamic and proactive management team (1 company)
- Commitment to achieving certification (1 company)
- An autonomous decision making process which limited "corporate politics" which would have otherwise hindered implementation (1 company)
- A management that is encouraged to take full responsibility for the entire task (1 company)

Companies in which the practices of management helped the implementation of ISO 9000 typically have a structured process of management meetings and reviews, have common objectives driven through leadership from top management, and have a motivated and autonomous management team that values their employees as contributing members of the company.

Realise Benefits. A realisation of the benefits helped provide the motivation and justification to achieve certification to ISO 9000 for 15% of the certified companies. This included:

- Realisation of the internal benefits to be gained such as improvement of their control systems, improved capability of existing systems to deal with increasing complexity of the product and customer expectations, an improvement in design performance, manufacturing performance and project management, a means of quality improvement and a step towards Total Quality Management. One company added that a company in financial need is more receptive to opportunities for improvement and savings in cost,

and assures accountability and commitment which in turn ensures focus and progress
 (8 companies)

- Realisation of the external benefits to be gained such as an enhanced reputation as a registered supplier which can provide a competitive edge, profitability and integrity. One company added that a realisation of the fact that it would become a future requirement in their marketplace provided the motivation to implement ISO 9000
 (5 companies)

A realisation of the internal and external benefits is an important factor in choosing to implement ISO 9000 and maintaining the motivation to proceed.

Training. Training given to staff or that staff had already gained helped implementation for 15% of the certified companies. This included:

- Staff well trained and experienced, with high standards of workmanship. One company added that all staff were already trained in their current jobs and their future job
 (5 companies)
- Existing staff trained in Quality Assurance and able to implement ISO 9000. One company added that all employees were trained in quality improvement methods and the quality improvement philosophy which greatly facilitated the introduction of ISO 9000
 (5 companies)
- Training given to staff. One respondent stated that they attended a two day seminar covering the development of quality manuals and quality management systems and a one day seminar on temperature measurement which were of particular help. One company stated that training in Statistical Process Control helped to familiarise people with quality concepts
 (2 companies)
- A resource of competently trained technical people in positions of management
 (2 companies)
- Valuable lessons were learnt from implementation of ISO 9000 in one department first
 (1 company)

Weaknesses in training hindered the implementation of ISO 9000 for 28% of certified companies (approximately twice the number of companies for which training helped implementation). This included:

- lack of understanding by management, including the facilitator, of what ISO 9000 was, what it required, and lack of understanding of the certification process. This slowed the implementation process considerably and meant that there was a lack of in-house expertise available to assess the adequacy of the systems introduced
 (9 companies)
- Poor job performed in selling the benefits and reasons for change to employees. For two companies this led to doubt amongst employees as to the benefits to be gained and a lack of appreciation of the need to document the systems and procedures. One company stated that they had learnt that it is important to explain to employees from the beginning what management is trying to achieve. Another company stated that it had made the mistake in promoting ISO 9000 of emphasising the fact that it is needed in order to continue retain customers rather than stressing the need for standardised and formalised systems of operation
 (6 companies)
- Lack of training of all staff in the basic principles of quality assurance and the purpose

- of quality systems (3 companies)
- Difficulty getting production staff in particular to use the systems developed ie. non-conformance reporting and documentation of corrective action taken (1 company)
- Lack of education amongst some employees (1 company)
- Lack of training of employees in current job procedures (1 company)

In general the ease of implementation of ISO 9000 is dependent upon the level of training given to staff. This is in terms of the ability of the Facilitator to coordinate the implementation process, the verifiable capability of the employees to perform their work, and the employees willingness to accept change due to their understanding of the reasons and need to change and the benefits to be gained.

The Facilitator. The Facilitator chosen to coordinate the implementation of ISO 9000 helped implementation for 11% of the certified companies. The reasons given included:

- A full-time facilitator was employed to coordinate the development and implementation of the quality systems - the company "did not try to go it alone." One company added that it helped that the appointed person reported directly to the General Manager (5 companies)
- A well trained and informed quality manager drove the programme (1 company)
- Trust and empowerment was given to the people made responsible for the documentation and implementation of the quality systems (1 company)
- The organisation had a professional corporate Quality Assurance team of experienced quality practitioners (1 company)
- A Quality Assurance team was established in-house (1 company)
- An experienced consultant was used (1 company)

The Facilitator hindered implementation for 16% of the certified companies. The reasons given included:

- Difficulty with interpretation of the standards and subsequent application in a practical sense (3 companies)
- No particular person to drive the programme which warrants a single person in a full-time position (2 companies)
- Over-zealous interpretation of the standards with a tendency towards over-documentation. One company added that the systems being developed were detailed and restrictive to the extent that their customer service and performance would have suffered. (2 companies)
- Initially chose a facilitator that saw Total Quality Management and ISO 9000 as being synonymous ("which they are not") (1 company)
- Poor consultancy resulting in inappropriate documentation being developed which prevented training and assimilation (1 company)
- Benefits oversold to end users (1 company)
- Did not have ISO 9000 quality system models to compare and work from (1 company)

In summary, it is important to appoint a well qualified and experienced facilitator with the necessary responsibility and authority to coordinate the implementation of ISO 9000.

Resources. Availability of resources helped implementation for 4.5% of certified companies. This included:

- An open budget (1 company)
- A large company, therefore can afford money and resources to achieve and maintain certification (1 company)
- The Board's approval of resources to achieve certification (1 company)
- The company was prepared to make financial investment in the development of systems and in training to the new systems (1 company)

A lack of resources hindered implementation for 26% of the certified companies (approximately six times the number of companies for which the availability of resources helped implementation). This included:

- Lack of time or personnel available due to existing workloads. One company added that this meant a low level of departmental contribution and employee involvement (8 companies)
- Lack of money. The cost of becoming certified to ISO 9000 in terms of the costs incurred during implementation, and the certification and surveillance audit costs imposed by the certification bodies was found to be very high. Reasons given for the lack of money were "due to recession and competitive environment," "small company," "reduced cash flow," and "undercapitalised because we are a small business and do not get much assistance from the banks" (6 companies)
- Unrealistic time frames imposed by management. The planned time frames imposed by management were unrealistic and too restrictive with management not taking measures to allow time provision (4 companies)

It is important that adequate resources in terms of time, money and personnel are budgeted for prior to the initiation of the implementation process in order to ensure the effective implementation of ISO 9000. However it is apparent that the initial costs of implementation for many small companies are almost inhibitive; as found above in section 3.3.2.

Business Barriers. Barriers associated with the particular way their business operated hindered implementation for 10% of the certified companies. This included:

- Traditionally the responsibility for quality was delegated to an individual as a technical role divorced from production interests rather than quality being viewed as everyone's responsibility (2 companies)
- As a branch relied on head office for purchasing (2 companies)
- Manufacturing, sales and administration divisions tend to operate very autonomously (1 company)
- Emphasis on production quantity not quality (1 company)
- Operate a bonus scheme (emphasis on production quantity not quality) (1 company)

Convoluted organisational structures can complicate the implementation of ISO 9000 as can business schemes that directly or indirectly place emphasis on production quantity rather than quality ie. bonus schemes.

Customer. Customers helped implementation of ISO 9000 for 8% of the certified companies. This was primarily due to the motivational effect that pressure from existing customers had upon their company to implement ISO 9000 and included:

- The New Zealand Dairy Board's supplier approval programme (3 companies)
- "Our major customer is selling into Japanese and European markets" (1 company)
- Customers are increasingly seeking full traceability (1 company)
- Increasing involvement of our customers in ISO 9000 (1 company)
- Exposure to overseas customers ie. "the Ford Motor Company has encouraged us to adopt their quality standards Q101 and Q1" (1 company)

One certified company stated that "customer ignorance" hindered implementation of ISO 9000.

In general pressure from existing customers provides a motivational effect upon companies to implement ISO 9000.

Responsibility and Authority Definition. Existing clear definition of Responsibility and Authority helped 3% of the certified companies. This included:

- Clearly defined responsibilities and authorities - and therefore established accountability (2 companies)
- All staff accept quality as being their responsibility (1 company)

Poor definition of responsibility and authority hindered 8% of the certified companies. This included:

- Difficulty in getting staff, particularly middle management and supervisory level, to accept responsibility and accountability (the management systems that are developed offer discipline but it can be difficult to get people to operate within these formalised systems) (3 companies)
- An organisational structure that hindered implementation of ISO 9000 (1 company)
- Lack of responsibility - "get someone else to do it" (1 company)

Clear definition of responsibilities and authority helps to establish accountability and provides the discipline necessary to assure continued compliance with the systems developed.

Communication. Good communication helped 6% of the certified companies. This particularly included the use of teams:

- "Team talks" used to carry the message (1 company)
- Team approach to problem solving and a thorough communication programme by the use of "team briefs" (1 company)
- Many long term employees so teamwork was an untapped resource suited to the culture of the company (1 company)
- Regular bimonthly meetings of all site "quality coordinators" of the corporation (1 company)
- Good in-house communication systems (1 company)

Poor communication hindered 8% of the certified companies. This included:

- Conflicts between divisions (2 companies)
- Poor communication between management and floor staff - compounded by a "them and us" attitude (2 companies)
- Language difficulties with factory staff which has a large proportion of pacific island and Maori people. This also language and cultural barriers with documentation (2 companies)
- Fear of lost job security by having documented work instructions - primarily due to poor communication of the companies intentions (1 company)

Therefore good communication throughout the organisation is important to gaining acceptance of ISO 9000. Teams were found to be a useful mechanism to disseminate information. However existing conflicts between departments and management and shop floor personnel are counter productive in terms of communication, and language difficulties between differing races needs special attention.

Magnitude. The size of the task of implementation of ISO 9000 hindered 8% of the certified companies. This emphasises the importance of planning in the initial stages of the implementation process and includes:

- Perceived "paperwork mountain" in establishing a quality system with the attitude that it is a long slow process requiring huge resources by many people (3 companies)
- "A cumbersome and time consuming process of amendments, document reviews and document control" (1 company)
- Existing workloads delayed the implementation process (1 company)
- "a concerted effort is required to pull all activities together" (1 company)

This emphasises the importance of planning and the allocation of time and resources in the initial stages of the implementation process.

Planning. Two certified companies (2.2%) stated that good planning including goal setting helped the implementation of ISO 9000.

Suppliers. Two certified companies (2.7%) stated that their suppliers hindered the implementation process. This included inadequate support from suppliers who at the time were not committed to, or understood, the concept of ISO 9000 based quality systems, and suppliers that do not verify the final quality of their goods (placing more emphasis on production quantities)

Scope. One certified company (1.4%) stated that the scope of the quality systems hindered the implementation process in that at the time certification was awarded the systems only applied to management and that for the systems to be effective they needed to be company-wide.

Non-Certified Companies

The non-certified companies rated the factors that help and hinder implementation of ISO 9000 similarly to the certified companies with Spearman's Rho (rank order correlation coefficient) used to compare the level of agreement between the certified and non-certified companies being $\gamma_s = 0.864$ for factors that help implementation (a strong relationship), and $\gamma_s = 0.714$ for factors that hinder implementation (a moderate relationship).

For the factors that help implementation of ISO 9000 the main differences in the ratings given by the certified and non-certified companies are that the non-certified companies underestimate the importance of the following:

- The qualification and capability of **The Facilitator** - the person chosen to coordinate the implementation of ISO 9000
- **Management Practices** such as attitudes towards employees and involvement of them in the decision making process
- **Management Commitment** and the effect it has upon employee acceptance and the ease of implementation of ISO 9000
- **Complexity of the operation** with regards to the size of the company and the level of technology deployed
- The importance of **Realisation of the benefits** to the motivation of staff towards achieving certification

The non-certified companies did not expect each of the factors that hinder implementation to be as great a problem as the certified companies experienced, with the exception of Resources, Existing Systems and Customers which in each case twice as many non-certified companies expected them to be a hindrance to implementation than the number of certified companies that found them to be a hindrance. The main differences between the certified and non-certified companies include:

- **Resources.** The main concern of the non-certified companies was the implementation cost and the provision of other resources. It is likely that lack of resources is the primary reason why companies have delayed the implementation of ISO 9000.
- **Existing Systems.** Twice as many non-certified companies expect inadequate or nonexistent systems to hinder implementation of ISO 9000 than the number of certified companies that found existing systems to be a hindrance. This disregards the fact that every company has a quality system whether they realise it or not, in one form or another. Furthermore, where a company already complies to other industry standards, such as the regulatory standards found in the aeronautics and food industries, satisfying the requirements of ISO 9000 is a relatively easy process.
- A greater number of non-certified companies anticipated problems with **Customers** than the proportion of certified companies that experienced problems with customers. The non-certified companies expected problems associated with obtaining certificates of analysis or conformance, identification of product, and measures to ensure traceability.
- The **Culture** of the company was rated by half the number of non-certified companies than certified companies as likely to hinder implementation of ISO 9000. This draws the conclusion that either the non-certified companies underestimate the importance of the companies culture upon the ease of implementation, or the culture of the certified companies is significantly more conducive at present to the implementation of ISO 9000 - the latter may be true and attributable to the fact that the majority of non-

certified companies intending to implement ISO 9000 are small companies of fewer than 50 employees.

- The effect of **Management commitment** upon the ease of implementation was underestimated by non-certified companies.
- The qualifications and capability of **The Facilitator** was not expected to prove such a problem as the certified companies experienced it to be.

3.4.1.2 Summary of the Factors that Helped and Hindered ISO 9000 Implementation in New Zealand

A summary of the factors described earlier in Section 3.4.1 that both helped certified companies and hindered other certified companies are listed in Table 6. The sum of the proportions of companies affected and the ratio of the proportion of companies helped versus those hindered is given for each factor. A helped/hindered ratio of greater than 1.0 means that that factor helped more companies than it hindered by the factor given in the ratio. A helped/hindered ratio of less than 1.0 indicates that that factor hindered more companies than it helped with the ratio indicating the relative proportion of companies helped.

Table 6 Factors that Helped and Hindered ISO 9000 Implementation

Factor	Helped (%)	Hindered (%)	Sum (%)	Helped Hindered
Culture	44.9	45.9	91	1.0
Management Commitment	43.8	21.6	65	2.0
Existing systems	53.9	8.1	62	6.7
Training	14.6	28.4	43	0.5
Complexity of Operation	23.6	13.5	37	1.7
Resources	4.5	25.7	30	0.2
The Facilitator	11.2	16.2	27	0.7
Communication	5.6	8.1	14	0.7
Responsibility & Authority definition	3.4	8.1	12	0.4
Customer	7.9	1.4	9	5.6

Existing Systems was the single greatest helpful factor for implementation of ISO 9000 having helped 54% of the certified companies which was seven times as many companies than those for which existing systems hindered implementation. **Culture** of the company and **Management Commitment** were the next helpful factors with Management Commitment helping twice as many certified companies as those that it hindered. The **Culture** of the company was the single greatest hindrance to implementation of ISO 9000 with **Training**, **Resources** and **Management Commitment** next.

Overall the **Culture** of the company had the greatest affect upon the ease of implementation of ISO 9000 in New Zealand companies, followed by **Management Commitment** and **Existing Systems**.

3.4.1.3 Summary of the Factors that Helped Implementation of ISO 9000 in New Zealand

A summary of the factors that only helped companies to implement ISO 9000 are listed in Table 7 in order of the proportion of companies affected.

Table 7 Factors that Helped Implementation of ISO 9000 in New Zealand

Factor	Helped (%)
Market	19
Management practices	17
Realise benefits	15
Planning	2

Pressure to implement ISO 9000 from the marketplace and from a realisation of the benefits helped 34% of the companies (19% and 15% respectively).

Particular Management practices that were conducive to the implementation of change helped 17% of the companies, with Planning of the implementation process identified by only 2% of the companies as having specifically helped the implementation of ISO 9000.

3.4.1.4 Summary of the Factors that Hindered Implementation of ISO 9000 in New Zealand

A summary of the factors that hindered the implementation of ISO 9000 are listed in Table 8 in order of the proportion of companies affected.

Table 8 Factors that Hindered Implementation of ISO 9000 in New Zealand

Factor	Hindered (%)
Business Barriers	10
Magnitude	8
Suppliers	3
Scope	1

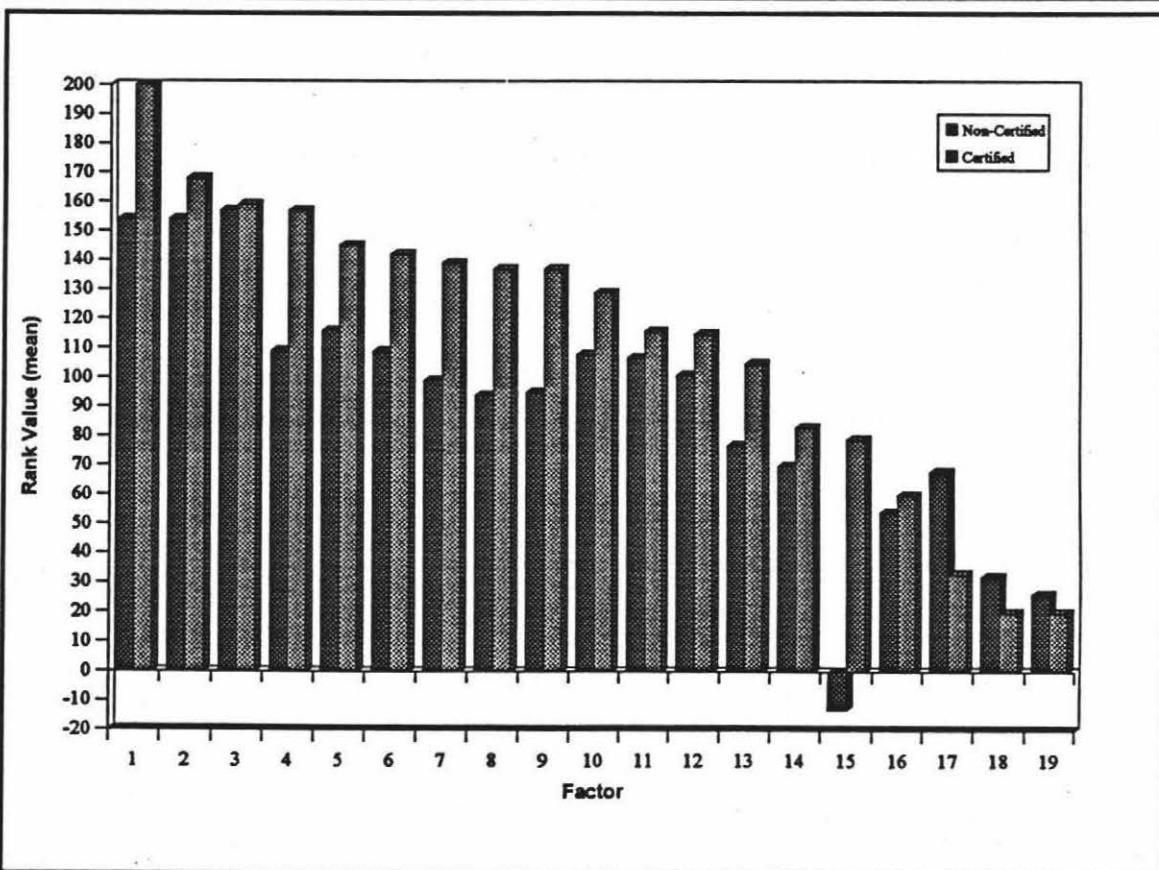
Particular business barriers (ways the company operates) hindered 10% of the companies. The Magnitude of the task and the scope of the affect of ISO 9000 across the company hindered implementation for 9% of the companies in total (8% and 1% respectively). Suppliers proved to be a hindrance for 3% of the companies.

3.4.2 Factors that Affect ISO 9000 Implementation

A list of factors known to hinder some companies in implementation of ISO 9000 was rated on a number line according to the degree to which each factor helped or hindered implementation for the certified companies, and the degree that each factor would help or hinder implementation for the non-certified companies. The responses were weighted with -3, -2, and -1 according to the degree of hindrance, 0 for neither helped or hindered, and +1, +2, and +3 according to the degree of help that that factor provided to the ease of implementation. The results were summed and the means are given in Table 9 and represented graphically in Figure 10. A value of +300 would mean that all of the respondents said that that factor helped or would help implementation of ISO 9000. See Table 16 of Appendix 3.

Table 9 Factors Ranked in Order of Perceived Affect on Implementation

Certified Companies		Non-Certified Companies	
Factor	Mean	Factor	Mean
1.Senior Management commitment	201	Corporate philosophy	157
2.Quality policy	168	Quality policy	154
3.Corporate philosophy	159	Senior management commitment	154
4.Employee participation	157	Company-wide awareness of importance	116
5.Company-wide awareness of importance	145	Employee participation	109
6.Customer	142	Customer	109
7.Employee motivation and co-operation	139	Perception of the benefits	108
8.Responsibility/Authority definition	137	Communication	101
9.Training	137	Company culture	107
10.Perception of the benefits	129	Employee motivation and co-operation	99
11.Company culture	116	Training	95
12.Communication	115	Responsibility/Authority definition	94
13.Corp experience with ISO 9000 impl'n	105	Corp experience with ISO 9000 impl'n	77
14.Employees acceptance of change	83	Employees acceptance of change	70
15.Resources	79	Supplier	68
16.Interpretation of the standards	60	Interpretation of the standards	54
17.Suppliers	33	Understanding how ISO 9000 relates to TQM	32
18.Unions	20	Unions	26
19.Understanding how ISO 9000 relates to TQM	20	Resources	-13

**Figure 10 Factors Ranked in Order of Perceived Affect on Implementation**

All factors scored as helping implementation (a positive mean), with the exception of Resources which again feature as hindering implementation for non-certified companies. The ranking can be taken to represent the factor that most helps implementation with the greatest rank value (mean), and the factor that least helps implementation of ISO 9000 having the least rank value. This ranking provides a useful guide for anticipating the major problems and beneficial factors that companies may actually encounter.

Observations of the ranking in Table 6 and Figure 10 include:

1. **Senior Management Commitment** stands alone as the factor that most helps implementation. This is consistent with Tables 4 and 5 where senior management commitment had a major affect upon implementation, and suggests that on the whole management in New Zealand is committed to the implementation of ISO 9000 based quality systems.
2. **Quality Policy** was the second most helpful factor in the implementation of ISO 9000. The Quality Policy establishes the intentions and directions of the company which is always useful in guiding the implementation of ISO 9000 and determining the scope of the quality system being developed.
3. **Corporate philosophy** and 4. **Employee participation** appear through their high ranking to be in such a state in New Zealand companies to be conducive to ISO 9000 implementation.
5. **Company-wide awareness of importance**, pressure from the 6. **Customer and the motivational affect it has for attaining certification**, 7. **Employee Motivation and Co-operation** which can only be obtained through understanding of the need to change and the benefits to be gained, 8. **Responsibility and Authority Definition**, and 9. **Training** each rated highly for their experienced and expected helpful effect upon ISO 9000 implementation.
10. **Perception of the Benefits** also rated relatively high as helping implementation of ISO 9000 which is consistent with Section 3.3.1 and 3.4 above where a realisation of the benefits to be gained provided motivational pressure to gain ISO 9000.
11. **Company culture** and 12. **Communication** represent the median ranking for affect upon implementation of ISO 9000 and verifies their importance in the implementation process as found in Section 3.4 above.
13. **Corporate Experience with ISO 9000 Implementation** definitely has an effect upon the ease of implementation of ISO 9000 and is rated as having helped implementation.

The degree to which the remaining six factors helped implementation of ISO 9000 declines rapidly from this point, and represent the factors of this listing that least helped implementation of ISO 9000.

14. **Employee acceptance of change**, and 15. **Resources** such as time, personnel and money were similarly ranked. A ranking at this level by certified companies indicates that neither of these factors are effortlessly attained. Resources represents the most significant difference

between certified and non-certified companies with non-certified companies anticipating resources as likely to hinder ISO 9000 implementation.

16. Interpretation of the standards proved relatively difficult, followed by **17. Suppliers -** problems associated with trying to convince suppliers to consistently supply to product specification and to supply proof of conformance documentation. However these two factors still rated overall as having helped implementation of ISO 9000.

18. Unions and **19. Understanding how ISO 9000 relates to TQM** were the factors proving of the least help of this listing, but as rated indicate very little effect upon the ease of implementation of ISO 9000, and being of no hindrance.

Non-certified companies ranked the factors in a very similar order but they expected every factor to pose a greater problem than the certified companies found them to be, with the only significant exception that they did not expect to encounter as many problems with their suppliers. Again resources were their major concern - this was the only factor that was rated as likely to hinder implementation of ISO 9000. The observed differences between the certified companies and the non-certified companies appears to be due to the inexperience and ignorance of the non-certified companies as to the factors that actually affect the implementation of ISO 9000

3.4.3 Did Implementation of ISO 9000 Conflict with other Activities on-site?

Certified companies were asked whether implementation of ISO 9000 conflicted with other activities on-site. The responses are shown in Figure 11. See Table 17 of Appendix 3.

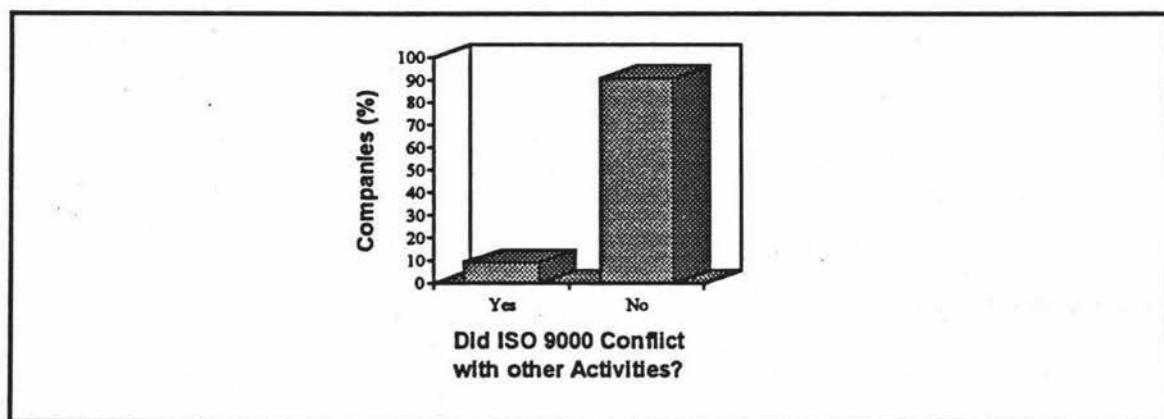


Figure 11 Did Implementation of ISO 9000 Conflict with other Activities on-site?

