World Academy of Science, Engineering and Technology
International Journal of Economics and Management Engineering
Vol:6, No:10, 2012

Incentives to Introduce Environmental Management System in the Context of Building an eco-Innovative Potential – A Case of Podkarpackie Voivodeship

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***Abstract*—**This paper shows the results of empirical research. It presents experiences of Polish companies from the Podkarpackie voivodeship connected with implementing EMS according to the requirements of the ISO 14001 international standard. The incentives to introduce and certify organizational eco-innovation, which formal EMSs are treated as, are presented in this paper.

***Keywords*—**Environmental Management System (EMS), ISO 14001, Podkarpackie voivodeship (Poland)

I. Introduction

THE results presented in this paper are an element of broader complete inquiries conducted by the author in the form of, among others, direct in-depth interviews with representatives of 57 companies from the Podkarpackie voivodeship (in Poland). This article is an attempt to answer the question concerning the reasons for which the researched entities decided to introduce EMS. The answer to this question shall allow for preparing an appropriate strategy, aimed at promoting pro-ecologic and system actions in the field of both strategic and operations management. Today it is endeavored to make quality and innovation important competitiveness criteria in modern economy. It is a significant matter when considering the European Union's policies, which put much emphasis on balanced economic growth, with eco-innovativeness as their key element. Among other methods, it can be expressed through introducing formal environmental management systems, which proper function and improvement enables to generate different types of eco-innovations.

Introduction and proper functioning of EMS is a part of the *Podkarpackie voivodeship development strategy for 2007-2020*. The strategic goal described in this document is the "rise of the national and international economic competitiveness of the region through the increase of its innovativeness, and with that its effectiveness, which shall create conditions for increasing employment as well as a rise of earnings and life standards of the regional populace [1]."

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Along with the region's economy, technical infrastructure, rural and farming areas, social capital, international cooperation, healthcare and social protection, environmental protection is one of 8 main strategic areas of the voivodeship. One of the reasons for the priority approach to the matter of the desired, systemized environmental management is the fact that the discussed region is qualified to the group of the least polluted in the country. In the European area, Podkarpackie voivodeship plays a protective function for unique natural and cultural resources. It must be underlined that the socio-economical position of the voivodeship is significant. Vital international, national and regional communication routes, connected with e.g. the Pan-European transport corridor III, cross in this area. Podkarpackie is situated in the South-East part of Poland and it borders on Ukraine from the East and Slovakia from the South, and is the outer border of the EU. As far as the quality of life is concerned, Podkarpackie voivodeship is among the leading regions in the country [2].

II. Research Methodology

Qualitative research has been chosen in the paper. This type of research allowed to explain and understand, to a certain degree, the relations and dependences present in the area of the researched phenomenon [3].

The non-probability sampling method – purposive sampling – has been used in the research as the type and structure of the sample resulted from the intended research targets. The complete conducted inquiries included, among others, such methods as collecting and processing information from all populace units, which fulfilled the sampling frame's criterion. The researched companies were registered in the REGON register of the Central Statistical Office in Rzeszów, whereas their registered offices were located in the Podkarpackie voivodeship region.

The research objects were companies which introduced EMS according to the ISO 14001 standard and which, at the time of the research, held a valid certificate given by an independent and eligible certifying unit. It confirmed that the company (in a scope specified by that company) has introduced EMS and makes use of it. In Poland there is no official, credible register which would gather information regarding companies which introduce EMS basing on the international standard discussed here.

Because of this, those identified on the base of knowledge, the author's experience as well as information found on the eko-net website (a website for environmental protection specialists supported by the ISO 14000 Polish Forum Club Association) have been qualified to the sampling frame. As a result of consulting representatives of the Ministry of Environmental Protection, as well as specialists in the abovementioned area, it has been confirmed that such a course of action is appropriate. The direct contact of the researcher, made in offices of 43 companies as well as consulting management board representatives in charge of EMS, enabled gathering primary data from the people most involved in the proper functioning of EMS. (During the period of conducting the research in the Podkarpackie voivodeship's region, the sample frame unit's criteria were met by 57 companies. However, the research results presented in this paper concern 43 companies. The amount of companies which refused to take part in the research was 24,6% - that is 14 companies). When choosing the methodology it has been decided that a moderate interview questionnaire should be employed. In the researches concerning EMS conducted so far, by foreign and (only few) Polish authors, the basic methods used to gather primary data were mail questionnaires as well as telephone and Internet interviews. It has been decided to abandon the abovementioned methods. This decision was based on the very small return of questionnaires sent both by post as well as the Internet. Moreover, it was also based on the reluctance of management systems specialists towards such methods. This approach is confirmed by results of the research conducted by the Polish ISO 14001 Forum in 2004 using the mail questionnaires method, which was to evaluate the Polish companies' effectiveness in environmental management. The questionnaires have been sent to 450 organizations which held the ISO 14001 certificate (this was about half of all the Polish organizations holding certificates at that time). 58 complete questionnaires returned, which meant that only 12,8% of the companies from the researched group answered them. [4]. This example is not a good testimony for the openness of organizations holding certified EMS ISO 14001 and their eagerness for dialogue with interested third parties.

