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CRITICAL SUCCESS FACTORS AND IMPROVEMENTS IN ISO 9000 MAINTENANCE

Roslina Ab Wahid
Universiti Teknologi MARA, Shah Alam, Malaysia

James Corner
University of Waikato, New Zealand and
Research Fellow, Bordeaux Management School, France

Abstract

The purpose of the ISO 9000 standards is to facilitate the multinational exchange of products and services by providing a clear set of quality systems requirements. It is also to assist organizations of all sectors and sizes to implement and operate an effective quality management system (QMS). The generic nature of the standards allows interested companies to determine the specifics of how the standards apply to its organization. Registration or certification to the standards demonstrates to customers that the supplying organization has achieved a basic level of quality assurance by the formalization and documentation of its quality management system. However, there is a lacking in the literature on the post-certification period as most of the published work focuses on how to obtain certification and the impact of certification on ISO 9000-certified companies. Thus, studies do not generally address what happens after the companies have obtained their certification. *Keywords: ISO 9000 maintenance, quality systems, quality management systems*

Introduction

The purpose of the ISO 9000 standards is to facilitate the multinational exchange of products and services by providing a clear set of quality systems requirements. It is also to assist organizations of all sectors and sizes to implement and operate an effective quality management system (QMS). The generic nature of the standards allows interested companies to determine the specifics of how the standards apply to its organization. Registration or certification to the standards demonstrates to customers that the supplying organization has achieved a basic level of quality assurance by the formalization and documentation of its quality management system (Beattie & Sohal, 1999). The ISO 9001:2000 follows a plan-do-check-act cycle to align and enhance the compatibility of ISO 9001:2000 with ISO14001:1996 which also follows a process-based approach (Yahya and Goh, 2001).

Generally, the implementation of ISO 9000 QMS can be divided into five stages; planning (plan), documentation (do), verification and validation (check), deployment (act) and continuous improvement (Nanda, 2005). The continuous improvement stage is actually a phase where maintenance of the quality system ISO 9001:2000 is carried out. This phase is important if the organization wants to continuously improve and reap the long term benefits of having a quality management system in place. Continuous maintenance of the ISO 9000 is essential to satisfy the

surveillance visits by registrars, and to monitor and improve the quality system (Chin et al., (2000). However, there is a lacking in the literature on the post-certification period as most of the published work focuses on how to obtain certification and the impact of certification on ISO 9000-certified companies. Thus, studies do not generally address what happens after the companies have obtained their certification. This paper identifies the critical success factors of ISO 9000 maintenance in a service company. It also highlights the changes and improvements experienced by the company as a result of maintaining the quality system.

Literature review

For the past 15 years, there has been a growing body of literature relating to ISO 9000 quality management system. This includes studies which have been conducted on the implementation of ISO 9000 in small, medium, and large size companies both in the manufacturing (Bhuiyan and Alam, 2005; Lipovatz et al., 1999; Beattie and Sohal, 1999) and service sectors (Poksinska et al., 2006; Karim et al., 2005; Efstratiadis et al., 2000; Sarkar, 1998; Mo and Chan, 1997; Carlsson and Carlsson, 1996; Motwani et al., 1996). Also, comparative studies have been done on ISO 9000 standards on manufacturing and service organizations in terms of levels of resources required, motivations for implementation, difficulties faced, benefits gained and management practices applied in the implementation of the ISO 9000 standard (Singh et al., 2006) and within the same industries but different countries (Ahmed et al., 2005). Aspects of implementation such as the critical success factors (Low and Omar, 1997; Li and Gurnani, 1997; Cheng and Tummala, 1998; Chin et al., 2000) for and barriers (Quasi et al., 2002; Srinidhi, 1998; Samson, 1997) to the implementation and certification have also been well researched and published.

