

## CHAPTER 5

### 5. CONCLUSION & DISCUSSION

#### 5.1 Constraints in implementation of ISO 9000 elements

In this research the following seven elements were identified as the most difficult ones and they are actually inter-related to each other

- (1) Corrective and preventive actions
- (2) Design control
- (3) Management responsibility
- (4) Statistical techniques
- (5) Process control
- (6) Document and data control
- (7) Quality system



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It appears that when the management encountered difficulties in fulfilling their responsibility, such as establishing and maintaining an effective documented quality system, and control of nonconforming products, three consequences occur:

- (1) Failure in fulfillment of quality system requirements.
- (2) Failure in identifying quality records and developing procedures to control documentation within the company: both are essential elements of documentation and data control.
- (3) Failure to ensure the conformity of products: as management fails to control the conformity of products, this directly affects the adherence of requirements stipulated by corrective and preventive actions. This difficulty in corrective and

preventive actions is also, in part, caused by failures in fulfilling the design control requirements.

The above three consequences eventually disturbed the implementation of process control. In addition, the low knowledge of shop-floor workers in statistical tools and techniques not only made the fulfillment of statistical techniques requirements difficult; it also affects the corrective and preventive actions.

## **5.2 The links between Causes of obtain the ISO 9000 Certification with Constraints in implementation of the ISO 9000 elements**

The result in Table II clearly indicates that the companies obtain certification for developmental causes experienced a lesser difficulty in satisfying the elements of ISO 9000 as compared to the companies obtain certification for mixed and non-development causes. When associating the companies obtain developmental causes with mixed causes, it seems that the companies obtain certification for developmental causes established a better state of understanding with customers' requirements. In addition, the companies obtain certification for developmental causes have been able to meet the requirements in the contract adequately. The significance of means difference for management responsibility has suggested the existence of active involvement by top management in ISO implementation. Their involvement is most likely to be in the form of:

- Consistent review and its documentation
- Performing assigned responsibility adequately
- Verification of resources and personnel

For corrective and preventive actions, the companies obtain certification for developmental causes have again exhibited better ability in fulfilling them. Note that the mean scores for both companies obtain certification for developmental and mixed causes were quite high in this element, indicating the difficulty of fulfilling it. Although other elements did not exhibit any significant differences, mean scores for the companies obtain certification for developmental causes are lower than for the companies obtain certification for mixed causes (except for document and data control, control of customer-supplied product, inspection and test status, and servicing).

The result for the pair DC-NC indicates much more persuasive evidence than that for pair DC-MC, as only one element has a positive mean difference (inspection and test status). At this point we can claim that the firms, which are determined to improve their internal efficiencies, would execute the ISO 9000 exercise more seriously.

Statistical outcomes for the pair MC-NC imply that the companies obtain certification for mixed and non-developmental causes are both statistically identical in perceived difficulty. It appears that although the companies searching mixed causes intend to improve efficiencies and capture greater market share, they tend to lean toward the latter purpose. As a result, the approach or action taken by the companies obtain certification for mixed and non-development causes would not differ much. Consequently, their perception on constraints in implementing the twenty ISO elements should also be similar, if not the same.

The reason why the companies search mixed and non-development causes perceived greater difficulty is, may be, due to lack of management support and involvement, which has been confirmed here as both the companies obtain certification non-development causes and mixed causes have greater difficulty than the companies searching development reasons. Without this essential element to support ISO 9000, implementation would generally lead to an unsatisfactory result.

### **5.3 The link between Foreign Market Share with Constraints in implementation of the ISO 9000 elements**

The result documented in Table III suggests that foreign market companies are concerned more with establishing good understanding and communication with their customers (including foreign customers). In addition, momentous focus has been placed by foreign market companies in achieving higher degree of conformance to specifications. This is reflected in significant difference in inspection and testing, and control of non-conforming product.