The interviews conducted for this research were not recorded, although literature (e.g. A.H. Verschoor, L. Reijnders [5]) suggests gathering data in such a way. The author's earlier experience show that turning on the voice recorder (which is a useful aid for the researcher) formalizes and limits the conversation, creating a barrier for giving honest, critical answers for the presented questions. Hence, notes have been made by use of stenography to recreate the acquired information as accurately as possible. Despite the fact that all steps have been taken to increase the credibility and authenticity of the acquired information, the author does realize that these types of papers are burdened with a certain mistake probability. As observed by S. Curkovic, R. Sroufe and S. Melnyk [6], interviews concerning the environmental issues are connected with pressure of giving answers which are socially acceptable/desirable. Moreover, in some companies the answers have been given by EMS representatives who received their function only recently and, due to their short job seniority, were not always aware of the actual incentives to introduce and certify EMS.

When visiting the companies during the interview, the author tried not to express her own opinions, suggestions, believes connected with the subject of her research, she also tried not to show emotions such as e.g. surprise, deprecation, delight, which could influence the answers given. Much care was put into eliminating factors which influenced the impartiality of the answers, although the chosen questionnaire formula could still be burdened with the Hawthorne effect in some degree.

III. Description of the Studied Companies

The researched companies represented various PKD–2007 (NACE Rev. 2) sections and they held an EMS certified by an independent unit for its eligibility with the PN-EN ISO 14001:2005 standard (table 1).

TABLE I
DIVISION OF THE RESEARCHED COMPANIES BASING ON PKD-2007 SECTIONS (BROAD STRUCTURE OF NACE REV. 2 - STATISTICAL CLASSIFICATION OF ECONOMIC ACTIVITIES IN THE EUROPEAN COMMUNITY)

	Operating section	Number of entities	Percent of entities
A.	Agriculture, forestry and fishing	0	0%
B.	Mining and extraction	2	4,65%
C.	Industrial processing	26	60,47%
D.	Electricity, gas, steam and air conditioning supply	5	11,63%
E.	Water supply; sewerage, waste management and remediation	0	0%
F.	Construction	6	13,95%
G.	Wholesale and retail trade; automotive repair	1	2,33%
H.	Transport and warehouse management	2	4,65%
I.	Accommodation and catering services	0	0%
J.	Information and communication	0	0%
K.	Finance and insurance	0	0%
L.	Real estate	0	0%
M.	Professional, scientific and technical services	1	2,33%
N.	Administrative and support services	0	0%
O.	Public administration and national defense; necessary social protection	0	0%
P.	Education	0	0%
Q.	Healthcare and welfare	0	0%
R.	Culture, entertainment and recreation	0	0%
S.	Other services	0	0%
T.	Household employers; Household production of goods and services for own use	0	0%
U.	Exterritorial organizations and units	0	0%

Source: Own work based on the conducted research results.

More than a half (60,5%) of the companies holding a certified EMS from the Podkarpackie voivodeship were involved in industrial processing. 17 large companies were dominant in this group. 7 entities represented medium companies. 2 organizations have been counted as small companies. A relatively high level of interest in introducing and certifying EMS in this sector was connected with minimizing the effects of perceiving industrial processing as being burdened with a wide range of negative effects on the environment.

It is worth mentioning that, because of its location in the European and national area, Podkarpackie voivodeship has inter alia a production function.

Because of its geographical-historic conditioning, the aviation industry, which does take advantage of innovative solutions, has played an important role in the region for over 70 years. The resilient functioning of the Aviation Valley cluster is crucial for shaping the supply and demand in the sphere of industrial processing, particularly when 90% of Polish aviation industry production comes from South-East Poland. (The Aviation Valley Association consists of 90 members from the region - as for July 30th 2012 - and still more pass the application process. Detailed information concerning the Aviation Valley can be found at: [7]).

