

DIFERENCES IN MANAGES ASSESSMENTS OF ISO 14000 STANDARD IMPLEMENTATION IN TURKEY

DIFERENÇAS NA AVALIAÇÃO DOS GESTORES SOBRE A IMPLEMENTAÇÃO DOS PADRÕES ISO 14000 NA TURQUIA

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RESUMO

Este estudo relata os resultados de um levantamento sobre as melhorias obtidas como resultado da implementação dos padrões do Sistema de Gestão Ambiental (EMS) ISO 14000 e as diferenças das melhorias em relação às características das empresas. O levantamento foi conduzido para explicar melhorias relacionadas ao processo de gestão ambiental e o desempenho geral das empresas. O estudo incluiu sessenta e seis empresas que implementaram os padrões ISO 14000 na Turquia. Foram preparados demonstrativos relacionados ao processo de gestão ambiental para avaliar as melhorias obtidas com a implementação da ISO 14000 EMS. Os demonstrativos neste estudo são relevantes para pesquisas anteriores. Foi usada a análise fatorial visando determinar os fatores das variáveis que explicam as melhorias. Nove fatores foram identificados: o estabelecimento de um sistema pró-ativo de gestão ambiental, a efetividade no uso de recursos, a efetividade do processo de controle, o relacionamento com a indústria e o governo, o atendimento das expectativas dos acionistas, a demonstração da responsabilidade social, a rentabilidade, a produtividade e a competitividade. A seguir foi realizado o teste T para determinar as diferenças das avaliações dos gerentes com relação a certas características das empresas. Estes achados mostram que existem diferenças nas avaliações de melhorias obtidas como resultado da implementação dos padrões da ISO 14000 em relação ao volume de vendas, à posse de capital estrangeiro e a implementação dos padrões ISO 14000. Por outro lado, o setor industrial, a duração da empresa e uma orientação às exportações não foram estatisticamente significativas para as diferenças observadas nas avaliações.

ABSTRACT

This study reports the results of a survey about the improvements achieved as result of ISO 14000 Environmental Management System (EMS) standard implementation and the differences of improvements with respect to firm characteristics. A survey has been conducted in order to explain the improvements related to environmental management process and overall firm performance. The survey involved sixty-six enterprises implementing ISO 14000 EMS standard in Turkey. In order to assess improvements obtained from ISO 14000 EMS implementation, statements related to environmental management pro-

cess and overall firm performance indicators have been prepared. The statements in this study are relevant to previous research. A factor analysis was employed to determine the factors of the variables explaining improvements. Nine factors have been identified related to achieved improvements, such as establishment of pro-active environmental management system, effectiveness in resource utilization, effectiveness of process control, relationships with industry and government, meeting expectations of stakeholders, demonstration of social responsibility, profitability, productivity, and competitiveness. Then, a T- test was conducted to determine the differences of managers' assessments with respect to certain firm characteristics. The findings have shown that there are differences in the assessments of improvements achieved as a result of ISO 14000 EMS standard implementation with respect to sales volume, foreign-capital possession, and ISO 14000 EMS standard implementation. On the other hand, industrial sector, age of establishment, and export orientation are not statistically significant for the differences in the assessments of improvements.

PALAVRAS-CHAVE

Gestão ambiental, Padrões ISO 14000 EMS, desempenho geral da empresa, Turquia

KEYWORDS

Environmental management, ISO 14000 EMS standard, overall firm performance, Turkey.

INTRODUCTION

It has become indispensable for companies all over the world not only to produce high quality products and services in today's highly competitive markets, but also establish reliable and robust systems and processes for protecting environment. As we examine the evolution of quality management concept, contemporary understanding of quality management requires the incorporation of product quality with environmental and employee quality. Because of their social responsibility, the companies are obliged to take into consideration the requirements of the future consumption of resources. In this era, the companies may achieve success in competitiveness through building a vision that considers a balance between the quality and as well as the impact of their products on environment (Puri, 1996).

The companies are requested to assess environmental impact of their products when they prepare long-term strategies, which in turn might affect their stakeholders. An environmental system

established in this direction will be contributing to product improvement, effectiveness of waste management system, prevention of work accidents, and continuous improvement of firm performance (Mason, 1994). ISO 14000 Environmental Management System (EMS) standard plays an important role for guiding companies in their efforts formulating management strategies and also establishing systems for environmental protection. It contributes to improvement of firm performance and facilitates world trade (Kocasoy, 1997). ISO 14000 EMS standard requests commitment in four major organizational issues (Raiborn et al, 1999):

1. responsabilidade social,
2. Assurance of firm procedures with laws and regulations in environmental issues,
3. Continuous improvement, and
4. Minimization of waste and prevention of pollution.