Of the certified companies that responded 91% said that the implementation of ISO 9000 did not conflict with other activities on site, and 9% said that it did conflict with other activities on site.

Those conflicts that did occur include:

- Caused a loss of focus on current Total Quality Management (TQM) and Continuous Improvement Process (CIP) strategies. Although ISO 9000 and continuous

improvement strategies are complimentary to each other they should not be undertaken concurrently as it causes a conflict in priorities causing a lack of focus on one of the two strategies. (3 companies)

- Caused a delay of work on the development of other systems (such as implementation of the FORD Q1 quality system) (1 company)
- Differences in viewpoint between the certification body and regulatory bodies such as the Ministry of Agriculture and Fisheries (MAF). (1 company)

The first two conflicts listed indicate that the resource requirement of ISO 9000 can cause lost momentum towards the achievement of other goals. This suggests that implementation of ISO 9000 should not be undertaken concurrently with the development of other related strategies.

The next two conflicts that were submitted appear to contradict themselves. In each case, in the authors viewpoint, the companies objective should have been strengthened by the implementation of ISO 9000:

- Caused a loss of focus on the need to develop stronger markets (ie poor sales) (1 company)
- Conflict between the requirements of Contract review and the company's philosophy to "give customers what they want when they want it." The conflict, as perceived by the company, was that with contract review "you can not take orders without finding out beforehand if it can be produced - especially from a delivery point of view." Surely ensuring that you are capable of producing and providing the product is conducive to giving "customers what they want when they want it." The dilemma to this company appears to be that they now cannot make the instant promise to their customers that they know the customer wants to hear when attempting to place an order.

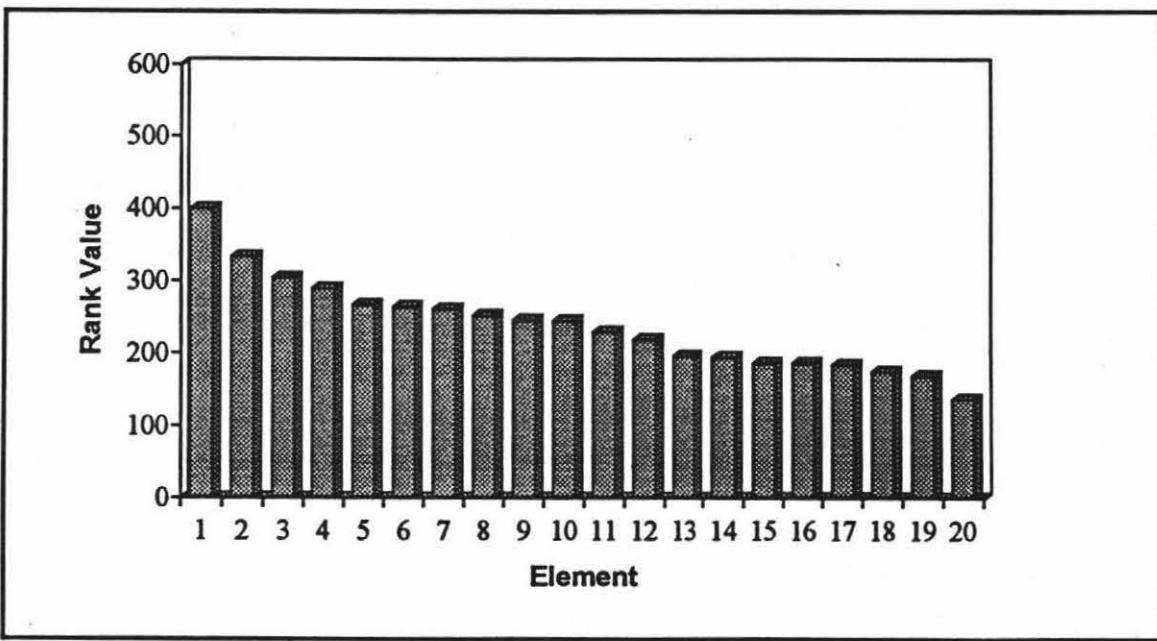
This suggests that some companies may view ISO 9000 as a set of measures that are taken in addition to the normal business process rather than the beneficial documentation and development of present systems.

3.4.4 Ranking of the Elements of ISO 9000 for Ease of Implementation

Certified companies were asked to score each element of the standard appropriate to their level of certification on a number line according to the degree of effort involved in meeting the requirements of that element. Ratings ranged from "No Effort" to "Very Hard." In the analysis of the responses received, seven weighting coefficients were applied ranging from 0 through to 6 such that "No Effort" received a weighting of 0, and "Very Hard" received a weighting of 6. Table 10 and Figure 12 show the averaged weighted results ranked in order of magnitude. A value of 600 would mean that all the respondents said that the requirements of that element of the standard were "Very Hard" to implement, a value of 0 would mean that all the respondents found that element "No Effort" to implement. See Table 18 of Appendix 3.

Table 10 Ranking Elements of ISO 9000 for ease of implementation

Applicable Standards			Element	Rank Value
9001	9002	9003		
✓			1.Design control	400
✓	✓	✓	2.Quality system	334
✓	✓	✓	3.Documentation control	304
✓	✓		4.Internal quality audits	290
✓	✓	✓	5.Corrective action	267
✓	✓	✓	6.Training	264
✓	✓		7.Contract review	261
✓	✓	✓	8.Statistical techniques	252
✓	✓		9.Purchasing	246
✓	✓	✓	10.Inspection, measuring and test equipment	245
✓	✓	✓	11.Control of nonconforming product	230
✓	✓		12.Process control	219
✓	✓	✓	13.Product identification and traceability	197
✓	✓		14.Purchaser supplied product	195
✓	✓	✓	15.Inspection and test status	187
✓	✓	✓	16.Management responsibility	187
✓	✓	✓	17.Inspection and testing	185
✓			18.Servicing	175
✓	✓	✓	19.Quality records	169
✓	✓		20.Handling, storage, packaging and delivery	137

**Figure 12 Ranking Elements of ISO 9000 for Ease of Implementation**

All of the elements of the standard were rated as difficult to implement. Not any of the elements of the standards received a mean rank value of 600 ("Very Hard".) Similarly not any elements received a mean rank value of 0 ("No Effort".) The hardest element to implement, Design control, was rated at 400, the easiest, Handling, storage, packaging and delivery, was rated at 137 giving a range of 263.

Observations of the ranking of the elements of ISO 9000 in Table 10 and Figure 12 include:

- 1. Design control.** Those that implemented ISO 9001 found Clause 4.4 Design control particularly difficult to assimilate - so much so that Design control rated markedly higher than the remaining elements of the standard as the most difficult to implement. A possible explanation of the high ranking of Design control is that product design functions where present in companies tend to be reasonably well defined and specialised processes. Meeting the requirements of Clause 4.4 Design control of ISO 9001 can involve some heavy modifications to well established procedures.
- 2. Quality system.** Effective implementation and maintenance of a quality system in accordance with the standards was the next relatively troublesome element. This was surprising to the author as Clause 4.2 Quality system in essence simply states that the company must effectively meet the requirements of the standard. This suggests that coordination of the implementation process and compliance with the requirements of the standards in their entirety was difficult for most companies.
- 3. Documentation control.** Documentation control also proved relatively difficult. This clause is arduous to implement not because of its complexity but the large span of effect it has company-wide, and the time required to document the systems. It is difficult to develop an all encompassing document control system that is effective.
- 4. Internal quality audits.** Internal Quality Audits also were difficult to implement. This is probably due to special considerations that usually need to be made such as external training of at least one person in auditing techniques, planning the audits, and organising, training, leading and controlling internal auditing teams.
- 5. Corrective action, 6. Training, and 7. Contract review** were each of similar difficulty to implement and were at the mid-range of the mean rank value ratings.
- 8. Statistical techniques, 9. Purchasing, and 10. Inspection, measuring and test equipment** also each gained a rank value of similar difficulty, with **11. Control of nonconforming product** next with a rank value of 230.
- 12. Process control** gained a rank value of 219. It was expected by the author that this would have a higher rating of difficulty as this is the clause of the standard that requires documented work instructions. However as found in Section 3.4.1 "Factors that Help and/or Hinder ISO 9000 Implementation," existing systems which includes documented work instructions helped the majority (54%) of the certified companies in implementing ISO 9000.
- 13. Product identification and traceability and 14. Purchaser supplied product** were next with rank values of similar difficulty. In relative terms these and the remaining six

elements are the easiest to implement.

15. Inspection and test status, 16. Management responsibility, and 17. Inspection and testing were easier than the above to implement with similar rank value ratings.

18. Servicing, and 19. Quality records were the penultimate clauses of the standards in terms of difficulty to implement. Servicing applies only to companies certified to ISO 9001 that actually service their product in the marketplace, and hence had a small sample size, but unlike Design control rated as relatively easy to implement. Quality records such as internal audit reports, corrective action reports, non-conformance reports, management reviews, calibration records, and test results are all proof that the quality system is actually working effectively and correctly as documented, and again the certified companies found it relatively easy to satisfy the requirements of this standard.

20. Handling, storage, packaging and delivery was significantly easier than the other elements to implement. This is most likely due to the relatively untailorable and unambiguous nature of this clause.

This ranking provides a tool useful for the initial planning of the allocation of necessary resources required to implement ISO 9000.

3.5 BENEFITS

3.5.1 Benefits from Certification to ISO 9000 Experienced by Certified Companies, and Anticipated by Non-Certified Companies

An open ended question required the respondent to identify any benefits accrued from ISO 9000 certification. Figure 13 summarises the results. See Table 19 of Appendix 3.

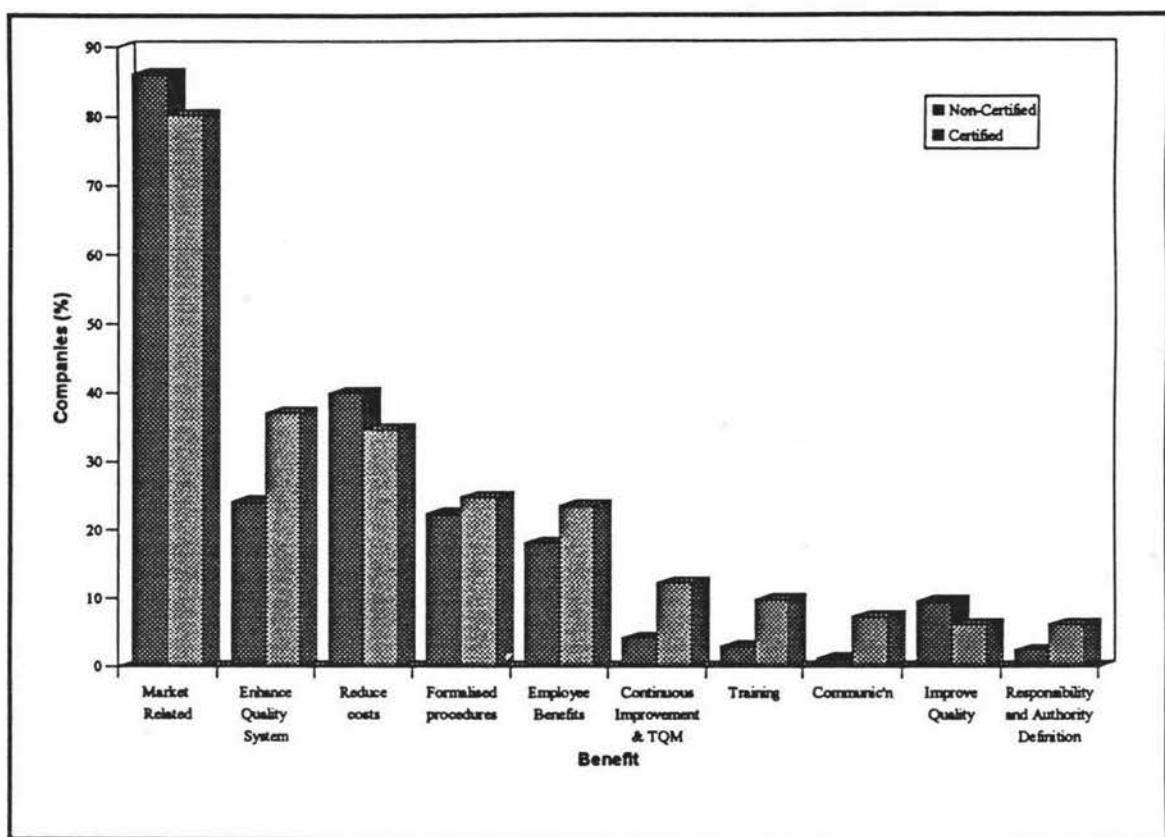


Figure 13 Significant Benefits from Certification to ISO 9000

Market Related. The majority of certified and non-certified companies, 80% and 86% respectively, stated benefits relating to the market. The actual market benefits experienced by certified companies in order of incidence include:

- Access to markets - local and export (27 companies)
- Enhanced company image and reputation including credibility and a gain in customer confidence (23 companies)
- Fewer customer complaints (11 companies)
- Marketing advantage over competitors (7 companies)
- Retain sales to existing customers that require ISO 9000 (6 companies)
- Gain sales to new customers - an increase in market share (6 companies)
- Fewer audits by customers (1 company)

In summary, four of the market related benefits relate to a gain in sales (access to markets, enhanced company image, marketing advantage over competitors, and a gain in sales to new customers). One of the market benefits relate to the retention of existing customers, and two

relate to a savings in costs and an increase in customer satisfaction (fewer customer complaints and fewer audits by customers).

Enhance Quality System. Enhancements to the existing systems were gained by 37% of the certified companies, and expected by 24% of non-certified companies. This difference between certified and non-certified companies illustrates that enhancements to the existing systems is a relatively unanticipated benefit that is gained. Specific enhancements that were experienced by certified companies include:

- Improved documentation - including records, and job procedures (7 companies)
- Emphasis on quality (4 companies)
- Provides a process for continuous improvement due to system reviews, internal auditing, nonconformance reporting and corrective action (4 companies)
- Improved internal organisation and streamlined business operation (4 companies)
- Improved control of manufacturing and non-manufacturing processes allowing recognition of potential problems and reducing variation (4 companies)
- Identification of weaknesses in existing systems due to internal auditing and system reviews (3 companies)
- Improved control of suppliers through the supplier approval system (3 companies)
- Defined policies (1 company)

This suggests a much more comprehensive and disciplined quality management system is gained as a result of implementation of ISO 9000.

Reduce Costs. A reduction in total costs was experienced by 35% of the certified companies and was expected by 40% of the non-certified companies. The reduction in total costs actually gained by the certified companies include:

- An increase in productivity due to a reduction in internal losses due to less waste, reject and rework (23 companies)
- A decrease in customer complaints and returns, and subsequently lower warranty costs (5 companies)
- A decrease in the number of audits by customers (1 company)

The reduction in costs are a result of better training of employees, greater process and product/service control, and a greater confidence by the customer.

Formalised Procedures. Formalisation of procedures was a benefit gained by 25% of the certified companies and anticipated by 22% of non-certified companies. The standardised systems, procedures and product/service specifications that result provide a consistent and disciplined approach to the provision of products and services.

Employee Benefits. Direct benefits to the employees were identified by 24% of the certified companies and 18% of the non-certified companies. Actual benefits identified as being gained by the certified companies in order of incidence include:

- Improvement in pride in what has been achieved at all levels, and a subsequent

improvement in morale and confidence of the workforce	(9 companies)
• Increased awareness of the importance of quality	(4 companies)
• Greater staff involvement in the development of the operating systems	(3 companies)
• Development of a unified directional focus and common objectives	(3 companies)

This suggests that the implementation of ISO 9000 can be a motivating experience for many employees through increased involvement, and awareness of the importance of quality and business objectives.

Continuous Improvement and TQM. Of the certified companies 12% found that the developed quality system provided a suitable foundation for continuous improvement or Total Quality Management (TQM). Only 4% of non-certified companies identified this as being an expected benefit from implementation of ISO 9000.

Training. Improved levels of staff training was realised by 10% of the certified companies. One certified company in addition noted an improvement in the way training was recorded. Of the non-certified companies only 3% expected training to be a benefit from certification to ISO 9000.

Communication. An improvement in communication was experienced by 7% of the certified companies. This included improvement in communication internally at all levels including teamwork and support (4 companies), improved communications externally with customers and suppliers particularly with regards to specifications (1 company). Internal improvement of communication was expected by only 1% of non-certified companies.

Improve Quality. Actual improvement in product and/or service quality was noted as being a benefit by 6% of certified companies and was anticipated by 10% of non-certified companies. Although this appears to be a relatively minor benefit that is gained from the implementation of ISO 9000, only 1% of all companies that attain i9, only 1% of all companies that attain ISO 9000 certification claim no improvement in their product/service quality; as found in below Section 3.5.6.

Responsibility and Authority Definition. Definition of responsibility and authority was identified as being a benefit by 6% of the certified companies. This was qualified by two companies stating that it clarified to employees the expectations of them, and by one company claiming that it helped to reinstate accountability. Definition of responsibility and authority was expected to be a benefit by only 2% of the non-certified companies.

Technology. One certified company (1%) claimed an improvement in the level of technology deployed as a result of ISO 9000 implementation in that they recognised the need for, and now have, more on-line automated inspection.

Resources. One certified company (1%) stated that they experienced a decrease in time spent solving unexpected problems which provided management with more time to manage. Similarly, only 1 of the non-certified companies (0.6%) anticipated the provision of resources as being a benefit.

3.5.2 Benefits Gained During the Implementation Process

Certified companies were asked whether the process of preparing for certification brought about any benefits to their organisation. The responses received are shown in Figure 14. See Table 20 of Appendix 3.

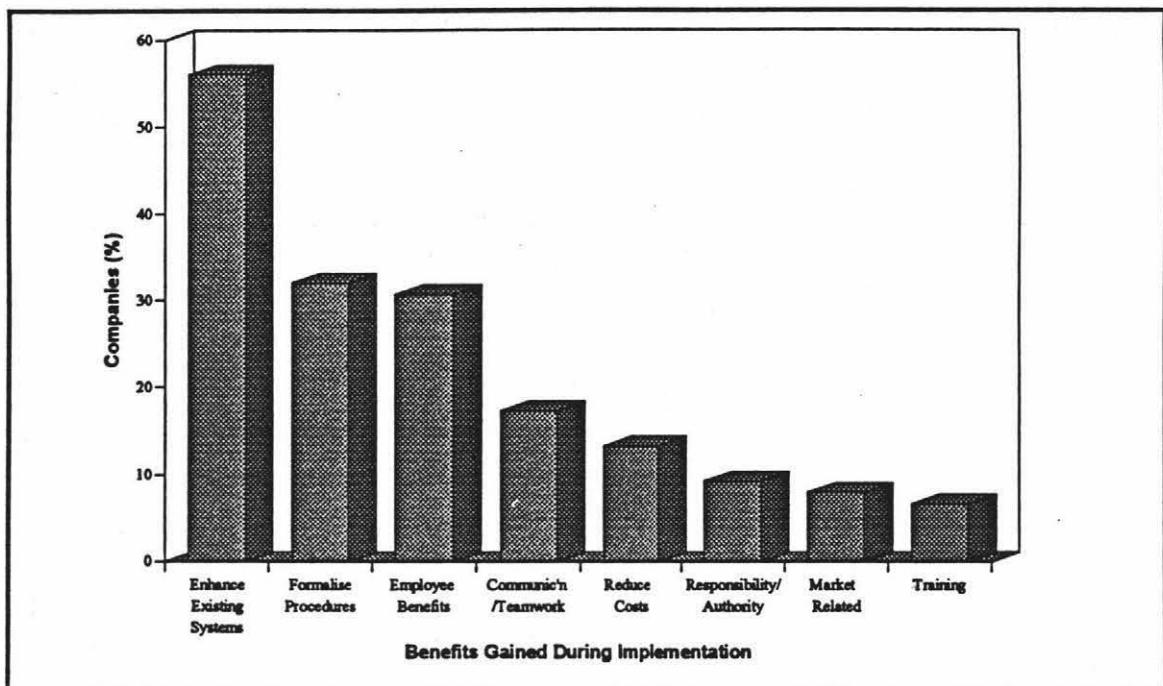


Figure 14 Benefits Gained During the Implementation Process

Enhance Existing Systems. Enhancements to the existing systems was the single greatest benefit gained as a result of the process of implementation of ISO 9000. This was experienced by 56% of the certified companies. Common improvements to the existing systems in order of incidence include:

- Various improvements to weak areas of the existing systems highlighted as a result of the critical review of the systems which is forced as an inherent part of the documentation process (12 companies)
- improved documentation control and record keeping including documentation of procedures. Three companies added that the improved documentation provided additional advantages such as support for planning and for making objective decisions (12 companies)
- Organisation and development of a controlled system conducive to sustainable improvement (6 companies)
- Focus on quality and the prevention of poor quality (5 companies)
- Provides confidence in the quality of the product or service (5 companies)
- Simplification of existing systems and procedures (2 companies)

This indicates that ISO 9000 provides a beneficial benchmark against which a comprehensive review of existing systems can be performed.

Formalise Procedures. Formalised Procedures was a benefit experienced by 32% of the certified companies. This involved reviewing all existing quality related systems and procedures in the company and standardising any differences, then structuring these as the formalised documented quality system. Specific benefits stated included the improvement of existing procedures, creation of consistency in the way procedures are performed, greater discipline in terms of conformance with defined procedures and to agreed performance standards, and that company policies are clearly defined and understood at all levels of the organisation.

Employee Benefits. Employee related benefits were gained by 31% of the companies. These included:

- Improved quality awareness. This includes realisation of the need for quality, the principles of quality assurance, the need for quality systems, and the need for continuous improvement of product/service quality (10 companies)
- Greater employee involvement resulting in increased job satisfaction, morale, pride, confidence, and a development of trust company-wide (8 companies)
- A focus on internal and external customers (5 companies)
- Provided a discipline for maintaining desirable behaviour (1 company)

This highlights the important effect that the implementation of ISO 9000 can have upon the culture of the organisation in terms of improved awareness of the need for quality, greater employee involvement, and discipline.

Communication/Teamwork. Improved communication and the ability to work in as a team was a benefit gained by 17% of the companies. This included:

- More openness and an improvement in the effectiveness of communication between all staff. One company attributed the improvement in communication specifically to documentation, and another company added the comment that staff complaints are now listened to (7 companies)
- Effective operation as a team or in teams providing greater participation and interaction between all staff (6 companies)

Reduce Costs. A reduction in total costs was realised by 13% of the certified companies. This was achieved by:

- Reduced waste, reject rates, and subsequent rework, and therefore an increase in production efficiency and productivity (5 companies)
- Reduced internal and external customer complaints (2 companies)
- Reduced warranty costs (1 company)
- Reduced inwards goods inspection (1 company)
- Improved control of the process (1 company)
- Shorter design cycles (1 company)

The reduction in costs are a result of the review of current practices conducted as a result of the implementation of ISO 9000 and subsequent process redesign, training, and greater process and product/service control.

Responsibility/Authority. Definition of responsibility and authority was a benefit experienced by 9% of the certified companies. Comments included:

- More clearly defined responsibilities and authorities throughout the organisation providing greater appreciation of performance expectations (4 companies)
- Increased understanding of departmental responsibilities (2 companies)
- Accountability, and therefore discipline, strengthened (1 company)

The implementation of ISO 9000 forces a constructive review of current responsibilities and authority.

Market Related. Market related benefits were gained by 8% of the companies. These included:

- A focus on customer requirements (1 company)
- Fewer customer complaints (1 company)
- Customer satisfaction (therefore retain their custom) (1 company)
- Gave customers confidence in product (1 company)
- "Increased customer interest as they became aware that our company was working towards ISO 9000" (1 company)
- Provided confidence for marketing personnel (1 company)

In summary the implementation of ISO 9000 provided internal market related benefits such as a focus on the customer, fewer customer complaints, provided additional confidence to marketing personnel and gave external benefits in terms of market credibility.

Training. Training was a benefit gained from implementation of ISO 9000 experienced by 7% of certified companies. This included:

- Ability to multi-skill employees through the use of documented work procedures (2 companies)
- More focus on training (1 company)
- Improved understanding and ability to perform particular tasks (1 company)
- Facilitated induction of new employees (1 company)
- Greater understanding of process control (1 company)

As a result of ISO 9000 implementation more emphasis is placed on training with the consequence that employees gain a better understanding of the work process.

In summary, similar benefits were nominated as being gained during the implementation of ISO 9000 as those nominated as being gained from being certified to ISO 9000 with the exception that realisation of an improvement in product/service quality was gained until after certification as were the benefits of continuous improvement and Total Quality Management which are usually post-certification initiatives (as found below in Sections 3.5.3 and 3.8.4).

3.5.3 Future Benefits Expected (Post-Certification)

Certified companies were asked whether they expected any benefits in the future as a result of being certified. This was asked in order to identify any on-going benefits that develop as a result of ISO 9000 implementation, and any additional benefits a company might expect to accrue. The responses received are shown in Figure 15. See Table 21 of Appendix 3.