In addition, significant difference is evident for handling, storage, packaging, preservation and delivery, to ensure absence of damage and degrading in the products. The plausible reason for foreign market companies outperforming Sri Lankan market companies may be attributed to the demanding foreign customers. Due to more demanding market conditions in foreign countries, foreign market companies have to perform well to capture and maintain their market share. As a result, due concern is

demanding market conditions in foreign countries, foreign market companies have to perform well to capture and maintain their market share. As a result, due concern is placed on issues such as conformance to specifications, understanding customers' needs and wants, the appropriate product handling and training needed to attain better performance, even before the implementation of ISO 9000. Hence, when these foreign market companies embarked on the process of obtaining ISO certification, it became much easier.

Although foreign market companies outperformed Sri Lankan market companies in these particular areas, this did not imply that foreign market companies performed better than Sri Lankan market companies in every single aspect of organizational performance.

#### **5.4 The link between Company's ownership with Constraints in implementation of the ISO 9000 elements**



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The overall result in Table IV is as expected at the outset of this research. With active participation from foreign partners, a company is better performed than those Sri Lankan-owned companies in two aspects. First, foreign-owned companies tend to be equipped with more advanced equipment and machinery that are brought in by overseas shareholders. Second, the employees in foreign owned companies have a bigger chance of being exposed to current management and operational approaches and practices. With these two competitive edges, foreign-owned companies would face lesser difficulties if they were to adopt a quality assurance system.

## 5.5 Advantages of the implementation of the ISO 9000

For internal advantages, a high mean score of better documentation should not be surprising as "documentation" has been identified as one of the core concepts of ISO 9000. Implementing of ISO 9000 has helped to establish a complete and well-organized file of control procedures. Specifically, ISO requires management to identify quality records and develop procedures to control quality documentation within the organization. Prior to establishment of proper documentation of quality records, the empirical quality data need to be solicited. To do so, a measurement system responsible for raw data collection is required. In other words, in the process of practicing ISO requirements, both the measurement system and documentation system are the first two areas that need to be dealt with. As a result, the measurement system also experiences some degree of improvement along with documentation, which is shown in the mean score of improved measurement system. Higher quality awareness may also be possible when the whole organization starts to engage in various quality tasks.

It is widely accepted that when an organization is registered as an ISO organization, it has proved that it has attained the minimum requirements of a quality management system. These minimum characteristics are quality practices in areas such as management responsibility, documentation, and the other 18 elements of ISO 9000. By demonstrating these desirable practices and behaviours, an organization will eventually improve. Consequently, customer satisfaction improves, and this is evidenced in the high score of improved customer satisfaction.

ISO certification can be viewed as an internationally recognized contractual agreement in

performing certain minimum characteristics of a quality management system. It is because of this high recognition given by the international community; the perceived quality of an organization significantly increases when it registers itself as an ISO compliant organization. This is demonstrated through the high score of higher perceived quality value. The argument mentioned above is also applicable for good competitive tool.

In addition, ISO 9000 itself is a ticket to the foreign market, as the foreign community strongly advocates the implementation of ISO 9000.

#### **5.6 The links between Causes of obtain the ISO 9000 Certification with Advantages of the implementation of the ISO 9000**

The findings of significant difference in the companies obtain certification for developmental and mixed causes, and no significant difference between the companies implementing certification for mixed and no-developmental causes, are suggesting that internally driven companies achieved greater beneficial outcomes from implementation of the ISO quality assurance system.

It could be argued that the adoption of quality efforts by companies obtain certification for developmental causes is usually initiated by top management. With top management support in the process of preparation and implementation of ISO 9000, employees' quality awareness will improve. Furthermore, proactive implementation of ISO 9000 tends to stimulate greater inter departmental involvement and collaboration. This is reflected in the statistical difference of higher quality awareness and improved

departmental cooperation between the companies. obtained certification for developmental and non-developmental causes.

In addition, reduced scrap and increased preventive action have also indicated a mild degree of statistical difference. The absence of significant difference for improved measurement system and better documentation across the companies obtaining certification for developmental causes, mixed causes, and no-developmental causes, may be partly explained by the hallmark of ISO 9000 itself. As ISO 9000 places significant weight on documentation and on measurement and quantification of processes, all applicants for ISO certification need to fulfill all the requirements regardless of the motives for obtaining certification.

## **5.7 CONCLUSION**



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This research has concentrated on the constraints in implementation of twenty ISO 9000 elements.