Likewise, numerous studies have been done on the reasons for obtaining ISO 9000 certification (Singh and Mansour-Nahra, 2006; Awan and Bhatti, 2003; Santos and Escanciano, 2002; Van de Wiele et al., 2001; Fuentes et al., 2000; Van der Wiele and Brown, 1997), the impact of improvements generated (Calisir et al., 2005), and the benefits of ISO 9000 on companies (Singh and Mansour-Nahra, 2006; Bursacca and Lunghi, 2003; Casadesus et al., 2001; Yahya and Goh, 2001; Casadesus and Gimenez, 2000). Also studied were the business value of ISO certification and its impact on the companies' business performance (Costa and Lorente, 2007; Saizarbitoria et al., 2006; Terziovski et al., 1997) and the degree of small companies' dissatisfaction with ISO 9000 certification (Rodriguez-Escobar et al., 2006). However, not much literature is found on the maintenance of ISO 9000 quality management system and the post-certification period apart from a few studies that have been carried out on the critical maintenance issues of the ISO 9000 system in Hong Kong electronics manufacturing companies (Chin et al., 2000) and on the construction companies in Singapore (Low and Omar, 1997). None so far is in the service sector.

Critical success factors of ISO 9000 maintenance

The maintenance phase of ISO 9000 is important as it entails mechanisms necessary to facilitate continuous improvement of the quality system in order for it to be sustainable. Maintenance of the quality management system is defined by Van de Water (2000) as "*the application of management concepts to aspects of the process of*

quality management with the objective of keeping this process in a perfectly well defined state, to keep the introduced philosophy highly evolving for the organization's members, to bring it into a state seen fit to control all aspects of quality."

According to him, stagnation of the process of quality management and its translation into concrete activities on all levels of the organization can be prevented by maintaining the quality system as it would provide constant monitoring, controlling, assessing, and improving through both the technical and socio-cultural aspects to quality management. The maintenance phase places emphasis on management reviews, corrective and preventive actions, collection and analysis of data, measurement of performance, and continuous improvement. Chin et al. (2000) have examined the criticality of the 20 ISO 9000 clauses from the old version in the maintenance of ISO 9000. Based on that study, 73.61 percent of the survey respondents who consist mainly of company's management representatives for the ISO 9000 quality system consider the "corrective and preventive actions" the most critical issue in maintaining the ISO 9000 system. Four other clauses of secondary importance are clauses "document & data control", "internal quality audits", "quality system", and "management responsibility" respectively. To explore current practices in maintaining ISO 9000, 12 representative ISO 9000 registered companies were selected for interviews for the purposes of that study. From the interviews conducted with the quality directors and quality assurance managers of the companies, it was found that the success factors for ISO 9000 maintenance for electronics manufacturing companies are management commitment, teamwork, and company-wide ISO recognition. In fact, management commitment is found *crucial* for successful maintenance (Chin et al, 2000). The study found that the teamwork approach has proven to be effective for identifying and solving problems in the maintenance phase while company-wide recognition of ISO will certainly promote employee involvement in the maintenance phase.

Through the same interviews, it was found that to achieve the effective maintenance of ISO 9000, continuous management support is a primary success factor and many reported failure cases are attributable to lack of constancy in management commitment and involvement. This seems to be in tandem with the reasons why companies failed the surveillance audits which are mostly due to lack of top management involvement and understanding of ISO 9000 requirements for the companies' quality systems (McCullough and Laurie, 1995; Dzus and Sykes, 1993). In addition, these researchers found another major failing was the lack of effective internal corrective measures once system non-conformance and deficiencies were identified as the failed companies were often not aware of the importance of ISO 9000 maintenance and did not have well-established procedures to maintain their quality systems after ISO 9000 registration.