An investor-friendly environment creates conductive conditions for the development of this type of production. The Rzeszow University of Technology, with its well developed Faculty of Mechanical Engineering and Aeronautics, as well as the centrally located Jasionka international airport, play an important role in this process. Apart from the aviation industry, the four main pillars of the industry's branch structure are electro-mechanical, chemical and food industries. Together they generate approximately 70% of the voivodeship's industrial production [8].

Among researched companies, 14% of the entities were involved in construction. Because of the group's size, three large, two medium and one small company have been distinguished. 11,6% of the companies were involved in producing and supplying electric energy, gas and steam (because of the size of the group, three medium and two big companies have been added to it), whereas 4,7% of the respondents declared mining and extraction as their profile of activity.

Podkarpackie voivodeship has large supplies of natural gas, which are present in separate deposits or with petroleum. Estimates show that the amount of gas extracted in the voivodeship satisfies 12% of the country's gas requirements [9]. The voivodeship also plays an important role in distributing natural gas imported from Russia, Ukraine and other nations throughout the whole country. Moreover, important elements of the national power system, such as electrical reduction stations of the highest voltage as well as many high voltage lines, are located in the Podkarpackie voivodeship.

4,7% of the researched companies which introduced EMS were involved in transport and warehouse management (those were only large companies), 2,3% in wholesale and retail trade, motor vehicle repair, including motorcycles, whereas an equal percentage was involved in the technical activities (it was a small company).

While conducting the analysis of the operating area of the researched companies, it has been determined that 74,4% of them (that is 32 companies) functioned not only in Poland but also in other, often very distant, countries (table 2). 11,6% of the researched companies operated only in Poland.

TABLE II
OPERATING AREA OF THE RESEARCHED COMPANIES

Operating area (selling products/services)	Number of companies	Part of the researched populace (%)
only the county	3	7,0%
only the voivodeship	0	0,0%
several voivodeships	3	7,0%
whole country	5	11,6%
country and abroad	32	74,4%

Note: In this instance, the area of functioning is the area in which the company sells its products/services.

Source: Own work based on the results of the conducted research.

7% of the respondents offered their products in several voivodeships and an equal percentage of the researched companies declared that they operate only in the area of one county, whereas one company sold its products only in the area of a special economic zone.

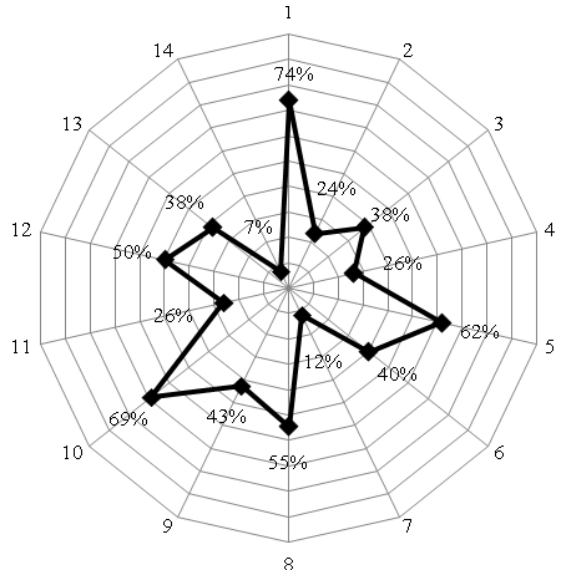
A high share of companies, which sell their products and services not only in their country but also in other countries, partly resulted from the period of time for which the companies in question functioned on the market. The minimal period of market activity for the researched companies was 8 years. (Two medium companies, one small and one large company functioned on the market for 8 years. As a result of verification information given by an representative with those present on the website it occurred that the company, counted as large, functioned on the market for over 8 years as part of another company which has been restructured).

One company (involved in the gas sector) was active on the market for over 100 years. A majority of the researched entities had long-time experience and a stable position in running a business on international markets. Regardless of the operating area, the presented companies were also distinguished by their market expansion policy.

IV. Incentives to Introduce Environmental Management System based on Own Research

The results of the author's own research show that the most important incentive to introduce EMS according to the ISO 14001 standard was the expectations of customers and business partners. 74% of the researched companies declared this (figure 1).