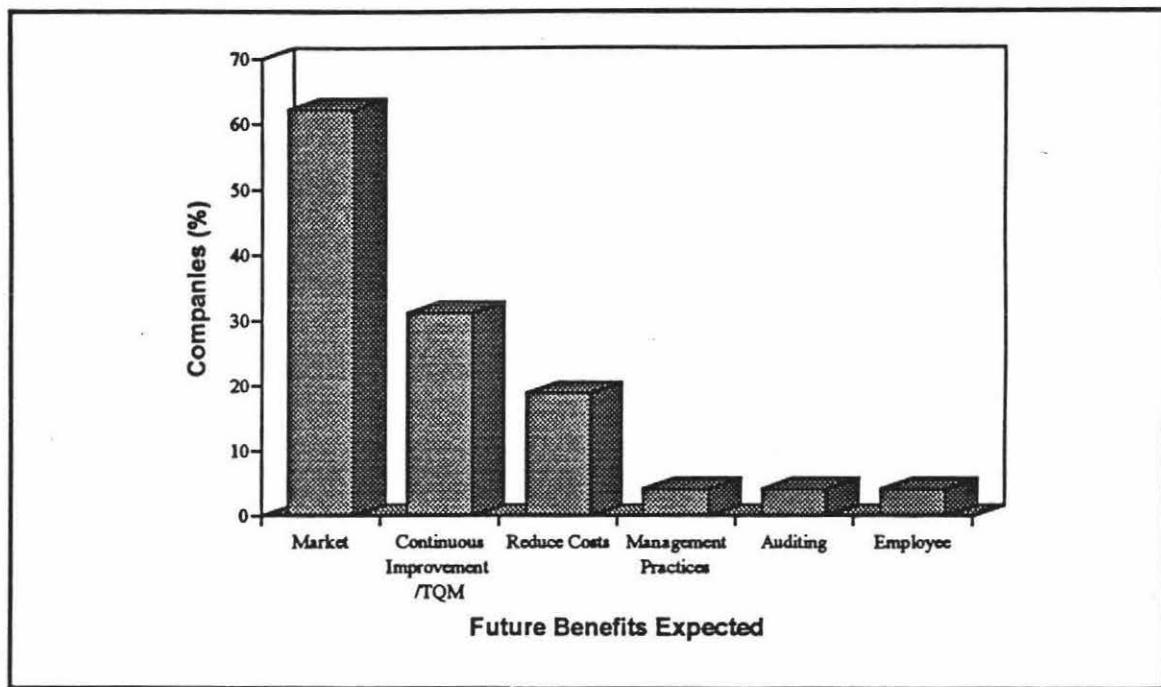


Figure 15 Future Benefits Expected from ISO 9000

Market. Future benefits relating to the market were expected by 62% of the certified companies. The market benefits in order of incidence include:

- An increase in sales/market share - in local and export markets (12 companies)
- Access to markets that require ISO 9000 certification - both local and export (12 companies)
- Retain existing customers by satisfying their requirement for certified suppliers (11 companies)
- A competitive edge providing a marketing advantage over competitors that are not certified (7 companies)
- Provide confidence in our ability to consistently provide products that meet customer requirements (5 companies)

The future market related benefits expected from being certified to ISO 9000 reflect those gained during the implementation of ISO 9000 and upon certification to ISO 9000 as found in Sections 3.5.1 and 3.5.2 above.

Continuous Improvement/TQM. Continuous improvement and Total Quality Management (TQM) was an on-going future benefit expected by 31% of the certified companies. This included continual improvement of the process, the quality systems and product/service quality through the process of continual review, internal and external auditing and corrective

action to prevent recurrence of non-conformances. Only 2 companies of the 23 that gave this response specifically made reference to TQM stating that attaining ISO 9000 now enabled them to further develop toward TQM principles.

Reduce Costs. A continued reduction in total costs was identified by 19% of the companies as being a future benefit. Of the 14 companies 13 claimed further reductions in waste, rejects and rework resulting in improved efficiencies and productivity, 3 companies expected a further reduction in customer complaints and warranty and service costs, and 1 company expected improvements in efficiency due to further reduction in the rate of inwards goods inspection as suppliers comply to their request to provide certificates of conformance.

Management Practices. Continued improvement of management practices was considered to be an on-going benefit by 4% of the companies. This includes continued employee involvement, continued benefits due to definition and delegation of responsibility, and an increase in the use of Statistical Process Control and Problem Solving techniques.

Auditing. The periodic monitoring of the quality system by the external auditing body was considered a benefit by 4% of the companies as it ensures continued compliance to all procedures internally.

Employee Benefits. On-going employee benefits were claimed by 4% of the certified companies and include increased job satisfaction with employees having more responsibility and therefore a continued reduction in supervisory time required.

3.5.4 Problems Solved as a Result of Implementation of ISO 9000

The companies, certified and non-certified, were asked whether any problems inherent in their company were, or would be, solved as a result of quality system implementation. Of the certified companies 78% acknowledged that implementation of a quality system did solve problems within their company, and 60% of the non-certified companies acknowledged that implementation of a quality system would solve problems inherent in their company. The responses are shown in Figure 16. See Table 22 of Appendix 3.

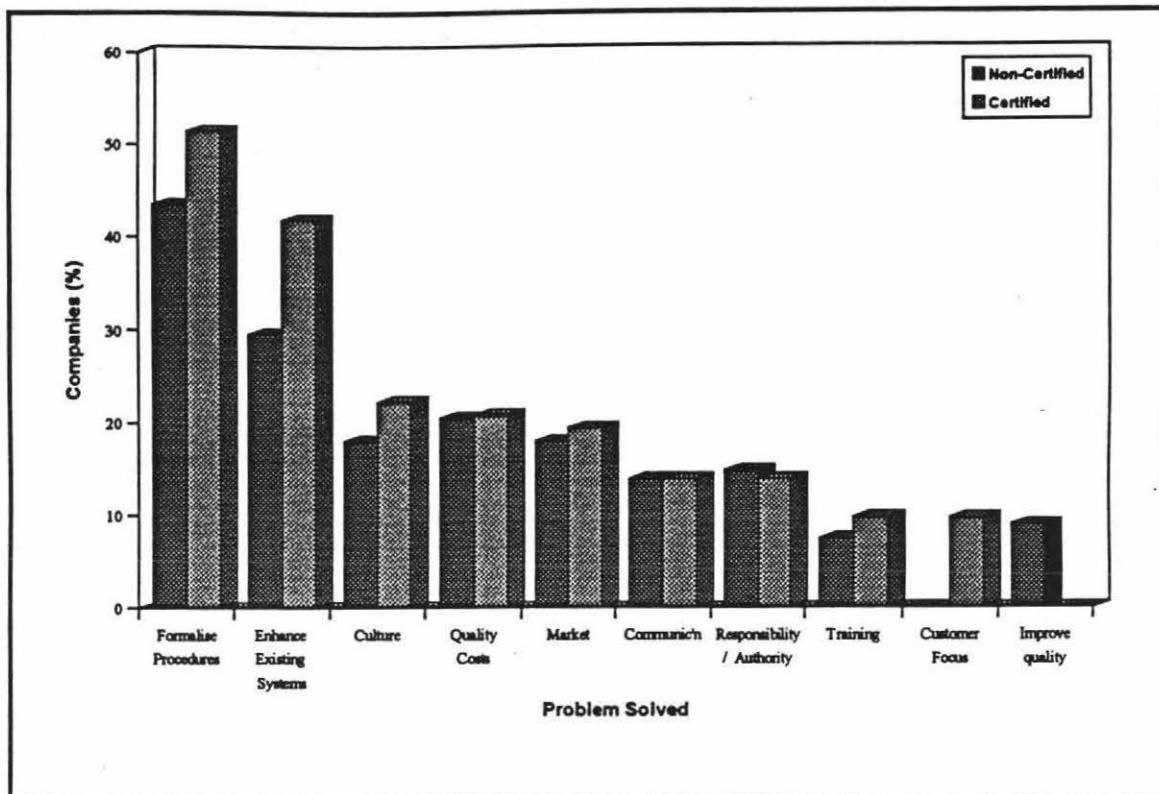


Figure 16 Problems Solved as a Result of Implementation of ISO 9000

Spearman's Rho (rank order correlation coefficient) used to compare the level of agreement between certified and non-certified companies regarding the above responses is $\gamma_s = 0.936$ which indicates a very high level of agreement. This suggests that in general the problems that are expected to be solved as a result of implementation of ISO 9000 are in fact solved. However a lack of focus on the customer was a problem that was solved as a result of implementation of ISO 9000 for 10% of the certified companies that was not anticipated. This is due to the non-certified companies not being aware of a lack of customer focus until the process of implementation of ISO 9000 alerts them to the fact. Conversely 9% of non-certified companies expect an improvement in product/service quality which however was not identified by the certified companies as being a problem that was solved as a result of ISO 9000 implementation.

Formalise Procedures. A lack of formalised procedures was a problem that was solved for half (51%) of the certified companies and was expected to be solved by 43% of the non-certified companies. In order of incidence this had the effect of:

- Creating consistency by alleviating uncertainty and removing subjective assessments
- Improving control of documentation
- Providing an enforceable code of practice which fostered accountability and discipline
- Facilitating training - the documentation serves as an ideal training tool
- Simplification of operating systems and procedures
- Reducing supervisory requirements

In general the simplification, standardisation and formalisation of procedures, and the provision of uniform standards of acceptance at all stages was gained as a result of implementation of ISO 9000.

Enhance Existing Systems. Enhancements to the existing systems which overcame inherent problems were experienced by 42% of the certified companies and anticipated by 30% of the non-certified companies. Enhancements made that improved inherent problems in the companies in order of incidence include:

- Formalised and effective corrective action that prevents problems from recurring (11 companies)
- Improved product traceability, identification and control including identification of non-conforming product (7 companies)
- Improved control of the production process, including quantification of process parameters and trend analysis, and more rigorous product sampling and retention (6 companies)
- Auditing (internal and external) highlighted the weaknesses of the systems in place and provided a benchmark against which a tangible measure of progress could be made (5 companies)
- Calibration of test equipment (2 companies)
- Improved integration of the companies Total Quality Management programme. This had the added advantage that all areas are now subject to continuous improvement rather than just the problem areas which had high visibility (1 company)

Weaknesses of existing quality systems are identified during the critical review forced through the process of documentation of the quality systems.

Culture. Implementation of ISO 9000 solved problems associated with the culture of the company for 22% of the certified companies and was expected by 18% of the non-certified companies. Some of the problems associated with the culture of the certified companies that were solved include:

- Poor morale and motivation of employees which improved through staff involvement and teamwork (6 companies)
- A lack of quality consciousness and common objectives at all levels (6 companies)
- A lack of realisation by management that their responsibility is to manage and that many of the problems are management related (1 company)

This suggests that valuable lessons are often learnt during the implementation process such as the value and benefits of employee involvement, the development of common objectives, and the realisation by management of the inadequacies of the existing systems for which they are responsible.

Quality Costs. The total quality costs were found to decrease for 21% of the certified companies and were expected to decrease by an equivalent number of non-certified companies. Reductions in the total cost of quality were due to an increase in productivity attributable to a decrease in losses due to poor quality such as waste and rejects, and a reduction in complaints from the customer.

Market. Problems associated with the marketplace were alleviated for 19% of certified companies and expected to be solved by 18% of non-certified companies. Problems associated with the market that were solved include:

- A reduction in defective work received by the customer and therefore a corresponding drop in the level of field complaints and increase in customer confidence and satisfaction (8 companies)
- An increase in market share (3 companies)
- A competitive advantage with certification providing greater credibility (3 companies)

This implies the retention of existing customers and an increase in sales to new customers.

Communication. Poor communication was a problem that was found to be improved by 14% of certified companies and expected to be solved by an equivalent number of non-certified companies. Communication improvements included enhanced interdepartmental communication as a result of bringing departments together to cooperatively work on implementation of ISO 9000. For one company this had the residual effect of dissolving conflicts such as that commonly experienced between the sales and production departments. Communication to employees of the companies intentions and expectations, and communication of change were other improvements that were experienced.

Responsibility/Authority. Poor definition of responsibility and authority was a problem solved for 14% of the certified companies and expected to be solved by 15% of the non-certified companies. This includes definition of individual responsibilities and authorities, which as one company noted tends to engender accountability and discipline.

Training. Inadequate training was a problem solved for 10% of the certified companies and expected to be solved by 7% of the non-certified companies. This includes improvements in the training system, induction training, retraining, and multi-skilling of employees. However as found in Section 3.5.5 below, a lack of training was a cause of quality related problems that remained after certification for 29% of all certified companies. Therefore although 10% of the certified companies claim that implementation of ISO 9000 solves training inadequacies, 29% (three times as many companies) claim that inadequate training is still a problem after certification.

Customer Focus. As discussed below Figure 16 a lack of focus on the customer was a problem that was solved as a result of implementation of ISO 9000 for 10% of certified companies which was unanticipated by non-certified companies. This is due to the non-certified companies not being aware of the inherent lack of customer focus until the process of implementation of ISO 9000 alerts them to the fact. The increase in customer focus gave employees a greater awareness and appreciation of product/service quality and the customers needs including in some cases both internal and external customers.

Improve Quality. In contrast to the certified companies 9% of non-certified companies expected an improvement in product/service quality which was not identified by the certified companies as being a problem that was solved from ISO 9000 implementation. However 6% of the certified companies did identify an improvement in quality as being a benefit from implementation of ISO 9000 (as found in Section 3.5.1). This suggests that, although quality was apparently not a prior problem to companies now certified, non-certified companies can expect implementation of ISO 9000 to assist in the improvement of product/service quality.

Formalisation of procedures, enhancements to existing systems, communication, responsibility and authority definition and training are all problems solved as a direct result of the implementation of the requirements of ISO 9000. The remaining problems that were solved - culture, quality costs, market, customer focus, and an improvement in quality - are indirect benefits gained as a result of the process of implementation of ISO 9000.

3.5.5 Causes of Quality Problems that Remain After Certification to ISO 9000

Certified recipients of the survey were asked if they had any causes of quality related problems that remained after implementation of ISO 9000. Of the certified companies 58% responded in the affirmative, as shown in Figure 17. See Table 23 of Appendix 3.

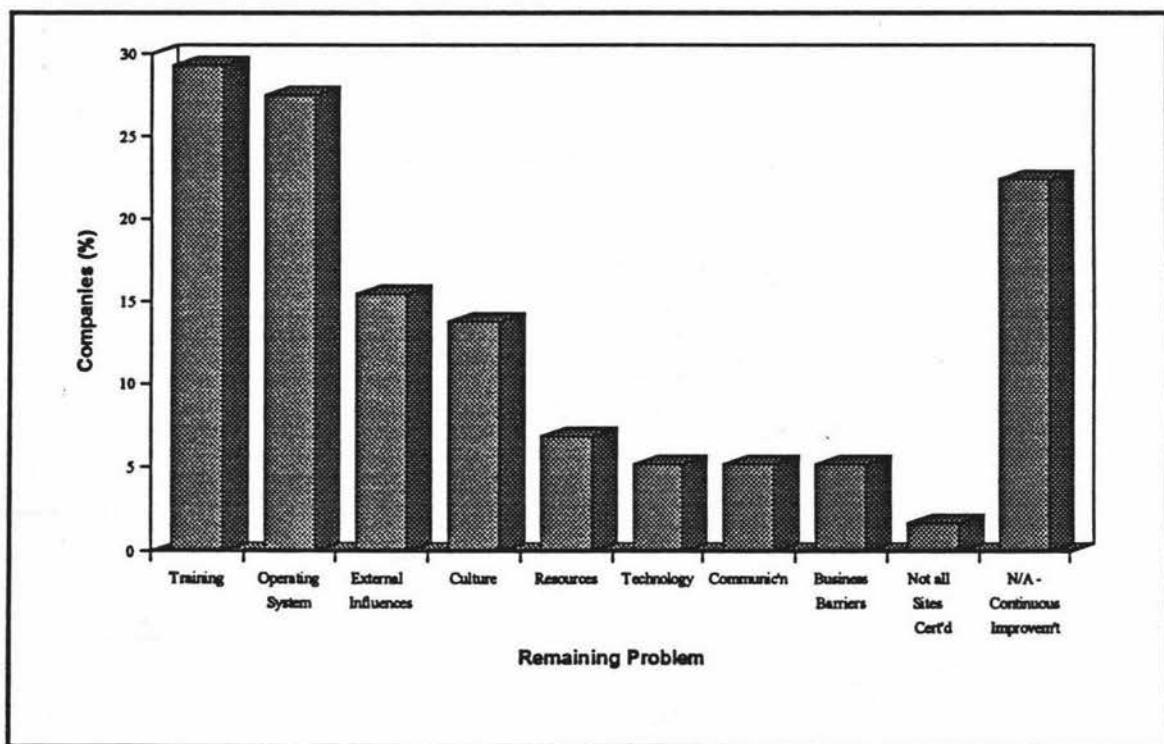


Figure 17 Causes of Quality Related Problems Remaining After Certification to ISO 9000

The causes of quality related problems remaining after certification are as follows:

Training. Foremost was a lack of training that remained after certification for 29% of the certified companies. This included:

- Training in quality awareness
- Training in the use/operation of the quality system
- Job training for new and existing staff.

Training being a cause of quality related problems remaining after certification is consistent with the fact that training was a relatively unanticipated benefit gained through exposure of training inadequacies during the ISO 9000 implementation process. It is also consistent with its high ranking as a factor that hinders ISO 9000 implementation.

Operating System. Operating System. Fundamental problems associated with how the quality system operated remained after certification for 28% of the companies. This included:

- Inability to investigate root causes of quality problems through corrective action and therefore the symptoms are treated with the problems only temporarily postponed (2 companies)
- Process incapability (2 companies)
- Lack of statistical process control (2 companies)
- Carelessness with order entry procedures (2 companies)
- Late delivery and wrong invoice data (1 company)
- Poor raw material traceability (1 company)
- Problems with product identification (1 company)
- Lack of some manufacturing procedures (1 company)
- Lack of maintenance of production equipment (1 company)
- Unacceptable reject rates (1 company)
- Bureaucracy developed through implementation of ISO 9000 means that a simple change to the product may require several hours to rewrite documentation resulting in delayed response times to customers (1 company)

Obviously even post-certification can be an important time for "fine-tuning" the quality system.

External Influences. Influences external to the company causing quality related problems remained after certification for 16% of the companies. This included:

- Poor quality from suppliers (3 companies)
- Transit damage to finished product by road/rail/sea carriers (2 companies)
- Poor supplier traceability (1 company)
- Poor supplier delivery (1 company)
- Frequent changes of requirements by customers causing a delayed response (1 company)

Suppliers represent the greatest external influence that causes quality related problems in terms of unreliable delivery, poor quality and lack of traceability with carriers causing damage to the finished product in-transit.

Culture. Problems caused by the culture within the organisation remained after certification for 14% of the companies. This included:

- Poor conformance to procedures/systems (2 companies)
- Corporate indifference contravenes efforts to motivate employees to continually improve the process and product quality.
- Poor acceptance of new systems
- Lack of appreciation of the need for preventative corrective action by sales personnel therefore recurrent problems in the market place
- Slow adjustment to a teamwork approach (change of culture)
- The comment "but we've always done it this way." Although documented procedures are helping overcome this
- Residual desire to rush jobs

The cultural problems may be due to a lack of understanding of the reasons and need for change and the benefits to be gained.

Resources. A lack of resources remained after certification for 7% of the companies. Examples given include:

- A lack of time and staff resulting in jobs being rushed (1 company)
- A lack of staff resulting in an inability to maintain the quality system (1 company)
- A lack of money resulting in quality control measures being taken rather than preventative corrective action (1 company)
- Low national stocks of raw materials forcing undesirable numbers of specification changes (1 company)

A continued commitment from management is required after initial certification in order to maintain the quality system and to retain continued compliance to ISO 9000.

Technology. Development in technology caused quality related problems after certification for 5% of the companies. This included:

- Difficulties with environmental control within the factory
- Rapid product development in a competitive marketplace
- The market leader of their particular product in terms of technological advancement and as a result "sometimes push the limits a bit hard"

This suggests that it is not easy to retain continued compliance to documented procedures in climates of high technological development.

Communication. Poor communication caused quality related problems after certification for 5% of the companies. This included:

- Poor interdepartmental communication
- A lack of review and communication of modifications to systems.

Because of the scope of the ISO 9000 based quality systems, consideration of the effect that any change may have on the quality system as documented, is an important part of all modification processes and communication of the nature and effect of the change is necessary to ensure that the quality system documentation is maintained and remains accurate.

Business Barriers. Particular business barriers caused quality related problems for 5% of the companies. This included:

- Substantial redundancies and staff changes following amalgamation of two companies
- Existence of a bonus system supporting productivity in terms of production quantity
- Inherently variable raw material characteristics which constantly change the manner in which it can be processed

This indicates that careful planning of the quality system implementation and maintenance processes is required with due regard to current business strategies and developments.

Not All Sites Certified. Not all sites of their company certified caused quality related problems after certification for 2% of the companies (1 company). This presented a problem due to varying degrees of documentation of standard processes and procedures.

Not Applicable (N/A) - Continuous Improvement. In addition to the above, 22% of the companies responded by saying that this question did not apply to them since they operated to a Continuous Improvement philosophy and believed that it is inevitable that there will always be problems left outstanding as potential sources for improvement.

Many of the problems that have been identified as remaining after certification are failures of the implementation process to address the requirements of ISO 9000 adequately. For example problems identified that remain after certification to ISO 9000 that should not remain include:

- Lack of Training
- Operating System failures
- External Influences ie. poor supplier traceability
- Culture ie. lack of conformance to procedures
- Communication ie. a lack of review and communication of modifications to the system

It is surprising in some case to identify obvious noncompliances to ISO 9000 as causes of quality related problems remaining after certification for companies that retain their certification status.

3.5.6 Did Corrective Action, Management Review, Internal Audits, etc actually Improve the Quality of their Product or Service?

Certified companies were asked whether corrective action, management review, internal audits, etc actually did cause quality improvement. Provision was made in the questionnaire for four response categories. The responses are shown in Figure 18. See Table 24 of Appendix 3.

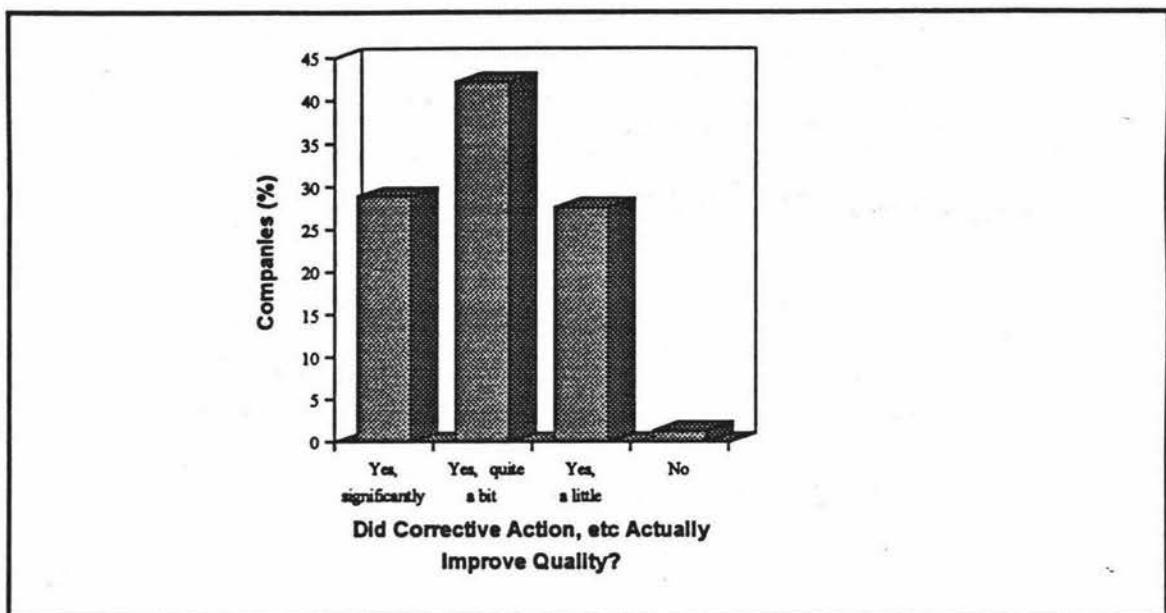


Figure 18 Did Corrective Action, Management Review, and Internal Audits, etc Actually Improve the Quality of their Product or Service?

The greatest proportion of certified companies (42%) responded in the "Yes, quite a bit" category. Next at 29% was "Yes, significantly" followed closely by "Yes, a little" with 28% of certified companies. Only 1% of all certified companies experience no quality improvement from implementation of corrective action, management review, internal audits, etc.

This represents a much smaller proportion of companies claiming no quality improvement from implementation of ISO 9000 than had been anticipated, primarily because of knowledge of the high proportion of companies seeking certification to ISO 9000 purely for marketing reasons - as confirmed in Section 3.3.1 'Reasons for Seeking Certification to ISO 9000' which shows currently that 44% of all certified companies and 30% of all non-certified companies implement ISO 9000 because they are forced into it either because their competitors are implementing ISO 9000, their customers want it, or corporate management demand it.

In conclusion, irrespective of the motive for implementation of ISO 9000 and the degree of commitment to it, only 1% of the companies that attain certification claim no improvement to their product or service quality.

However, as found in Section 3.5, an improvement of product/service quality was identified as being a relatively minor benefit gained from the implementation of ISO 9000.

3.5.7 Does Implementation of ISO 9000 Greatly Improve the Company?

An open-ended question was structured in an attempt to gain an appreciation of the companies' attitudes towards the value of ISO 9000 asked if the respondent thought that the company had greatly improved as a result of ISO 9000 implementation. Non-certified companies were asked if they thought the company would greatly improve as a result of implementation of ISO 9000. The responses are shown in Figure 19. See Table 25 of Appendix 3.

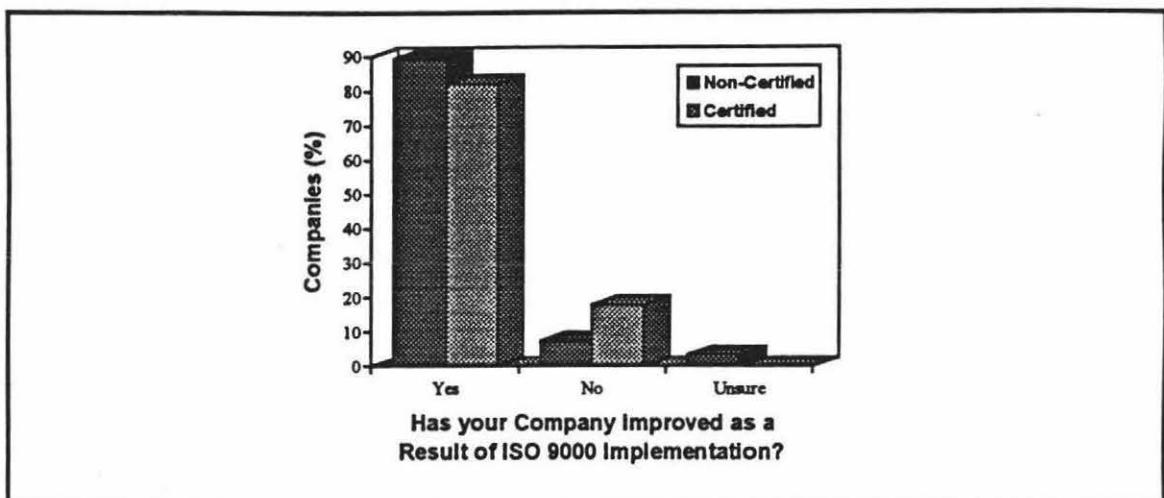


Figure 19 Does Implementation of ISO 9000 Greatly Improve the Company?

