

EFFECT OF MANAGEMENT SYSTEMS ISO 9000 AND ISO 14000 ON ENTERPRISES' AWARENESS OF SUSTAINABILITY PRIORITIES

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Introduction

Reinforcement of sustainable (long term focused) behavior of enterprises is often connected with investment into and implementation of management standards leading to improvement of organization performance. Implementation of ISO 9000 and ISO 14000 management systems brings about questions that need to be answered in order to tune up enterprise performance concerning quality and environmental activities possibly measured by indicator parameters. Increasing of management awareness of specific questions of sustainability will necessarily bring apparent positive results that authors describe in work parallel to this paper.

Primary goal of this study is to discover if application of ISO 9000 and/or ISO 14000 management systems as sophisticated modern management methodic complexes has positive effect on awareness of an owner or top management of enterprise's sustainability/CSR (corporate social responsibility) priorities. The paper also characterizes morphologically which companies are more engaged into ISO implementation and which are less engaged.

1. Theory and Hypotheses

1.1 ISO 9000 Quality Management System Standard

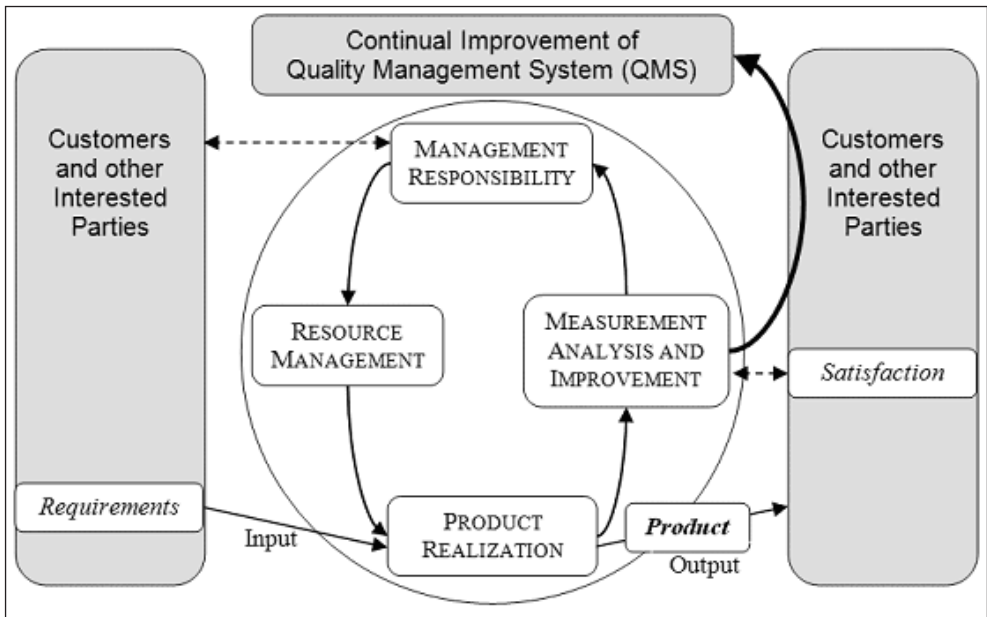
The ISO 9000 family of international quality management standards and guidelines has earned a global reputation as a basis for establishing effective and efficient quality management systems. Figure 1 describes ISO 9000 process approach. Since their initial

publication in 1987, the ISO 9000 standards have undergone three revision cycles and have had a great impact on the implementation of international trade and quality management systems by organizations throughout the world. It is widely acknowledged that proper quality management improves business, often having a positive effect on investment, market share, sales growth, sales margins, competitive advantage, and avoidance of litigation. The quality principles in ISO 9000:2000 are also sound, according to Wade [27] and also to Barnes [1], who says that "ISO 9000 guidelines provide a comprehensive model for quality management systems that can make any company competitive." Implementing ISO often gives the following advantages [17], [9]:

- Creates a more efficient, effective operation.
- Increases customer satisfaction and retention.
- Reduces audits.
- Enhances marketing.
- Improves employee's motivation, awareness, and morale.
- Promotes international trade.
- Increases profit.
- Reduces waste and increases productivity.
- Represents the common tool for standardization.

Aims of ISO 9000 are quite basic – to give confidence in the organization's ability in order to provide consistently conforming products to its customers. The way in which the enterprise manages its business activities in order to achieve this objective differs apparently and depends very much on its nature and type (most of all economic sector, size, legal form,

Fig. 1: The ISO 9000 Process Approach



Source: own based on www.iso.org

and others) and ISO provides systematic activity setting to meet company goals and requirements.