Environmental management system effectiveness requires sufficiency of human, financial,

technical, and management resources, as well as top management commitment and effective training of personnel (Affisco et al, 1996).

2. THE TURKISH AND WORLD IMPLEMENTATIONS OF ISO 14000 EMS STANDARD

Quality, cost, and meeting customer expectations are not sufficient to keep up with competitiveness in the long-term. In addition to these criteria, environmental protection, resource utilization, and innovation of environmental friendly products issues are considered as the new paradigm in business circles (Ferone, 2001). Certification of ISO 14000 EMS standard has become so extensive because companies demanding environmental clean products increasingly request their suppliers to accomplish their certification. For example, IBM and Ford are willing to work with suppliers that are sensitive to environmental issues, and urge them to receive certification of ISO 14000 EMS standard (Jackson, 1998). The number of ISO 14000 EMS standard certified companies was nearly 37000 in 112 countries by the end of 2001. The certification densities can be explained by two factors. The first factor is significant overlap between ISO 9000 and ISO 14000 standards and the second is the number of environmental pacts (Vastag, 2004). Empirical studies illustrate that many companies currently accomplish ISO 14000 EMS standard certification as a weapon of competition because it affects corporate image significantly. However, markets in the future are likely to request ISO 14000 EMS standard certification as an obligation (Chin et al, 1999a, Rondinelli et al, 2000).

ISO 14000 EMS standard certification developments in Turkey are increasingly improving to cope with the rest of the world. The number of ISO 14000 EMS standard certified for-profit companies in Turkey at the end of 1996 was 26 and it increased to approximately 250 at the end of 2003 (Kal-Der). Nowadays, many companies achieve ISO 14000 EMS standard certification because of environmental awareness, public concern

about environmental issues, market pressures, and legal requirements. A research conducted in Turkey has revealed that companies seek ISO 14000 EMS standard certification to improve their social relations, assure legal requirements, achieve job security, and integrate quality and environmental management systems (Bolat, 2003).

3. IMPROVEMENTS AS A RESULT OF ISO 14000 EMS STANDARD IMPLEMENTATION

In the literature, there are two major approaches in regard to implementation of environmental management and strategies. Reactive approach of environmental management preaches prevention of pollution in end-of-pipe through compliance with laws and regulations. On the other hand, pro-active approach of environmental management is concerned with preventing pollution in the source. Pro-active approach requires adoption of the idea for continuous improvement in processes; involvement of everyone at all levels in the organisation to environmental activities; improvement of coordination among functional departments, and accomplishment of technological developments (Russo et al, 1997; Klassen et al, 1996; Klassen et al, 1999). In pro-active environmental management, involvement of suppliers in the process of environmental protection will improve processes and financial performance (Theyel, 2000).

As it is pointed out above, fundamental changes are necessary in the organizational culture to adopt such an environmental management approach. However, ISO 14000 EMS standard does not provide a definite explanation of cultural change (Shinichi et al, 2000). Nonetheless beyond compliance with process control and environmental regulation, the following items for preventing pollution at the source exist in the ISO 14000 EMS standard (Walker, 2000):

- Sustaining continuous improvement through preventing pollution at the source.

- Installing a continuous review system to determine environmental goals and their accomplishment.

- Determination of roles and responsibilities within the firm.

- Training of all employees for enhancing their skills and capabilities in environmental management.

ISO 14000 EMS standard implementation aids as a guide for companies in integrating their environmental management activities with their strategic plans, goals, and values effectively in the long run (Raiborn, 1999). The implementation of the standard provides firms various benefits, which are establishing a proactive environmental management system, reduction of waste, optimization of resource utilization, meeting environmental expectations of stakeholders, compliance to environmental regulations, protection from unfair competition, enhancement of company image, cost savings, and improvement of productivity and profitability (Rezaee et al., 2000; Tan, 2003). Publications about the benefits of ISO 14000 EMS standard implementation are available although they are limited. However, manager assessments of improvements obtained from ISO 14000 standard implementation may differ with respect to product and service characteristics of each company, market structure, and employee skills. Assessment of improvements obtained as a result of ISO 14000 standard implementation with respect to firm characteristics is considered as a very significant contribution to research in this field.