Benefits of ISO 9000 certification

The literature on the benefits of obtaining ISO 9000 certification is mixed. Terziovski et al. (1997) concluded in their study that ISO 9000 certification does not have a significant positive relationship with business performance. They suggested that the benefits attributable to certification were mainly for procedural efficiency and error rates, and less likely for market share. On the other hand, Terziovski et al. (2003), Corbett et al. (2002) and Mann and Kehoe (1994) find that adopting ISO 9000 does

have a positive effect on business performance. Corbett et al. (2005) and Chow-Chua et al. (2003) suggest ISO 9000 certification leads to significant improvement in financial performance. Furthermore, Naveh and Marcus (2005) found that installing and using ISO 9000 lead to achieving competitive advantage through improved on-time delivery and reduction in cost. Karim et al. (2005) conducted a study on Australian construction firms and found that the implementation of ISO 9000 in these firms has resulted in:

a. Less rework and repair
b. Higher operational efficiency in operation
c. Continual improvement of operation
d. Improved internal performance appraisal systems
e. Better risk management
f. More systematic record keeping
g. Greater client satisfaction
h. Better access to domestic markets
i. Enhanced competitiveness

Magd (2008) found that some of the benefits of implementing ISO 9001:2000 in Egyptian manufacturing companies are improved documentation, improved efficiency of the quality system, clearer work instructions, procedures and job responsibilities, improved product quality. Improved documentation, improved quality perception, disciplined work environment, and consistency across the organization are the main benefits discovered by Bhuiyan and Alam (2005). Meanwhile, Han and Chen (2007) suggest that ISO 9000 registration efforts enhance quality, cost reduction, dependability, and flexibility. The lack of literature on ISO 9000 maintenance phase or the post certification period, especially in the service sector, resulted in two research questions such as:

RQ1.What are the critical success factors for ISO 9000 maintenance in a service organization?

RQ2.What are the changes and improvements obtained by the organization as a result of maintaining the ISO 9000 quality system?

Methodology

This paper adopts a case study approach as described by Yin (2003) to investigate the research questions described. The experience of a service organization relating to the ISO 9000 maintenance was carefully reviewed. The study summarizes 4 years of ISO 9000 quality management system maintenance in the organization. Thirteen face-to-face interviews were conducted over a period of 8 weeks with top management, middle management, lower management in charge of operations and quality, and the management representative responsible for the quality system in the case organization. Each interview took between 1.5 to 2 hours. As part of the data gathering process, ISO 9000 quality documents and company publications were also reviewed. *Thematic* analysis as described by Braun and Clarke (2006) was used to analyze the data where it

involves familiarizing oneself with the data collected, coding, searching for themes, and defining and naming the themes before producing the report.

MK Private Limited

MK Private Limited (MK) is a subsidiary of a major airlines company set up to handle the delivery of cargo around the world via the parent company's global network of routes. Currently, the company has about 900 employees. The core businesses or services of MK are sales of cargo space on the parent company flights, handling of normal cargo, express cargo, perishable, animal, and transhipment cargo on behalf of the parent airlines and customer airlines, i-port transhipment service and charter services. Customers of MK consist of freight forwarders, agents, customer airlines, both local and overseas. The scope of the quality system for MK is planning of chartering of its parent airline's aircraft for transportation of cargo and provision of cargo ground handling services and warehouse operations on behalf of its parent company and customer airlines.

Cargo operations at MK are divided into three sections namely; operations commercial, operations line stations, and operations support. Operations Commercial's core processes are export and import operations, ramp, documentation office and physical charter. The core functions of Operation Line Stations are quality assurance and Line Station, transshipment, customer care and cargo safety. Meanwhile, Operations Support consists of core processes such as management and maintenance of cargo equipment, budget, tender and procurement of cargo equipment, animal hotel, express handling unit, and property administration and maintenance. The preparation for MS ISO 9001:2000 at MK started in June 2003 with the appointment of a consultant. Six months later, MK was awarded the MS ISO 9001:2000 Quality Management System for the above scope. Other prestigious awards received by MK are the ISO 14001:2004 and OHSAS 18001:1999, Best Global Ground Handler (2007) and Excellence in Logistics - Air Cargo Services (2007). Prior to ISO 9000 certification, MK was making losses. The major challenge for top management of the company at that time was to make the company profitable again. A plan was devised to turn the company around and the strategy was to be more competitive by increasing operational efficiency and reducing operating cost. At the same time, the company began looking for ways to make cargo operations more systematic and effective in an effort to reduce the mishandling rate and to shorten loading time. The ISO 9000 certification was seen by its management as a way to achieve the above goals.