Yes. The majority of certified and non-certified companies answered "Yes" (82% and 89% respectively). The reasons given for saying "Yes" by the certified companies in order of incidence include:

- Formalisation of procedures. This greatly improved the company by providing a more systematic approach to many aspects of the business, gave better control over the way tasks were performed, simplified many of the systems and procedures, provided control of documentation, and eliminated subjective interpretations of quality (13 companies)
- Reduction in total costs due to increased efficiency and productivity from fewer rejects and rework, better control of the process and reduced variability of the product (9 companies)
- Benefits to employees. Increased employee involvement and job satisfaction, greater awareness of quality and the need for quality, a better understanding of the production systems and procedures, and the provision of a unified directional focus on quality (9 companies)
- Improved customer relations. More secure relationships with customers through an enhanced reputation and corporate image by achieving registered supplier status. This gave the customer greater confidence in the product/service quality (7 companies)
- Continuous improvement through the process of internal auditing, management review and corrective action (6 companies)
- Better internal organisation through definition of responsibility, disciplined systems, and accountability (6 companies)
- Increased market share and access to new markets and business opportunities (4 companies)
- Improved interdepartmental and intradepartmental communication (4 companies)
- Elimination of causes of nonconforming product through effective corrective action

- | | |
|---------------------------------|----------------|
| • Improved training | (4 companies) |
| • Improved product traceability | (3 companies) |
| • Improved product quality | (1 company) |
| | (1 company) |

In addition to the above, three of the certified companies replied that their company has improved but not greatly as they had always practiced good management, and had product quality and process control systems already in place. In general this indicates that the implementation of ISO 9000 has the potential to provide enhancements to all areas of a company's operation.

No. Answering that their company had not improved at all were 18% of the certified companies. Of the non-certified companies that intended to implement ISO 9000, 7% expected that their company would not improve. Reasons given why the certified companies did not improve include:

- Already had quality systems and procedures in place prior to implementation of ISO 9000 therefore no improvement was gained (6 companies)
- Certified to ISO 9003 and need to implement ISO 9002 before any improvement can be expected (3 companies)
- Total Quality Management provides the baseline of the companies quality improvement strategy (2 companies)
- A good quality system takes about five years to construct (1 company)

This indicates that the extent of the benefit to be gained from ISO 9000 is dependent upon the adequacy of the systems that already exist in a company.

Unsure. Of the non-certified companies intending to implement ISO 9000, 3% were unsure as to whether implementation of ISO 9000 would greatly improve their company.

In summary, this suggests that most companies (82%) perceive that they have gained from the process of implementing ISO 9000.

3.6 THE CERTIFICATION AGENT

The following three areas investigated the attitudes and behaviour of the certification agent from the certified companies perspective.

3.6.1 Did the Certification Agent Help?

In response to a question asking whether the certification agent used actually helped the company in the implementation process 71% of all certified companies answered Yes, and 29% No. The relative proportions are shown in Figure 20. See Table 26 of Appendix 3.

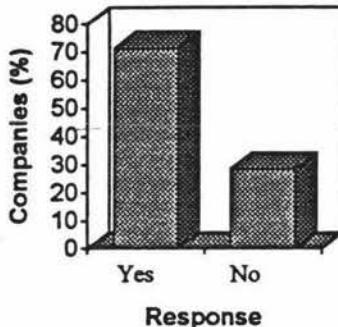


Figure 20 Did the Certification Agency Help?

Of the 55 companies that responded in the affirmative, 53 companies gave an answer to a question that asked how the certification agency helped. The responses could be grouped into the following four categories:

a) General Advice

Thirty five companies (66%) said that the certification agency helped by providing general, valuable and sympathetic advice throughout all stages of implementation and certification. Specifically this included the responses given in the following six paragraphs.

Four companies were given advice at the planning stage of implementation which aided in setting the direction to take in order to achieve certification. One company was advised to "create the systems within your own company. What other companies do may not be what your company needs."

Three companies found that the training courses and seminars offered by the certification agency were of help. One company noted that in addition to the training course, literature that was provided was found to be useful. This company was also permitted to witness an audit in another division of the same corporation and found this to be particularly useful.

Ten companies were assisted in the interpretation of the standards. One company found this valuable in overcoming the formal wording of the standard. One company stated that the assistance provided in interpretation of the standard meant that they were able to implement systems to ISO 9000 standard with the minimum of effort and maximum effect. Similarly another company stated that obtaining the auditors interpretation of the standards early in the

implementation process allowed the auditor's requirements to be designed into the systems being developed. In this case however there was found to be little agreement with subsequent auditors of the same certification body! This reflects a lack of consistency between auditors which was also noted below in Section 3.6.2.2 when certified companies were asked how they would prefer the certification agency to behave.

Two companies were provided with the auditor's ISO 9000 audit check list before the certification audit which was found to be valuable in interpreting the requirements of the standards.

Eight companies were given advice regarding the documentation requirements for ISO 9000. Assistance ranged from defining the structure and required format of documentation, to actually tidying up the documentation of procedures, and compiling the quality manual.

One company stated that advice given to them by the certification agent during telephone conversations and the certification audit provided helpful reassurance by reinforcing advice obtained from a consultant.

b) Pre-assessment Audit

Ten companies stated that the pre-assessment audit helped the implementation of ISO 9000. The help gained includes advice, ideas and practical suggestions and recommendations, clarification, an appreciation of the requirements, further interpretation of the standards (noted by three companies), and it gave an indication of the state of readiness of the company for the certification audit.

One company added that it was made very clear however that the certification agency was not a consultancy agency.

c) Certification Audit

Six companies found that useful advice and recommendations for corrective action were given by the certification bodies during the certification audit following the discovery of non-compliances. One company added that the certification body was supportive and constructive at all stages throughout the audit.

One company stated that the selected certification agency held the belief that their objective was to help the company achieve certification, not prevent it, and therefore useful guidance and encouragement was given prior to and during the certification audit. A similar observation was made by two other companies that stated that the flexibility in the interpretation of the standards by the certification agent was helpful in achieving certification.

d) Surveillance Audits

One company stated that the regular surveillance audits were found to help strengthen the quality system through the identification of non-compliance conditions and subsequent implementation of the recommendations made by the auditors.

3.6.2 Behaviour of the Certification Agency

Following are the responses to two parts of a question presented with the intention of determining the behaviour of the certification agency. See Table 27 of Appendix 3.

3.6.2.1 Rating of Certification Agency Behaviour

Certified companies were asked to describe the behaviour of the certification agent they used by ticking one of five categories provided. The responses are shown in Figure 21.

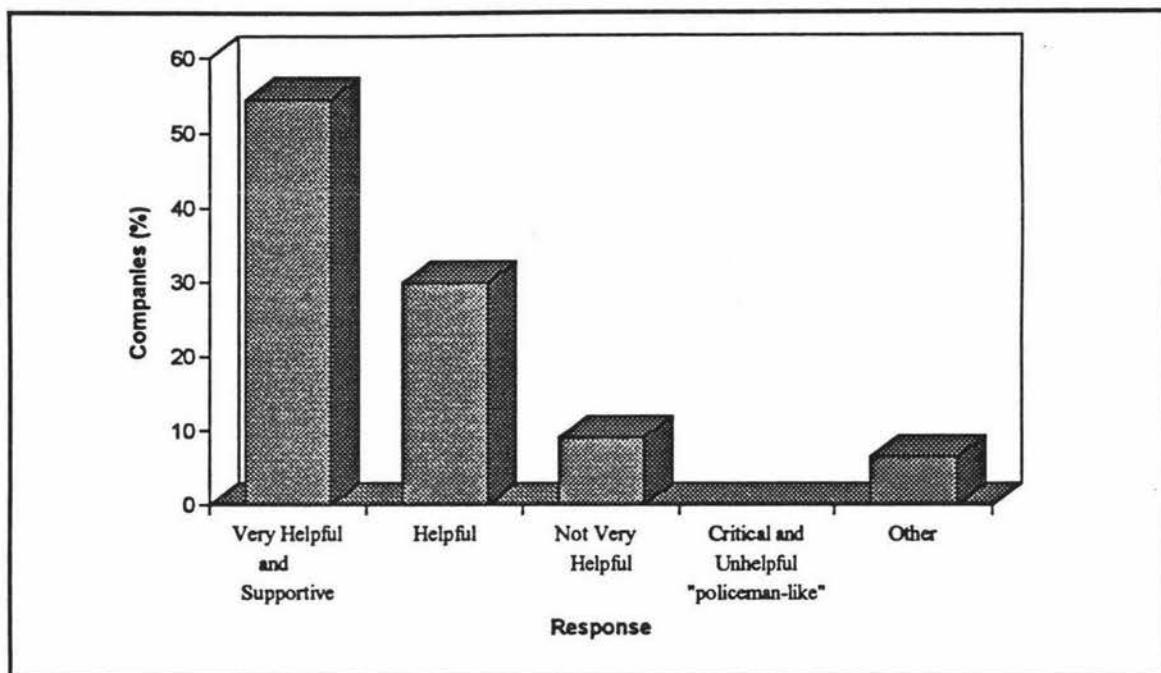


Figure 21 Behaviour of the Certification Agency

The certification agent was found to be "Very Helpful and Supportive" by 55% of the companies, "Helpful" by 30% of the companies, "Not Very Helpful" by 9% of the companies, and no companies found the certification agent to be "Critical and Unhelpful - "policeman like.""

A further 7% of the companies described the behaviour of the certification agent in their own words in the fifth category labelled as "Other". These were:

- "the certification agent was prompt, pleasant, efficient, professional and expensive"
- "the agent had good human relations skills and established a good rapport with all sections of the workforce"
- "it depended upon which auditor in the organisation was spoken to"
- "professionalism sadly was lacking, especially communication"
- "we felt we were doing things to satisfy the auditor rather than the standard"
- "little allowance permitted for practicalities"
- "their workload means long delays for organisations waiting in the queue for an audit"

The majority of companies found the certification agent to be helpful and supportive. However, as found in Section 3.6.2.2 below, a third of the companies would prefer that the auditors behaved differently.

3.6.2.2 How would you Prefer the Certification Agency to Behave?

Following the previous question which asked the respondents to rate the behaviour of the certification agent was a question asking how the companies would prefer the certification agents to behave.

No differently. Twenty four of the seventy seven respondents to this question (31%) stated that they would prefer the certification agents to behave as they did. Of these, 86% had stated that the certification agents were very helpful and supportive - there to assist you become certified and 14% had rated the certification agent as being helpful.

No response. No response to this question was given by 27 companies (35%). It is the authors opinion that a response that offers no modification to the certification agencies behaviour indicates that the respondent was content with the behaviour received from the agency. Assuming this to be true the summation of the companies that prefer that the certification agents behave no differently and those that offered no suggestion for modification, indicates that 66% of the companies were satisfied with the certification agents behaviour.

Differently. Twenty six companies (34%) would prefer the certification agents to have behaved differently. The preferred behaviour suggested could be grouped into the following categories:

- More helpful and supportive, including more advice was suggested by thirteen companies, in order to assist the company as much as possible to obtain certification. Two of these companies would have specifically liked more help with interpretation of the standards, and one company suggested the provision of an "advisory service" for those companies awaiting certification but delayed by the high demand for certification services.
- Less bureaucratic, clinical and pedantic was preferred by six companies. Three companies qualified their statements in the following ways:
 - "as if we are their customer; as we perceive ourselves to be"
 - "in the calibration area"
 - "should provide rationale when taking a stance on a particular point"
- More consistency between auditors was suggested by one company as "some surveillance auditors have sent us off on a tangent".
- One company would have preferred "more management charisma and professionalism", stating that they were "not inspired by the agency staff".
- Two companies noted that the certification agents were very busy due to an apparent time shortage and would prefer that they had more time and subsequently provide a better service.
- To provide a time estimate of when the company would be ready for the certification audit, following the pre-assessment visit, was recommended by one company.

- More effort in surveillance audits would have been preferred by one company.
- One company suggested that if the certification agency has policies on what will or will not be acceptable within a particular section of the standard they should advise the company of their specific requirements.

The first two categories of preferred behaviour reflect the philosophy of some certification agencies of auditing only and not providing advice. The second two categories of preferred behaviour reflect a lack of skills of the auditor. Overall 34% of the certified companies would prefer the certification agents to have behaved differently which indicates that one third of the certification agents/agencies fail to provide a service that convinces the auditees of their purpose, integrity and professionalism.

3.7 QUALITY STRUCTURE

The following five sections summarise the responses to questions asked in order to gain an appreciation of the companies organisation for quality.

3.7.1 Do they have a Quality Assurance Department?

The response to a question asking whether they had the equivalent of a Quality Assurance Department is shown in Figure 22. See Table 28 of Appendix 3.

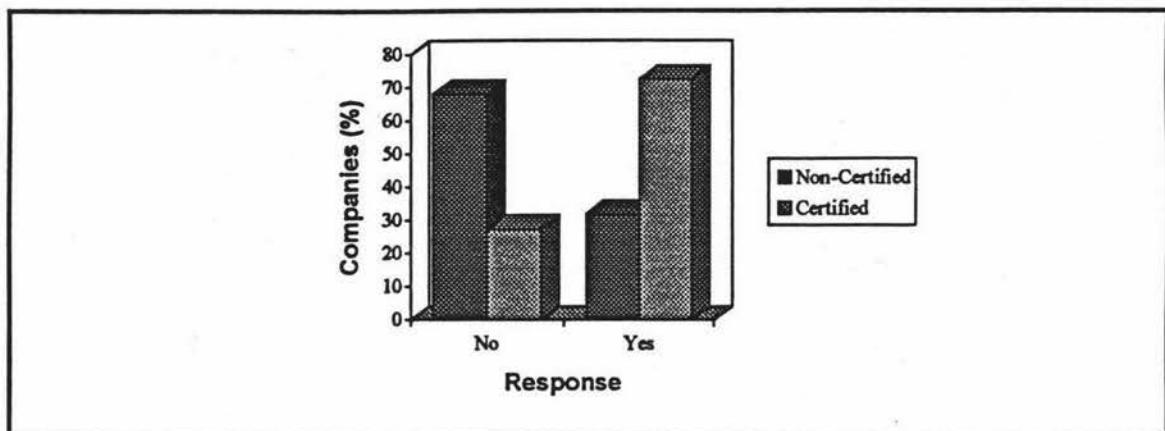


Figure 22 Do they have a Quality Assurance department?

The responses received indicate that 73% of all certified companies, and only 32% of all non-certified companies have a Quality Assurance department. This represents a significant difference between certified and non-certified companies ($\chi^2 = 62.6$, df = 1, p << 0.005).

As determined in section 3.1 the average size of non-certified companies is significantly smaller than the average size of certified companies, with 68% of all non-certified companies having fewer than 50 employees, whereas 70% of all certified companies have greater than 50 employees. Immediately, the difference in the frequency of Quality Assurance departments appears to be assignable to the difference in size distribution between the certified and non-certified companies. The null hypothesis that the distribution of Quality Assurance departments is equal to the size distribution of the certified and non-certified companies is true, ie no significant difference between the two distributions at the 95% confidence level ($\chi^2 = 0.02$, df = 1, p >> 0.05).

For both certified and non-certified companies, whether or not they have a Quality Assurance department is directly and significantly related to the size of the company; ($\chi^2 = 37.8$, df = 5, p < 0.01) and ($\chi^2 = 31.2$, df = 5, p < 0.01) respectively. A significantly high proportion of certified and non-certified companies that lacked Quality Assurance departments had fewer than 20 employees. Therefore it can be concluded that most of the non-certified companies do not have a Quality Assurance department principally due to their relatively small size.

3.7.2 To whom does the "Quality Assurance Manager" Report?

Those companies that did have a "Quality Assurance Department" were asked to whom the "Quality Assurance Manager" directly reported. The responses are shown in Figure 23. See Table 29 of Appendix 3.

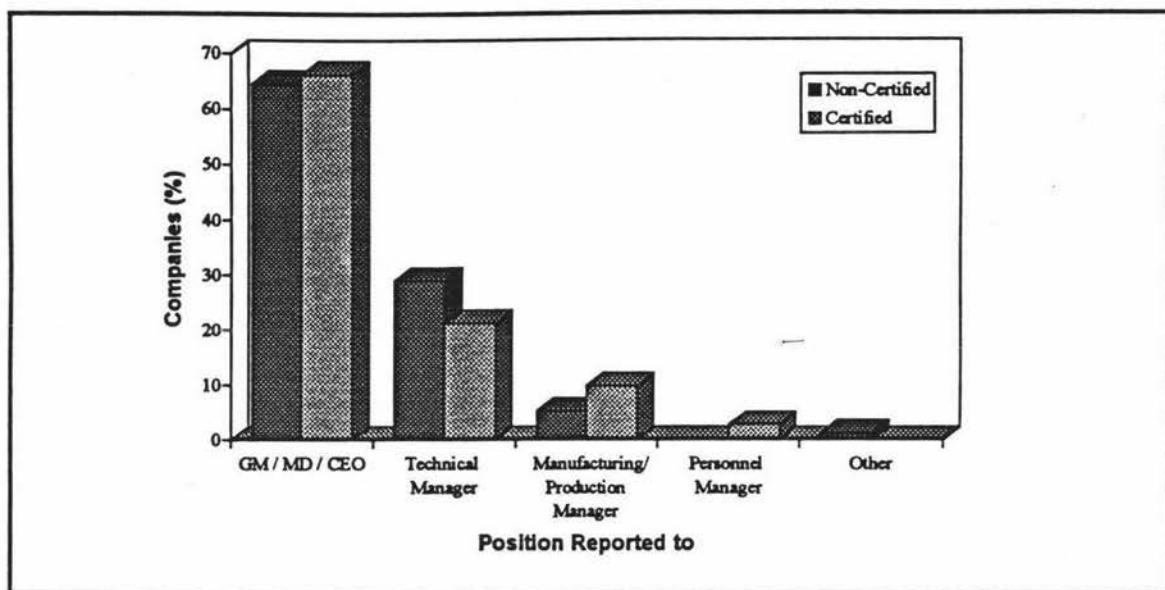


Figure 23 To whom does the Quality Assurance Manager Report?

No significant difference between certified and non-certified companies with respect to whom the "Quality Assurance Manager" reports can be observed ($\chi^2 = 6.95$, df = 4, p >> 0.05). For the majority of certified and non-certified companies (66% and 65% respectively) the "Quality Assurance Managers" report directly to the General Manager (GM), Managing Director (MD) or Chief Executive Officer (CEO). The "Quality Assurance Manager" reported to the Technical Manager in 21% of certified companies and 29% of non-certified companies. Reporting to the Manufacturing or Production Manager were 5% of the non-certified companies and 10% of certified companies. In addition to these 3% of the certified companies' "Quality Assurance Managers" reported directly to the Personnel Manager, and 1% of the non-certified companies' "Quality Assurance Managers" reported directly to "others" ie. supervisors.

3.7.3 Who is Responsible for Quality?

The responses to a question asking who in their organisation was responsible for quality are shown in Figure 24. See Table 30 of Appendix 3.

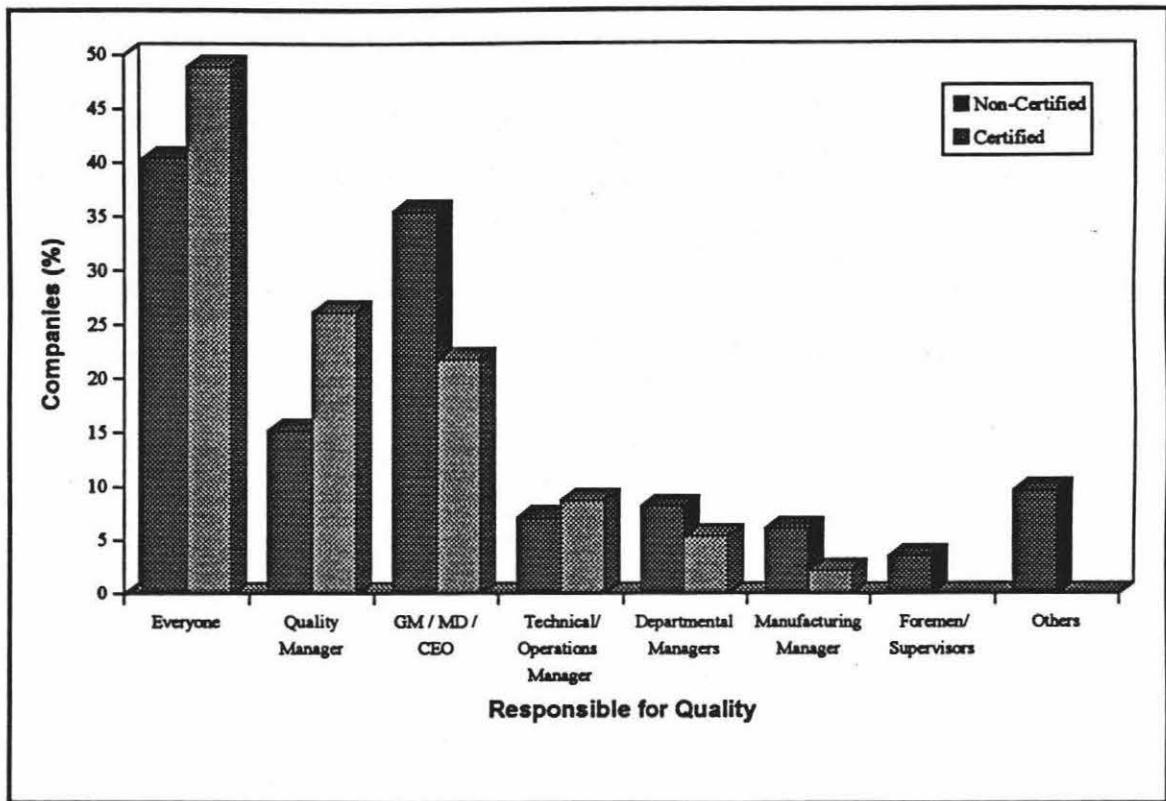


Figure 24 Who is Responsible for Quality?

Grouping the last five positions together and performing a Chisquare analysis indicates that the distribution of responsibilities for quality for certified companies is significantly different to that of non-certified companies ($\chi^2 = 12.8$, df = 3, p < 0.05). The difference was primarily due to the fact that:

- As found in section 3.7.1 the non-certified companies, which are smaller than the certified companies, have a smaller proportion of "Quality Assurance Departments/Managers." However, 21% of certified companies as opposed to 12.5% of non-certified companies, that did have a "Quality Assurance Department", stated that the "Quality Manager" was responsible for quality. It is expected that this difference in the responsibility of the "Quality Manager" is due to non-certified companies not having a Quality Manager whose job function is solely quality management.
- only non-certified companies have single individuals lower than management level that are responsible for the quality of the product or service.

The greatest proportion of the certified and non-certified companies said that Everyone in the organisation is responsible for quality (49% and 40% respectively), followed by 26% of the certified companies and 15% of the non-certified companies that said that the Quality Manager is responsible for quality - the difference being due to the size of the company

limiting the practicality of having a "Quality Manager" solely responsible for the quality of the product or service, as stated above.

Top management including the General Manager (GM), Managing Director (MD), or Chief Executive Officer (CEO) was responsible for quality for 22% of certified companies and 35% of the non-certified companies. Again the non-certified companies being generally smaller than certified companies can not justify having a Quality Manager solely responsible for quality.

The Technical or Operations Manager is responsible for quality for 9% of certified companies and a similar proportion (7%) of non-certified companies.

The responsibility for quality was relegated to each of the Departmental Managers for 5% of the certified companies and 8% of the non-certified companies. The Manufacturing Manager was responsible for quality for 6% of the non-certified companies and the remaining 2% of the certified companies. This again highlights a difference of which the cause is most likely assignable to the difference in size between certified and non-certified companies.

Of the remaining 14% of non-certified companies, 4% had the responsibility for quality assigned to the Foremen or Supervisors, and 10% (a relatively high proportion) had the responsibility assigned to "Others" such as "quality control (QC) departments", "final assembly and packaging", "everyone except senior management", the "maintenance department", an "auditor", a "contracts administrator" and "field officers".

3.7.4 Help from a Consultant?

When asked whether they did, or would, get help from a quality consultant the responses were as shown in Figure 25. See Table 31 of Appendix 3.

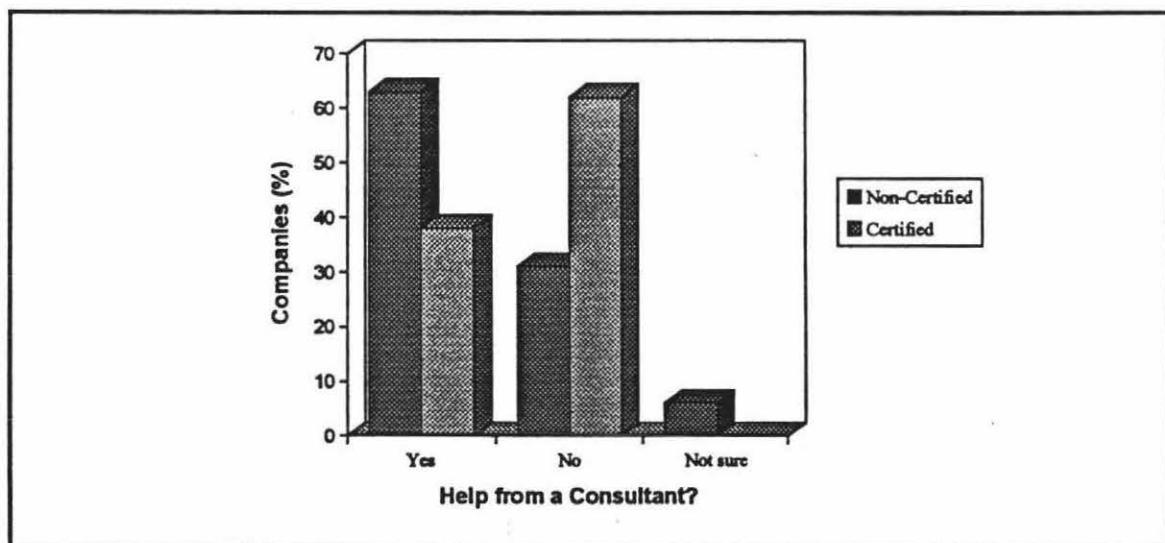


Figure 25 Help from a Consultant?

