



Impact of ISO 9000 certification on training and development activities

Impact of
ISO 9000
certification

An exploratory study

Hesan A. Quazi

*Division of Strategy, Management and Organization, Nanyang Business School,
Nanyang Technological University, Singapore, and*

Ronald L. Jacobs

*Workforce Development and Education, The Ohio State University,
Columbus, Ohio, USA*

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Abstract *The push for ISO 9000 certification in Singapore can be viewed as a positive step towards enhancing training and development activities in the certified companies. This exploratory study examined the nature and extent of impact of ISO 9001 certification on training and development activities of organizations operating in Singapore. A survey approach was adopted. The respondents were asked to indicate the nature and extent of human resource development (HRD) activities three years before and three years after ISO certification. They were also asked to indicate whether the changes, if any, were due to the certification only or other reasons. The findings indicated improvements in training needs analysis, training design, training delivery, training evaluation and HRD activities in the sample organizations. The small sample size has constrained the authors' ability to generalize the findings. Researchers interested in the topic may like to request a copy of the survey instrument that was used in this study and carry out similar studies in other ISO member countries to validate (or disprove) the findings of this study.*

Introduction

Training and development and ISO 9000 quality management initiatives in Singapore
The Skills Development Fund (SDF) was established in 1979 by legislation to provide financial assistance to companies to encourage them to train and upgrade the skills of their workers. The SDF's mission is to develop and promote financial schemes and programs to support the rapid development of a world-class skilled workforce that possess the capabilities to transform Singapore into a knowledge-based economy, and sustain Singapore's competitiveness and economic growth (Productivity and Standards Board, 2000/2001). The Singapore Government had been actively promoting the ISO 9000 certification since 1988 (Lee and Lim, 2000) and the Singapore Quality Award (SQA) to make companies in Singapore more competitive. Further, to encourage the small and medium-sized organizations to opt for ISO 9000 quality management systems (QMS) a number of assistance schemes were set up including SDF and Local Enterprise Technical Assistance Scheme (LETAS). These initiatives aimed at helping local enterprises seeking external assistance to modernize and upgrade their operations, including getting ISO 9000 certification (Quazi and Padibjo, 1998).



ISO 9000 quality management system and its linkage with training and development

The ISO 9000 family of international standards were first introduced by the International Organization for Standardization in 1987, which was subsequently revised in 1994. The standard has since gone through a major revision in 2000. The study presented here primarily refers to the later two versions of the ISO 9000 standards. The ISO 9000[1] family of standards and guidelines has earned a global reputation as the basis for establishing QMSs. By following the ISO 9000 standards, companies discover what makes them successful and then they can document this information in formalized processes and procedures. Improved documentation, positive cultural impact, higher perceived quality and faster development time are some of the advantages of ISO 9000 certification. ISO certification has also been used as a marketing tool to open up new markets beyond the traditional sphere of influence. Some quality and productivity-related benefits of such certification include an improvement in on-time delivery and reduction in the cycle time, error rates and test/inspection procedures (Taormina, 1996).

One of the key elements in the ISO 9001 standard is the clause on training (Clause 4.18 of ISO 9001:1994 standard and 6.2.2 of ISO 9001:2000 standard). These clauses describe the training and experience requirements of an organization. It requires that the organization train new employees and all personnel whose work affect quality. The aim is to continually improve training programs to enable employees to handle changes in the global marketplace. The standard requires that the need for training of personnel should be identified and a method for providing that training should be established. Further, consideration should be given to providing training to all levels of personnel within the organization (ISO, 1994; 2000). The standard also emphasizes that particular attention should be given to the selection and training of recruited personnel and personnel transferred to the new assignments (ISO, 9004).

In spite of the successes of ISO 9000, however, there remain issues in regard to its implementation and use. For one thing, it has been argued that ISO 9000 breeds inflexibility in organizations (Taormina, 1996). In practice, whenever standards are commonly recognized across an organization, it makes whatever future revisions are made to the standards all the more difficult to accomplish. This implies that ISO might have the effect of stifling creativity among employees who are expected to take ownership of their own processes. Once the standards become institutionalized, employees may be uncertain of the wisdom of changing something that has been widely accepted.

Once the standards become institutionalised, employees may be uncertain of the wisdom of changing something that has been widely accepted. Finally, becoming certified and adhering to the ISO standards simply requires a high investment of organizational time, effort, and resources. Indeed, some organizations have balked at using ISO simply because the expected expenses involved seemed greater than the expected benefits. In addition, ISO 9000 certification inevitably affects all aspects of the organization, including the training and development activities, which may not be altogether anticipated. In this sense, ISO 9000 certification may have as much impact on its support activities as those considered to be primary to the organization's reason for being in business.