The empirical result has revealed that the seven most difficult elements are:

- (1) Corrective and preventive actions
- (2) Design control
- (3) Management responsibility
- (4) Statistical techniques
- (5) Process control
- (6) Document and data control
- (7) Quality system



Apparently, all these elements are closely related to an organization's quality system. It seems that an inefficient quality system significantly affects the implementation of ISO 9000 elements. On the other hand, the three elements that are easy to implement are more related to operational procedures.

- (1) Inspection and test status
- (2) Packaging, preservation and delivery
- (3) Inspection and testing

This suggests that before implementation of ISO 9000 elements, a proper quality management system must first be established.

The result for foreign market companies and type of ownership of company implies that both these factors act as the driving force for obtain ISO certification. They also enhance a company's ability to perform in accordance with ISO 9000 series of standards requirements. The companies that deal with the foreign markets are most likely motivated or forced by the market to obtain ISO certification. The companies that are controlled by foreign partners (parent company) may obtain certification to satisfy the requirements of the parent company. As such, resources in term of management and technical support would flow in to facilitate the implementation of ISO 9000.

At this point, it is clear these four critical factors significantly influence ISO 9000 implementation: strong internal drive to improve, market shares in foreign countries, company's ownership, and quality management system.

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## APPENDIX 1

### Test results for Causes of obtain the ISO 9000 Certification with Constraints in implementation of ISO 9000 elements

No:	ISO 9001 clause	Mean score for the companies searching			
		Development causes	Non development causes	Mixed causes	Mean
1.	Corrective and preventive action	2.90	3.12	3.18	3.04
2.	Design control	2.81	2.9	2.85	2.85
3.	Management responsibility	2.46	2.77	2.76	2.67
4.	Process control	2.54	2.84	2.61	2.66
5.	Statistical techniques	2.58	2.6	2.74	2.66
6.	Document and data control	2.69	2.7	2.62	2.65
7.	Quality system	2.61	2.69	2.67	2.64
8.	Control of nonconforming products	2.44	2.67	2.61	2.56
9.	Training	2.44	2.7	2.54	2.55
10.	Internal quality audits	2.40	2.65	2.59	2.52
11.	Control of customer supplied products	2.45	2.52	2.29	2.44
12.	Contract review	2.32	2.41	2.63	2.42
13.	Servicing	2.36	2.53	2.30	2.39
14.	Purchasing	2.28	2.52	2.30	2.38
15.	Product identification and traceability	2.25	2.44	2.45	2.37
16.	Control of inspection measuring and test equipment	2.34	2.4	2.36	2.36
17.	Control of quality records	2.26	2.45	2.33	2.35
18.	Inspection and testing	2.23	2.39	2.35	2.32
19.	Handling, storage, packaging, preservation and delivery	2.23	2.33	2.35	2.29
20.	Inspection and test status	2.24	2.24	2.16	2.22

Table VI

**Test results for Foreign Market Share with Constraints in implementation of ISO 9000 elements**

No:	ISO 9001 clause	Less than 5% to foreign market (SLM)		More than or equal 5% to foreign market (FM)	
		Mean	Std Dev	Mean	Std Dev
1.	Management responsibility	2.76	1.18	2.60	1.25
2.	Quality system	2.72	1.01	2.55	1.20
3.	Contract review	2.59	1.04	2.19	1.10
4.	Design control	2.78	1.12	2.95	1.25
5.	Document and data control	2.66	1.09	2.59	1.18
6.	Purchasing	2.43	0.99	2.30	1.12
7.	Control of customer supplied products	2.46	1.07	2.37	1.17
8.	Product identification and traceability	2.45	1.06	2.30	1.13
9.	Process control	2.69	1.07	2.64	1.09
10.	Inspection and testing	2.44	1.10	2.13	1.02
11.	Control of inspection measuring and test equipment	2.40	1.03	2.33	1.12
12.	Inspection and test status	2.29	1.01	2.15	1.18
13.	Control of nonconforming products	2.72	1.02	2.42	1.13
14.	Corrective and preventive action	2.31	1.07	2.97	1.17
15.	Handling, storage, packaging, preservation and delivery	2.37	0.95	2.12	1.02
16.	Control of quality records	2.4	1.17	2.32	1.18
17.	Internal quality audits	2.63	1.08	2.41	1.16
18.	Training	2.69	1.02	2.40	1.16
19.	Servicing	2.46	0.93	2.24	0.98
20.	Statistical techniques	2.74	1.08	2.57	1.04