Critical success factors in ISO 9000 quality management system maintenance

The studies on ISO 9000 have found that several factors are critical to the successful implementation and maintenance of the quality system, such as the commitment and support from top management, teamwork, and company-wide ISO recognition (Chin et al., 2000). Low and Omar (1997) also cited that top management commitment and support as one of the most important factors for certification and maintenance of the ISO 9000 in the construction industry in Singapore. Other factors of importance reported by the study are the concurrent use of technical and social aspects of quality management, and productive relationships. Similarly, Cheng and Tummala (1998) found that employee involvement is critical in achieving the ISO 9000 registration and

in the effective maintenance of ISO 9000 quality system in Hong Kong and China companies. They described employees as management, supervisors, staff, and operators of the companies they studied and stressed that the attitude and behavior of people working in the organization is critical to achieving the ISO 9000 certification and its maintenance. In the case of MK, 76.92 percent of the respondents interviewed said that top management commitment and leadership, and employee involvement are the most critical factors for success of ISO 9000 maintenance. The importance of people, which includes management and employees in maintaining the quality management system is clearly felt by the Head of Cargo Operations when he said:

> *"The soft side is very important in any ISO program. People are the one who make the system moves. A system is just a framework to show them the way to do it."*

This view is supported by the Senior Manager of Information Technology when he explained:

> *"It's always the people. You can have the best policy, procedures and system in place, but if you don't have the strong involvement and commitment from people, it can weaken the system. We must instill a very strong sense of accountability and responsibility and have a clear role. A lot of problems here are due to people not sure and clear of their roles. In ISO, every single individual must be informed and communicated."*

The results of the interviews also show that motivation and good reward is the third critical success factor in maintaining the ISO 9000 quality system at MK. Continuous improvement which is presented by 15.38 percent of the respondents is at the fourth place. Other factors critical to ISO 9000 maintenance at MK are teamwork, ISO 9000-certified vendors, correct identification of issues to measure for process improvement, having the right people for the job, having the quality system ingrained within the quality culture, and continuously making a reference to ISO 9000 and its standard operating procedures. Table I shows the critical succeed factors of ISO 9000 maintenance at MK.

Table I: Critical success factors of ISO 9000 maintenance

Rank	Critical success factor
1	Top management commitment
=1	Employee Involvement
3	Motivation & Reward
4	Continuous Improvement
5	Teamwork
=5	ISO 9000-certified vendors
=5	Correct identification of issues to measure process improvement
=5	Having a QMS ingrained in the quality culture
=5	Continuously making reference to ISO and Standard Operating Procedure.

In practice, top management are committed to ISO 9000 maintenance of their company and evidence of their commitment and support can be seen in how they involved themselves in various quality activities that support the maintenance of the quality system. At the same time, they headed the ISO 9000 Steering Committee, chaired ISO related meetings, documented processes, initiated improvement projects, conducted workshops on the importance of ISO 9000 and its related matters, and trained employees. This is done on top of their other responsibilities in areas such as strategic planning, setting and reviewing of quality policy and objectives, and planning of resources. To encourage staff to seek improvement initiatives and appreciate those who have done it, MK came up with several recognition and reward programs for the staff in the form of cash rewards, paid holiday packages and commendation certificates. At the same time, teamwork was also encouraged and nurtured through and during these improvement initiatives. Initiative and Creative Circle (ICC) teams entered nation-wide competitions and have won the top ten placing for the past several years. Top management of MK also introduced the concept of multi-tasking to ensure the company has flexibility in using its human resources. This is in line with its objective to have lean but effective business operations that will contribute to operating efficiency and cost reduction without compromising the quality of its service to customers.