Literature review

The main objective of this section of the paper is to review the existing body of knowledge relating to the impact of ISO 9000 certification on the training and development activities of the organizations concerned. Literature reveals that ISO 9000 certification has resulted in both positive and negative impacts on organizational performance, which are elaborated below.

Positive impacts of ISO certification

A number of studies revealed that company size was one of the factors responsible for deriving benefits from ISO 9000 certification. For example, Tsekauras *et al.* (2002) found that in the Greek manufacturing and service sectors the adopters of ISO 9000 quality assurance standards were larger companies producing intermediate goods. In another study conducted by Elmuti and Kathawala (1997), in two manufacturing plants, one ISO 9000 certified and the other non-ISO 9000 certified, owned by a large corporation in the USA, it was found that the ISO 9000 quality program improved the participants' quality of work life. In addition, there was a positive impact on employee productivity and export sales. A follow-up interview with the management of the corporation indicated that ISO 9000 supported the organizational objectives of productivity, quality of products, increased export sales, and quality of work life. Chittenden *et al.* (1998) found that, in the UK, firms that adopted ISO 9000 tended to be large, multi-product and manufacturing based. These firms had customers that were larger than themselves or from government departments. These firms also had a formal management structure. On the other hand, the firms which did not adopt ISO 9000 tended to be smaller businesses that dealt with domestic customers and serving the local market. The authors concluded that a high majority of ISO 9000 users felt that the advantages of using ISO 9000 outweighed the disadvantages. Manufacturing firms that implemented ISO 9000 were primarily motivated by the desire to improve internal processes, while small firms were motivated by marketing and competitive advantages.

Contrary to the above two studies, McAdam and McKeown (1999) reported that in Northern Ireland ISO 9000 certification resulted in benefits for the small businesses. The specific benefits were:

- better control of business;
- increased sales/business;
- reduced costs;
- increased productivity; and
- fewer customer complaints.

The authors also reported that the businesses that were gaining most from TQM implementation had started with ISO 9000 and focused on both external (e.g. customer satisfaction, etc.) as well as internal measures (scrap, efficiency, etc.). These organizations also had full management commitment, high levels of employee participation and training. In a same vein, Sun (1999) found that in Norwegian companies, implementation of the ISO 9000 standard was significantly correlated with the reduction of bad quality products and customer complaints, and business performance such as profitability and productivity.

Quazi and Padibjo (1998) found that ISO 9000 certified small and medium size enterprises in Singapore reaped a number of benefits including:

- an increased customer preference;
- improved company quality image and competitiveness in the market;
- compliance to customer requirement;
- streamlined procedures and documentation;
- increased consciousness for preventive and corrective actions; and
- provision of a foundation in the pursuit of TQM.

The study also found that ISO 9000 certification provided a stepping-stone toward TQM practices.

The study of Anderson *et al.* (1999) reported a different type of benefit that was achieved through ISO 9000 certification. They found that manufacturing firms in North America adopted ISO 9000 as a means to provide credible signals of quality assurance to external parties. In addition, ISO 9000 was adopted as a tool in a larger strategy of achieving competitive advantage through quality management and communicating quality results. For most firms, complying with customer or regulatory requirements appeared to be a secondary consideration.

Despite the benefits reported above, there were numerous barriers that were faced by ISO 9000 certified companies, which included high cost of implementation, lack of full commitment and participation of top management, lack of financial and human resources, employee resistance, no perceived advantage in certification of the service industry, and that proper training and education of employees could not be ensured (Quazi and Padibjo, 1998). Tsekauras *et al.* (2002), in their study on Greek manufacturing and service sectors, found that the effects of an adopting an ISO 9000 standard on certain dimensions of profitability were not significant in a period of five to six years after adoption. Similarly, the study of Terziovski *et al.* (1997) found that quality certification had no significant, positive relationship with business performance. The study of Simmons and White (1999) in the USA did not support the claims that ISO certified companies help realise the advantages in operational performance over non-ISO certified companies. Sun (1999) also found that the ISO 9000 certification had little influence on market position and competitiveness, and no influence on employee satisfaction and environment protection.

Contrary to the above mentioned studies, Heras (2002), in a recent study involving 400 ISO 9000 certified companies and 400 non-certified companies in the Basque autonomous community, reported a positive association between ISO 9000 certification and superior financial performance.