**Table VII**




**Test results for company's ownership with Constraints in implementation of ISO 9000 elements**

No:	ISO 9001 clause	Less than 50% Sri Lankan owned companies (FO)		More than 50%, Sri Lankan owned companies (SLO)	
		Mean	Std Dev	Mean	Std Dev
1.	Management responsibility	2.58	1.27	2.72	1.15
2.	Quality system	2.58	1.17	2.68	1.02
3.	Contract review	2.43	1.17	2.43	0.97
4.	Design control	2.93	1.17	2.79	1.18
5.	Document and data control	2.73	1.23	2.65	1.05
6.	Purchasing	2.41	1.07	2.36	1.00
7.	Control of customer supplied products	2.34	1.09	2.51	1.09
8.	Product identification and traceability	2.33	1.15	2.40	1.05
9.	Process control	2.63	1.16	2.65	1.04
10.	Inspection and testing	2.28	1.13	2.36	1.01
11.	Control of inspection measuring and test equipment	2.40	1.16	2.33	0.98
12.	Inspection and test status	2.15	1.15	2.27	0.96
13.	Control of nonconforming products	2.48	1.13	2.62	0.99
14.	Corrective and preventive action	2.97	1.18	3.10	1.07
15.	Handling, storage, packaging, preservation and delivery	2.24	1.01	2.33	0.99
16.	Control of quality records	2.30	1.19	2.38	1.12
17.	Internal quality audits	2.34	1.15	2.66	1.03
18.	Training	2.41	1.18	2.65	1.00
19.	Servicing	2.16	0.95	2.49	0.97
20.	Statistical techniques	2.45	1.09	2.78	1.07

**Table VIII**

**Test results for Causes of obtain the ISO 9000 Certification with Advantages of the implementation of ISO 9000**

<b>Internal advantages of ISO 9000</b>	<b>Developmental causes</b>	<b>Non-developmental causes</b>	<b>Mixed causes</b>	<b>Mean</b>
Better documentation	4.47	4.37	4.49	4.44
Higher quality awareness	4.43	4.21	4.07	4.23
Improved measurement system	4.15	4.09	4.11	4.11
Increase preventive action	4.11	3.91	4.08	4.03
Improved departmental cooperation	4.13	3.92	4.04	4.03
Positive cultural change	3.88	3.83	3.89	3.87
Enhance inter company communication	3.94	3.79	3.9	3.87
Reduced scrap	3.92	3.69	3.82	3.81
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<b>External advantages of ISO 9000</b>	<b>Developmental causes</b>	<b>Non-developmental causes</b>	<b>Mixed causes</b>	<b>Mean</b>
Improved customer satisfaction	4.47	4.34	4.40	4.40
Higher perceived quality	4.30	4.26	4.19	4.25
Good competitive tool	4.26	4.20	4.34	4.25
Publicity for the company	3.89	3.98	3.86	3.91
Increased market share	3.80	3.76	3.79	3.78
Priority in the market	3.55	3.44	3.38	3.45
Reduced quality audits	3.00	3.00	3.06	3.02

**Table IX**

## APENDIX II

### QUESTIONNAIRE

A QUESTIONNAIRE TO IDENTIFY THE CONSTRAINTS IN IMPLEMENTATION OF ISO 9000 QUALITY MANAGEMENT SYSTEM ELEMENTS IN SRI LANKAN INDUSTRIES AND THEIR CAUSES.

#### General Section

1. Indicate the correct category below, regarding your company ISO 9000 certification status.

(1) ISO 9000 certified company

(2) Non ISO 9000 certified company

2. What is the main manufacturing product of your company?



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3. Indicate the correct category below, that the percentage of sales to the foreign market of your product.