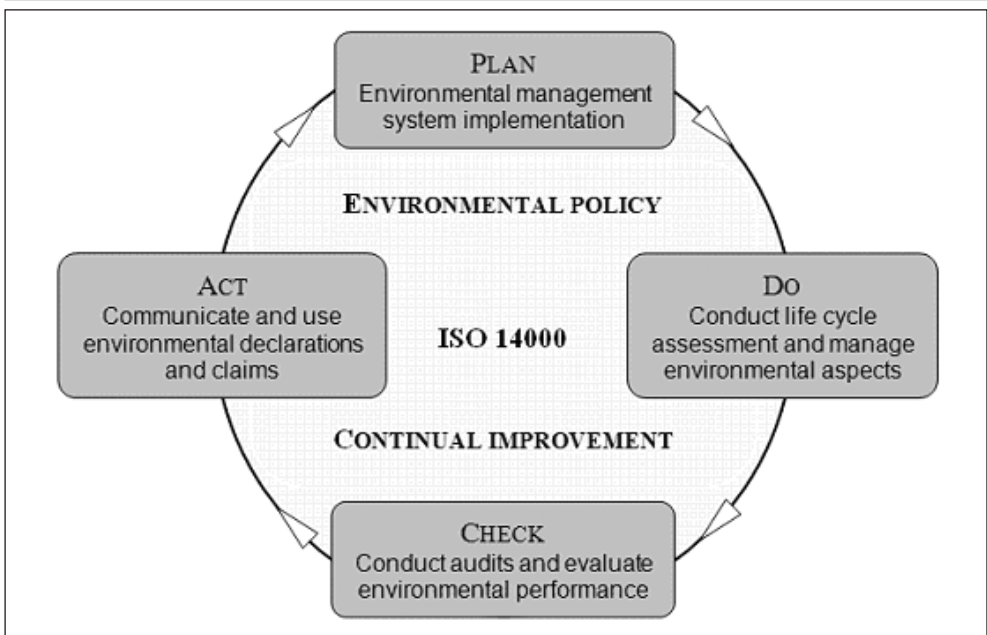
1.2 ISO 14000 Environmental Management System Standard

Organizations of all kinds are increasingly concerned with achieving and demonstrating sound environmental performance by controlling the impacts of their activities, products and services on the environment, consistent with their environmental policy and objectives. They do so in the context of increasingly stringent legislation, the development of economic policies, norms and other measures that foster environmental protection, and increased concern expressed by interested parties about environmental matters and sustainable development. The most representative EMS ISO 14000 International Standard is based on the methodology known as Plan-Do-Check-Act (PDCA). PDCA can be briefly described as follows [17], [10].

- Plan: establish the objectives and processes necessary to deliver results in accordance with the organization's environmental policy.
- Do: implement the processes.
- Check: monitor and measure processes towards environmental policy, objectives, targets, legal and other requirements, and report the results.
- Act: take actions to improve continually performance of the environmental management system.

International Standards covering environmental management are intended to provide organizations with the elements of an effective environmental management system (EMS) that can be integrated with other management requirements and systems and help organizations achieve environmental and economic goals. The basis of the approach is shown in figure 2. The success of the system depends on commitment from all levels and functions of the organization, and especially from top management.

Fig. 2: Environmental Management System Model by ISO 14000



Source: own based on www.iso.org

1.3 Elasticity, Adaptability and Enterprise Performance in Sustainability Context

Elasticity of management, entrepreneurship adaptability and stability are closely interconnected concepts. Elasticity of management is described in literature in four dimensions as: (1) reactive, (2) adaptive, (3) defensive, and (4) creative attributes of the strategy of an observed firm [25]. Elasticity of enterprise management, as ability to react adequately at emerging conditions, is reflection and root of adaptability as enterprise's ability to survive consistently changing conditions. Progressive stability is understood as adaptability so strong, that it enables the enterprise not only to survive, but thank to continuous improvement of processes it also becomes more robust and achieve better sustainable results that can be observed on selected criteria. Kovařová concludes that entrepreneurship performance and effectiveness is directly connected with establishing its sustainable competitiveness [13].

Sustainability concept with the accent on small and medium businesses (SMEs) should

be examined in five important aspects [23], [19]:

- Economic aspects (E).
- Social aspect (S).
- Environmental aspect (N).
- Technological aspect (T).
- Legislative and political (L).

1.4 Sustainability Priorities of Entrepreneurships

European foundation for management development (EFMD) recommends enterprises to pursue four groups of priorities (research questions H1-H7) of sustainable development [23]:

- Priority focused on employees and social aspect.
- Priority focused on environment.
- Priority focused on natural resources and their costs – economical aspect.
- Priority focused on product quality and technological aspect.

Observing these priorities, four hypotheses were formulated. First two hypotheses are descriptive and next two concern sustainability

priorities and influence of ISO management systems on them.

- HYP1: Most enterprises that implemented ISO 14000 implemented also ISO 9000.
- HYP2: Bigger enterprises pay more attention to implementation of ISO 9000 and/or ISO 14000 than the smaller ones.
- HYP3: Businesses priorities are primary focused on quality.
- HYP4: Application of ISO 9000 and/or ISO 14000 management systems has positive enhancing and balancing effect on sustainability priorities of entrepreneurships.

2. Original Research and Its Methodology

Methodic used during creation of this paper is described in this chapter. After preliminary research and inspiration from relevant scientific literature there were hypotheses formulated. Hypothesis was subsequently evaluated by data analysis of the questionnaire research characterized below.

2.1 Questionnaire Research

Questionnaire research was realized during spring semester 2012 by students of Business Entrepreneurship Faculty in Karvina, Silesian University in Opava (Czech Republic). 722 companies active in Czech and Slovak Republic in time period 2009–2011 were subjects of interest (SMEs are creating 89 % of sample group in accordance with number of employees' criterion). Interview protocol included controlled dialogue of a student with an enterprise owner, an executive manager or a top manager, so the collected data have the character of expert guess opinion. Company identification (10 questions) and identification of a student and his opinion on questionnaire relevance (5 questions) was necessary part of each form. Initial sample size 722 companies were filtered and reduced to 677 credible items. The questionnaire form also includes nondisclosure statement to provide business and privacy protection. Moreover data were analyzed anonymously and published as only no-name data.

Data reliability is assured (1) by authorization (contact person, signature, stamp), (2) by subjective student relevance evaluation, partially (3) by internet verification and (4) by statistical validity (standard deviation and Pearson correlation index).