Regarding the impact of firm size, the study of Kie and Palmer (1999) on manufacturing companies in New Zealand found that smaller companies, when compared to the larger ones, were more likely to implement ISO 9000 because of external factors rather than internal factors. They found that the small companies were less likely to implement a TQM program compared to large ones and were likely to stop after implementing one ISO program. Further, large companies appeared to be more likely to use ISO 9000 as a precursor to TQM, whereas small companies were satisfied with ISO 9000 accreditation. Sun and Cheng (2002) reported the effects of ISO 9000 certification and TQM implementation in Norwegian SMEs and large firms. They

found that the SMEs implement ISO 9000 standards and TQM because of market and customer demand or external pressure rather than internal initiation. Further, they found no significant relation between current ISO 9000 certification and improvement of business performance. In a study of organizations with less than 250 employees in Australia, Wiele and Brown (1997/1998) found that most SMEs seemingly felt forced to go for ISO 9000 certification and did not move further down the quality path. Goh and Ridgway (1994) reported a very similar finding on SMEs in the UK. Their study revealed that the ISO 9000 certification was considered the end-point in the quality journey of the sample companies.

In summary, specific benefits of ISO 9000 certification that have been reported by various authors are:

- improved quality of work life;
- increased customer preference;
- improved company quality image and competitiveness in the marketplace;
- higher productivity and export sales;
- better control of business;
- reduced costs;
- fewer customer complaints;
- streamlined procedures and documentation; and
- increased consciousness for preventive and corrective actions and the like.

On the other hand, some other studies indicated that ISO 9000 certified companies did not realize advantages in operational performance and foreign sales over non-certified companies. Clause 4.18 of ISO 9001:1994 (and clause 6.2.2 of ISO 9001:2000) requires that the certifying companies establish and maintain documented procedures for identifying training needs and provide for training of all personnel performing activities affecting quality. Although requirements of all the ISO 9000 clauses are important for the quality management system, it can be argued that employee training is critical for the achievement of most of the benefits discussed above. McAdam and McKeown (1999) found that for the achievement of customer satisfaction, scrap reduction and improvement of efficiency, full management commitment and high level of employee participation and training were necessary.

Although the above review of literature on ISO 9000 and its impact on various aspects of business revealed very little direct association between ISO 9000 certification and training and development activities of firms, a number of studies have reported the relationships between training and business performance (for example, see Jacobs, 1994; Jacobs *et al.*, 1992; Robinson and Robinson, 1989). It appears that very few studies have systematically investigated the impact of ISO 9000 certification on the nature and extent of training and development activities of organizations[2]. The objective of the present study is to fill that gap in the literature.

Objective and hypotheses

As indicated in the introduction section, the Singapore Government is keenly interested in training and development and quality management initiatives including SQA and the ISO 9000 certification. It therefore makes good sense to explore the

complementarities of these two initiatives i.e. training and development and quality management initiatives. In view of this, the objectives of this exploratory study have been set to examine the extent of impact of ISO 9000 certification on training and development activities of the sample organizations in Singapore. Based on the literature on human resource management, training and development and the requirements of ISO 9000 standards, the following hypotheses have been developed:

- H1.* ISO 9000 certification does not have significant impact on the extent of “training needs analysis”.
- H2.* ISO 9000 certification does not have significant impact on the extent of “training design”.
- H3.* ISO 9000 certification does not have significant impact on training delivery methods?
- H4.* ISO 9000 certification does not have significant impact on “training evaluation”.
- H5.* ISO 9000 certification does not have significant impact on HRD activities in general.

These hypotheses were derived since they represent the basic phases of the systems approach of training design (O'Connor *et al.*, 1996). For the study, training needs analysis was considered as determining what training subjects are essential and to help identify those employees who are in need of the training. Training design was defined as the creation of an intervention or training effort targeted at addressing the problem identified. Examples of such activities might include curriculum development, course design, computer-aided design and the development of learning aids or materials. Training delivery was defined as the means to communicate the training information to the employees, including the selection and deployment of the media, methods, and arrangement of the facilities. Training evaluation was defined as the systematic process of determining the effects of the training on learning and business performance.

Methodology

A survey research methodology was used for the study. A questionnaire was developed to address the questions. Primarily a five-point interval scale was used to capture the human resource development (HRD) related information on “before” and “after” the ISO 9000 certification. The companies were asked to indicate the extent of their training and HRD activities three years prior to certification and three years after the certification. They were also asked to indicate the possible reasons for changes after certification.

The questionnaire was pre-tested with three ISO 9000 certified organizations and two researchers knowledgeable in the field. These respondents were requested to comment on the content as well as the clarity of the questionnaire. The questionnaire items were subsequently amended as per the comments received during the pre-test.

Most of the questions in the questionnaire were aimed at capturing the information on the extent of activities three-year prior and three-year after ISO 9000 certification. The following types of questions were included:

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- Average number of hours of training per employee per year for different levels of employees.
 - Average percentage of payroll \$ spent for training for different levels of employees.
 - Average training hours per employee per year for different types of training[3].
 - Human resource development related activities (11 items).
 - Training design and delivery related activities (seven items).
 - Benefits of ISO 9000 certification.