(1) Less than 5% to the foreign market

(2) More than or equal 5% to the foreign market

4. Indicate the correct category below, that the percentage of local ownership of your company .

(1) Less than 50% Sri Lankan owned company

(2) More than or equal 50% Sri Lankan owned company

#### Quality section

1. Indicate the correct cage(s) below, that the actual causes for obtaining ISO 9000 certification of your company



(1) Developmental causes

- Desire to improve the company's internal processes
- Desire to enhance the overall competitive performance of the company.

(2) Non-developmental causes.

- Requirement of major customers
- Survive in the future tendering processes or markets
- Realization that it is progressively becoming a requirement of doing business
- Marketing and public relations tool

2. Fill the cages below, using the scale of 5-1, with

5 = strongly agree

1 = strongly disagree

according to the level that your company has beneficial outcomes, either internally or externally

(1) Internal advantages of ISO 9000

- 1. Better documentation
- 2. Higher quality awareness
- 3. Improved measurement system
- 4. Increase preventive action
- 5. Improved departmental cooperation
- 6. Positive cultural change
- 7. Enhance inter company communication
- 8. Reduced scrap

(2) External advantages of ISO 9000

- 1. Improved customer satisfaction
- 2. Higher perceived quality
- 3. Good competitive tool
- 4. Publicity for the company
- 5. Increased market share
- 6. Priority in the market
- 7. Reduced quality audits


3. Fill the cages below, using the scale of 5-1, where

5 = very difficulty to accomplish

1 = very easy to accomplish, and

X = not applicable

according to your company perceived level of difficulty in satisfying the 20 elements of ISO 9001

- 1. Design control  University of Moratuwa, Sri Lanka  
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- 2. Management responsibility
- 3. Process control
- 4. Statistical techniques
- 5. Document and data control
- 6. Quality system
- 7. Control of nonconforming products
- 8. Training

9. Internal quality audits

10. Control of customer supplied products

11. Contract review

12. Servicing

13. Purchasing

14. Product identification and traceability

15. Control of inspection, measuring and test equipment

16. Control of quality records



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17. Inspection and testing

18. Handling, storage, packaging, preservation and delivery

19. Inspection and test status

20. Corrective and preventive action

## APPENDX C

### Correspondence between ISO 9001:1994 and ISO 9001:2000

ISO 9001:1994 clause	ISO 9001:2000 clause
1 Scope	1
2 Normative reference	2
3 Definitions	3
4 Quality system requirements [title only]	
4.1 Management responsibility [title only]	
4.1.1 Quality policy	5.1 + 5.3 + 5.4.1
4.1.2 Organization [title only]	
4.1.2.1 Responsibility and authority	5.5.1
4.1.2.2 Resources	6.1 + 6.2.1
4.1.2.3 Management representative	5.5.2
4.1.3 Management review	5.6.1 + 8.5.1
4.2 Quality system [title only]	
4.2.1 General	4.1 + 4.2.2
4.2.2 Quality system procedures	4.2.1
4.2.3 Quality planning	5.4.2 + 7.1
4.3 Contract review(title only)	
4.3.1 General	
4.3.2 Review	5.2 + 7.2.1 + 7.2.2 + 7.2.3
4.3.3 Amendment to a contract	7.2.2
4.3.4 Records	7.2.2
4.4 Design control (title only)	
4.4.1 General	
4.4.2 Design and development planning	7.3.1
4.4.3 Organizational and technical interfaces	7.3.1
4.4.4 Design inputs	7.2.1+ 7.3.2
4.4.5 Design outputs	7.3.3
4.4.6 Design review	7.3.4
4.4.7 Design verification	7.3.5
4.4.8 Design validation	7.3.6
4.4.9 Design changes	7.3.7
4.5 Documents and data control (title only)	
4.5.1 General	4.2.3
4.5.2 Document and data approval and issue	4.2.3
4.5.3 Document and data changes	4.2.3
4.6 Purchasing (title only)	
4.6.1 General	
4.6.2 Evaluation of sub contractors	7.4.1
4.6.3 Purchasing data	7.4.2
4.6.4 Verification of Purchased product	7.4.3