Questionnaire was focused on seven areas of interest (11 of 61 questions evaluated):

- Enterprise identification (4 of 10 questions evaluated).
- Enterprise's strategic management (6 questions).
- Economic and financial trends of business, risk management (11 questions).
- Personal politics of company (7 questions).
- Production, services and innovations (8 questions).
- Grants and subsidies (4 questions).
- Energetic and material savings and application of renewable sources (8 questions).
- Sustainability priorities of enterprises (7 of 7 questions evaluated).

2.2 Selected and Evaluated Questions (Criteria)

There were evaluated following questions/criteria. Numbering of questions correspond the one used in the questionnaire. Each part had space for possible comment or further narrative information about questions asked.

Enterprise identification:

- A2: Legal form of enterprise (self-employed entrepreneur, liability limited company, public liability company, other);
- A5: Major branch of economic activity according NACE classification (A – U codes);
- A7: Average number of employees (0, 1–10, 11–50, 51–100, 101–250, more than 250);
- A8: Average annual turnover – sales in CZK (less than 1 mil., 1 mil.–10 mil., 10 mil.–100 mil., 100 mil.–1 bill., over 1 bill.)

Sustainability priorities of enterprises – with respect to EFMD methodic (part H):

Scale: 0–10 (0... no priority, 10... highest priority)

- H1: Basic Human Need Fulfillment (job creation, employee pride, meeting customer demands...);
- H2: Environmental harmonization;
- H3: Performance Optimization (people, products, and processes do what they're designed to do);
- H4: Loss and Waste Prevention (reducing present and future costs);
- H5: Product Quality Improvement;
- H6: Resource Use Optimization (including raw materials and labor);

- H7: Product-Life Enhancement (increasing profit potential).

2.3 Data Structure and Analysis

Data were processed by Microsoft Excel® and IBM SPSS® software. Charts and tables are presented and commented in the next part of article. Discussion with other published related scientific results is presented later.

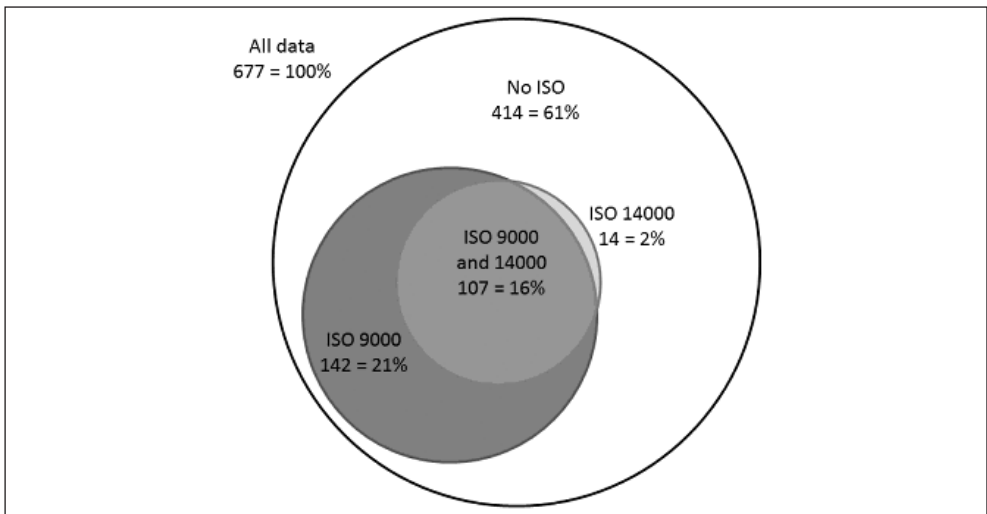
For the reason of comparison analysis data were structured into four data evaluation groups (except for all data group):

- Enterprises with neither ISO 9000 nor ISO 14000 implemented – expected to be less stable (414 enterprises).
- Enterprises with ISO 9000 implemented (249 enterprises). 42 % of companies with ISO 9000 have also ISO 14000.
- Enterprises with ISO 14000 implemented (121 enterprises). 88 % of companies with ISO 14000 have also ISO 9000.

- Enterprises with both ISO 9000 and ISO 14000 implemented – expected to be most stable and synergic (107 enterprises).

Economic activity statistical evaluation (NACE) shows, that most researched companies (24 %) is active in section C – Manufacturing. Next very strong group (23 %) belong into section G – Wholesale and retail trade; repair of motor vehicles and motorcycles. Third strong section is C – Construction (13 %). Other two sections overreached 5 % of ‘all data’ group of companies: section I – Accommodation and food service activities (6 %) and M – Professional, scientific and technical activities (6 %). All other sections are covered fewer than by 5 % of researched enterprises. Deeper analyses of economic activity type and enterprises’ ISO attitude will be subjected to further research.

Fig. 3: Interconnected ISO Implementation Groups of Interest in Absolute Numbers of Respondents and Percent



Source: authors

The prior figure 3 clearly describes the structure of examined companies regarding ISO 9000 and/or 14000 implementation. There is well visible, that 61 % companies did implement neither ISO 9000 nor ISO 14000 management system. More popular is ISO

9000 QMS, implemented by 37 % of enterprises and less popular is ISO 14000 EMS implemented by 18 % of examined enterprises. Moreover 16 % of all data group creates enterprises with both ISO 9000 and 14000 implemented so only 2 % of enterprises

implemented ISO 14000 without ISO 9000. This induces idea that ISO 14000 is some kind of 'upgrade' or 'second round' after ISO 9000 on the way towards sustainability.