The last section of the questionnaire dealt with the background information of the organizations.

The list of the target companies was obtained from the directory of the ISO certified companies published by the Productivity and Standards Board (PSB). The questionnaire was mailed or faxed to 177 ISO 9000 certified companies in Singapore and was addressed to the management representative of the ISO 9000 program, HR manager, or other executive that senior management deemed suitable to respond. To improve the response rate, follow-up calls were made two weeks after the questionnaires were sent out.

Results

Profile of the sample organizations

A total of 33 completed questionnaires were received, which represented about 19 percent response rate. Of these responses, 28 were useable for analysis. The final sample consists of 19 companies from the manufacturing sector (68 percent) and the rest were from the non-manufacturing sector. Among the manufacturing companies, 17 are privately owned (89.5 percent), while foreign companies wholly own the remaining two companies. A large proportion of manufacturing companies (52.6 percent) had a turnover of between S\$10.0 million to less than S\$50.0 million, as compared to 11.1 percent for non-manufacturing companies in the sample. Four manufacturing companies reported having turnover over of S\$100.0 million (21.1 percent). No non-manufacturing company reported such turnover for the same period. About 53 percent of the manufacturing companies and 56 percent of non-manufacturing companies reported having less than S\$15.0 million in total fixed asset (Table I shows the summary information).

Among the 19 manufacturing companies, 17 (89.5 percent) are certified in the ISO 9002 standard. Almost the same proportion (88.9 percent) of the non-manufacturing companies are also certified in the ISO 9002 standard. The rest of the sample companies are ISO 9001 certified. About 63 percent of the manufacturing companies and 78 percent of the non-manufacturing companies had hired consultant(s) to assist them in getting certified. About 21 percent of the manufacturing companies and 44 percent of non-manufacturing companies took about six months to get certified whereas, 47 percent of the manufacturing companies and 66 percent of the non-manufacturing companies took about one year for such certification. In the non-manufacturing companies, the highest percent of educational qualification for the workforce is "secondary level" followed by "tertiary level". However, in the case of the manufacturing companies, the highest proportion of the employees has "primary level"

Table I.
Formal education level of
the employees of the
sample companies

Organizational variables	Classifications	Manufacturing		Service	
		Number	Percent	Number	Percent
Sample size		19	68	9	32
ISO certified	ISO 9002 certified		89.5		88.9
Ownership	Private		89.5		100
	Foreign		10.5		0.0
Turnover	More than 100 million		53		11
	10- < 50 million		21		0.0
	< 10.00 million		53		56
Fixed assets	Yes		53		78
Hired consultants for certification	About six months		21		44
	About one year		47		66
Level of education	Primary		12.7		37.5
	Secondary		56.1		31.8
	"A" level		5.1		6.2
	Tertiary		18.3		16.0

education followed by "secondary level". It is also noted that non-manufacturing companies have the higher percentage of employees with "tertiary level" education (18.3 percent) compared to the manufacturing sector (16.0 percent).

Test of hypotheses

Paired mean *t*-tests between the pre-and post ISO 9000 certification activities were conducted on the total as well as the manufacturing sample. Because of the very small sample size from the service sector ($N = 9$) no such tests were conducted[4]. Summary results are described below.

H1. *Impact on training needs analysis (TNA)*. Based on the total sample, a significant increase in TNA after ISO 9000 certification ($p < 0.001$) was noted. Similar significant impact was found in the manufacturing sample ($p < 0.001$).

H2. *Impact on training design*. Based on the total sample there was a significant increase in Training Design activities after ISO 9000 certification ($p < 0.001$). A similar significant increase was found in the manufacturing sample ($p < 0.001$).

H3. *Impact on training delivery methods*. Seven indicators (in-house training, in-house training by external trainers, external training, computer-based training, class room training, experiential training and on-the-job training) were used to measure the impact of ISO 9000 certification on training delivery methods. The *t*-test results on the total sample indicate significant impact on each of the training delivery indicators (p -values ranging between 0.000 to 0.017). Similar results were obtained in the case of the manufacturing sample (p -values ranging between 0.000 to 0.004).

H4. *Impact on training evaluation*. Four indicators (i.e. post-course review and follow-up, overall review of impact, feedback to improve and use of feedback to plan) were used to measure the impact of ISO 9000 certification on training evaluation. The *t*-test results on the total sample, indicate significant positive impact on all the training evaluation indicators (p -values ranging from 0.000 to 0.002). A similar result was also obtained in the case of the manufacturing sample (p -values ranging between 0.000 to 0.006).