4. METHODOLOGY

4.1. Scope of the Study

This study encompasses sixty-six ISO 14000 certified companies from different sectors and aims to examine managers' assessments of improvements in environmental management processes and as well as overall firm performance.

The questionnaire was sent out to a hundred and sixty ISO 14000 certified companies, and sixty-six responses were collected back. The names and addresses of the companies practicing ISO 14000 EMS standard are obtained from Kal-Der (the Turkish Quality Association) database. In the survey, forty-six of the responses are from manufacturing and twenty from service companies. Hence, the return rate of questionnaires was 41%. The basic sample characteristics are illustrated in Table 1. In the questionnaire, many variables indicating improvements in firms' environmental management processes and overall firm performance are determined from previous studies. Quality and environmental department managers are asked to fill out questionnaires according to a 5 point Likert-scale with the statements; (1) I do not agree definitely, (2) I do not agree, (3) I am indefinite, (4) I agree, and (5) I agree definitely.

4.2. Hypotheses of the Research

The findings of previous research have implied that assessments of improvements obtained from ISO 14000 EMS implementation may differ with respect to firm characteristics. Utilizing the findings of previous research, hypotheses of this study are formulated and stated below:

4.2.1. Hypothesis related to sectors

Although ISO 14000 EMS standard is designed for all types of sectors, service sectors are behind manufacturing in implementation. As previous studies indicate, ISO 14000 EMS standard is designed and developed mostly for the manufacturing sectors, and the implementation is not clear for service companies and creates difficulties. In addition, the impact of manufacturing sectors to environment is more risky as compared to service companies (Holt, 1998). The hypothesis based on this finding is as follows:

H₁: There is difference with respect to sector in the assessment of improvements achieved as a result of ISO 14000 EMS standard implementation.

Table1. Sample Statistics

A. Industry mix	Size	Percentage
Electric/ Electronic	6	9,0
Food	9	13,6
Textile	4	6,0
Automobile	8	12,2
Metal and Machinery	8	12,2
Chemistry	3	4,6
Construction and Construction equipment	6	9,0
Service sector	20	30,4
B.Export orientation		
Not exporting	18	27,3
Exporting	48	72,7
C. Sales volume range		
1 Trillion-10 Trillion T.L.	21	31,8
>10 Trillion T.L.	45	68,2
D. Existence of foreign capital		
Existent	29	44,0
Nonexistent	37	56,0
E. Age of establishment		
Before 1970	20	30,3
1970-1979	11	16,7
1980-1989	19	28,8
After 1989	16	24,2
F. Length of ISO 14000 EMS standard application		
ISO 14000 EMS standard implementation longer than three years	30	45,5
ISO 14000 EMS standard implementation less than three years	36	54,5

Source: Research data

4.2.2. Hypothesis related to age of establishment

As markets change, the age of establishment influences firms and they encounter with different problems. Because their systems and approaches are new, the younger companies adapt to changes more easily than the older organizations (Glancey, 1998). A research has shown that the opinions of managers on quality practices change with respect to firm age (Madu et al, 1995). The hypothesis based on this finding is as follows:

H_2 : There is difference with respect to age of establishment in the assessment of improvements achieved as a result of ISO 14000 EMS standard implementation.

4.2.3. Hypothesis related to scale of firm with respect to sales volume

The results of a research on the effects of firm scale, in the formulation of strong environmental goals and strategies, have illustrated that small- and middle-scale firms do not share much concern about environmental issues. The reasons, which they have reported, are absence of an organizational unit to coordinate environmental processes, financial resources to initiate environmental activities, and a well-regulated process structure (Azzone et al, 1997). The hypothesis based on this finding is as follows:

H_3 : There is difference with respect to firm scale in the assessment of improvements achieved as a result of ISO 14000 EMS standard implementation.

4.2.4. Hypothesis related to foreign-capital possession

A research conducted on ISO 9000 Quality Management System (QMS) implementation in 500 foreign and domestic U.S.A. companies in 1997 has revealed that customer influences on ISO 9000 acquisition according to domestic companies is more significant as compared to foreign ones. The domestic companies strive to enter European Union markets and the customers in these markets request ISO 9000 certification.