3. Findings and Results

Following paragraphs and figures describe research results concerning:

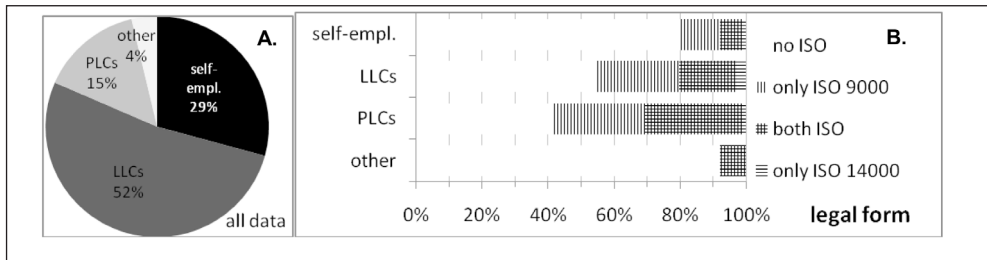
1. Identification a categorization (A) of examined companies and their attitude (B) to ISO management systems. The charts 'A' (on left side) are presented to show percent rate of evaluated criterion on all data group.
2. Impact of ISO 9000 and/or ISO 14000 on selected criteria of sustainability priorities comparing performances of groups of interest. The "all data" group is presented as average value to show well apparent difference between the "non ISO" group and 'ISO implemented groups' performance.

3.1 Identification a Categorization of Examined Companies and Their Attitude to ISO Management Systems

Figure 4 A shows rates of different legal forms of enterprises on all data group. Approximately a half of examined enterprises are limited liability companies (LLCs), and one third is self-employed entrepreneurs. Figure 4 B displays attitude of different legal forms of enterprises towards ISO implementation. Most engaged group is public liability companies (PLCs) and 60 % of them have implemented ISO 9000 or 14000. On the other side group of self-employed entrepreneurs indicate only 20 % of ISO 9000 or 14000 active respondents. Group of LLCs lies in between with 45 % of ISO active respondents.

Figure 5 A shows percent of number of employees groups of enterprises on all data group. Approximately a half of examined

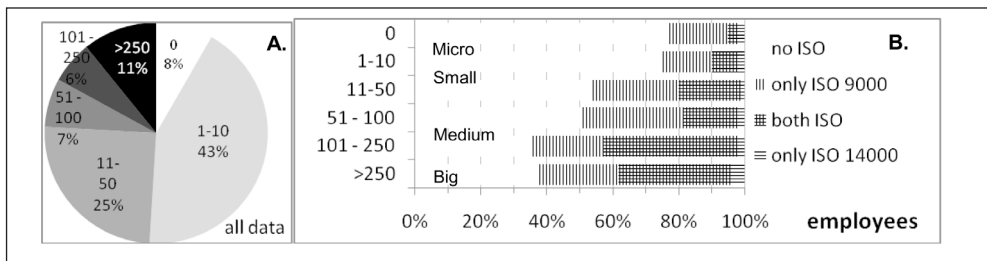
Fig. 4: Legal Form of Examined Enterprises (Question A2) and Their Approach to ISO 9000 and 14000



Note: A. shows percentage of legal forms characteristic for all data. B. shows percentage of engagement in ISO implementation according to legal form groups.

Source: authors

Fig. 5: Size of Examined Enterprises Regarding Number of Employees (Question A7) and Their Approach to ISO 9000 and 14000



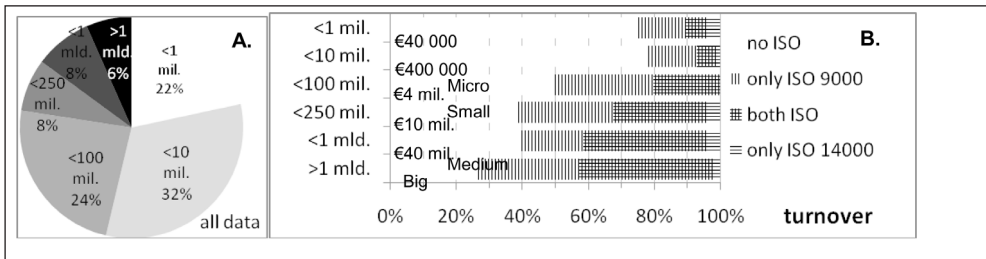
Note: A. shows percentage of number of employees' groups characteristic for all data. Figure B. shows percentage of engagement in ISO implementation according to number of employees.

Source: authors

enterprises are micro companies with less than 10 employees and one quarter are small entrepreneurs with 11 to 50 employees. Only 13 % of investigated enterprises are classified as medium and 11 % as big (with respect to methodic: EC, 2003). Figure 5 B displays attitude of different size groups of enterprises regarding number of employees towards ISO implementation. Most engaged are medium and big companies with 62 % to 65 % of them having implemented ISO 9000 or 14000.

On the other side group without employees indicate 21 % and group of micro entrepreneurs 26 % of ISO 9000 or 14000 active respondents, what are surprisingly high number with consideration of tiny organization structure of these enterprises. Group of small enterprises is in between with 47 % to 50 % of ISO active respondents. This strengthens the fact that mentioned management systems are also suitable for little companies.

Fig. 6: Size of Examined Enterprises Regarding Annual Turnover (Question A8) and Their Approach to ISO 9000 and 14000



Note: A. shows percentage of turnover groups' characteristic for all data. Figure B. shows percentage of engagement in ISO implementation according to annual turnover. Source: authors

Figure 6 A shows rates of annual turnover groups of enterprises on all data group. More than a half (54 %) of examined enterprises are micro companies with less than €400 000 annual turnover and only 6 % of investigated data are big companies. So SMEs (€400 000 to €40 mil.) makes approximately 40 % of all data group (no fully conform to methodic: EC, 2003).