H5. *Impact on human resource development activities.* Five indicators (average number of training hours per employee per year, average training hours per employee per year for different types of training, average percentage of payroll dollar spent on training, types of training provided in organizations, and perceived benefits of ISO 9000 certification) were used to measure the impact of ISO 9000 certification on HRD. The *t*-test results on the total sample indicate significant impact on overall HRD activities (*p*-values ranging between 0.000 to 0.003). A similar result was obtained in the case of the manufacturing sector (*p*-values ranging between 0.000 to 0.003).

In summary, all the hypotheses are rejected, which indicates that ISO 9000 certification does have some impacts on training and development activities of an organization. However, given the very small sample size, it is not possible to generalize and as such it should be interpreted with caution. For detailed comments refer to the section on summary and discussion

Analysis of other indicators of training and development

The participating organizations reported an increase in the average number of training hours per employee per year at all levels (i.e. executives, mid-level managers, supervisors and front-line employees). However, the middle level managers and executives had the largest increase with 80.6 percent and 77.7 percent respectively. The aggregate change for manufacturing companies showed an increase of 67.7 percent. In case of non-manufacturing companies the results were different from those of the manufacturing sector. Training hours increased by 31 percent and 3 percent respectively in the case of the front-line employees and mid-level managers. However, training hours declined in the case of the executives and the supervisors. The combined sample, however, showed an increase in all levels of employees ranging between 27 percent and 50 percent (see Table II). When the respondents were asked to indicate the possible reasons for such changes, about 43 percent indicated that the change was due to the implementation of ISO 9000 standard only (see Table III).

In the manufacturing sector, average training hours per employee per year for different types of training increased for most categories of employees and types of training except for technical training, and production and engineering related training, in which cases the hours decreased for the supervisory and the front line staff (see Table IV). A different picture emerged when the non-manufacturing sample was analyzed separately. For example, for the executives, average training hours increased only for the management training program. In the case of the middle level managers, hours for all types of training went up except for product and quality training, in which case the hours remained the same. For the supervisors, out of eight available training programs, training hours for five of them went up. Finally, for the front line employees, hours for four out of seven programs went up (for details, see Table V).

When the total sample was analyzed, a similar result as that of the non-manufacturing sample was found only in the case of the training of executives, but somewhat different results were found for rest of the employee categories. For example, hours for the middle level managers went up for all types of training programs, hours went up for 50 percent of the available programs (i.e. computer related, management, trade and craft, and certified technical training) for the supervisory staff, and for the front line employees, hours went up for most types of training programs except for two (i.e. technical and production engineering) (see Table VI).

Table II.
Average number of
training hours per
employee per year

Levels of executives/employees	Total sample		Manufacturing		Non-manufacturing	
	Before ISO 9000 certification ^a	After ISO 9000 certification ^b	Before ISO 9000 certification	After ISO 9000 certification	Before ISO 9000 certification	After ISO 9000 certification
Executives	23.7	35.5 (↑ by 49.8%)	18.8	33.4 (↑ by 77.7%)	46.0	40.0 (↓ by 13%)
Middle level managers	28.0	42.1 (↑ by 50.4%)	22.7	41.0 (↑ by 80.6%)	55.0	56.7 (↑ by 3.1%)
Supervisors	29.6	37.5 (↑ by 26.7%)	25.5	38.5 (↑ by 51.0%)	53.3	43.3 (↓ by 18.8%)
Front line employees	20.1	27.6 (↑ by 37.3%)	14.6	21.0 (↑ by 43.8%)	50.0	65.0 (↑ by 30%)
Aggregate	93.4	133.2 (↑ by 42.5%)	73.6	123.4 (↑ by 67.7%)	172.3	170.0 (↓ by 1.3%)

Notes: ^a Three years average prior to certification; ^b Average of up to three years after certification

When the respondents were asked to indicate the reasons for the change in average training hours per employee per year for different types of training, 61 percent of the total sample indicated the change was due to the implementation of ISO 9000 standard only. The opinion of the respondents varied between the manufacturing and service sector (see Table VII).

Average percent of payroll amount spent on training. In the manufacturing sector, there was slight increase in average percentage payroll amount spent on training in the case of mid-level managers (0.1 percent) and the supervisors (0.4 percent). However, the amount spent declined in the case of the executives (by about 2 percent) but there was no change for the front-line employees (Table VIII).

When the respondents were asked to indicate the reasons for change in the percentage of payroll spent for training, 57 percent of the total sample indicated the change was due to the implementation of ISO 9000 standard only. The opinion of the respondents varied between the manufacturing and service sector, e.g. 47 and 78 percent of the manufacturing and service organizations respectively indicated that the reason for the change was due to ISO 9000 certification (see Table IX).