Besides, domestic companies accomplish more significant improvement as a result of ISO 9000 QMS standard implementation in procuring better quality production components and parts from suppliers and accomplishing process design. The hypothesis based on this finding is as follows:

H_4 : There is difference with respect to foreign-capital possession in the assessment of improvements achieved as a result of ISO 14000 EMS standard implementation.

4.2.5. Hypothesis related to export orientation

ISO 9000 QMS and ISO 14000 EMS standard certification is a requirement to make business in European Union countries. Because ISO 9000 QMS standard certification is an indispensable requirement for small scale and exporting companies to operate in the European Union markets, they are obliged to accomplish ISO 9000 standard certification just like the large scale firms (Naidu et al, 1994). In the same way, ISO 14000 EMS standard certification has also become an obligation to export to the European Union markets. The hypothesis based on this finding is as follows:

H_5 : There is difference with respect to export orientation in the assessment of improvements achieved as a result of ISO 14000 EMS standard implementation.

4.2.6. Hypothesis related to length of ISO 14000 standard implementation

Powel (1995) has reported that quality efforts do not provide immediate positive results on performance outputs. A research conducted in Finland has shown that companies employing ISO 9000 QMS standard longer than three years have achieved reduction of variability in product quality, improvement in team working, and better adaptability to ISO 14000 EMS standard implementation. (Erkiila-Lehto et al., 1999). The basic procedures of ISO 9000 QMS and ISO 14000 EMS standards are very similar in issues such as documentation, policy, training, strategy, and auditing. Because of

these similarities, improvements obtained from ISO 14000 EMS standard implementation are expected to increase in time as they excel in assessing processes (Favreau, 1998). The financial effects of environmental management and policy established according to the framework of ISO 14000 EMS standard will be observed at all levels of the organization only in the long run (Raiborn et al, 1999). The hypothesis based on this finding is as follows:

H_6 : There is difference with respect to length of ISO 14000 standard implementation in the assessment of improvements achieved as a result of implementation.

4.3. Analysis of data

All data have been analyzed statistically by utilizing a SPSS software package. The following statistical methods have been used:

- a. To accomplish the parametric hypothesis test, Kolmogorov-simirnov test was used to determine whether the data was distributed normally.
- b. Arithmetic mean, standard deviation, and frequencies were used to evaluate the data in general.
- c. Factor analysis was used to determine the factors of the statements related to improvements achieved as a result of ISO 14000 EMS implementation.
- e. Reliability analyses were conducted to determine the reliabilities of variables used in this research and all the factor variables obtained from the factor analyses.
- f. T-tests and one way Anova analyses (for the age of establishment) were conducted to determine the differences in the improvements achieved with respect to firm characteristics as a result of ISO 14000 EMS standard implementation.

5. RESULTS

In the study, managers' assessments of improvements related to environmental management

processes and overall firm performance in the ISO 14000 EMS standard implementing firms are measured, and differences with respect to firm characteristics are examined. Twenty-seven variables explaining the improvements related to environmental management processes and seven variables explaining overall firm performance have been developed from previous studies in the field of environmental management research. A factor analysis was conducted to determine the factors of these variables (See Tables 2 and 3). Six factors have been determined that explain 75.18% of the variation of improvements related to environmental management processes. On the other hand, only three factors have been determined, which explain 84.31% of the variation of improvements in firm performance. The names of the factors, the variables under these factors, and sources of variables in the brackets are given below:

Factor 1.1. Establishment of pro-active environmental management system

1. Improvements in recycling have been achieved through recover of waste and reuse of non-hazardous waste (Gupta, 1995).
2. Adoption of environmental friendly technologies, which minimize environmental pollution, has become faster and more extensive (by the researchers).
3. Improvements have been achieved for promoting awareness among the suppliers in the production of environmental friendly products/services (Walton et al, 1998).
4. More effective coordination of functional units for environmental management in related processes is achieved (Theyel, 2000).
5. Training and education of personnel in the accomplishment of environmental performance is facilitated (by the researchers).
6. Improvements are achieved for the integration of quality and environmental goals (by the researchers).

7. Number of programs for continuous improvement of processes has increased (by the researchers).

8. Significant contributions to updating and effective implementation of environmental management have been acquired (Theyel, 2000).

Factor 1.2. Improvement of resource utilization

9. Optimal allocation of technical resources has been achieved (by the researchers).

10. Optimal allocation of managerial resources has been achieved (by the researchers).

11. Optimal allocation of human resources has been achieved (by the researchers).

12. Reductions in energy and water are observed (Klassen et al, 1996).

13. Improvements in consumption of raw material and material are achieved (Kocasoy, 1997).

Factor 1.3. Effectiveness of environmental control in firm process

14. Disorders in processes are detected much easier and faster (by the researchers).

15. Improvements are achieved in the analysis of hazardous effects of operations and products/services (by the researchers).