The first point to note is that the two distributions are diametrically equivalent. Of the certified companies only 38% used a consultant, whereas 63% of all the non-certified

companies that are either in the process of implementing ISO 9000 or are seriously considering implementation of ISO 9000 will use a quality consultant.

Whether or not the company has a Quality Assurance department has no significant affect upon whether or not the company used, or will use, a Quality Consultant. This applies for companies already certified and non-certified companies currently in the process of implementing ISO 9000 or seriously considering it; certified ($\chi^2 = 2.5$, df = 1, p > 0.05), non-certified ($\chi^2 = 0.17$, df = 2, p >> 0.05).

Similarly the size of the company has no significant affect upon whether or not the company used, or will use, a Quality Consultant; certified ($\chi^2 = 4.5$, df = 4, p >> 0.05), non-certified ($\chi^2 = 8.4$, df = 8, p >> 0.05).

This suggests that the non-certified companies are either not as confident in their approach to ISO 9000 or simply lack the additional resources in terms of manpower required to implement ISO 9000 and that this may, in addition to the cost of implementing ISO 9000, be a contributing factor in their delay of implementation.

The nature of the help that was sought from the consultants was disclosed by 29 of the 30 certified companies that used a consultant. The help gained was as follows:

- assistance in actually writing the procedures and compiling the manuals (8 companies)
- initial planning, and scheduling of the implementation process (7 companies) including establishing of the Quality Policy (1 company) (7 companies)
- interpretation of the standards (5 companies) and informing of certification bodies requirements (1 company) (5 companies)
- general objective advice (5 companies) including advice on how to involve all employees (1 company) (5 companies)
- total setup of the Quality System and implementation process (4 companies)
- advice on documentation format and structure (3 companies)
- motivation (2 companies)
- staff training and ISO 9000 quality systems awareness (1 company)
- training in Total Quality Management (TQM) and to establish the initial culture change (1 company)
- to facilitate coordination between other divisions seeking certification to ISO 9000 simultaneously (1 company)

This indicates that quality consultants are used for advice during all stages of ISO 9000 implementation from initial planning and general advice to actually assisting in the writing and compiling of quality manuals.

It was found that whether or not the certified company used a Quality Consultant had no effect upon the factors that helped or hindered implementation of ISO 9000, and had no effect upon the benefits gained; (factors that helped ISO 9000 ($\chi^2 = 15.3$, df = 14, p >> 0.05), factors that hindered ISO 9000 ($\chi^2 = 13.4$, df = 13, p >> 0.05), benefits gained ($\chi^2 = 9.73$, df = 13, p >> 0.50)).

3.7.5 Who Wrote the Procedures?

The certified companies were asked who wrote the procedures required for ISO 9000. The responses are shown in Figure 26. See Table 32 of Appendix 3.

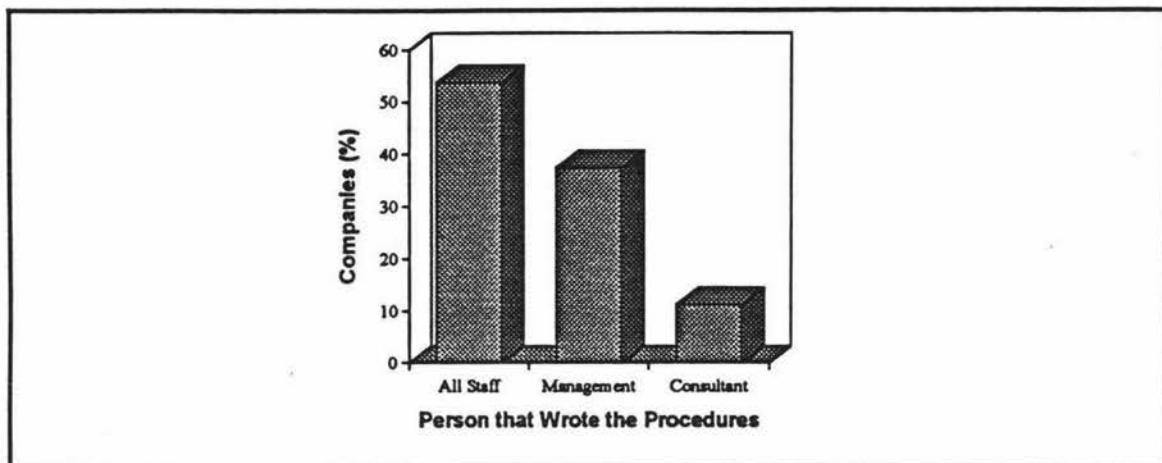


Figure 26 Who Wrote the Procedures?

The majority of certified companies (54%) had the staff write their own procedures. Management wrote the procedures in 38% of the companies, and consultants were used to write the procedures in 11% of the companies.

A Chisquare analysis testing for significant correlations between who wrote the procedures and the level of ISO 9000 sought, the size and age of the company yielded no significant differences. This indicates that the level of ISO 9000 sought, and the size and age of the company has no significant effect upon who is chosen to write the procedures; (level of ISO 9000 sought versus who wrote the procedures ($\chi^2 = 2.65$, df = 4, $p > 0.50$), size versus who wrote the procedures ($\chi^2 = 12.7$, df = 8, $p > 0.05$), and age versus who wrote the procedures ($\chi^2 = 5.62$, df = 8, $p > 0.50$)).

However, there is a disproportionately high number of small companies that used consultants to write the procedures as shown in Figure 27. See Table 33 of Appendix 3.

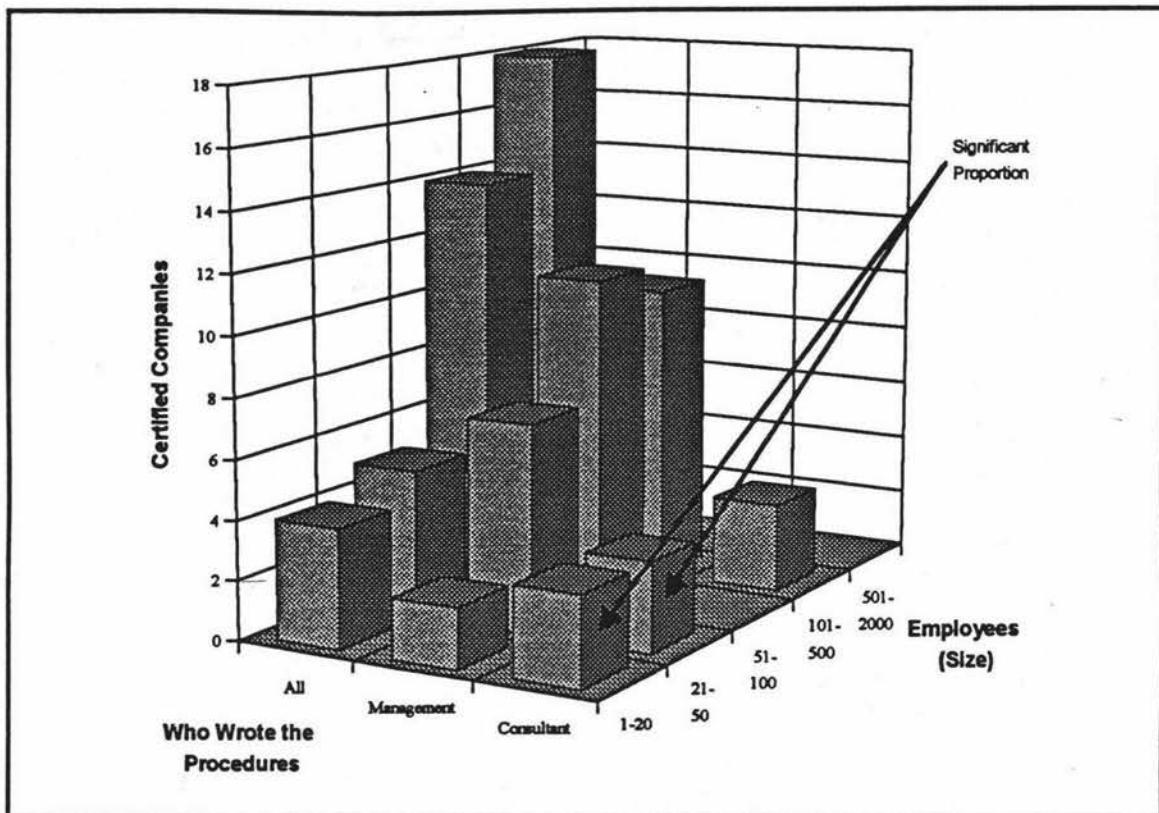


Figure 27 Who Wrote the Procedures versus Number of Employees (Size)

This becomes significant at $p \approx 0.2$, for $\chi^2 = 12.7$ and $df = 8$ as above with the number of small companies that used consultants contributing most to the Chisquare (χ^2) value as shown in Table 33 of Appendix 3. Hence with approximately 80% confidence it can be stated that a significantly large number (25%) of small companies with between 1 and 50 employees use consultants to write their procedures.

3.8 TOTAL QUALITY MANAGEMENT

Following are the responses to questions asked in order to gain an appreciation of the companies' attitudes and intentions towards quality management.

3.8.1 Have they Heard of Total Quality Management (TQM)?

The question was asked of non-certified companies of whether they had not heard of TQM. See Table 34 of Appendix 3.

Of the 198 non-certified companies that responded to this question only 14 companies had not heard of TQM. That is 93% of the companies had heard of TQM which indicates a very high level of awareness; as is the case for the awareness of ISO 9000 as discussed in Section 3.2.

Of the 14 companies unaware of the existence of TQM 11 companies (79%) had fewer than 20 employees, and the remaining 3 companies (21%) had fewer than 50 employees. All 14 companies were more than 10 years old, with 7 companies (50%) aged between 11 and 20 years, 5 companies (36%) aged between 21 and 50 years, and 2 companies (14%) aged between 51 and 200 years.

The size distribution of non-certified companies that had not heard of TQM is significantly different to the size distribution of non-certified respondents as a whole ($\chi^2 = 47.6$, df = 4, p << 0.005). This is due to the disproportionately large number of non-certified companies, which have not heard of TQM, that have less than 20 employees.

Similarly the age distribution of the non-certified companies that had not heard of TQM is significantly different to the age distribution of non-certified respondents as a whole ($\chi^2 = 30.9$, df = 4, p << 0.005). This is due to the fact that all of the non-certified companies that had not heard of TQM are more than 10 years old.

This suggests that the non-certified companies that have not heard of TQM are relatively small companies with the majority (79%) having fewer than 20 employees and all have existed for more than 10 years. This should be the target market of any campaign intending to promote the awareness of Total Quality Management.

As found above in Section 3.2, only companies of similar characteristics (fewer than 20 employees and aged between 10 and 20 years old) had not heard of ISO 9000 which suggests that these companies are stagnating with respect to business development.

The size and age distribution of non-certified companies that have not heard of ISO 9000 and TQM are significantly different at the 99% confidence level, but not at the 99.5% confidence level; the Chisquare test for difference between size distribution yielded $\chi^2 = 9.47$, df = 2, and for difference between age distribution yielded $\chi^2 = 11.61$, df = 3. This suggests that in all probability (99% confidence) that the non-certified companies that have not heard of ISO 9000 are not the same companies as those that have not heard of TQM, although they do have similar characteristics of size and age.

3.8.2 Do they Currently follow Total Quality Management Philosophies?

Figure 28 clearly illustrates the diametrically equivalent distribution of certified and non-certified companies that do and do not currently follow the philosophies of TQM. Of the certified companies 78% claim to follow the philosophies of TQM, with the remainder (22%) not following the philosophies of TQM. Of the non-certified companies 79% do not follow the philosophies of TQM, whereas 21% do follow the philosophies of TQM. See Table 35 of Appendix 3.

The significant difference between certified and non-certified companies ($\chi^2 = 65.0$, df = 1, p << 0.005) is highly implicative of the suggestion that the implementation of ISO 9000 is the assigned cause of the variance. This suggests that ISO 9000 is, or is used as, the beginning of TQM. This should be considered in conjunction with the next section which investigates to what degree ISO 9000 is used as the beginning of TQM.

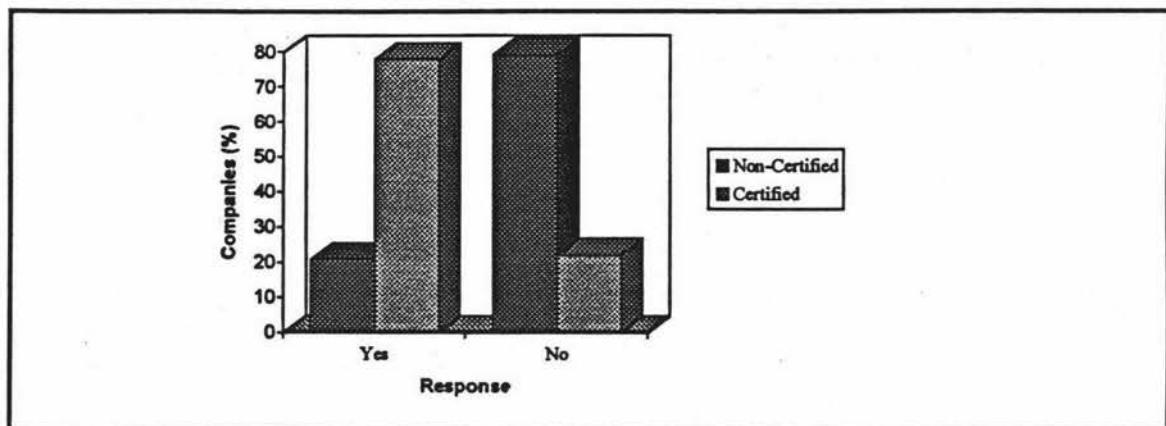


Figure 28 Do they Currently Follow Total Quality Management Philosophies?

3.8.3 Is Certification the Beginning of Total Quality Management?

The responses to a question asking whether ISO 9000 was the beginning of TQM are shown in Figure 29. See Table 36 of Appendix 3.

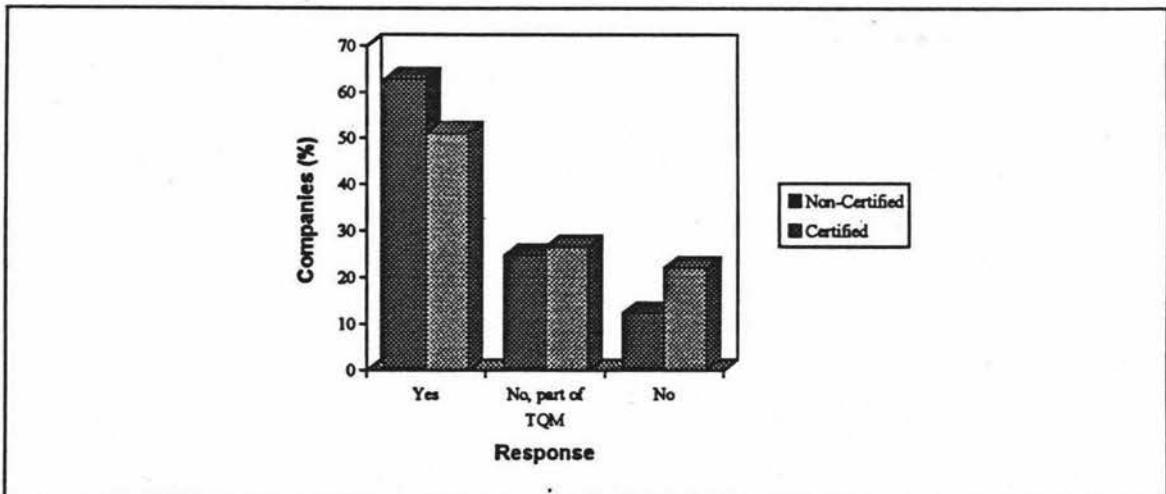


Figure 29 Is Certification the Beginning of Total Quality Management?

A high proportion of certified (51%) and non-certified companies (63%) indicated that ISO 9000 is the beginning of TQM. A further quarter of the certified and non-certified respondents (actually 27% and 25% respectively) claimed that implementation of ISO 9000 was part of an existing TQM strategy. A smaller proportion of certified companies (22%) and non-certified (12%) companies implement ISO 9000 without utilising it as a foundation upon which to build a TQM philosophy within the company. A Chisquare analysis of the above distribution reveals no significant difference between certified and non-certified companies ($\chi^2 = 4.28$, df = 2, p > 0.10).

Therefore an increasing majority of companies use ISO 9000 as a foundation for TQM, with approximately a quarter of all companies implementing ISO 9000 as part of their TQM strategy. Only approximately a quarter of companies choose not to take advantage of the ISO 9000 quality system to build TQM philosophies within their company.

Calculating the number of respondents that see ISO 9000 as a part of, or a precursor to TQM indicates that 78% of certified companies, and 88% of non-certified companies, see a relationship between ISO 9000 and Total Quality Management.

3.8.4 Future Intentions Regarding Quality

The companies were asked of any future intentions they had with regards to quality. The responses are shown in Figure 30. See Table 37 of Appendix 3.

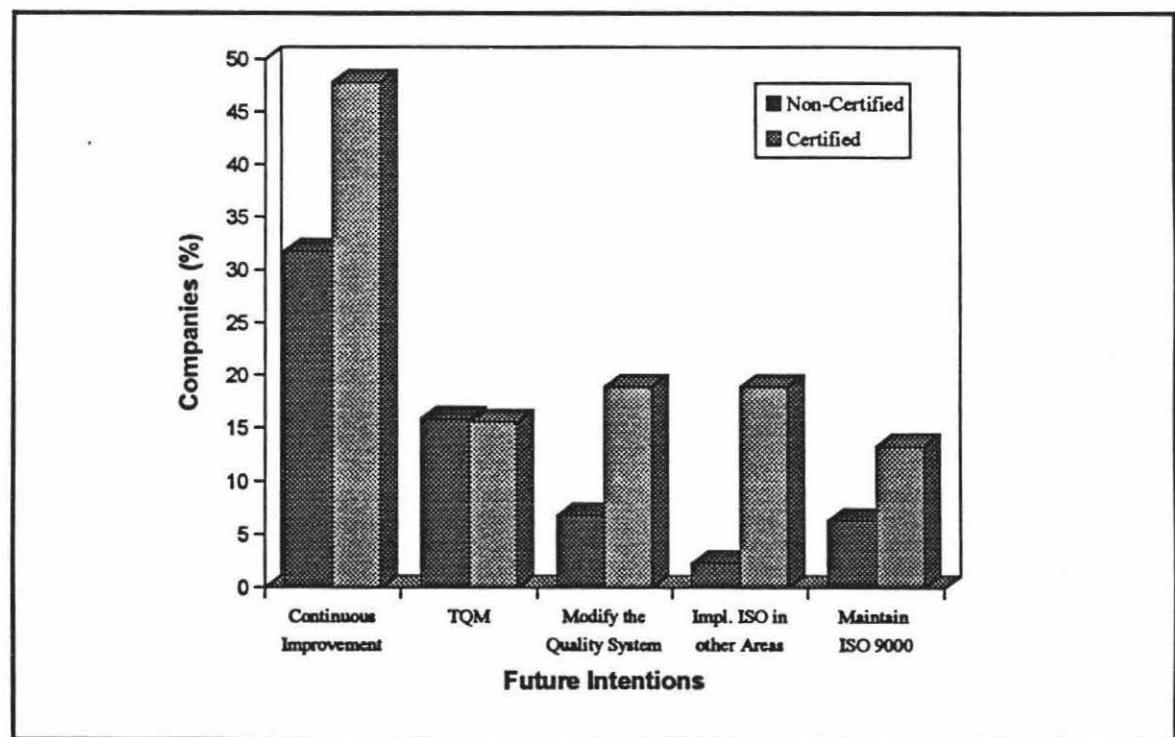


Figure 30 Future Intentions Regarding Quality

Of the certified companies 48% stated that their principle intention for the future was continuous improvement, and 16% intended to follow the teachings of TQM.

Modifications to their Quality system was next on the agenda for 19% of the companies, including making enhancements or upgrading their quality system to the next level of ISO 9000, and 19% intended to expand implementation to other areas of their company. This included implementing ISO 9000 at other sites of their company as well as inflating the company's system to encompass practices not strictly addressed in the standard such as safety, environmental management systems, accounting, and engineering workshop practices.

Only 13% of the certified respondents simply intend to maintain their Quality system.

Of the non-certified companies, 32% intended to adopt a continuous improvement approach, and an additional 16% intend to follow the philosophies of TQM. Those that intended to modify their Quality system totalled 7%, and an equivalent number simply intended to maintain their quality system to ensure continued compliance. Only 6% of the non-certified companies intend to only maintain their Quality System once certified, and few non-certified companies (2%) anticipate the implementation of ISO 9000 in other areas of the company.

Companies that intend to continuously improve their quality system or follow TQM can be grouped together to total 64% of the certified companies and 48% of the non-certified companies. Similarly companies that want to modify their quality system or implement ISO 9000 in other areas of the company can be grouped together totalling 33% of the certified companies and 9% of the non-certified companies. And those companies that simply intend to maintain ISO 9000 to ensure continued compliance remain at 13% of the certified companies and 6% of the non-certified companies.

Hence three main intentions exist with regards to quality post-certification:

- Total Quality Management and continuous improvement (64% of certified companies)
- Modify the quality system (33% of certified companies)
- Maintain the quality system (13% of certified companies)

3.9 ADVICE TO COMPANIES CONSIDERING CERTIFICATION TO ISO 9000

Table 11 and Figure 31 shows the responses given when certified companies were asked what advice they would give to a company which has just heard about ISO 9000 and is considering certification. See Table 38 of Appendix 3.

Table 11 Advice to a Company Considering Certification to ISO 9000

Advice from Certified Companies	(%)
Planning	37
Employee involvement	35
Talk to certified companies	22
Go for it!	22
Top management commitment	17
Resources available	15
The Facilitator	15
Do use Quality Consultants	15
Do <u>not</u> use Quality Consultants	9
Contact the Certification Agency	9
Keep it Simple	9
Existing systems	7

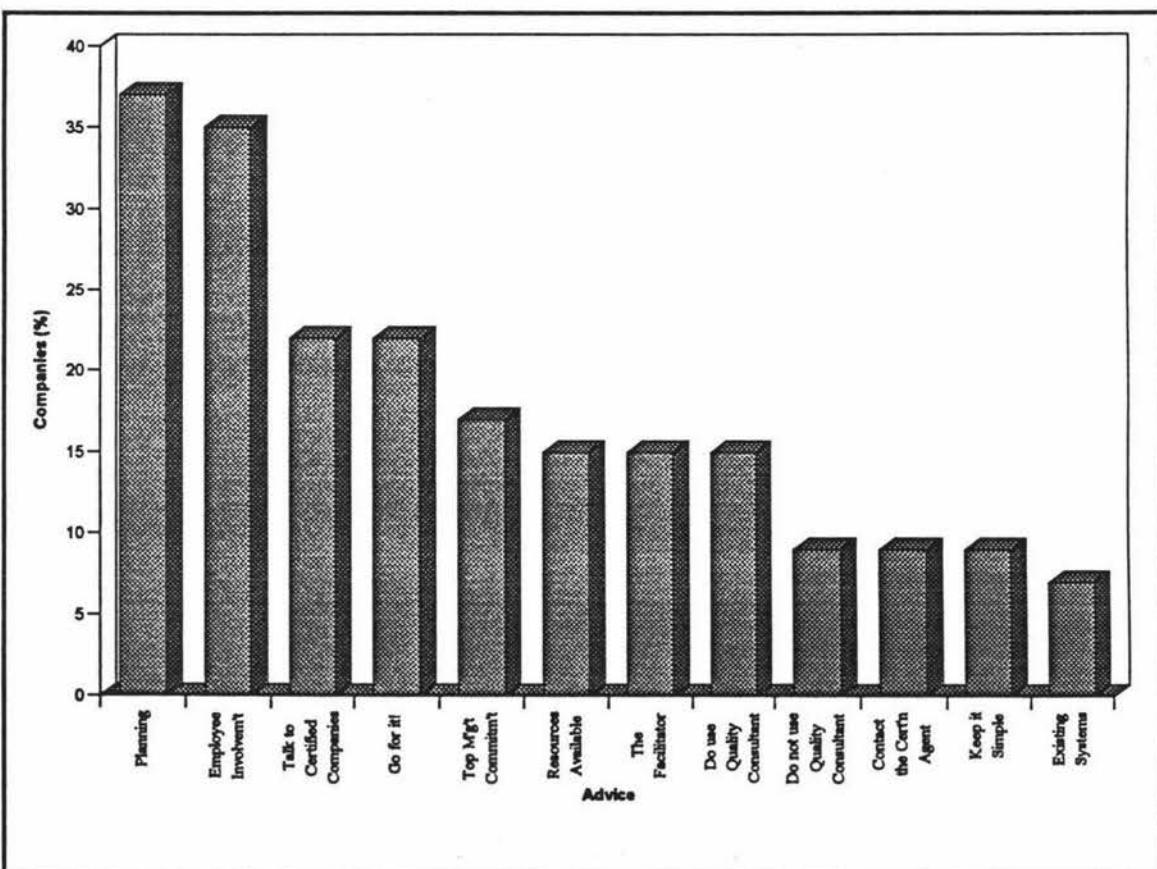


Figure 31 Advice to a Company Considering Certification to ISO 9000

Planning. To plan the implementation process was the advice given by the largest proportion of certified companies (37% = 30 companies). Following the first imperatives of buying a copy of the standards and carefully considering the requirements of ISO 9000 (as suggested by one company) is the fundamental decision noted by four companies of selecting the appropriate level of ISO 9000.

Eight companies advised that considerable time must be spent planning the implementation strategy before any attempt is made to "install" ISO 9000 into the company. The planning should be in consultation with all areas of the company affected by the requirements of ISO 9000 in order to ensure that practical and achievable goals are set towards implementation. The goals should be in small enough increments to allow progress to be monitored and set in a time frame that ensures that the implementation programme is not rushed and such that it allows provision of time for changes to take effect and allows time for training of employees to work within the framework of the new systems.

It is important at this stage to ensure that the hardest requirements are not left to be implemented last. Internal auditing, non-conformance reporting, corrective action, and management review should be implemented early in the implementation process as these indicate discrepancies within the quality system, and at the time of certification the auditors will want to see a history of these systems in the form of minutes of meetings and records as evidence of their effective operation.