Figure 6 B displays the attitude of different size groups of enterprises regarding annual turnover towards ISO implementation. Most engaged are big companies with 74 % of them having implemented ISO 9000 or 14000 (40 % both ISO). On the other side group of micro companies indicate 22 % to 24 % of ISO 9000 or 14000 active respondents, what matches well with the number of employees size criterion. Group of small and medium enterprises is in between with 51 % to 61 % of ISO active respondents.

Pearson correlation index between criteria A7 and A8 shows very high value: 0.806, which indicates close correlation.

3.2 ISO 9000 and 14000 Management Systems and Sustainability Priorities of Enterprises

Seven criteria concerning sustainable development priorities recommended enterprises to pursue by European foundation for management development (EFMD) are evaluated below [23]. Complex strategic approach to these sustainability aspects should cover reactive, adaptive, defensive, and creative attitude [25]. Meaning of priority criteria is:

- H1: Basic Human Need Fulfillment (job creation, employee pride, meeting customer demands...);
- H2: Environmental harmonization;
- H3: Performance Optimization (people, products, and processes do what they're designed to do);
- H4: Loss and Waste Prevention (reducing present and future costs);
- H5: Product Quality Improvement;
- H6: Resource Use Optimization (including raw materials and labor);
- H7: Product-Life Enhancement (increasing profit potential).

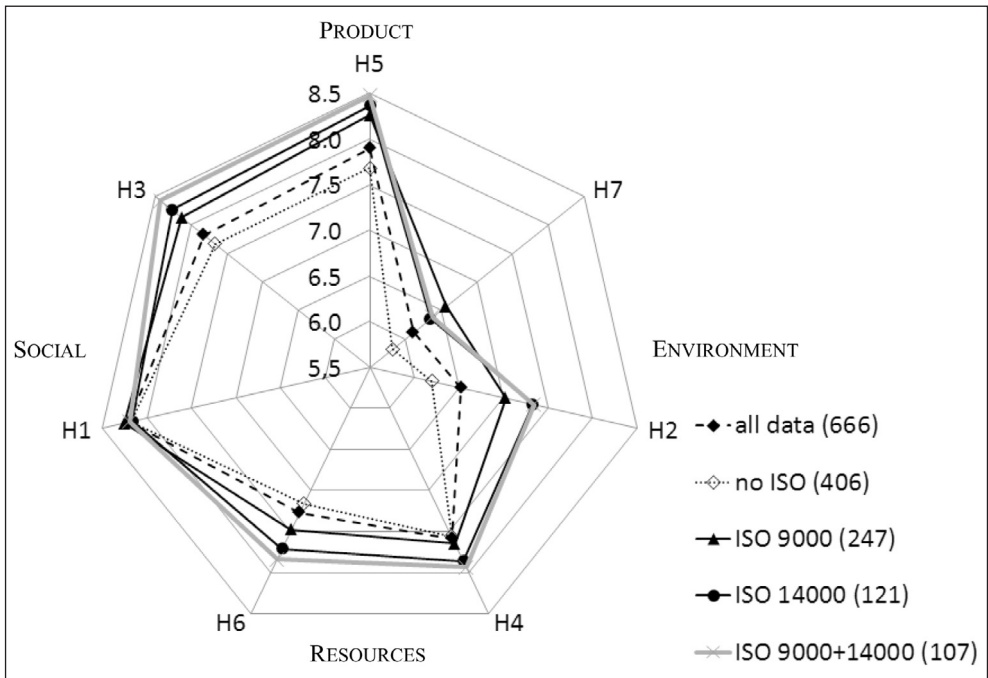
Tab. 1: Evaluation of the Criteria H1 to H7 – Sustainability Priorities of Entrepreneurships According to EFMD and Standard Deviation

Average mean	H5	H7	H2	H4	H6	H1	H3	σ
all data (666)	7.9	6.1	6.5	7.6	7.3	8.2	7.8	0.71
non ISO (406)	7.7	5.8	6.2	7.6	7.2	8.2	7.7	0.80
ISO 9000 (247)	8.3	6.6	7.0	7.6	7.5	8.3	8.1	0.60
ISO 14000 (121)	8.4	6.4	7.3	7.9	7.7	8.2	8.3	0.65
ISO 9000+14000 (107)	8.5	6.4	7.3	7.9	7.8	8.2	8.4	0.68
max. – min.	0.8	0.7	1.2	0.3	0.7	0.1	0.8	

Note: Highest values are highlighted by bold font and smallest values are written in italics.

Source: authors

Fig. 7: Evaluation of the Criteria H1 to H7 – Sustainability Priorities of Entrepreneurships in Heptagonal Spider Web Chart



Source: authors

Optional evaluation scale is 0 to 10 points, when 0 means no priority and 10 means highest priority.

Most aimed priorities (see point score in table 1 and figure 7) are H5 (max. 8.5 points – improvement of product quality), H3 (max. 8.4 points – performance optimization) and H1 (max. 8.3 points – basic human need

fulfillment). Less aimed (most ignored) priorities are H7 (max. 6.6 points – product life enhancement), H2 (max. 7.3 points – environmental harmonization) and H6 (max. 7.8 points – optimization of resources utilization). Most visible imbalance and weakest awareness are seen in the “product-environment” quadrant (H7 and H2 criteria).