16. Reductions of wastes and pollution at the end of processes are achieved (by the researchers).

17. Number of corrective actions in processes is increased (by the researchers).

Factor 1.4. Industry and government relationships

18. Improvements in industrial relations are observed (by the researchers).

19. Positive implications in the execution of laws and by-laws are observed (Chin et al, 1999).

20. Improvements are observed in relations with government organizations (Kocasoy, 1997).

Factor 1.5. Meeting expectations of stakeholders

21. Positive contributions to the utilization and preservation of limited natural resources are achieved (by the researchers).

22. Expectations of our customers for producing environmental friendly products are better met (by the researchers).

23. Expectations of investors are met and success criteria are justified so that incoming capital has increased (Theyel, 2000).

24. Improvements are achieved in employee relations (by the researchers).

Factor 1.6. Accomplishment of social responsibility

25. Control of environmental risk is improved through determination of the limitations of responsibilities (by the researchers).

26. Company image and public relations are improved (Chin et al, 1999b).

27. Contributions to a healthy and reliable work environment are obtained (Gupta, 1995).

Factor 2.1. Profitability indicators

1. Increases of profitability in the long run are possible (Chin et al, 1999b).

2. Rate of investment (ROI) of our investments is improved (Ahmed et al, 1998).

3. Significant increases in sales volumes are achieved (by the researchers).

4. Cost savings are obtained in all processes (Chattopadhyay, 2001).

Factor 2.2. Competitiveness indicators

5. Competitiveness has enhanced (by the researchers).

6. Increase of market share is obtained (Klassen et al, 1996).

Factor 2.3. Productivity indicators

7. Productivity increases in all processes have become possible (Quazi, 1999).

If improvements related to environmental management process in Table 2 is examined, the averages of the variables "accomplishing social responsibilities" and "improvements for controlling waste" are 4 or above. However, no significant

Table 2. Factor analysis and averages of assessment of improvements related to environmental management process

Variables Number	Means	Factor Loadings						Communalities
		F.1.1	F.1.2	F.1.3	F.1.4	F.1.5	F.1.6	
1	4.30	.816						.847
2	3.88	.775						.814
3	3.19	.716						.774
4	3.90	.693						.811
5	4.17	.667						.765
6	3.78	.610						.749
7	2.84	.518						.672
8	3.41	.506						.669
9	3.78		.812					.798
10	3.26		.778					.775
11	3.78		.752					.741
12	3.19		.558					.689
13	3.75		.547					.552
14	4.06			.840				.780
15	4.21			.807				.783
16	4.21			.773				.698
17	3.89			.540				.732
18	4.06				.759			.750
19	4.34				.731			.606
20	3.80				.647			.744
21	2.54					.863		.893
22	3.04					.828		.843
23	2.21					.739		.862
24	2.76					.505		.718
25	4.50						.818	.805
26	4.34						.747	.673
27	4.50						.649	.758
Eigenvalues		11.21	2.27	2.02	1.72	1.61	1.45	
Total Variance Explained		41.54	8.41	7.49	6.38	5.97	5.37	
Cronbach alpha*		91.77	85.48	84.10	73.81	87.01	71.32	
KMO>.783; Bartlett Test=1062.322; p<0.000; n=66 *; Relative Reliability of Each Factor: (%)								

Source: Research data

improvements are pointed out in regard to pro-active environmental management practices. For example, programs for continuous improvements in processes, responsibility of suppliers for producing environmental friendly products or utilization of technologies minimizing hazardous environmental effects are not significant according to managers. It is pointed out that improvements for energy and resource utilization and meeting expectations of stakeholders are insignificant.

If improvements with respect to overall firm performance indicators in Table 3 are examined, firms do not accomplish significant improvements as a result of ISO 14000 EMS implementation with the exception of competitiveness indicators.