Having carefully planned the implementation programme a date should be set for the external certification audit, and it is important that the agreed deadlines are adhered to.

Three companies warned that it is important that all employees are aware that passing the certification audit is not the end but is the first step of certification. Once registered supplier status is attained it must be maintained and the regular surveillance audits by the external certification agency which are usually carried out at six month intervals are to ensure continued compliance to the requirements of ISO 9000.

Additional precautionary advice offered was:

- plan secretarial time
- it is important that the facilitator does not work in isolation but that all departments affected by the implementation of ISO 9000 work step by step under the guidance of the facilitator in achieving the goals of the implementation programme
- do not expect immediate benefits

One company recommended monitoring quality costs and another recommended that ISO 9000 be used as a foundation for the establishment of Total Quality Management.

Employee Involvement. To ensure active employee involvement was advised by 35% (28) of the certified companies reinforcing the point that it is imperative to obtain employee ownership of the system. Absolute commitment at all levels of the organisation to achieving ISO 9000 is essential for the establishment of an effective quality system and to void the attitude that it is just "a plaque on the wall." This can only be gained through all staff understanding, prior to initiating implementation, the need for ISO 9000 and awareness of

what ISO 9000 is, what is required and why, the objectives (how it is going to be achieved), the benefits to be gained, and the point that it is here to stay not just "the flavour of the month."

Following the awareness training as many staff as possible must be involved in the implementation programme right from the beginning, and all staff must be regularly informed of progress being made. Involving the people in developing the systems in this way is more time consuming but is likely to produce maximum ownership and commitment to the system.

Three companies recommended that staff should be allowed and encouraged to draft their own procedures and process documentation. This will ensure maximum ownership, understanding, and commitment to the systems being developed.

Talk to Certified Companies. Twenty two percent of the companies said to talk to other companies who have been through the process of implementing ISO 9000. This was found to be of particular use in the initial planning phase in order to gain an appreciation of what certification entails, and in terms of relating problems and useful advice to ease the implementation process. However one company added the point that companies must be prepared to make mistakes as they find out what is best for their specific organisation. Two companies added that in their experience they have found companies very willing to relate their experiences, and in particular Quality Assurance managers are "happy to give advice and articles."

One company recommended obtaining advice from a recently certified company on what additional areas of the business operation may be relevant to specific certification agencies. For example some areas previously not considered as being important by Telarc are now mandatory ie. safety precaution notices.

Two companies recommended acquiring copies or examples of a registered supplier's quality systems manual and procedures.

"Go for it!" Twenty two percent of the companies simply implied that the implementation of ISO 9000 was definitely a worthwhile endeavour and recommended that all companies should embrace it without hesitation.

Eleven of the companies literally said "Go for it" or the equivalent of "Do it". In addition to this advice seven companies added the following qualification:

- "...the benefits certainly outweigh the time, cost and effort"
- "...but do not expect it to be a panacea to all problems"
- "...but do not make a hobby of it"
- "...if you need to"
- "...if relevant, or if customers request it"
- "...or risk being closed out of markets"
- "...if you want to survive"

The attitudes these messages convey ranges from those companies that see ISO 9000 as

necessary only if the company is forced to implement it, to those that recommend the implementation of ISO 9000 to all companies because of the benefits to be gained. As cautioned by one respondent, it is important not to expect the implementation of ISO 9000 to be a panacea to all problems within the organisation.

Top Management Commitment. The importance of securing top management commitment to ISO 9000 implementation was noted by 17 % of the companies.

Commitment to ISO 9000, and leadership of the implementation process must come from the top of an organisation. The Chief Executive Officer (CEO) and/or General Manager (GM) should be actively involved in, and driving, the implementation process. This is important in terms of ensuring the necessary allocation of resources, leadership and support of the implementation process. In order for this to be achieved the CEO and/or GM must be convinced of the need for ISO 9000. A recommendation to this effect from one CEO was for the CEO of the company to attend an executive management summary seminar in order to gain a suitable introduction to ISO 9000.

Resources. Fifteen percent of the companies gave advice relating to the allocation of resources.

Nine companies warned not to underestimate the requirement for resources. The time, effort, training, personnel and expense required can easily be under calculated. Two companies advised that it would take 12 to 18 months, whereas one company warned to expect it to take longer than anticipated. One company gave the following guidelines for calculating the time required for implementation of ISO 9000:

"Estimate the executive time involved to achieve certification and multiply by 2-5 depending on the nature and size of the company ...then ensure you have the necessary resources to meet the desired time scale"

In terms of the payback period that can be expected two conflicting opinions were received:

- "apparently high initial cost has almost 6 months payback period"
- "financial outlay will not be recouped for several years due to the nature of setting up such a system"

Obviously the financial payback period varies greatly between companies and will be dependent primarily upon the adequacy of existing systems, but also upon the potential to gain or at least sustain customer sales.

One company acknowledged that there are grants available to help with costs incurred. These are available from the Business Development Board under the title of the Enterprise Growth Development Scheme and subsidise the cost of the external certification audit and costs incurred in procuring the services of a consultant.

The Facilitator. Advice regarding the Facilitator was given by 15% of the certified companies.

Three companies recommended the appointment of one full time person, without other responsibilities, to coordinate the implementation process - the facilitator.

Only one company recommended the employment of an expert as the facilitator. The remainder of the companies recommended that the appointed person is trained by attending courses on how to implement ISO 9000, and internal auditing, before beginning ISO 9000 implementation. A cautionary note was added by one company advising people attending such courses to ensure that the organisation running the course does not deal solely with abstract problems - the examples given must be relevant and meaningful.

One company stressed the importance of the company writing its own manual(s) and in doing so resisting temptation of the facilitator to copy solutions sighted at, or borrowed from, other companies.

One company advised the resistance of pedantic influences and issues raised by certification agents suggesting that the main focus should be on practicality of the systems being developed.

Quality Consultants. Fifteen percent of the certified companies recommended using a quality consultant and 9% recommended not using a quality consultant. Comments for and against the use of Quality Consultants are as follows:

Do use Quality Consultants

- Implement ISO 9000 alone if possible, but if it is decided to use external assistance seek professional advice from an experienced consultant that has either been recommended or has a verifiable record of successes.
- One suggestion given was to prepare a detailed brief to be submitted to the consultant by which their performance can be monitored. Another useful technique is to always ask "why?"
- One company recommends the use of an external consultant as "a different set of eyes can really be helpful," but notes that consultants are expensive, and another company that obviously benefited from the use of a consultant recommends that a company considering implementation of ISO 9000 gets "as much professional consulting as you can afford."

Do not use Quality Consultants

- Six companies recommended avoiding consultants because of a lack of ownership that results from systems developed by people inexperienced with the organisation. It is recommended that the company writes the quality manual(s) itself, resulting not only in a sense of ownership but that of pride and achievement, and complete comprehension of the system developed.
- One company held reservations about the consultants ability to fit in with the culture of an organisation.

The prevailing message is: "Beware of Quality Consultants - but use them if you need to." It is a cautionary note to be careful in the selection of a suitable and competent consultant, and a reminder of the imperative to create ownership of the systems developed.

The Certification Agent. Nine percent of the companies gave advice relating to the external certification agencies.

Three companies made the recommendation to contact the certification agency to seek advice on the course of action necessary for registration as a certified supplier.

Two companies stated that it is important to talk to the chosen certification agent as soon as possible in order to establish any peculiarities with that particular certification bodies' interpretation of the requirements of the standard. This is reflected in the advice given above titled "Talk to Certified companies" which quotes an example where some areas previously not considered by Telarc as being important are now mandatory (ie. safety precaution notices).

Keep it Simple. Nine percent of the certified companies advised to keep the systems being developed as simple as possible.

Comments include:

- plan for simplicity - be aware of institutionalised formality
- effective systems/manuals are as simple as possible
- structure the systems to be totally operator friendly so that they become the natural framework of the business
- avoid over-documentation

This suggests that there is a very real threat of developing over-complicated and over-documented systems. This must be avoided if the systems to be developed are to remain practicable.

Existing systems. Seven percent of the companies noted the importance of existing systems in the implementation of ISO 9000. It is important to ensure that the existing systems are captured rather than starting with the intention of blindly developing completely new systems based upon the requirements of ISO 9000. The existing systems should be identified, evaluated for relevance and adequacy, redrawn in an agreed format, and modified and improved where necessary in order to comply with the requirements of ISO 9000. Any obsolete documents should be disposed of, or archived, as appropriate.

One company stated that most successful companies have much of what is required by ISO 9000 already in place, but that they commonly do not realise it.

Advice from Non-Certified companies

Statements made in the general comments section of the survey sent to the non-certified companies were very similar to those of the certified companies but non-certified companies rated resources once again as the top priority for consideration and did not realise the full importance of planning to the success of the implementation programme. Employee involvement although mentioned was underrated for its effect upon the effectiveness and ease of implementation of ISO 9000.

3.10 SUMMARY OF THE FACTORS THAT AFFECT ISO 9000 IMPLEMENTATION AND THE BENEFITS GAINED ACCORDING TO THE CERTIFIED COMPANIES IN NEW ZEALAND

The following lists provide a summary of the factors that affect the implementation of ISO 9000 and the benefits gained according to the certified companies in New Zealand.

3.10.1 Factors that Affect ISO 9000 Implementation in New Zealand

Culture

Helped:

- Existing quality consciousness
- Cooperation of staff - a willingness to change
- Involvement of all employees at all levels
- Stable industrial relations
- Internal discipline
- Good understanding by staff of the intentions and direction of the company

Hindered:

- Resistance to being changed
- Employee age - older employees found the need to change particularly difficult to accept
- Lack of commitment
- Lack of discipline
- Poor industrial relations ("a them and us attitude")
- Conservatism

Management Commitment

Helped:

- Visible commitment from top management
- Commitment from Middle Management
- Management dedicated to maintaining market leadership and committed to the implementation of ISO 9000 as a means of achieving this objective

Hindered:

- Lack of understanding of the need for ISO 9000
- Old management styles with entrenched attitudes and authoritarian policies
- Initial resistance by lower and middle management to the concept of formalised systems
- Impatience of middle management for returns/benefits
- Lack of recognition and commitment of the time and resources required
- Implementation of ISO 9000 was not prioritised in all locations within the company

Existing systems

Helped:

- Existing Systems already in place
- "Already had a Total Quality Management programme running"
- Already registered to other quality standards (ie. Telarc registered laboratories, Ford Q101, NZS 5845, NZS 5401:1982, AS 2210, API 5L, the New Zealand Standards Mark)

Hindered:

- Lack of formalised procedures
- Procedures not documented
- Lack of document control and no structured documentation hierarchy
- Introduction of Total Quality Management before ISO 9000 hindered implementation of ISO 9000 as the two systems were difficult to integrate

Training

Helped:

- Staff well trained and experienced, with high standards of workmanship
- Existing staff trained in Quality Assurance and able to implement ISO 9000
- Training in quality management principles and quality systems given to staff
- A resource of competently trained technical people in positions of management
- Valuable lessons were learnt from implementation of ISO 9000 in one department first

Hindered:

- Lack of understanding of the what ISO 9000 was, what it required, and a lack of understanding of the certification process
- Poor job performed in selling the benefits and reasons for change to employees
- Lack of training of all staff in the basic principles of quality assurance and the purpose of quality systems
- Difficulty getting production staff in particular to use the systems developed
- Lack of education amongst some employees
- Lack of training of employees in current job procedures

Complexity of Operation

Helped:

- A small number of employees
- A relatively simple process
- A high technology based operation
- A relatively new plant

Hindered:

- A complex range of products and end user needs
- Complex production systems
- Short lead times and a high service requirement meant a need for flexibility
- Some systems still in the process of being developed and established
- A large number of employees and processes
- Inadequate or no inspection, measuring and test equipment

Resources

Helped:

- An open budget
- A large company therefore can afford the money and resources required
- Approval of resources to achieve certification
- Company prepared to make financial investment in the development of systems and in training to the new systems

Hindered:

- Lack of time and personnel available due to existing workloads
- Lack of money
- Unrealistic time frames imposed by management

The Facilitator

Helped:

- A full-time facilitator was employed
- A well trained and informed quality manager drove the programme
- A Quality Assurance team was established in-house
- An experienced consultant was used
- Trust and empowerment was given to the people made responsible for the documentation and implementation of the quality systems
- The organisation had a professional corporate Quality Assurance team of experienced quality practitioners

Hindered:

- Benefits oversold to end users
- Did not have models to compare and work from
- Difficulty with interpretation of the standards and subsequent application in a practical sense
- No particular person to drive the programme
- Over-zealous interpretation of the standards with a tendency towards over-documentation
- Initially chose a facilitator that saw Total Quality Management and ISO 9000 as being synonymous which they are not
- Poor consultancy resulting in inappropriate documentation being developed which prevented training and assimilation

Market

Helped:

- Needed ISO 9000 in order to gain access to particular markets
- Pressure from existing customers for which certification to ISO 9000 forms part of their supplier approval programme
- Enhanced competitive position by either providing a competitive advantage or alleviating a present disadvantage

Management Practices

Helped:

- Commitment to achieving certification
- The belief that the employees are important and involvement of them in decision making
- A positive management and board attitude
- A dynamic and proactive management team
- An aim to improve operating efficiencies in all areas
- An existing structured system of meetings, leadership, and review
- An autonomous decision making process with limited "corporate politics" involved
- A management that is encouraged to take full responsibility for the entire task

Realise Benefits

Helped:

- Realisation of the internal benefits to be gained
- Realisation of the external benefits to be gained

Communication

Helped:

- "team talks" used to carry the message
- Team approach to problem solving and a thorough communication programme by the use of "team briefs"
- Many long term employees so teamwork was an untapped resource suited to the culture of the company
- Regular bimonthly meetings of all site "quality coordinators" of the corporation
- Good in-house communication systems

Hindered:

- Conflicts between divisions
- Poor communication between management and floor staff - compounded by a "them and us" attitude
- Language difficulties with factory staff which has a large proportion of pacific island and Maori people. This also created language and cultural barriers with documentation
- Poor communication of the companies intentions which led to a fear of lost job security by having documented work instructions

Responsibility and Authority Definition

Helped:

- Clearly defined responsibilities and authorities with established accountability
- All staff accept quality as being their responsibility

Hindered:

- Difficulty in getting staff, particularly middle management and supervisory level, to accept responsibility and accountability
- Lack of responsibility - "get someone else to do it"

Business Barriers

Hindered:

- The responsibility for quality was delegated to an individual as a technical role divorced from production interests rather than quality being viewed as being the responsibility of everyone
- Relied on head office for purchasing
- Manufacturing, sales and administration divisions tend to operate very autonomously
- Emphasis on production quantity not quality
- Operate a bonus scheme

Customer

Helped - provided motivation for certification:

- The New Zealand Dairy Board's supplier approval programme
- Major customers are selling into Japanese and European markets
- Customers are increasingly seeking full traceability
- Increasing involvement of our customers in ISO 9000
- Exposure to overseas customers

Hindered:

- "Customer ignorance" of ISO 9000

Magnitude

Hindered:

- Perceived "paperwork mountain" in establishing a quality system and that it is a long slow process requiring huge resources
- A belief that it is a cumbersome and time consuming process of amendments, document reviews and document control
- Existing workloads delay the implementation process
- A concerted effort is required to pull all activities together

Suppliers

Hindered:

- Inadequate support from suppliers who are not committed to, or understand, the concept of ISO 9000 based quality systems
- Suppliers that do not verify the final quality of their goods; placing more emphasis on production quantities

Planning

Helped:

- Goal setting

Scope

Hindered:

- At the time certification was awarded the systems only applied to management - for the systems to be effective they need to be company-wide.

Comparison with the findings from the Literature Search and Practicing Quality Consultants. The factors that affect the implementation of ISO 9000 in New Zealand according to the certified companies are identical to those identified by the literature search and practicing quality consultants, as summarised in Section 2.3 above, with the following exceptions:

- "Ethnic difficulties" associated with the culture of the company (of Section 2.3 above) were not experienced by the certified companies but did cause problems with communication.
- The importance of employee involvement was mentioned by the certified companies ("Culture") but not the importance of involving the unions. This suggests that the unions do not present as much of a hindrance to the implementation of ISO 9000 as they are purported to.
- Expectation of short financial payback periods was not a factor raised by the certified companies as having hindered the implementation of ISO 9000.
- A lack of Communication was not observed by the literature search or practicing quality consultants, but was an important factor raised by the certified companies as having hindered the implementation of ISO 9000.
- "Business Barriers," "Customer," "Magnitude," "Suppliers" and the "Scope" were factors that hindered the implementation of ISO 9000 for the certified companies that were not observed by the literature search and practicing quality consultants.
- Difficulty with the Maintenance of the quality system in terms of the effective implementation of internal audits, management review and corrective action was not reported by the certified companies. This is due to the nature of this research the purpose of which was to investigate the factors that hinder the implementation of ISO 9000 prior to certification. It is expected that the factors that affect the effective maintenance of the quality system, and subsequently the maintenance of ISO 9000 certification, are identical to those found in this investigation that affect the implementation of ISO 9000. An investigation into the factors that affect the maintenance of ISO 9000 could serve the basis of further research.

3.10.2 Benefits from Certification to ISO 9000 Gained in New Zealand

Enhanced Existing Systems

- Improved documentation
- Focus on quality and the prevention of poor quality
- Formalised and effective corrective action that prevents problems from recurring
- Improved internal organisation and streamlined business operation
- Improved control of manufacturing and non-manufacturing processes
- Provides a process for continuous improvement due to reviews, internal auditing, nonconformance reporting and corrective action
- Auditing (internal and external) and system reviews highlight the weaknesses of the

systems in place and provides a benchmark against which a tangible measure of progress can be made

- Improved control of suppliers via the supplier approval system
- Defined policies
- Various improvements to weak areas of the existing systems highlighted as a result of the critical review of the systems forced as an inherent part of the documentation process
- Improved documentation control and record keeping including documentation of procedures
- Organisation and development of a controlled system conducive to improvement
- Simplification of existing systems and procedures
- Improved product traceability, identification and control including identification of non-conforming product
- Improved control of the production process, including quantification of process parameters and trend analysis, and more rigorous product sampling and retention
- Calibration of test equipment

Market

- Access to markets - both local and export
- Enhanced company image and reputation
- A competitive advantage with certification providing greater credibility
- A gain in customer confidence
- Fewer customer complaints
- Increased customer satisfaction hence retain their custom
- Retain sales to existing customers that require ISO 9000
- An increase in market share
- Fewer audits by customers
- A focus on customer requirements
- Provides confidence for marketing personnel
- Increased customer interest as they become aware that the company is working towards ISO 9000

Reduction in total costs

- Increased productivity due to a reduction in internal losses due to less waste, reject and rework
- Fewer audits by customers
- Reduced internal and external customer complaints
- Reduced warranty costs
- Reduced inwards goods inspection
- Improved control of the process
- Shorter design cycles

Training

- More focus on training
- Improved levels of staff training
- Improved recording of training
- Improved understanding and ability to perform particular tasks
- Greater understanding of process control
- Ability to multi-skill employees through the use of documented work procedures
- Documentation facilitates training including the induction of new employees

Formalisation of procedures

- Provided an enforceable code of practice which fostered accountability and discipline
- Creation of consistency in the way procedures are performed by alleviating uncertainty and removing subjective assessments
- Improved existing procedures
- Simplification of operating systems and procedures
- Company policies are clearly defined and understood at all levels of the organisation
- Improved control of documentation

Employee Benefits and Company Culture

- Improved quality awareness
- Greater employee involvement and teamwork resulting in increased job satisfaction, morale, pride in what has been achieved at all levels, and confidence and a development of trust company-wide
- Development of a unified directional focus and common objectives
- A focus on internal and external customers
- Provided a discipline for maintaining desirable behaviour
- A realisation by management that their responsibility is to manage and that many of the problems are management related

Communication

- Improved communication internally at all levels including interdepartmental and intradepartmental communication
- Improved communication externally with customers and suppliers, particularly with regards to specifications
- More openness and an improvement in the effectiveness of communication between all staff
- Effective operation as a team or in teams providing greater participation and interaction between all staff

Definition of Responsibility and Authority

- Helped to clarify to employees the performance expectations of them
- Helped to reinstate accountability, and strengthened discipline
- Increased understanding of departmental responsibilities

Technology

- Improved level of technology deployed as the need for more on-line automated inspection was recognised

Resources

- A decrease in time spent solving unexpected problems which provided management with more time to manage.

Continuous Improvement and Total Quality Management (TQM)

- A foundation for continuous improvement and Total Quality Management

Product and/or Service Quality

- Improved product and or service quality

Comparison with the findings from the Literature Search and Practicing Quality Consultants. The benefits from certification to ISO 9000 in New Zealand according to the certified companies are identical to those identified by the literature search and practicing quality consultants, as summarised in Section 2.3 above, with the following exception:

- The literature search and practicing quality consultants failed to identify that the level of technology deployed improved as a result of implementing ISO 9000 as the need for more on-line automated inspection was recognised.

3.10.3 Future Benefits Expected (Post-Certification) as a Result of ISO 9000 Implementation and Certification

Market

- An increase in sales/market share - in local and export markets
- Access to markets that require ISO 9000 certification - both local and export
- Retain existing customers by satisfying their requirement for certified suppliers
- A competitive edge by providing a marketing advantage over competitors that are not certified
- Confidence in the companies ability to consistently provide products that meet customer requirements

Continuous Improvement and Total Quality Management (TQM)

- Continual improvement of the process, quality systems and product/service quality through management review, internal and external auditing and corrective action

Reduced Total Costs

- Further reductions in waste, rejects and rework resulting in improved efficiencies and productivity
- Further reduction in customer complaints and warranty and service costs
- Further reduction in the rate of inwards goods inspection as suppliers comply to requests to provide certificates of conformance.
- Continued reduction in supervisory time required.

Improved Management Practices

- Continued employee involvement
- Continued benefits due to definition and delegation of responsibility

- Increase in the use of Statistical Process Control and Problem Solving techniques

Surveillance Audits

- The periodic monitoring of the quality system by the external certification agent ensures continued compliance to all procedures internally

Employee Benefits

- Increased job satisfaction with employees having more responsibility

Comparison with the findings from the Literature Search and Practicing Quality Consultants. The future benefits expected (post-certification) as a result of ISO 9000 implementation and certification, according to the certified companies, are identical to the benefits identified by the literature search and practicing quality consultants, as summarised in Section 2.3 above, with the following exceptions:

- The certified companies expected the improved management practices gained as a result of implementing ISO 9000 to continue after certification
- The certified companies expected that the periodic monitoring of the quality system by the external certification agent during surveillance audits will ensure continued compliance to all quality system procedures internally

4 CONCLUSIONS

Two objectives formed the foundation of this research. The first was to identify the factors that actually affect ISO 9000 implementation in New Zealand companies. This included factors that help and factors that hinder ISO 9000 implementation. The second was to determine the benefits that companies claim to derive from ISO 9000 implementation and certification.

The factors found that actually affect ISO 9000 implementation in New Zealand companies in order of incidence are:

1. Company culture
2. Management commitment
3. Existing systems
4. Training
5. Complexity of operation
6. Resources
7. The facilitator
8. The market
9. Management practices
10. Degree of realisation of the benefits
11. Communication
12. Responsibility and authority definition
13. Business barriers
14. Customer
15. Magnitude
16. Suppliers
17. Planning
18. Scope

The benefits gained by companies certified to ISO 9000 in New Zealand in order of incidence are:

1. Enhanced existing systems
2. Market improvements
3. Reduction in total costs
4. Training
5. Formalisation of procedures
6. Employee Benefits and Company Culture
7. Communication
8. Definition of Responsibility/Authority
9. Technology
10. Resources
11. Continuous Improvement and TQM 1
12. Product and/or Service Quality

Future benefits expected by certified companies (post-certification) as a result of ISO 9000 implementation and certification, in order of incidence are:

1. Market improvements
2. Continuous improvement and Total Quality Management
3. Reduced total costs
4. Improved management practices
5. Surveillance audits ensuring continued internal compliance to standard procedures
6. Employee benefits

The majority (seventy percent) of certified companies are larger companies in the range of fifty to five hundred employees. In contrast the majority (sixty eight percent) of non-certified companies are small companies in the range of one to fifty employees. This suggests that the larger companies have taken the lead with respect to implementation of ISO 9000 in New Zealand.

Of the non-certified companies ninety four percent had heard of ISO 9000 which indicates a

high level of awareness of ISO 9000. The majority of non-certified companies that have not heard of ISO 9000 are relatively small companies with fewer than 20 employees and aged between 11 and 20 years. Non-certified companies of similar characteristics (fewer than 20 employees and more than 10 years old) had not heard of Total Quality Management.

This suggests that these companies are stagnating with respect to business development. This is possibly due to ignorance caused by a disconnection/dissension from journals, trade fairs, and other industrial media, disinterest caused by the current climate of cost reduction, or neglect caused from currently small and geographically protected market niches. It is recommended that the reasons why these companies are lacking in business development, and specifically why these companies are not receiving exposure to external business development information and trends, should form the basis of further research.

Non-certified companies with fewer than 20 employees and aged between 11 and 20 years should form the target market of any campaign intending to promote the awareness of ISO 9000 or Total Quality Management.

Of the non-certified companies up to as many as half are currently in the process of implementing ISO 9000, a further quarter are seriously considering the implementation of ISO 9000 (essentially intending to implement ISO 9000 in the next five years), with the last quarter having no intention of implementing ISO 9000. This suggests that the potential number of companies seeking certification totals three quarters of the companies in New Zealand.

Of the non-certified companies currently implementing ISO 9000 only two percent are working towards certification to ISO 9003 (compared to % of currently certified companies) which indicates a trend away from this level of the standards with a proportionate increase in the number of companies working towards ISO 9001. This suggests a realisation of the limited value to be gained from implementation of ISO 9003.

It has been revealed that companies implement ISO 9000 for either of three reasons:

- They have to
- They need to
- They want to

Companies that have to implement ISO 9000 do so because of an imposed requirement. Those that need to implement ISO 9000 do so because they need to in order to gain improvement in existing systems or to provide market credibility. Those companies that want to implement ISO 9000 do so because a realisation of the benefits to be gained in terms of improvements from the implementation of ISO 9000, or they can see a probable future requirement.

The motives for the implementation of ISO 9000 were not clearly definable as the classifications of the "enlightened" and the "desperate" provided by the Ministry of Commerce with the best approximation of the enlightened companies being those that want to implement ISO 9000, and the best approximation of the desperate companies being those companies that have to implement ISO 9000.