Implementation of ISO 9000 and ISO 14000 indicates highest enhancement of criterion H2 awareness (see tables 1 and 3) – environmental harmonization (H2: max. – min. difference is 1.2 points) and also H5 – product quality ($\Delta=0.8$ points) and H3 – performance optimization ($\Delta=0.8$ points). Implementation of ISO management systems less influence criteria H1 – basic human needs fulfillment (max. – min. difference is 0.1 points) and H4 – loss and waste prevention (max. – min. difference is 0.3 points).

In the figure 7 there is well apparent positive enhancing influence of ISO management systems implementation on awareness of sustainable priorities as the points connected by line characterizing ISO implementation

groups are in all cases more distant from the midpoint (higher point score) than “non ISO” group (the surface of shape is bigger). Exception makes point H1, which does not change (or grows insignificantly) due ISO influence. The extent of expansion (Δ) for criteria H1 to H7 is stated in the table 3.

The balancing effect is characterized by standard deviation (σ) coefficients found in the table 1. Balance is understood as closest values of all criteria as possible and corresponds to the lowest value of standard deviation. Most balanced is heptagon characteristic for ISO 9000 group (0.60), ISO 14000 group (0.65) and both ISO group (0.68) with comparison to 0.80 characteristic for “non ISO” group. This is possible to interpret that ‘non ISO’ enterprises have priorities of sustainable entrepreneurship most scattered.

Tab. 2: Pearson Correlation Table of Examined Criteria (Symmetric Matrix)

		Legal form	Employees	Annual turnover	Human needs	Environ. harmon.	Perform. optimis.	Waste prevent.	Quality improv.	Sources optimis.	Lifespan extnt.
Correlations											
		A2	A7	A8	H1	H2	H3	H4	H5	H6	H7
A2	Pearson Correlation	1	.558**	.513**	-.027	.076*	.103**	.020	.045	.062	.024
	Sig. (2-tailed)		.000	.000	.479	.049	.008	.609	.245	.112	.537
	N	677	677	639	666	665	665	664	656	657	649
A7	Pearson Correlation	.558**	1	.806**	.009	.162**	.155**	.082*	.080*	.149**	.055
	Sig. (2-tailed)	.000		.000	.814	.000	.000	.036	.042	.000	.158
	N	677	677	639	666	665	665	664	656	657	649
A8	Pearson Correlation	.513**	.806**	1	.017	.136**	.203**	.127**	.088*	.123**	.027
	Sig. (2-tailed)	.000	.000		.679	.001	.000	.001	.029	.002	.497
	N	639	639	639	629	629	628	628	621	622	616
H1	Pearson Correlation	-.027	.009	.017	1	.208**	.329**	.298**	.255**	.204**	.175**
	Sig. (2-tailed)	.479	.814	.679		.000	.000	.000	.000	.000	.000
	N	666	666	629	666	662	662	661	653	654	647
H2	Pearson Correlation	.076*	.162**	.136**	.208**	1	.361**	.414**	.348**	.396**	.364**
	Sig. (2-tailed)	.049	.000	.001	.000		.000	.000	.000	.000	.000
	N	665	665	629	662	665	663	662	655	655	647
H3	Pearson Correlation	.103**	.155**	.203**	.329**	.361**	1	.522**	.484**	.519**	.359**
	Sig. (2-tailed)	.008	.000	.000	.000	.000		.000	.000	.000	.000
	N	665	665	628	662	663	665	664	656	656	648
H4	Pearson Correlation	.020	.082*	.127**	.298**	.414**	.522**	1	.527**	.535**	.337**
	Sig. (2-tailed)	.609	.036	.001	.000	.000	.000		.000	.000	.000
	N	664	664	661	661	662	664	664	656	656	648
H5	Pearson Correlation	.045	.080*	.088*	.255**	.348**	.484**	.527**	1	.515**	.497**
	Sig. (2-tailed)	.245	.042	.029	.000	.000	.000	.000		.000	.000
	N	656	656	621	653	655	656	656	656	653	646
H6	Pearson Correlation	.062	.149**	.123**	.204**	.396**	.519**	.535**	.515**	1	.473**
	Sig. (2-tailed)	.112	.000	.002	.000	.000	.000	.000	.000		.000
	N	657	657	622	654	655	656	656	653	657	648
H7	Pearson Correlation	.024	.055	.027	.175**	.364**	.359**	.337**	.497**	.473**	1
	Sig. (2-tailed)	.537	.158	.497	.000	.000	.000	.000	.000	.000	
	N	649	649	616	647	647	648	648	646	648	649

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Note: Circled Numbers Show Highest Values of Correlation Coefficient.

Source: authors

Upper table 2 characterizes correlation closeness according Pearson correlation indices. Light grey boxes in table 2 show highly significant correlation. It is possible to say, that all criteria correlates each to other except these:

- Basic human needs fulfillment (H1) is not influenced by size (A7, A8) and legal status (A2) and as well product lifespan extension (H7) and quality improvement (H5) is weakly influenced by (A2, A7, A8). We can deduct that quality improvement and basic human needs fulfillment is observed and product lifespan extension is disregarded no matter what the size of enterprise is.

In other hand highest induces of correlation show:

- Enterprise size criterion regarding number of employees (A7) and regarding annual turnover (A8). This is logical as both are size parameters and represent human and financial potential of an enterprise. Further closely correlating criterion next these two is the legal status of enterprise (A2), regarding PLCs as most employee numerous, LLCs in between and self-employed as less employee numerous or no employee enterprises.
- These criteria of sustainability priorities show close correlation: resource use optimization (H6), product quality improvement (H5), loss and waste prevention (H4) and performance optimization (H3) as they all have high point value and are moderately influenced by ISO implementation.