The meaning of this incentive becomes more explicit after analyzing the results from the companies' size perspective. It shows that the expectations of customers and business partners were a priority incentive for 80% of the small companies, 73,1% of the large and 66,7% of the medium companies. (When comparing the results of this research with other results it is important to note that the companies' classification differs in specific countries. It has been assumed (according with definitions presented by the Central Statistical Office), that micro-companies employ up to 9 people, small companies from 9 to 49, medium companies from 50 to 249 and large companies employ more than 250 people).



Key: [1]expectations of customers, business partners, etc.; [2]increasing the company's share in the market; [3]conformity with legislation; [4]increasing export potential; [5]increasing pro-ecological awareness among employees; [6]increasing the competitive edge; [7]a trend for new control and management systems; [8]the concept of continuous improvement; [9]a set development strategy of the organization; [10]environmental protection; [11]ISO 9001 system development; [12]increase of the company's credibility; [13]saving materials and energy; [14]other;

Note: All researched companies expressed their opinions in this matter. The answers do not sum up to 100% as respondents were allowed to give multiple answers.

Source: Own work based on results of empiric research.

Fig. 1 Incentives to introduce EMS basing on the ISO 14001 standard

The fact that most often the customers and business partners are also reliant producers/service providers may justify this. In order to create an added value they put the elements (in the premises of their own establishment), which are acquired from suppliers/contractors who act on a specific basis such as e.g. outsourcing, to further processing. It should be underlined that during the interviews the respondents stated that holding an independent confirmation of an introduced EMS by the company quite often was the expectation of customers and business partners. Moreover, questions concerning ecological, economical or social effects rarely occurred if the company's system was operational and improved.

The expectations of holding an EMS by the company were rarely expressed by so called "regular citizens". The author's experience shows that a part of society is unaware of what the ISO 14001 standard is related to. Even in the ISO 9001 standard, which has been popularized in Poland, when its mark is seen on a product it is interpreted by some individual customers as an indicator that the product "is fresh" or "reliable". This confirms the lack of understanding the standard's meaning, especially their process approach.

The conclusions of the conducted interviews show that in the case of entities involved in the automotive business, EMS certification is an actual necessity.

Without independent confirmation of holding EMS it is impossible to produce components for this industrial sector. Similarly, EMSs are introduced and certified in a growing number of Polish hospitals (along with quality management systems). Pharmaceutical companies noticed the fact that more and more often holding a certified EMS is the criterion according to which hospitals chose their qualified suppliers.

A part of the respondents were also aware that, after Poland has entered the European Union in 2004, companies wishing to export goods or successfully compete in important tenders (e.g. in the area of construction or installation), should prove that they are holders of an EMS certificate. This fact is confirmed by the gathered primary data, which show that since the end of 2004 62,8% of companies (among those analyzed in this research) held certified EMS. Holding a certificate appears to be particularly important when cooperating with recipients from Germany, Denmark, Norway and Sweden. It is generally not required when cooperating with countries such as Russia or Ukraine.

To make a generalization, it might be said that a part of the researched companies operate in a homogenous macro-environment characteristic for a specific sector. The companies could not change this environment to fit their needs and so they had to adapt to it.

Despite the clearly pro-ecological principles of the ISO 14001 standard, environmental protection is second, with 69% declaring so, among other incentives to introduce and certify EMS. For large companies it was as important as expectations of customers and business partners. Medium and small companies declared environmental protection, although these were not always reflected by actual actions in the discussed area. The companies agents' declarations (which appeared during in-depth interviews), that "they are a small company (compared to those operating globally) and in general have little effect on the environment, due to which they can do little for its benefit" or "their production is not harmful for the environment", spoke for such a generalization.

At this point it is worth focusing on another group of respondents, taking into consideration that their production is based on specific outside indents (government, military), which guidelines concerning specific processes are described in detail. They cannot be altered even if the company tries to use substances other that petrochemicals to e.g. clean components to decrease the negative effect on the environment. All changes undertaken in such processes which are initiated "from the bottom are unsuccessful", as complex legal issues, additional investments on the client's part and the "general reluctance to change" restrain them.

The increase of employees' pro-ecological awareness took third place among other incentives to implement formal EMS (62% of declarations). Similarly to the next incentive, which is continuous improvement (declared by 55% of the researched companies), the importance of pro-ecological awareness depends on the size of the company which introduces the discussed system. Both of these incentives were relatively unimportant from the perspective of small companies (60% of respondents from this group did not declare them).

Exactly half of the researched companies from the group of medium companies also neglected these incentives, whereas 69,2% respondents from the large company group declared that the increase of awareness motivated them to introduce EMS. Analogically, for large companies the incentive to introduce EMS was the concept of continuous improvement.