By multi-tasking, employees' potential and talent are unleashed, which is also beneficial for employees because they can avoid the monotony that comes with doing the same job repetitively. In addition, multi-tasking also serves to optimize human resources to be more productive and efficient in the use of resources. At the senior manager's level, multi-tasking also acts as part of succession plan for them to move to the top in future. This is line with MK's policy of promoting from within the company. To maintain its ISO 9000 quality system, the company has carried out several continuous improvement initiatives. Each manager in every department is required to come up with two improvement projects every year. Thus far, some of the improvement projects that have been carried out are to improve the skill of employees in problem solving and corrective and preventive action analysis, modification, simplification and improvement of work processes, upgrading of system to minimize administration time, improvement of forms and documentation, and also upgrading of vendor monitoring device and system.

Changes and improvements obtained due to ISO 9000

Previous studies had uncovered a plethora of benefits from being certified to ISO 9000 standards. Burzacca and Lunghi (2003), Casadesus et al. (2001), Yahya and Goh (2001), and Casadesus and Gimenez (2000) show that some of the common benefits from certification to the ISO 9000 standard are customer satisfaction, continuous improvement, increase in quality awareness, improved management control, improved productivity, improved efficiency and effectiveness, improved profitability, reduced costs, improved internal communication, greater motivation of employees, and worldwide recognition. For MK, since the implementation of ISO 9000 in January 2004, the company has been back in the black. The company has made profits for the years 2004, 2005, 2006 and 2007. Apart from that, results from interviews show that several positive changes have taken place especially with regard to people, process,

and system. People's mindsets have changed and they are more open and receptive to new ways of doing things. They have become more responsible and accountable for their work. Employees are more aware of policy and procedures. Attitudes of staff from top to bottom have changed for the better; they have become very committed. All ranks and levels are involved in maintaining the quality system. As the General Manager of Revenue Management puts it:

> *"Attitude of staff from top to bottom has changed for the better; they become very committed. All ranks and levels are involved."*

This change of attitude in people is due to an increase in people's awareness of the process as it has become standardized as explained by the General Manager of Finance:

> *"People are more aware of and talk more about the processes, service level and service standards which they are expected to deliver. It has become more transparent and visible to them. With ISO 9000, processes have become standardized."*

Table II: Areas and results of improvement by MK

Improvement	
Area	**Result**
Processes • Simplify the process by reducing the number of activities in the process • Processes are documented • Processes are changed to suit the market • Simplify import delivery performance by asking key agents to pre-alert shipment • Processes are standardized	• Easier tracing of work errors • Shorter time taken to trace a process • Immediate recording and detection of discrepancies and damages at cargo warehouse • Shorter delivery and release time for shipment • Smoother process flow • Improved process time • Decreased maintenance cost • Reduced cargo mishandling rate • Reduced number of customer complaints • Increased in service standard • Reduced standard time to process transshipment cargo • Lower claim compensation • Increased awareness in people about the process and service standard • Increased transparency on process and service standard • Improved service standard
Documentation • Standard operating procedures are constantly updated • Online document control system to control document	• Improved customers' trust and confidence in the company • People are more responsible and accountable for their work • Help to track and monitor performance • Trigger corrective and preventive action • Staff are more aware of policy and procedures

Improvement	
Area	**Result**
	• Change of staff attitude • Transparency in doing business • People work in accordance with the procedures • Improved work organization
System • Daily meeting and post-mortem • Online document system • Online booking • Internal training	• People become more proactive in tackling problems • Easier to control document • Wider access to trace and track processes • Reduced cycle time for change of document • Better housekeeping • Customer Services department has been closed • Checking of booking through online electronic computer bookings.