Types of quality related training provided by the sample organizations. About 95 percent of the manufacturing companies provided some form of ISO 9000 training for their executives during the implementation of the standard. For non-manufacturing, 89 percent of the companies provided such training. All the companies surveyed did provide such training for their middle level managers. More than 90 percent (manufacturing 95 percent, non-manufacturing 100 percent) of the sample companies provided awareness training for their supervisory level employees. In the case of the front-line employees, 68 percent of the manufacturing and 100 percent of the non-manufacturing companies provided such training. Less than two-thirds of manufacturing companies (63.2 percent) and 100 percent of the non-manufacturing companies reported having their employees trained as "lead auditor". About 95 percent of the manufacturing companies and 89 percent of the non-manufacturing companies provided internal auditor training to their employees.

Possible advantages of ISO 9000 certification. The respondents were asked to rate a number of statements regarding the possible advantages of ISO 9000 certification on a five-point Likert scale (1 = strongly disagree and 5 = strongly agree). The statements were on training and development, competitive position, customer relationship, quality of products and services, training related record management, and on-the-job-training. Summary result are shown in Table X.

Reasons for change	Total sample N = 28	Manufacturing N = 19	Service N = 9
Due to the implementation of ISO 9000 standard only (%)	42.86	31.58	66.67
Due to change of company policy other than ISO 9000 certification (%)	39.29	47.37	22.22
Due to change of government directives (%)	3.57	0	11.11
Due to other reasons (s) (%)	14.28	21.05	0

Table III.
Reasons for change in
employee training hours

Table IV.
Average percentage
change of hours per
employee per year of
different types of training
after ISO certification
(manufacturing
companies)

Levels of executives/employees	Technical training (%)	Product and quality training (%)	Computer-related training (%)	Management training (%)	Supervisory training (%)	Production and engineering related training (%)	Trade and craft related training (%)	Certified technical training (%)
Executives	*	↑ 100.0	*	↑ 65.0				
Middle level managers	↑ 100	↑ 7.3	↑ 93.1	↑ 80.4	*	↑ 88.0%	*	↑ 50.0
Supervisors	↓ 31.7	↑ 50.7	↑ 100	↑ 42.9	↑ 36.6	↓ 39.8	No change	↑ 85.3
Front line employees	↓ 128.6	↑ 55.2	*	*	*	↓ 23.1	No change	↑ 66.7

Note: Areas with asterisks indicate that the training is not applicable to the employees

Levels of executives/employees	Technical training (%)	Product and quality training (%)	Computer related training (%)	Management training (%)	Supervisory training (%)	Production and engineering related training (%)	Trade and craft related training (%)	Certified technical training (%)
Executives	↓ 20.0	↓ 30.0	↓ 31.5	↑ 11.9	*	*	*	
Middle level managers	↑ 10.0	No change	↑ 31.3	↑ 23.5	↑ 66.7	↑ 40.0	*	*
Supervisors	↓ 20.0	↓ 50.0	↑ 27.4	↑ 31.3	↑ 0.5	↓ 25.0	↑ 50.0	↑ 50.0
Front line employees	↓ 22.2	↓ 25.0	↑ 35.1	↑ 20.0	*	↓ 25.0	↑ 20.0	↑ 50.0%

Table V.
Average percentage change of hours per employee per year of different types of training after ISO 9000 certification (non-manufacturing companies)

Table VI.
Average percentage
change of hours per
employee per year of
different types of training
after ISO 900 certification
(overall sample)

Levels of executives/employees	Technical training (%)	Product and quality training (%)	Computer related training (%)	Management training (%)	Supervisory training (%)	Production and engineering related training (%)	Trade and craft related training (%)	Certified technical training (%)
Executives	↓ 20	↓ 118	↓ 31.5	↑ 29.6	*	*	*	*
Middle level managers	↑ 5.6	↑ 44.9	↑ 45.7	↑ 39.6	↑ 66.7	↑ 67.0	*	↑ 50.0
Supervisors	↓ 17.6	↓ 18.6	↑ 33.8	↑ 32.4	↓ 44.7	↓ 1.6	↑ 31.3	↑ 61.2
Front line employees	↓ 19.9	↑ 24.7	↑ 35.1	↑ 20.0	*	↓ 52.1	↑ 17.2	↑ 55.0

Note: Areas with asterisks indicate that the training is not applicable to the employees

Training and development

Based on the total sample, 50 percent of the respondents either agreed or strongly agreed that ISO certification helped improve their training and development processes. Whereas, about 53 percent of the manufacturing organizations either agreed or strongly agreed with the statement.

Competitive position

The majority of the total sample (83 percent) agreed or strongly agreed that ISO 9000 certification improved their competitive position. About 95 percent of the manufacturing organizations agreed with the statement.