4. Discussion

4.1 Validation or Dismissing of Hypotheses

- HYP1: There is well apparent in the figure 3 and chapter 2.3, that most enterprises (88 %) that implemented ISO 14000 implemented also ISO 9000 – hypothesis confirmed.
- HYP2: Chapter 3.1 and figures 5 and 6 make light in question if bigger enterprises pay more attention to implementation of ISO 9000 and/or ISO 14000 than smaller. Most engaged are medium and big companies (regarding number of employees) with 62 % to 65 % of them having implemented ISO 9000 or 14000. On the other side group without employees

indicate 21 % and group of micro entrepreneurs 26 % of ISO 9000 or 14000 active respondents. Regarding annual turnover are most engaged big companies with 74 % of them having implemented ISO 9000 or 14000 (40 % both ISO). On the other side group of micro companies indicate 22 % to 24 % of ISO 9000 or 14000 active respondents. Group of small and medium enterprises is in between with 51 % to 61 % of ISO active respondents. – Hypothesis confirmed. We can induce, that almost three quarters of important business players, who turns most money on the market have implemented ISO management systems.

- HYP3: Highest point score in evaluation of enterprises sustainability priorities obtained in all groups of interest (all data, non ISO, ISO 9000, ISO 14000 and both ISO) product quality improvement priority (see table 1 – H5: all data: 7.9; non ISO: 7.7 together with priority H3; ISO 9000: 8.3 together with priority H1; ISO 14000: 8.4 and both ISO: 8.5) – Hypothesis confirmed. Quality improvement is priority no matter of ISO, however highest quality awareness indicated both ISO management systems implementation group and the increment of point score is over average.
- HYP4: Following table 3 characterizes points of improvement and difference Δ in points of awareness of sustainability priority H1–H7 due to implementation of ISO management systems. Delta values show positive effect on enhancing selected criterion awareness of interest groups (ISO 9000, ISO 14000 and both ISO) versus the group without ISO. The table is used to validate hypothesis. All criteria are apparently either partially or fully positively influenced by ISO management system implementation.

The balancing effect is characterized by standard deviation (σ) coefficients found in the table 1. Balance is understood as closest values of all criteria as possible and corresponds to lowest value of standard deviation. Most balanced is heptagon characteristic for ISO 9000 group (0.60), ISO 14000 group (0.65) and both ISO group (0.68) with comparison to 0.80 characteristic for “non ISO” group. Application of ISO 9000 and/or ISO 14000

Tab. 3: Table of Enhancing Positive Effect of ISO Implementation on Sustainability Priorities

#		ISO 9000		ISO 14000		ISO 9000 +ISO 14000		Positive/enhancing
			Δ		Δ		Δ	
15	H1	8.2 to 8.3	0.1	no change	0	no change	0	max. 0.1 part. positive
16	H2	6.2 to 7.0	0.8	6.2 to 7.3	1.1	6.2 to 7.3	1.1	max. 1.1 positive
17	H3	7.7 to 8.1	0.4	7.7 to 8.3	0.6	7.7 to 8.4	0.7	max. 0.7 positive
18	H4	no change	0	7.6 to 7.9	0.3	7.6 to 7.9	0.3	max. 0.3 part. positive
19	H5	7.7 to 8.3	0.6	7.7 to 8.4	0.7	7.7 to 8.5	0.8	max. 0.8 positive
20	H6	7.2 to 7.5	0.3	7.2 to 7.7	0.5	7.2 to 7.8	0.6	max. 0.6 positive
21	H7	5.8 to 6.6	0.8	5.8 to 6.4	0.6	5.8 to 6.4	0.6	max. 0.8 positive
		average	0.43	average	0.54	average	0.59	max. 0.59 positive

Source: authors

management systems has positive enhancing and balancing effect on sustainability priorities of entrepreneurs – hypothesis confirmed.

4.2 Opinion of Other Related Research Studies

Focused attention on quality (and its improvement), performance optimization and their positive effect on enterprises is not only partial result of this study, but is also confirmed by professional literature.

Kaynak explains that findings of his study, as well as of other research studies, support the positive effect of TQM practices on firms' performance. A lack of top management commitment to the implementation of TQM has emerged as a possible reason for the failure of TQM systems in some organizations [11]. In Samson's opinion three of the elements of TQM (leadership, people management and customer focus) have a significant positive effect on performance, but the other three categories (strategic quality planning, information and analysis and process management) did not [22]. According to Mizla's research of costs connected with quality, highest operational profit is reached by companies which have higher fix costs on quality than variable costs on quality [16]. This indirectly induces that companies which invested higher amount into quality prevention (QMS), do not have so high direct costs on quality (failures) and their economic performance is higher. Development of small and medium-size enterprises in Czech

Republic presume investment in innovations and human resources' development [14]. Němeček presented research results confirming that added value, profit and work productivity are better when enterprises use advanced technologies as TQM (ISO 9000), CNC, JIT, CRM and EAP [18]. Závadská concludes that the most frequently certified management system is usually QMS under the requirements of ISO 9001 [28].

Koc points out that findings of his research suggest a fit between ISO 9000 practices, manufacturing performance, competitive priorities and firm performance [12]. Sharma concludes that results of his study provide evidence about ISO 9000 certification being associated with improvements in financial performance especially in profit margin, growth of sales and earnings [24]. This corresponds well with evaluation of criterion A8.