In general the reasons given by the non-certified companies for not implementing ISO 9000 are founded on misconceptions due to a lack of understanding of the concept of ISO 9000 based quality systems and the rapidly increasing momentum towards certification, and a lack of appreciation of the benefits to be gained.

Most companies (eighty two percent) perceive that they gain from the process of implementing ISO 9000, and irrespective of the motive for implementation of ISO 9000 and the degree of commitment to it, ninety nine percent of the companies that attain certification claim that their product or service quality has improved. However the improvement of product or service quality was identified as being a relatively minor benefit gained from the implementation of ISO 9000.

When asked if the certification agency helped to achieve certification to ISO 9000 the majority (seventy one percent) answered in the affirmative. This was in the form of general advice, and advice given during the pre-assessment visit, certification audit and surveillance audits.

The majority (eighty five percent) of companies found the auditor to be helpful and supportive. However, a third of the companies would prefer that the auditors behaved differently. Overall thirty four percent of the certified companies would prefer the auditors to have behaved differently which indicates that one third of the certification agents/agencies fail to provide a service that convinces the auditees of their purpose, integrity and professionalism.

Quality consultants are used for advice during all stages of ISO 9000 implementation from initial planning and general advice to actually assisting in the writing and compiling of quality manuals. Of the certified companies thirty eight percent used a consultant, whereas 63% of all the currently non-certified companies that are either in the process of implementing ISO 9000, or are seriously considering implementation of ISO 9000, state that they will use a quality consultant.

This suggests that the non-certified companies are either not as confident in their approach to ISO 9000 or simply lack the additional resources in terms of manpower required to implement ISO 9000 and that this may, in addition to the cost of implementing ISO 9000, be a contributing factor in their delay of implementation. It was found that whether or not the company used, or will use, a quality consultant is not significantly affected by whether or not the company has a Quality Assurance department, or the size of the company. It was found that whether or not the certified company used a Quality Consultant had no significant effect upon the factors that helped or hindered implementation of ISO 9000, and had no significant effect upon the benefits gained.

In addition it was found that a disproportionately high number (twenty five percent) of small companies (with employees numbering between one and fifty) used quality consultants to write the procedures required for ISO 9000.

An increasing majority of companies use ISO 9000 as a foundation for Total Quality Management, with approximately a quarter of all companies implementing ISO 9000 as part of their Total Quality Management strategy. Only a further quarter of companies choose not

to take advantage of the ISO 9000 quality system to build Total Quality Management philosophies within their company.

Three main intentions exist post-certification with regards to quality:

- Total Quality Management and continuous improvement
- Modify the quality system
- Maintain the quality system

The majority of companies (approximately two thirds) intend to introduce Total Quality Management and continuous improvement, one third intend to modify their quality system, and approximately ten percent intend to simply maintain the quality system.

Advice given from certified companies to any company considering the implementation of ISO 9000 includes:

1. Planning - plan the implementation process
2. Employee Involvement - ensure active employee involvement
3. Talk to Certified Companies - to gain an appreciation of what certification entails
4. "Go for it!" definitely a worthwhile endeavour
5. Top Management Commitment - commitment and leadership
6. Resources - do not underestimate the requirement for resources
7. The Facilitator - appoint one full time person to coordinate the implementation process
8. Quality Consultants - "Beware of Quality Consultants - but use them if you need to"
9. The Certification Agent - talk to the chosen certification agent as soon as possible
10. Keep it Simple - a threat of developing over-complicated and over-documented systems
11. Existing systems - important to ensure that the existing systems are captured rather than starting with the intention of developing completely new systems. Most successful companies have much of what is required by ISO 9000 already in place, but that they commonly do not realise it.

It is expected that the factors that affect the effective maintenance of ISO 9000 are similar to those found in this investigation to affect the implementation of ISO 9000. An investigation into the factors that affect the maintenance of ISO 9000 could serve the basis of further research.

This study was conducted with the sponsorship of KPMG Peat Marwick in an effort to address the growing need to understand the factors that affect the implementation of ISO 9000, and the benefits to be gained, and is aimed towards gaining better control of the implementation process. This thesis provides a summary of a wide body of experience and knowledge and will contribute to the ease of implementation of ISO 9000 in many companies in New Zealand, and throughout the world.

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- 13 Hobbs, Stewart, Senior Engineer, KRTA Limited, 25 Teed Street, PO Box 9806, Newmarket, AUCKLAND
- 14 Cook, Allan, Operations Manager Dairy Services, MAF, Demeter House, 131 Victoria Street, Private Bag, CHRISTCHURCH
- 15 MacKenzie, Fiona, TELARC, Private Bag 28 901, Remuera, AUCKLAND
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APPENDICES**APPENDIX 1**
LIST OF SURVEY RESPONDENTS

Below is a listing of those companies that responded to the survey questionnaire and gave their company name.

CERTIFIED COMPANIES:

3M NZ Ltd, Apex Electronics Ltd, Wellington
Alcan NZ, Auckland
Alcatel NZ, Upper Hutt
Anchor Products, Engineering Services, Hamilton
Anchor Products, Hamilton
Anchor Products, Tirau
Annett & Darling Ltd, Timaru
APV Moffat Ltd, Christchurch
Arrest-Auckland-Pest Ltd, Helensville
Autoliv NZ Ltd, Auckland
Best Bars Ltd, Auckland
Bitumix Ltd, Auckland
Borden Flexipac, Christchurch
Borden NZ Ltd, Liquipac, Auckland
Cavalier Bremworth Ltd, Auckland
Cawthron Institute, Nelson
Chemical Cleaning Ltd, Mount Maunganui
Ciba-Geigy NZ, Auckland
Conform NZ, Auckland
CSP Galvanizing, Auckland
Custombilt Manufacturing, Auckland
Defiance Food Coatings, Christchurch
Diversey NZ Ltd, Auckland
Dulmison NZ Ltd, Auckland
Dulmison Morlynn, Auckland
Duroid Ltd, Auckland
Dynamic Controls Ltd, Christchurch
Evote Powder Coatings NZ Ltd, Auckland
Federal Springs, Lower Hutt
Fletcher Steel, Auckland
Fletcher Steel, Hamilton
Golding Industrial Wear Ltd, Auckland
Hawkes Bay Brewery, Hastings
Hayes Metal Refineries Ltd, Auckland
HMF-Forlong & Maisey, Hamilton
Holmes Packaging, Rotorua
Holt Lloyd Ltd, Gamlen Environmental Services, Auckland
Hovord Industries Ltd, Tauranga
Humes Steelpipe, Auckland
Interlock Hardware Developments Ltd, Auckland
Interlock Industries Ltd, Wellington
Jones & Sanford Ltd, New Plymouth
Kiwi Packaging, Auckland Carton Division, Auckland

Kiwi Packaging Ltd, Hastings
Kraus & Nainer NZ, Wellington
Levene Paint Manufacturing Ltd, Auckland
Lion Breweries, Auckland
Marine-Air Systems, Lower Hutt
McKechnie Metal Products, New Plymouth
Milburn Enamellers Ltd, Auckland
Milburn NZ Ltd, Westport
MM Cables NZ Ltd, Christchurch
Mobil Oil NZ Ltd, Wellington
National Can NZ Ltd, Panmure Division, Auckland
National Can NZ Ltd, Wellington
National Institute for Water & Atmospheric Research Ltd, Wellington
NEI Reyrolle Pacific, Wellington
NZ Insulators Ltd, Temuka
NZ Mechanical, Manufacturing Division, Palmerston North
NZ Milk Cooperative, Auckland
NZ Starch Products Ltd, Auckland
NZ Sugar Company Ltd, Auckland
NZ Woolspinners, Dannevirke
NZAS, Invercargill
NZFP Pulp & Paper Ltd, Kinleith Mills, Tokoroa
PDL Electronics, Napier
Printpac-UEB, Auckland
Printpac UEB, Palmerston North
Printpac-UEB, Hamilton
Printpac-UEB, Nelson
Printpac-UEB, Christchurch
Printpac-UEB, Hastings
Rheem NZ Ltd, Auckland
Safe Air Ltd, Blenheim
South Pacific Aluminium, Hamilton
Swages Engineering Ltd, Auckland
Taylors Lime Company Ltd, Palmerston, Otago
Temperzone Ltd, Auckland
Timpak Industries Ltd, Hamilton
Transpak Industries Ltd, Auckland
Trigon Packaging Systems, Hamilton
Unitech Industries Ltd, Auckland
Vega Industries Ltd, Porirua
Weldwell NZ Ltd, Napier
Wellington.R. Grace NZ Ltd, Porirua
Wrightcel Packaging, Feilding
Yuasa JRA Batteries Ltd, Auckland

NON-CERTIFIED COMPANIES:

Aarque Graphics NZ Ltd, Auckland
Abels Ltd, Auckland
Ace Bag Company Ltd, Palmerston North
Actronic New Zealand Ltd.
Admark Industries Ltd, Hamilton
Alfred Holt & Company, Mairangi Bay
Allflex, Palmerston North
Allied Concrete Ltd, Invercargill
Altex Coatings Ltd, Tauranga
Amtech Construction Ltd, Napier
Anglo Engineering Ltd, Auckland
APS Credicard Ltd, Christchurch
Aquatherm Manufacturing Ltd, Hamilton
Arnott & Company Ltd, Invercargill
Arnotts Biscuits NZ, Auckland
Arrow Manufacturing Ltd, Auckland
Artel Industries Ltd, Masterton
Ashley Wallpaper Manufacturing Ltd, Porirua
Asian New Zealand Meat Company Ltd, Wellington
Auckland Wire Services Ltd, Auckland
Autex Industries Ltd, Auckland
Automated Injection Moulding Ltd, Auckland
Aztec Packaging Ltd, Auckland
B.J. Ball Papers, Wellington
B.J. Ball Papers Ltd, Auckland
Bachler Steel Ltd, Lower Hutt
Baker Construction Ltd, Cambridge
Bank Print, Christchurch
Barnes Optical Ltd, Paekakariki
Bay Collection Agency Ltd
Bay of Plenty Industrial Paints Ltd, Rotorua
Bell Tea Company, Auckland
Bitumix Ltd, Gisborne
Boniface Bro's (PN) Ltd, Palmerston North
Brightway Products (1983) Ltd, Auckland
Britannia Brands NZ Ltd, Auckland
Bryant & Gadd Ltd, Hastings
Cadbury Confectionary Ltd, Dunedin
Cambrian Engineering Company Ltd, New Plymouth
Campbell Tube Products, Thames
Canterbury Timber Products Ltd, Rangiora
Carpet Shampooing Company Ltd, Christchurch
Carrel & Carrel Ltd, Auckland
Castrol NZ Ltd, Wellington
Cerissi Leathers Ltd, Auckland
Chaucer Press Ltd, Christchurch

Chemicca, Auckland
Chequer Systems Ltd, Auckland
Civil & Civic, Auckland
Clarke Industries Ltd, Hamilton
Columbit NZ Ltd, Auckland
Comalco-CHH Aluminium, Auckland
Construction Techniques Group Ltd, Auckland
Continental Plastics, Auckland
Copyrite Holdings Ltd, Dunedin
Corson Grain Ltd, Gisborne
Cosmetic Manufacturers Ltd, Auckland
Courtaulds Coatings NZ Ltd, Wellington
CRC Chemicals NZ Ltd, Auckland
Criterion Manufacturing Ltd, Auckland
C.W.F. Hamilton & Company Ltd, Christchurch
D. & H.D. Wills NZ Ltd, Wellington
Dominion Salt (North Island) Ltd, Mount Maunganui
Donald Buckley Photography Ltd, Invercargill
Drysdale Carpet Wool Cooperative Company Ltd, Palmerston North
Durametallic NZ Ltd, Auckland
Dwyer Fibreglass Industry Ltd, New Plymouth
Easteel Industries Ltd, Dannevirke
Electronic & Transformer Engineering Ltd, Auckland
Englefield Industries, Auckland
Ernest Adams Ltd
FAB Plastics Ltd, Christchurch
Faulkner Collins, Auckland
Feltex Tufted Carpets, Foxton
Ferro Plastic NZ Ltd, Auckland
Fibre-Form NZ Ltd
Fibreglass Developments Ltd, Palmerston North
Fitzroy Engineering Group Ltd, New Plymouth
Fitzwilliam Electrical, Christchurch
Fleming & Company Ltd, Gore
Fletcher Wood Panels Ltd, Taupo
Flight Group, Auckland
Future Engineering Ltd, Dunedin
G.E. Frew Ltd, Invercargill
G.L. McDowell Ltd, Invercargill
Gal Cooke Ltd, Auckland
Gartner Superlux Ltd, Auckland
Gelman Sciences Pty Ltd, Auckland
Gemini Hosiery 1991, Wellington
Getfresh Foods Ltd, Auckland
Goodwood Industries Ltd, Auckland
H.G.M. Construction Ltd, Kawerau
Hale Manufacturing Ltd, Wellington
Hale Manufacturing Ltd, Christchurch

Hardie Iplex, Palmerston North
Harold H. Morris Ltd, Wellington
Hawkins Construction Ltd, Auckland
Healtheries of NZ Ltd, Auckland
International Technology NZ Ltd, Wellington
Interworld Plastic NZ Ltd, Auckland
Irvines Freightlines Ltd, Nelson
Jimmys Pies Ltd, Roxburgh
Jobmin Joiners 1989 Ltd, Wellington
Jon Buckingham Ltd, Auckland
Kabeduct Industries Ltd, Auckland
Kalamazoo NZ Ltd, Lower Hutt
Kibbys Metal Pressing Ltd, New Plymouth
Kitchen Technique NZ Ltd, Wellington
Kuehje & Nagel NZ Ltd, Auckland
Leask Engineering Waikato, Tatuauui
Legge Pacific Ltd, Auckland
Liquid Air Ltd, Auckland
Logan Print, Gisborne
Lumen Design Ltd, Palmerston North
Mac Valves Pacific, Auckland
Macaustors Apparel Ltd, Christchurch
Machine Painters NZ Ltd, Hamilton
Maddick Marine Surveys Ltd, Auckland
Manro Engineering Ltd, Auckland
Marlborough Fibreglass, Blenheim
MDP Computer Services Ltd, Hastings
Mechanical Handling (South Island) Ltd, Christchurch
Mel-O-Rich Products Ltd, Wellington
Mercer Stainless Ltd, Christchurch
Mirotone NZ Ltd, Wellington
Motorola NZ Ltd, Auckland
Neill Cropper & Company Ltd, Auckland
Nelson Pine Industries Ltd, Richmond
New Plymouth Convention Bureau, New Plymouth
Norca Rug Company Ltd, Levin
Nutritech International Ltd, Auckland
NZ Solenoid Company, Wellington
Octa Associates Ltd, Auckland
Optech International Ltd, Auckland
Otis Elevator Company Ltd, Auckland
Owens Road Transport Ltd, Auckland
Pacific Steel Ltd, Auckland
Pan Tam Enterprises Ltd, Auckland
Panprint Ltd, Auckland
PDL Packaging Ltd, Auckland
Pegg Engineering Ltd, Motueka
Peterson Chemicals Ltd, Wellington

Petrochem Ltd, Hawera
Polarcup NZ Ltd, Auckland
Polychem Marketing Ltd, Auckland
Precision Office Industries, Wellington
Printgroup, Location not provided
Pultron Composites, Gisborne
Quik Stik International Ltd, Auckland
R.A. Humphries & Company, Invercargill
Rabco Industries Ltd, Christchurch
Reese Plastics, Auckland
Reese Plastics Ltd, Christchurch
Repro Graphics Ltd, Auckland
Richmond Foods Ltd, Rotorua
Rigg Zschokke Ltd, Masterton
Rinnai New Zealand Ltd, Auckland
Ristrom Packaging Ltd, Christchurch
Royds Garden Ltd, Nelson
Rylock North Shore, Auckland
S. Ivory Ltd, Auckland
Sanford Ltd, Auckland
Seabridge NZ Ltd, Wellington
Shell Chemicals NZ Ltd, Wellington
Sika NZ Ltd, Auckland
Smith & Smith Glass Ltd, Auckland
Solstat Industries Ltd, Christchurch
Southern Colour Print, Dunedin
Southland Engineering Group, Invercargill
Southward Engineering, Auckland
Spotless Plastics, Auckland
Sprechor & Schuh NZ Ltd, New Plymouth
Steltech Structural Ltd, Auckland
Stringer Engineering Ltd, Auckland
Sullivan Packaging Ltd, Christchurch
Sunbeam, Palmerston North
Sunshine Brewing Company Ltd, Gisborne
Synthetic Dyeworks, Auckland
T & J McIlwines Ltd, Marton
T.H. Barnes & Company Ltd, Blenheim
Tasman Pulp & Paper Company Ltd, Kawerau
Tauranga Canvas Company, Tauranga
Taylors Ltd, Christchurch
Technic Industries, New Plymouth
Tegel Foods Ltd, Auckland
Thorndon Rubber Ltd, Lower Hutt
Tiffany Division, Ernest Adams Ltd, Christchurch
Tip Top Ice Cream Company, Auckland
Tornos Repetition Ltd, Mount Maunganui
TSE Group Ltd, Wellington

Tui Milk Products Ltd, Palmerston North
Turnbull & Jones Industries Ltd, Wellington
Ultracon, Christchurch
Unisys NZ, Wellington
Vigilant Fire & Evacuation Systems, Christchurch
Vitel International NZ Ltd, Wellington
Washingtons Solar Systems/Washingtons Drilling Ltd, Timaru
Webling & Stewart Ltd, Wellington
Weltex Plastic Industries Ltd, Christchurch
Winstone Wallboards Ltd, Auckland
Yarrows (The Bakers) Ltd, Manaia

**APPENDIX 2
EXAMPLES OF SURVEYS SENT**

**APPENDIX 2a
EXAMPLE OF SURVEYS SENT
TO CERTIFIED COMPANIES**

SURVEY

INVESTIGATING THE FACTORS AFFECTING ADOPTION OF NZS/ISO 9000 IN NEW ZEALAND AND ASSOCIATED BENEFITS.

Please return in the freepost envelope to:



Freepost 3
Dave Dobbin
Production Technology
Massey University
Private Bag
Palmerston North.

THIS RESEARCH IS SPONSORED BY:

KPMG Peat Marwick
Management Consultants

Company Name _____

Type of Business Products/Services _____

Size (no. of employees) _____

Years of operation _____

Address _____

Your Name _____

Your Title/Function _____

SECTION 1

This section looks at the factors that affected the adoption of NZS/ISO 9000 in your company.

- 1** What level of NZS/ISO 9000 has your organisation adopted? [] NZS/ISO 9001
[] NZS/ISO 9002
[] NZS/ISO 9003

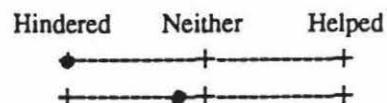
2 List here any factors inherent in your company that you could say helped the adoption of NZS/ISO 9000. (ie characteristics of your company that you could attribute to your NZS/ISO 9000 Quality Systems success).

3 List here the factors inherent in your company that you could say hindered the adoption of NZS/ISO 9000.

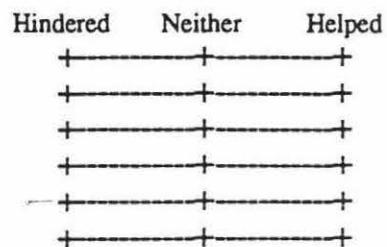
- 4 Below is a list of factors that commonly affect the implementation of NZS/ISO 9000. Please indicate on the scale (with a mark eg ---+) whether that factor hindered adoption of NZS/ISO 9000 in your company, or helped.

Example:

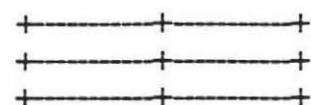
- i) a factor that severely hindered adoption would score:
ii) a factor that slightly hindered adoption would score:



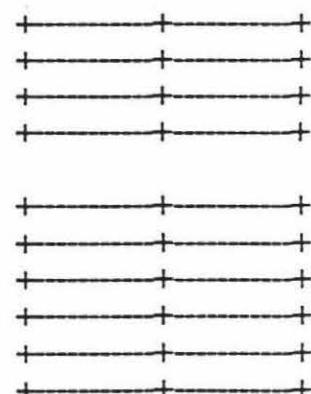
- Senior management commitment to Quality -
- Corporate philosophy - - - -
- Company culture - - - -
- Organisation of responsibility/authority -
- Corporate experience/knowledge - -
- Quality policy - - - - -



- Interpretation of the standards - - -
- Perception of benefits - - - -
- Uncertain how NZS/ISO 9000 relates to TQM -



- Employee participation - - - -
- Employee motivation/co-operation - - -
- Unions - - - - -
- Training - - - - -
- Company wide realisation of importance - -
- Acceptance of change - - - -
- Communication - - - - -
- Resources (ie time, money, materials, etc) -
- Suppliers - - - - -
- Customers - - - - -



Please elaborate on points you feel are important :

5

Below is a list of the elements of NZS/ISO 9001. Please indicate on the scale (with a mark eg ----) how hard it was for your company to comply with the requirements of each element.

(“Very Hard” means it took a lot of time and effort to meet the requirements,
“No Effort” means you probably already had a similar system in place).

			Very Hard	Some Difficulty	No Effort
• Management responsibility (incl. policy)	-	-	+	+	+
• Quality System (documentation/implementation)	-	-	+	+	+
• Contract review	-	-	+	+	+
• Design control	-	-	+	+	+
• Documentation control	-	-	+	+	+
• Purchasing	-	-	+	+	+
• Purchaser supplied product	-	-	+	+	+
• Product identification and traceability	-	-	+	+	+
• Process control	-	-	+	+	+
• Inspection and testing	-	-	+	+	+
• Inspection, measuring and test equipment	-	-	+	+	+
• Inspection and test status	-	-	+	+	+
• Control of nonconforming product	-	-	+	+	+
• Corrective action	-	-	+	+	+
• Handling, storage, packaging and delivery	-	-	+	+	+
• Quality records	-	-	+	+	+
• Internal quality audits	-	-	+	+	+
• Training	-	-	+	+	+
• Servicing	-	-	+	+	+
• Statistical techniques	-	-	+	+	+

- 6 What problems, if any, were solved, or changed, as a result of Quality System implementation in your company?**

- 7 Are there any outstanding causes of Quality problems in your company at present?

SECTION 2

This section is for you to indicate briefly the benefits you think have come from being certified.

- #### **8 What benefits has your company experienced from being certified?**

- 9 Has the process itself of preparing for certification brought about any benefits to your organisation? Please comment.**

- 10 Do you expect any other benefits in the future as a result of being certified? Please comment.**

11 Did the certification agency you used help you at all in the implementation of NZS/ISO 9000?

[] No

[] Yes; How? What with? _____

12 Of the following characteristics, which best describes the behaviour of the certification agency you used?

- [] very helpful and supportive - there to assist you become certified
- [] helpful
- [] not very helpful - just there to do their job
- [] critical and unhelpful, a 'policeman-type' attitude
- [] other, please describe: _____

How would you prefer them to behave? _____

13 Did becoming certified to NZS/ISO 9000 conflict with other Quality intentions in your company?

[] No

[] Yes; How? What with? _____

14 Did you find that actually performing Corrective Action and Management Review, etc, did cause Quality Improvement?

[] No

[] Yes, a little

[] Yes, quite a bit

[] Yes, significantly

SECTION 4

This last part of the survey is to give me an appreciation of your company's intentions.

19 What caused you to adopt NZS/ISO 9000

20 Would you say that your company has greatly improved as a result of NZS/ISO 9000 implementation? Why/why not?

21 Is NZS/ISO 9000 certification the beginning of a Total Quality Management (TQM) Programme in your company? Please comment.

22 Does your company have any future intentions regarding Quality in the short/long term? Please explain.

SECTION 3

This part of the survey is to give me an appreciation of your company's organisation for Quality.

15 Who is considered responsible for Quality in your company? (position)

16 Does your company have a Quality Assurance department? If so, where is it placed in the company structure? (ie to whom does the QA manager report?)

17 How were the procedures written, and by whom? _____

18 Did you get help from a consultant?

[] No

[] Yes; On what aspects? _____

- 23 What advice would you give to a company which has just heard about NZS/ISO 9000 and is considering certification?

- 24 Is there anything you would like to add about your company, its views, your views, anything that is missing from the survey form, or any comments regarding NZS/ISO 9000 or Quality Improvement in general?

Thank you for the time you have spent filling out this questionnaire.
Your cooperation is appreciated.

Please tick the box below if you would like a summary of my research findings.

Yes, please send me a summary of your findings.

APPENDIX 2b
EXAMPLE OF SURVEYS SENT
TO NON-CERTIFIED COMPANIES

SURVEY

INVESTIGATING THE FACTORS AFFECTING ADOPTION OF NZS/ISO 9000 IN NEW ZEALAND AND ASSOCIATED BENEFITS.

Please return in the freepost envelope to:



Freepost 3
Dave Dobbin
Production Technology
Massey University
Private Bag
Palmerston North.

THIS RESEARCH IS SPONSORED BY:

KPMG Peat Marwick
Management Consultants

Company Name _____

Type of Business Products/Services _____

Size (no. of employees) _____

Years of operation _____

Address _____

Your Name _____

Your Title/Function _____

SECTION 1

This section looks at the factors affecting the adoption of NZS/ISO 9000.

1 Have you heard of NZS/ISO 9000 Series Standards?

No

Yes

2 Are you currently certified to an NZS/ISO 9000 Standard?

No

No, but thinking about it

No, but currently in the process of preparing for certification to:

ISO 9001

ISO 9002

ISO 9003

Yes, which? ISO 9001

ISO 9002

ISO 9003

3 If you are not certified, do you intend to become certified in the future?

No

Yes, when? _____

4 Why do you/do you not, intend to become certified to NZS/ISO 9000?

- 5 What benefits do you think your company would gain from NZS/ISO 9000 certification?**

- 6 List here any factors inherent in your company that you could say would help, or has helped, the adoption of NZS/ISO 9000. (ie characteristics of your company that would contribute to your Quality Systems success).

- 7** List here any factors inherent in your company that you could say would hinder, or has hindered, the adoption of NZS/ISO 9000.

8 How do the following factors rate in your company at present? As they are, would they help, or hinder, NZS/ISO 9000 adoption?

(for example: if senior management commitment to Quality is poor at the moment in your company, it would hinder the adoption of NZS/ISO 9000).