Relationship with customers

More than 90 percent of all the respondents either agreed or strongly agreed that ISO 9000 certification improved relationship with their customers. About 79 percent of the manufacturing organizations agreed with the statement.

Quality of products and services

Of the total sample, 95 percent of the organizations either agreed or strongly agreed that the ISO 9000 certification helped improve the quality of their products and services. Whereas all the manufacturing companies agreed with the statement.

Training-related records management

About 75 percent of the total sample either agreed or strongly agreed that ISO 9000 certification improved training-related records management. Also, about 79 percent of the manufacturing and 66 percent of non-manufacturing companies agreed with the statement.

On-the-job training

Only 65 of the total sample organizations felt that ISO 9000 certification improved the on-the job-training program. Whereas about 69 percent of the manufacturing companies agreed with the statement.

Summary and discussion

This exploratory study examined the impact of ISO 9000 certification on the training and human resource development activities of a small sample of companies in Singapore. Although, due to the sample size limitation, valid conclusions could not be drawn, but in summary, from the results presented, a consistent pattern emerged. All

Reasons for change	Total sample N = 28	Manufacturing N = 19	Service N = 9
Due to the implementation of ISO 9000 standard only (%)	60.71	52.63	77.78
Due to change of company policy other than ISO 9000 certification (%)	25.00	25.31	22.22
Due to change of government directives			
Change of PSB/SDF incentive program (%)	7.14	10.53	
Due to other reasons (s) (%)	7.14	10.53	

Table VII.
Reasons for change of
hours in different types of
training

Table VIII.
Average percentage of
payroll amount spent on
training per year

Levels of executives/employees	Total sample		Manufacturing		Non-manufacturing	
	Before ISO 9000 certification ^a (%)	After ISO 9000 certification ^b (%)	Before ISO 9000 certification (%)	After ISO 9000 certification (%)	Before ISO 9000 certification (%)	After ISO 9000 certification (%)
Executives	2.7	1.5 (↓ by 1.2)	2.5	0.4 (↓ by 2.1)	3.2	5.7 (↑ by 2.5)
Middle level managers	2.8	3.4 (↑ by 0.6)	2.6	2.7 (↑ by 0.1)	3.5	6.0 (↑ by 2.5)
Supervisors	1.4	2.2 (↑ by 0.8)	1.3	1.7 (↑ by 0.4)	3.0	6.0 (↑ by 3.0)
Front line employees	1.1	1.8 (↑ by 0.7)	0.8	0.8 (No change)	3.0	6.0 (↑ by 3.0)
Aggregate	6.2	7.2 (↑ by 1.0)	4.4	3.9 (↑ by 0.5)	12.7	13.9 (↑ by 1.2)

Notes: ^a Three years average prior to certification; ^b Average of up to three years after certification

the five hypotheses were rejected, indicating significant improvements in training needs analysis, training design, training delivery, training evaluation, and human resource development activities were reported.

In case of the manufacturing organizations, average training hours had increased for all types of employees. About 50 percent of the respondents agreed or strongly agreed that the increase was due to the ISO 9000 certification.

Average percent of payroll amount spent also increased in both manufacturing and service sectors, with the exception in the case of executives in the manufacturing sample. A little over 50 percent of the respondents agreed or strongly agreed that the increase was attributable to the ISO 9000 certification.

More than 75 percent of the respondents agreed or strongly agreed that ISO certification resulted in improved competitiveness, improved relationship with customers, improvement of quality of products and services and improvement in training related records. However, only 50 percent of the respondents agreed or strongly agreed that the certification helped improve the training and development process.

Significant improvements in training needs analysis, training design, training delivery, training evaluation and HRD activities were reported in the manufacturing organizations. Also there was some agreement among the respondents that the improvements in the average training hours per employee and average percentage of payroll amount spent for training in the sample organizations were the outcome of ISO 9000 certification. Besides training related activities, the respondents also indicated that ISO 9000 certification helped their organizations derive benefits in a number of areas such as:

Reasons for change	Total sample N = 28	Manufacturing N = 19	Service N = 9
Due to the implementation of ISO 9000 Standard only (%)	57.14	47.37	77.78
Due to change of company policy other than ISO 9000 certification (%)	17.86	21.05	11.11
Due to change of government directives (%)			
Change of PSB/SDF incentive program (%)	10.71	10.53	11.11
Due to other reasons (s) (%)	14.29	21.05	

Table IX.
Reasons for change in percentage of payroll amount spent for training

Benefits of ISO 9000 certification	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
Improved training and development	4	14	32	28	22
Improved competitiveness		3	14	40	43
Improved relationship with customers			7	69	24
Improved quality of products and services			5	58	37
Improved training related records management		4	21	36	39
Improved on-the-job-training			48	42	18

Table X.
Perceived benefits of ISO 9000 certification (overall sample) – percent of responses

- improved competitiveness;
- improved relationship with customers;
- improved quality of products and services; and
- improved management of training records.