The environment performance of SMEs and their long-term commitment to management of their environmental impacts must be increased and supported through simple, effective and strategic support systems [3]. Study of Iraldo shows that positive effect of well-implemented EMS on resource productivity, market performance and intangible assets is visible, however not strongly supported by statistical analysis. Our study confirms positive influence on awareness of performance optimization (H3) and resource use (H6), but shows highest positive enhancement of environmental harmonization (H2) priority as

an effect of ISO 14000 implementation. The EMSs, in spite of their application in many years, have not achieved a high degree of “maturity” in their implementation yet [8]. Numerous internal and external benefits are expected from the implementation of EMS. Communication channels, skills, knowledge and attitude are all improved in SMEs adopting EMS. EMS implementations open up new interaction between staff and management and provide intangible benefits like enhanced morale, which is considered as very important [29]. Hillary concludes that extensive benefits accrue to SMEs adopting formal EMSs and this is widely reported in the analyzed studies. Disbenefits also exist, although there are less of them [6]. Ilomäki explains that the environmental management systems in Finland conditions are good tools for SMEs to reach their statutory requirements. However, EMSs do not appear to provide much impetus for SMEs to implement waste minimization [7]. In our study loss and waste optimization does not look so much as underestimated priority in comparison with product-life enhancement, which is generally most underestimated priority. There is well known contemporary high-consumption lifestyle which is characteristic with belief that welfare is closely connected with frequent replacement of goods with a new one and that such approach dynamises wheels of economics. This unfortunate broadly accepted attitude moves priority H7 to low ranks.

MacDonald discusses that corporations need the clear framework to grapple effectively with the challenge of moving toward a sustainable society. Furthermore, tools such as ISO 140001, after the useful start, do not assist themselves in the organization of strategic planning with true sustainability in mind [15]. Gupta states that past research on sustainability has evaluated the role played by the approach of sustainability in driving green initiatives, adopted by firm managers, and the ability of opportunities created from the firm as a result of these initiatives to drive superior performance [5]. Sustainable management of all social, environmental and economic aspects within a company is increasingly becoming the norm and a requirement for SMEs to operate on business. By implementing a sustainability network within real commitment towards improved performance, benefits to bottom line will

result, improving the efficiency of operations, communication and interaction with stakeholders, and reduced negative effects on society and the environment. Existing tools and strategies that assist in implementation of ISO 14001 still remain fragmented, trying to solve defects of all SMEs [2].

Many operation management tools, for example total quality management, ISO 9000 standards, excellence models and common assessment framework, reengineering, six sigma, lean systems, based on business process management techniques increase structuring of organizational processes. Over-standardization of organizational processes is the reduced ability of organizational process’ members to adjust their behavior according to changes in environment because of formally and informally imposed rules. Accumulation of rules and standards happens because of repetition, imposition and adoption of “structure-intensive” social and physical technologies [26].

Conclusion

Realized research brought interesting results supporting legitimacy of ISO 9000 and 14000 implementation in order to improve awareness of sustainable development priorities. Most focused priority of sustainability is quality improvement and performance optimization and paradoxically most underestimated priority is product-life enhancement, which aims against contemporary high-consumption lifestyle, however it stands fairly close to product quality.

Hypotheses were confirmed. Both ISO systems help to improve awareness and improve balance of enterprise in sustainability priorities. Adopting ISO 14000 is rather second step after implementation of ISO 9000; most enterprises with ISO 14000 adopted earlier ISO 9000 standard. ISO is implemented more often by big or medium enterprises, however also some micro enterprises have found their way to employ these systems.

It is possible to find some quality and environmental systems ex-post evaluation studies in literature, which merely consider these systems as generally beneficial, however likewise burdened by some imperfections. ISO 9000 seems to be more widely accepted and tuned-up system than younger ISO 14000.

Examination of research successfulness can be characterized by:

- Pros: rich sample size, recent data, interesting and coherent results.
- Cons: subjective data – management expert opinion.

Further and future research suggestions:

- Concurrently to this paper authors publish evaluation of ISO 9000 and/or ISO 14000 influence only on awareness of sustainability priorities but on specific measurable performance parameters.
- Further research connected with advanced management system and enterprise performance will be held by authors in near future.

This paper was published and described research was realized with the support of students_ grant system by Silesian University in Opava, grant number SGS/9/2012.

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Doručeno redakci: 19. 11. 2012

Recenzováno: 15. 1. 2013, 20. 1. 2013

Schváleno k publikování: 12. 4. 2013

EFFECT OF MANAGEMENT SYSTEMS ISO 9000 AND ISO 14000 ON ENTERPRISES' AWARENESS OF SUSTAINABILITY PRIORITIES

Adam Pawliczek, Radomír Piszczur

Presented paper discusses influence of implemented quality and environmental management systems ISO 9000 and ISO 14000 on enterprise sustainability (CSR) priorities. The paper brings original results and comments on realized and processed questionnaire research concerning approx. 700 companies operating through the Czech and Slovak Republic, called "Adaptability of entrepreneurship", financed by Silesian University in Opava. The paper evaluates difference in enterprise top management sustainability priorities awareness as an effect of implementation of ISO QMSs. The performance of four groups of companies (non ISO implemented, ISO 9000 implemented, ISO 14000 implemented and both ISO 9000 and 14000 implemented) is compared. There were selected seven criteria for evaluation, which can be marked as enterprise sustainability priorities plus three criteria to categorize enterprises. Four hypotheses were tested. The results show visible improvement in awareness of selected priorities at companies with implemented ISO QMS. Problematic and results are discussed and compared with professional literature.

Key Words: management systems, ISO 9000, ISO 14000, sustainability priorities, questionnaire research, Czech and Slovak enterprises.

JEL Classification: M11, O12, Q01.