In terms of process, the company managed to simplify and reduce the number of activities in some of the processes, particularly in cargo retrieval and release, which are critical to customers. Tracing of processes becomes easier and the root cause of problems is easier to detect, work errors are minimized and there is transparency in doing business. Processes have been changed to suit a changing market and market needs. The company has also managed to reduce the number of complaints from 30 a day to 3 per day and the cargo mishandling rate has dropped from 0.2 percent to 0.06 percent, making MK one of the best in this industry. With the new system, it also seems to raise the bar in term of trust from customers. MK has become very lean, and its services are very predictable and consistent. At the same time, people are also becoming more sophisticated in terms of technology and this creates a shift in the mindset of the staff. This is expressed by the Senior Manager, Information Technology when he said:

"They are adapting to technology; from phone bookings to online, electronic, computer bookings."

As for the online document system, according to the Management Representative, the acceptance of people is very impressive in which they use the system to upgrade their unit and as a result, the morale of the staff has improved. Table II shows the areas and results of improvement carried out by MK in maintaining its ISO 9000. It could be concluded that for MK, some positive changes have resulted because of the improvements carried out on the processes, documentation, and system in maintaining the ISO 9000. People want to contribute and become proactive; they are committed and involved and their morale has improved. They become more aware and knowledgeable about the processes and their roles in delivering the service. In terms of technology, they also become more sophisticated. In addition, MK gained more trust and confidence from the customers and the performance monitoring system has also improved. Financially, the company is continuously making profits. Table III depicts the transformation resulting from ISO 9000 maintenance in MK.

Table III: Improvements and changes due to ISO 9000 maintenance

Improvements in:
Processes Documentation System
⇩
Changes in:
People - Positive attitude - Improved morale - Aware & knowledgeable - Technology savvy Increased trust & confidence from customers Improved performance monitoring system

Conclusion

A number of useful conclusions can be drawn from the experience of MK with its maintenance of ISO 9000 quality management system. First, there seems to be similarities in terms of top management commitment and employee involvement being the top two critical success factors of ISO 9000 maintenance in all the studies conducted. Commitment and leadership from top management and involvement of employees are equally critical as ingredients for effective maintenance of the ISO 9000 quality system. Although employees took some time to be convinced of the benefits of having and maintaining the ISO 9000 certification, the right leadership and motivation have brought positive changes to their attitudes that lead to teamwork and participation in the effort for continuous improvement. Secondly, in the current study, motivation and reward is the third critical success factors of ISO 9000 maintenance for MK. This finding is consistent with the findings from Low and Omar (1997) which found the human/socio-cultural aspects as one of the most important factors for quality improvement in the construction industry in Singapore. Thirdly, in contrast to other studies, the current study found continuous improvement as the fourth critical success factors of ISO 9000 maintenance. Continuous improvement on the processes, documentation, and system has prevented the quality system of MK from being stagnant. In the current study, teamwork is also considered to be one of the critical success factors of ISO 9000 maintenance and this finding is also consistent with the findings from Chin et al. (2000) and Low and Omar (1997).

A lot of changes and improvements have been obtained by MK as the result of maintaining the ISO 9000. The most interesting and remarkable is the effect of improvement on processes, documentation, and system on people especially the employees. Employees are more motivated to maintain the quality system by participating in the quality related activities and improvement projects. Therefore, the result of the current study on the benefits of ISO 9000 supports the findings of other studies conducted by other researchers such as Man and Kehoe (1994), Corbett et al. (2002), Tersiovski et al. (2003), Bhuiyan and Alam (2005), Karim et al. (2005), Naveh and Marcus (2005), Han and Chen (2007), and Magd (2008) that suggest ISO 9000 can bring a lot of benefits to organizations. Looking at the experience of MK with its ISO 9000, it could be concluded that by maintaining the quality system, it has helped MK to continuously improve in terms of process, documentation, system, and most importantly people. These improvements have made the ISO 9000 quality management system sustainable at MK. As a result, the company has been able to use it as a tool to increase its operations efficiency and to reduce cost.

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