		Hinder	Help	Neither
i)	senior management commitment to Quality -	[]	[]	[]
ii)	corporate philosophy - - - -	[]	[]	[]
iii)	company culture - - - -	[]	[]	[]
iv)	organisation of responsibility/authority -	[]	[]	[]
v)	corporate experience/knowledge - -	[]	[]	[]
vi)	quality policy - - - -	[]	[]	[]
vii)	interpretation of the standards - - -	[]	[]	[]
viii)	perception of benefits - - -	[]	[]	[]
ix)	uncertain how NZS/ISO 9000 relates to TQM	[]	[]	[]
x)	employee participation - - - -	[]	[]	[]
xi)	employee motivation/co-operation - -	[]	[]	[]
xii)	unions - - - -	[]	[]	[]
xiii)	training - - - -	[]	[]	[]
xiv)	company wide realisation of importance -	[]	[]	[]
xv)	acceptance of change - - - -	[]	[]	[]
xvi)	communication - - - -	[]	[]	[]
xvii)	resources (ie time, money, materials, etc) -	[]	[]	[]
xviii)	suppliers - - - -	[]	[]	[]
xix)	customers - - - -	[]	[]	[]

Please elaborate on points you feel are important :

Would implementation of a Quality System like NZS/ISO 9000 solve any problems in your company? Please explain.

SECTION 2

This last part of the survey is to give me an appreciation of your company's organisation for Quality.

10 Who is/are considered responsible for Quality in your company? (their position)

11 Does your company have a Quality Assurance department? If so, where is it placed in the company structure? (ie to whom does the QA manager report?)

12 What future intentions, if any, does your company have regarding Quality in the short/long term?

13 Have you heard of Total Quality Management (TQM)?

[] No

[] Yes

14 Do you already have an existing TQM programme in place?

[] No

[] Yes

15 If you are considering implementing NZS/ISO 9000, would it be the beginning of a TQM programme for your company?

[] No

[] Yes

- 6 Would you say that your company would improve as a result of NZS/ISO 9000 implementation? Why/why not?

- 7 Would you get help from a consultant in order to implement ISO/NZS 9000?

[] No

[] Yes; On what aspects?

- 18 Is there anything you would like to add about your company, its views, your views, anything that is missing from the survey form, or any comments regarding NZS/ISO 9000 or Quality Improvement in general?

Thank you for the time you have spent filling out this questionnaire.
Your cooperation is appreciated.

Please tick the box below if you would like a summary of my research findings.

[] Yes, please send me a summary of your findings.

APPENDIX 3
TABLES OF RESULTS

The following tables represent the responses received from the survey of the certified and non-certified companies. Each table shows the title which indicates the question asked, the base which gives the number of respondents to that question (of a maximum of 92 for certified companies and 205 for non-certified companies), and the responses and proportion (%) of companies that gave each response. In addition each table shows the total percentage of responses where applicable. A total percentage of responses exceeding 100 indicates that some companies gave more than one answer to that question (ie. a total of 200% indicates that on average each company that responded gave two answers.)

Table 1 Responses received

Response	No. Contacted	No. Responded	Response Rate (%)	Average No. of Employees	Average Years of Operation
Quality Consultants	53	21	39.6	-	-
Companies Certified to ISO 9001	12	10	83.3	144	41
Companies Certified to ISO 9002	159	73	45.9	155	34
Companies Certified to ISO 9003	20	9	45.0	151	28
Non-certified Companies	809	205	25.3	114	34

Table 2 Size of Companies

Base: Certified = 90, Non-Certified = 201

Size (employees)	Certified (%)	Non-Certified (%)
1-20	10.0	38.3
21-50	16.7	29.4
51-100	33.3	11.4
101-500	36.7	17.4
501-2000	3.3	3.5
Total	100.0	100.0

Table 3 Age of Companies

Base: Certified = 85, Non-Certified = 202

Age (years)	Certified (%)	Non-Certified (%)
1-5	5.9	5.4
6-10	5.9	13.4
11-20	28.2	21.3
21-50	43.5	40.6
51-200	16.5	19.3
Total	100.0	100.0

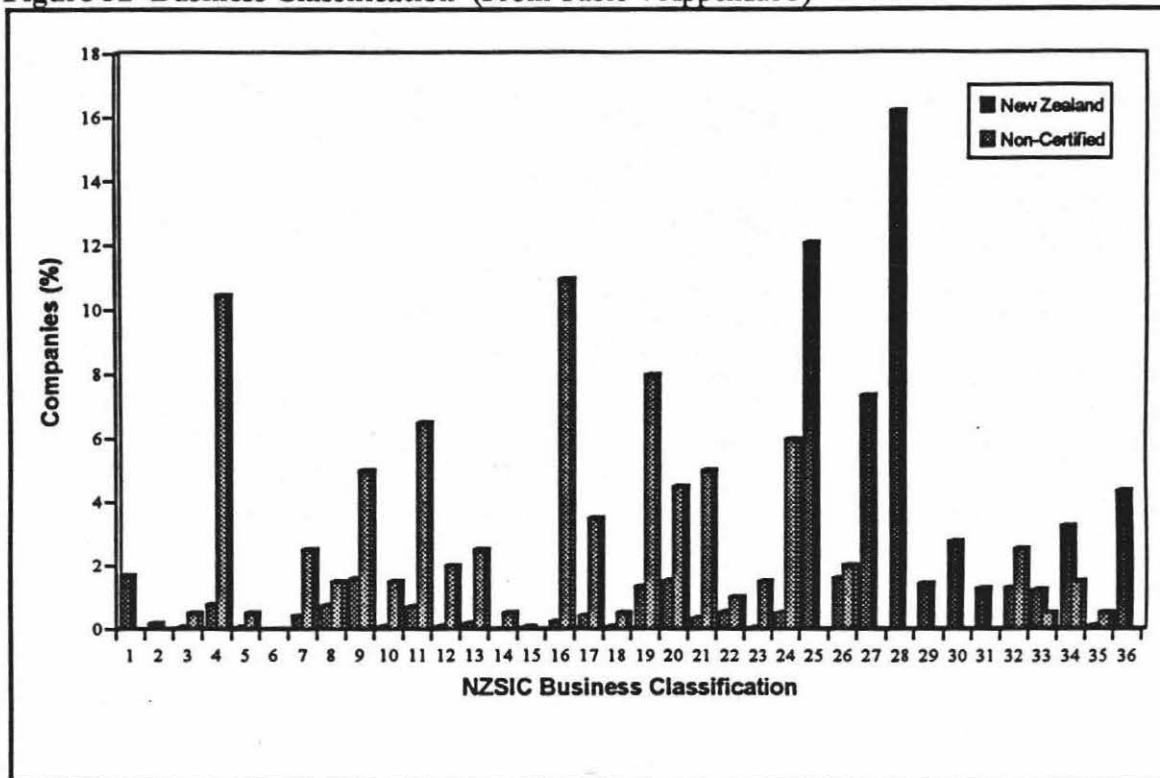
Table 4 Business Classification

Base: Certified = 91, Non-Certified = 201

Ratio = Certified (%) ÷ NZ (%)

NZSIC = New Zealand Standard Industrial Classification [82]

M/S	NZSIC Number	NZSIC Description	NZ (%)	Certified (%)	Non-Certified (%)	Ratio
M/S	112-113	1.Agricultural & hunt/trapping	1.69	1.49	0	
M	3111	2.Slaughter & meat processing	0.17	0.50	0	
M	3112	3.Dairy Products	0.07	3.37	0.50	48
M	3113-3122	4.Other Foods	0.78	5.62	10.45	7
M	313	5.Beverage industries	0.08	2.25	0.50	28
M	314	6.Tobacco	0.00	0.50		
M	321	7.Textiles	0.42	2.25	2.49	5
M	322-324	8.Clothing & leather goods	0.76	1.12	1.49	2
M	33	9.Wood & wood products	1.59	3.37	4.98	2
M	341	10.Paper & paper products	0.09	10.11	1.49	112
M	342	11.Printing & publishing	0.72	1.12	6.47	2
M	351	12.Industrial chemicals	0.10	3.37	1.99	34
M	352	13.Other chemical products	0.19	2.25	2.49	12
M	354	14.Petroleum & coal products	0.02	1.12	0.50	56
M	355	15.Rubber products	0.07	0.50	0	
M	356	16.Plastic products	0.24	7.87	10.95	33
M	36	17.Non-metallic mineral products	0.43	2.25	3.48	5
M	37	18.Basic metal industries	0.10	3.37	0.50	34
M	381	19.Fabricated metal products	1.33	15.73	7.96	12
M	382	20.Machinery	1.53	2.25	4.48	2
M	383	21.Electrical Machinery	0.35	8.99	4.98	26
M	384	22.Transport equipment	0.54	2.25	1.00	4
M	385	23.Professional equipment	0.05	4.49	1.49	90
M	39	24.Other industries	0.50	7.87	5.97	16
M/S	51 & 53	25Buildings & ancillary services	12.09	6.47	0	
M	52	26.Other construction	1.59	2.25	1.99	1
S	61	27.Wholesale trade	7.33	4.48	0	
S	62	28.Retail trade	16.18	1.49	0	
S	7112-7113	29.Road passenger transport	1.41	0.50	0	
S	7114	30.Road freight transport	2.73	1.99	0	
S	7115-7117,719	31.Services to transport	1.26	0.50	0	
M/S	72	32.Communication	1.28	1.12	2.49	1
S	92	33.Sanitary services	1.22	2.25	0.50	2
S	931	34.Education services	3.22	1.12	1.49	0
S	932	35.Research services	0.11	2.25	0.50	21
S	95	36.Personal services	4.35	0.50	0	
		Total	64.59	100.01	100.05	

Figure 32 Business Classification (From Table 4 Appendix 3)**Table 5 Business Type**

Base: Certified = 91, Non-Certified = 201

Response	Certified (%)	Non-Certified (%)
Manufacturing	101.2	103.6
Service	3.3	17.5
Total	104.5	121.1

Table 6 Location

Base: Certified = 91, Non-Certified = 198

Address	Certified (%)	Non-Certified (%)
Auckland	40.6	39.9
Blenheim	1.1	1.0
Christchurch	6.6	11.6
Dannevirke	1.1	1.0
Dunedin		2.0
Fielding	1.1	
Gisborne		2.5
Gore		1.0
Hamilton	8.8	2.5
Hastings	3.3	1.0
Helensville	1.1	
Invercargill	1.1	3.0
Kawerau		0.5
Levin		0.5
Lower Hutt	2.2	
Manai		0.5
Marton		0.5
Masterton		1.0
Morrinsville		0.5
Motueka		0.5
Napier	2.2	0.5
Nelson	2.2	1.0
New Plymouth	2.2	4.0
Otago	1.1	
Palmerston North	2.2	5.1
Porirua	2.2	
Rangiora		0.5
Rotorua	1.1	1.5
Taupo		0.5
Tauranga	2.2	2.0
Temuka	1.1	
Thames		0.5
Timaru	1.1	0.5
Tirau	1.1	
Tokoroa	1.1	
Upper Hutt	1.1	
Wellington	11.0	14.1
Westport	1.1	
Total	100.0	99.7

Table 7 Respondents Title

Base: Certified = 91, Non-Certified = 201

Title	Certified (%)	Non-Certified (%)
Quality Manager	48.4	15.4
GM	15.4	31.8
Director	12.1	32.3
Technical Mgr	12.1	10.9
Manufacturing Mgr	5.5	3.0
CEO	3.3	2.0
Personnel Mgr	2.2	0.5
Purchasing Mgr	1.1	0.0
Other	0.0	4.0
Total	100.1	99.9

Table 8 Have Non-Certified Companies heard of ISO 9000?

Base: Non-Certified = 205

Heard of ISO 9000?	Non-Certified	
	(No.)	(%)
Yes	193	94.1
No	12	5.9
Total	205	100

Table 9 ISO 9000 Certification Status

Base: Certified = 92, Non-Certified = 203

Status	Certified (%)	Non-Certified (%)
Not Certified and no intention of becoming so	-	25.6
Not Certified but intending to	-	24.6
ISO 9001 (Non-Certified : currently preparing for ISO 9001)	10.9	9.4
ISO 9002 (Non-Certified : currently preparing for ISO 9002)	79.3	39.4
ISO 9003 (Non-Certified : currently preparing for ISO 9003)	9.8	1.0
Total	100.0	100.0

Table 10 Time until Certification for Non-Certified Companies Intending to Implement ISO 9000
Base: Non-Certified = 153

Time	Non-certified Companies (%)
0-6 months	25.5
6-12 months	20.9
1-2 years	23.5
2-5 years	5.9
ASAP/Practicable	8.5
Still considering when	9.2
Other	6.5
Total	100.0

Table 11 Reasons for Implementing ISO 9000
Base: Certified = 74, Non-Certified = 141

Motive	Reason	Certified (%)		Non-Certified (%)	
		Sum	Total	Sum	Total
Have to	Competitors doing it	1.2		2.8	
	Customers want it	34.1		22.7	
	Corporate management demand it	8.5	43.8	4.3	29.8
Need to	Need to improve existing systems	13.4		5.7	
	Need market credibility	30.5	43.9	46.1	51.8
Want to	General desire to improve	20.7		19.9	
	Realise the benefits	25.6		41.1	
	Can foresee probable future requirement	8.5	54.8	12.8	73.8
Total		142.5	142.5	155.4	155.4

Table 12 "The Enlightened (Want to) and the Desperate (Have to/Need to)"
Base: Certified = 74

Response	Certified (%)	Non-certified (%)
Desperate	87.7	81.6
Enlightened	54.8	73.8
Total	142.5	155.4

Table 13 Reasons for not Implementing ISO 9000
Base: Non-Certified = 52

Reason	Non-certified (%)
Do not know enough about it	32.7
Cost of implementing it is greater than the benefits to be gained	26.9
No need for it	23.1
Does not apply to us	15.4
The standards will change	1.9
Total	100.0

Table 14 Factors that Help ISO 9000 Implementation

Base: Certified = 89, Non-Certified = 153

Certified		Non-Certified	
Factor	%	Factor	%
Existing systems	53.9	Existing systems	51.0
Culture	44.9	Culture	47.7
Management Commitment	43.8	Management Commitment	23.5
Complexity of Operation	23.6	Market	16.3
Market	19.1	Training	13.1
Management practices	16.9	Complexity of Operation	10.5
Realise benefits	14.6	Realise benefits	8.5
Training	14.6	Management practices	5.9
The Facilitator	11.2	Communication	5.2
Customers	7.9	Customers	3.9
Communication	5.6	Resources	2.0
Resources	4.5	External Assistance	2.0
Responsibility & Authority definition	3.4	Responsibility & Authority definition	1.3
Planning	2.2	The Facilitator	0.7
Total	266.2		191.6

Table 15 Factors that Hinder ISO 9000 Implementation

Base: Certified = 74, Non-Certified = 155

Certified		Non-Certified	
Factor	%	Factor	%
Culture	45.9	Resources	51.0
Training	28.4	Culture	23.2
Resources	25.7	Training	21.3
Management Commitment	21.6	Complexity of Operation	20.0
The Facilitator	16.2	Existing systems	15.5
Complexity of Operation	13.5	Management Commitment	11.0
Business Barriers	9.5	Magnitude	10.3
Responsibility & Authority definition	8.1	The Facilitator	7.7
Communication	8.1	Communication	7.1
Magnitude	8.1	Customer	6.5
Existing systems	8.1	Business Barriers	5.2
Suppliers	2.7	Responsibility & Authority definition	4.5
Customers	1.4	Market	2.6
Scope	1.4	Inertia	1.9
-	-	Scope	0.6
-	-	Commitment	0.6
-	-	Perception of the benefits	0.6
-	-	Planning	0.6
-	-	Advice	0.6
-	-	Ethnic	0.6
Total	198.7		191.4

Table 16 Factors Ranked in Order of Perceived Affect on ISO 9000 Implementation
 Base: Certified = 88, Non-Certified = 183

Certified		Non-Certified	
Factor	Mean	Factor	Mean
Understanding how ISO 9000 relates to TQM	19.8	Resources	-13.0
Unions	20.2	Unions	26
Suppliers	33.0	Understanding how ISO 9000 relates to TQM	31.8
Interpretation of the standards	59.1	Interpretation of the standards	54.2
Resources	78.6	Supplier	67.8
Employees acceptance of change	83.4	Employees acceptance of change	69.6
Corp experience with ISO 9000 implementation	104.6	Corp experience with ISO 9000 implementation	77.4
Communication	114.7	Responsibility/Authority definition	94.0
Company culture	115.8	Training	95.0
Perception of the benefits	129.3	Employee motivation and co-operation	99.4
Responsibility/Authority definition	136.5	Communication	101.2
Training	136.8	Company culture	107.0
Employee motivation and co-operation	138.9	Perception of the benefits	107.8
Customer	141.7	Customer	108.8
Company-wide awareness of importance	144.6	Employee participation	109.2
Employee participation	156.8	Company-wide awareness of importance	115.8
Corporate philosophy	158.8	Senior management commitment	153.8
Quality policy	167.9	Quality policy	154.4
Senior Management commitment	201.3	Corporate philosophy	157.2

Table 17 Did Implementation of ISO 9000 Conflict with other Activities on-site?
 Base: Certified = 76

Conflict?	Certified (%)
Yes	9.2
No	90.8
Total	100.0

Table 18 Ranking Elements of ISO 9000 for ease of implementation

Base: Certified = 77 maximum

Applicable Standards			Base	Element	Rank Value
9001	9002	9003			
✓			4	Design control	400
✓	✓	✓	74	Quality system	334
✓	✓	✓	73	Documentation control	304
✓	✓		67	Internal quality audits	290
✓	✓		66	Corrective action	267
✓	✓	✓	75	Training	264
✓	✓		64	Contract review	261
✓	✓	✓	73	Statistical techniques	252
✓	✓		65	Purchasing	246
✓	✓	✓	76	Inspection, measuring and test equipment	245
✓	✓	✓	76	Control of nonconforming product	230
✓	✓		65	Process control	219
✓	✓	✓	77	Product identification and traceability	197
✓	✓		56	Purchaser supplied product	195
✓	✓	✓	75	Inspection and test status	187
✓	✓	✓	75	Management responsibility	187
✓	✓	✓	75	Inspection and testing	185
✓			4	Servicing	175
✓	✓	✓	75	Quality records	169
✓	✓	✓	75	Handling, storage, packaging and delivery	137

Table 19 Benefits from Certification to ISO 9000

Base: Certified = 81, Non-Certified = 166

Certified Companies (Realised)	(%)	Non-Certified (Expected)	(%)
Market related	80.2	Market related	86.1
Enhance Quality system	37.0	Enhance Quality system	24.1
Reduce costs	34.6	Reduce costs	39.8
Formalised procedures	24.7	Formalise procedures	22.3
Employee benefits	23.5	Employee benefits	18.1
Continuous Improvement & TQM	12.3	Continuous Improvement & TQM	4.2
Training	9.9	Training	3.0
Communication	7.4	Communication	1.2
Improve product Quality	6.2	Improve product Quality	9.6
Responsibility and Authority definition	6.2	Responsibility and Authority definition	2.4
Technology	1.2		
Resources	1.2	Resources	0.6
Total	244.4		211.4

Table 20 Benefits Gained During the Implementation Process
 Base: Certified = 75

Response	Certified (%)
Enhance Existing Systems	56.0
Formalise Procedures	32.0
Employee	30.7
Communication/Teamwork	17.3
Reduce Costs	13.3
Responsibility/Authority	9.3
Market Related	8.0
Training	6.7
Total	173.3

Table 21 Future Benefits Expected from ISO 9000
 Base: Certified = 74

Response	Certified (%)
Market	62.2
Continuous Improvement and TQM	31.1
Reduce Costs	18.9
Management Practices	4.1
Auditing	4.1
Employee	4.1
Total	124.5

Table 22 Problems Solved as a Result of Implementation/Certification to ISO 9000
 Base: Certified = 72, Non-Certified = 122

Response	Certified (%)	Non-Certified (%)
Formalise Procedures	51.4	43.4
Enhance Existing Systems	41.7	29.5
Culture	22.2	18.0
Quality Costs	20.8	20.5
Market	19.4	18.0
Communication	13.9	13.9
Responsibility/Authority	13.9	14.8
Training	9.7	7.4
Customer Focus	9.7	-
Improve quality	-	9.0
Supplier	-	1.6
Reduce Liability	-	0.8
Top Management	-	0.8
Total	202.7	177.7

Table 23 Causes of Quality Related Problems Remaining After Certification
 Base: Certified = 58

Response	Certified (%)
Training	29.3
Operating System	27.5
External Influences	15.5
Culture	13.8
Resources	6.9
Technology	5.2
Communication	5.2
Business Barriers	5.2
Not all Sites Certified	1.7
Not Applicable - Continuous Improvement	22.4
Total	132.7

Table 24 Did Implementation of ISO 9000 Improve the Quality of their Product or Service?

Base: Certified = 76

Response	Certified (%)
No	1.3
Yes, a little	27.6
Yes, quite a bit	42.1
Yes, significantly	28.9
Total	99.9

Table 25 Did ISO 9000 Implementation Actually Improve the Company?

Base: Certified = 78, Non-Certified = 183

Response	Certified (%)	Non-Certified (%)
Yes	82.1	89.4
No	17.9	7.3
Unsure	-	3.3
Total	100.0	100.0

Table 26 Did the Certification Agency Help?

Base: Certified = 77

Response	Certified (%)
Yes	71.4
No	28.6
Total	100.0

Table 27 Behaviour of the Certification Agency
Base: Certified = 77

Response	Certified (%)
Very helpful and supportive	54.5
Helpful	29.9
Not very helpful	9.1
Critical and unhelpful - "policeman-like"	0.0
Other	6.5
Total	100.0

Table 28 Do they have a Quality Assurance Department?
Base: Certified = 91, Non-Certified = 185

Response	Certified (%)	Non-Certified (%)
No	27.5	68.1
Yes	72.5	31.9
Total	100.0	100.0

Table 29 To whom does the "Quality Assurance Manager" Report?
Base: Certified = 91, Non-Certified = 185

Response	Certified (%)	Non-Certified (%)
General Manager/Managing Director/CEO	66.2	64.5
Technical Manager	21.1	28.9
Manufacturing/Production Manager	9.8	5.2
Personnel Manager	2.8	-
Other	-	1.3
Total	99.9	99.9

Table 30 Who was responsible for Quality?
Base: Certified = 92, Non-Certified = 198

Response	Certified (%)	Non-Certified (%)
Everyone	48.9	40.4
Quality Manager	26.1	15.2
General Manager/Managing Director/CEO	21.7	35.4
Technical/Operations Manager	8.7	7.1
Departmental Managers	5.4	8.1
Manufacturing Manager	2.2	6.1
Foremen/Supervisors	-	3.5
Others	-	9.6
Total	113	125.4

Table 31 Help from a Consultant?

Base: Certified = 80, Non-Certified = 183

Response	Certified (%)	Non-Certified (%)
Yes	37.5	63.4
No	62.5	31.1
Not sure	-	5.5
Total	100.0	100.0

Table 32 Who wrote the Procedures?

Base: Certified = 82

Response	Certified (%)
All Staff	53.8
Management	37.5
Consultant	11.3
Total	102.6

Table 33 Who Wrote the Procedures versus the Number of Employees (Size)

Base: Certified = 75 (multiple response)

Each Cell: No. of companies responded (top)

 χ^2 contribution (bottom)

Who Wrote the Procedures?	All Staff	No. of Employees (Size)					Total
		1-20	21-50	51-100	101-500	501-2000	
Who Wrote the Procedures?	All Staff	4 0.11	5 1.04	14 0.06	18 0.19	2 0.86	43
	Management	2 0.51	7 0.42	11 0.38	10 0.16	0 0.73	30
	Consultant	3 4.10	3 1.11	0 2.74	3 0.05	0 0.22	9
		Total	9	15	25	31	82

Table 34 Have they heard of Total Quality Management?

Base: Non-Certified = 198

Response	Non-certified (%)
Yes	92.9
No	7.1
Total	100.0

Table 35 Do they currently follow Total Quality Management Philosophies?
 Base: Certified = 86, Non-Certified = 192

Response	Certified (%)	Non-certified (%)
Yes	77.9	20.8
No	22.1	79.2
Total	100.0	100.0

Table 36 Is Certification the beginning of Total Quality Management?
 Base: Certified = 86, Non-Certified = 172

Response	Certified (%)	Non-certified (%)
Yes	51.2	62.8
No, certification is part of our TQM philosophy	26.7	24.8
No	22.1	12.4
Total	100.0	100.0

Table 37 Future Intentions Regarding Quality
 Base: Certified = 90, Non-Certified = 176

Response	Certified (%)	Non-Certified (%)
Continuous Improvement following Certification	47.8	31.8
Modify the Quality System once Certified	18.9	6.8
Expand ISO 9000 to other areas of the Company	18.9	2.3
TQM	15.6	15.9
Maintain the ISO 9000 Quality System	13.3	6.3
Miscellaneous	4.4	3.4
Customer/Supplier	3.3	1.1
Employee Involvement	1.1	4.5
NONE/unsure	4.4	1.7
Not to become certified but to maintain current system	-	6.8
Training	-	1.7
Certification	-	42.6
Total	127.7	124.9

Table 38 Advice to a Company Considering Certification to ISO 9000
 Base: Certified = 81

Advice	Certified (%)
Planning	37.0
Employee involvement	34.6
Talk to certified companies	22.2
Go for it!	22.2
Top management commitment	17.3
Resources available	14.8
The Facilitator	14.8
Do use Quality Consultants	14.8
Do <u>not</u> use Quality Consultants	8.6
Certification Agency	8.6
Keep it Simple	8.6
Existing systems	7.4
Total	210.9

Table 39 Follow-up Survey Intentions with Regards to ISO 9000
 Base: Non-Certified = 70, Total = 81 (Sent 115 questionnaires = 70.4% response rate)

Status	Non-Certified (%)
Not heard of ISO 9000	11.0
ISO 9001 (Non-Certified : currently preparing for ISO 9001)	10.1
ISO 9002 (Non-Certified : currently preparing for ISO 9002)	25.7
ISO 9003 (Non-Certified : currently preparing for ISO 9003)	4.3
Not Certified but seriously considering implementing ISO 9000	27.5
Not Certified and no intention of becoming so	30.4
Other ("don't know enough about it")	2.9
Total	99.8