In addition to factor analysis, T-test and one way Anova analyses were conducted to determine the differences in assessment of improvements. In Table 4, only significant results are presented. The results of the T-test have shown that large-scale

firms improve better than medium scale firms in establishing pro-active environmental management system and accomplishing effectiveness of environmental process control. Table 4 also shows that the assessment of improvements differs with respect to foreign-capital possession. Examining those factors that have different means, managers of foreign partner firms point out more significant assessments in regard to relations with industry and government in implementing ISO 14000 EMS standard. Improvements of stakeholder expectations and competitiveness are better in domestic companies. However, those firms applying ISO 14000 EMS standard longer than three years achieve better improvements of productivity. Hence, the assessment of improvements achieved by the ISO 14000 EMS implementing firms is significantly different at 99% and 95% confidence levels with respect to firm characteristics. This result verifies the hypotheses H_3 , H_4 , and H_6 .

Table 3. Factor analysis and averages of assessment of improvements in overall firm performance

Variables No	Means	Factor Loadings			Communalities
		F.2.1	F.2.2	F.2.3	
1	2.93	.929			.899
2	2.21	.907			.840
3	2.52	.861			.808
4	3.15	.650			.701
5	3.86		.910		.854
6	4.43		.905		.852
7	4.10			.918	.952
Eigenvalues		3.63	1.59	1.11	
Total Variance Explained		51.94	22.78	9.65	
Cronbach alpha*		.9038	.8091		
KMO=.770; Bartlett Test=173.996; $p<0.000$; $n=66$ *: Relative Reliability of Each Factor (%)					

Table 4. T-test for differences in assessment of improvements as a result of ISO 14000 EMS standard implementation

Factor number	Factor name	Mean		T
Differences in assessments with respect to sales				
		N1:21	N2:45	
Factor 1.1	Establishment of pro-active environmental management system	-0.67	0.15	-2.827***
Factor 1.3	Effectiveness of environmental control in firm process	-0.36	0.11	-2.121*
N1:21(The number of medium scale firms), N2: 45 (The number of large scale firms)				
Differences in assessments with respect to foreign-capital possession				
		N1:29	N2:37	
Factor 1.4	Improvements in relationships with industry and government	0.32	-0.23	1.895*
Factor 1.5	Improvements in meeting expectations of stakeholders of the firms	-0.36	0.25	-2.128**
Factor 2.2	Competition	-0.30	0.21	-1.779*
N1:29 (The number of foreign-capital firms) N2:37 (The number of national firms)				
Differences in assessments with respect to length of ISO 14000 EMS implementation.				
		N1:30	N2:36	
Factor 2.3	Productivity	0.35	-0.50	3.100***
N1:30 (The number of firms implementing ISO 14000 EMS standard longer than three years)				

Source: Research data

6. CONCLUSION

It is found that the firms have achieved significant improvements through implementing ISO 14000 EMS standard with respect to accomplishment of social responsibility, relations with industry and government, effective control of environmental processes, productivity improvement, and competition. However, the implementation of ISO 14000 EMS standard does not provide significant improvements for issues such as playing a significant

role to establish a proactive environmental management system, increasing the number of programs for continuous improvement of processes, integration of goals for quality and environment, increasing the participation of employees in environmental training programs, building environmental responsibility in the suppliers of the firms, and integration of all functional units for environmental management operations. These activities necessitating cultural change are important for

establishing a pro-active environmental management system. The firms are committed to continuous improvement of environmental quality as a result of ISO 14000 EMS standard implementation. It is indispensable for the firms to achieve radical changes in their processes for effective implementation of ISO 14000 EMS standard. Implementation of a pro-active environmental management system and effectiveness of environmental process control in firms may become possible because of these radical changes in their processes. However, investing in product/service technologies to prevent and/or control pollution and training employees of the firm may not be achieved fully due to limited financial resources. Russo and Fouts (1997) have reported that the success of environmental management system is dependent on the availability of company resources and requires significant amount of resource for preventing pollution at the source. The reason for inefficient environmental control of processes and disability of preventive environmental management in small and medium size firms is the insufficient financial resources rather than the necessity of organizational cultural change.

Examining the differences with respect to foreign partnership in ISO 14000 EMS standard implementation, the assessment of relations with industry and government is more significant. This

finding implies that the foreign partner companies are very sensitive about local industrial relations, and comply with regulations of the country more strictly. The domestic companies on the other hand consider ISO 14000 standard certification as an important tool of competition. Examining the firms implementing ISO 14000 standard longer than three years, it is found that their assessment in regard to productivity improvements is similar to the results found in previous research. Finally, it may be concluded that positive effects of ISO 14000 EMS standard implementation will be achieved at levels of the organization in the long run. ➤

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