McAdam and McKeown (1999), Sun (1999) and Quazi and Padibjo (1998) reported that ISO 9000 certification helped improve relationship with customers, comply to customer requirements and reduce customer complaints, which are in line with the tentative finding of this study where 90 percent of the respondents agreed that such certification helped improve relationship with customers. Findings of this study regarding the positive impact of ISO 9000 certification on competitive position correspond with those of Anderson *et al.* (1999) and Quazi and Padibjo (1998). However, this finding is in contradiction with that of Sun (1999) and Sun and Cheng (2002), who reported that ISO 9000 certification had little influence on market position and competitiveness.

The finding of Quazi and Padibjo (1998) on improved training related records is similar to that of the present study. This is to be noted that improved quality records management is one of the primary benefits of ISO 9000 certification and, therefore, the tentative finding of this study is in consonance with the objective of the certification, although McAdam and McKeown (1999) reported that the ISO 9000 certified companies had high levels of training activities, which necessarily did not mean that such activities had gone up as a result of ISO 9000 certification. Quazi and Padibjo (1998), on the other hand, reported that lack of training of the employees was one of the barriers to ISO 9000 certification. However, the tentative findings of this study clearly indicate that such certification did help improve the training and human resource development activities of the responding organizations. Furthermore, between 40-60 percent of respondents agreed that the average hours of training per employee per year and average percentage payroll amount spent on training had increased due to the ISO 9000 certification.

Findings of this study indicate that ISO certification help improve the quality of the products and services. Although ISO 9000:1994[5] standard does not directly address the issues related to quality of the products and services, the improvement reported may be the outcome of a well-managed system. According to Dalfonso (1995) the ISO 9000 standard is to produce a quality system within an organization which enables it to improve the way it currently does business, focus resources, document its processes, improve its customer relationship and satisfy customers and be involved in quality improvement. The quality system induces the management and employees to consciously try to improve the quality of its products and services. Therefore, the finding of this study, although tentative, is consistent with the objective of the standard.

Limitations and directions for future research

The reported study was an exploratory one. The usefulness of the findings is further constrained by the small sample size. As the subject of this study is relatively unexplored, detailed work can be done in the future in different countries with a larger sample to substantiate the findings reported here. With a larger sample size, a number of other analyses can be carried out. For example, the impact of organizational size and ownership could be tested on the issues being studied in this article[6].

It is suggested that in future studies, special attention be given to the non-manufacturing sector.

This present study also suffers from sample selection bias. Appropriate sampling techniques may be adopted so that the findings could be generalized.

Another limitation of the present study is that it did not use matched samples for ISO 9000 certified and non-ISO 9000 certified companies for proper testing of the hypotheses. Further, the future studies should isolate the impacts of ISO 9000 from other possible variables, such as changes in the conditions internal and/or external to the sample organizations, to assess the true impact of ISO 9000 certification.

It may also be interesting to carry out a multi-country study to examine the impact of ISO 9000 on training and development activities and other organizational characteristics.

Researchers interested in the topic may like to request a copy of the survey instrument that was used in this study and carry out similar study in other ISO member countries to validate (or disprove) the findings of this study.

Notes

1. ISO 9000 is a generic identification of the quality management standard. In fact, according to the 1994 version of the ISO 9000 family of standards, companies could get certified under ISO 9001, 9002 or 9003 depending on the nature of their operation. However, in the 2000 version companies can only be certified under ISO 9001.
2. Proquest/ABI INFORM and EBOSCOhost data bases were used for the literature review.
3. Different types of training are included: technical training, product and quality related training, computer related training, management training, supervisory training, production and engineering related training, certified technical training and trade and crafts related training. This classification of training used is the SDF of Singapore.
4. Although we have not used a ratio scale it is noted from that for *t*-test for differences between means "at least interval data and a sample size of 12 or more are required" (Drew *et al.*, 1996). As an interval type scale to measure the extent of training impact was used, the methodology is considered as appropriate (also refer to Zikmund, 2003, p. 524).
5. ISO 9000:1994 emphasized more on the quality management system rather than the quality of the products and services. The new ISO 9001:2000 does address the quality of product and service issues through the clauses on planning of product realization, customer satisfaction and others.
6. A good discussion on the impact of ISO 9000 and organizational size could be found in Kie and Palmer (1999), Wiele and Brown (1997/1998), Goh and Ridgway (1994) and Quazi *et al.* (2002).

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