The fifth incentive for introducing and certifying EMS, which was declared by half of all the researched companies, was the increase of the company's credibility. 43% of the respondents declared a set development strategy. In this context it is worth noticing that nearly the same amount, 40% of the respondents, declared that their incentive was to increase the competitive edge. Saving materials and energy, as well as ensuring operations' conformity with the legislation, was declared by 38% of the companies.

The subject literature presents a lot of information concerning EMS to be an extension of the quality system created on the base of the ISO 9001 standard. But, only one in four companies introduced the analyzed system because of this criterion [10]. Similarly, 26% of the companies introduced and certified the system to increase its export potential, whereas 24% were motivated by a desire to increase their share in the market.

12% of the researched companies introduced EMS following a trend for new managing systems. The interesting fact is that none of the medium companies group's representatives introduced the system because of the trend. This has been declared as an incentive by 20% of the respondents representing small companies and 15,4% of agents representing large companies.

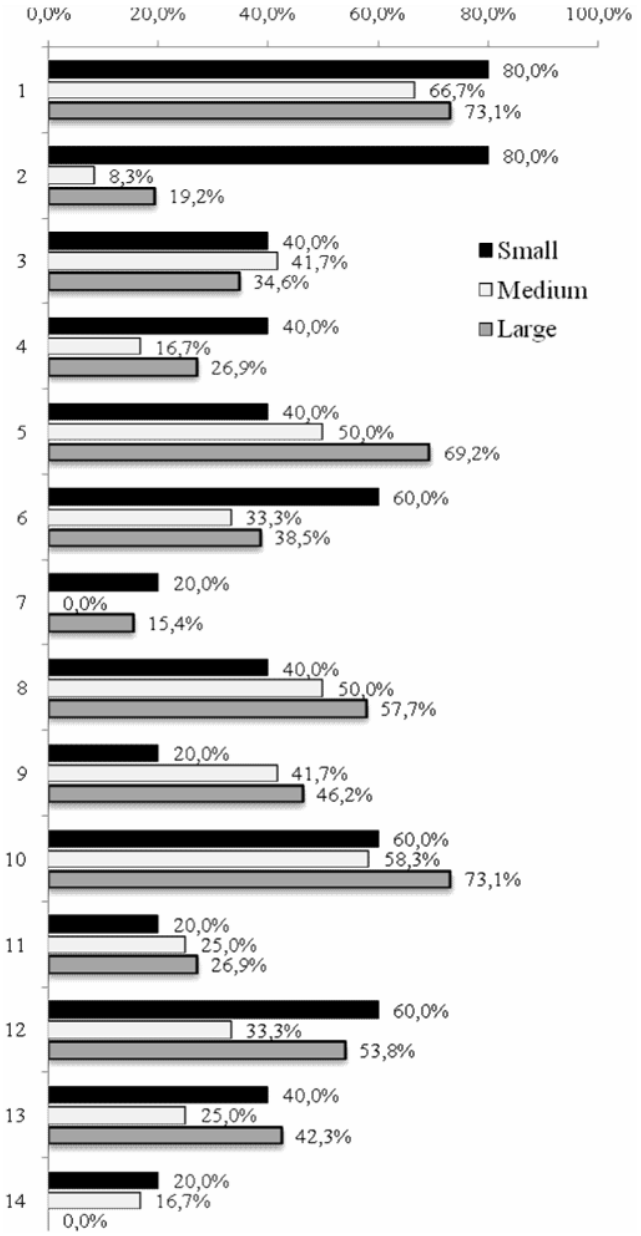
Among other reasons for implementing EMS: two organizations declared that those were financial issues. In one of those cases the system was important to gain additional points required to receive funds from the EU for an investment. The other entity declared that for many years it held EMS and decided to formalize it by the use of certification only because of the fact that they sought to gain credit for financing an investment crucial for the company's development. It occurred that holding a formal, certified EMS is a basic condition for gaining funds on preferential terms.

During interviews it was noticed that the expectations of customers and business partners are not an incentive to introduce a formal EMS in the power sector as "there are none". "Only in the price matters" for the recipient in this instance. Moreover, power recipients basically do not have any alternative as there are very few producers and they form a specific oligopoly. Hence, if the legislation does not impose some solutions then there "has to be a hobbyist" in the company to make the system function. One of the respondents expressed that in the future this situation may change due to the so called climate package, which might oblige companies not only to accept a more active approach towards introducing and certifying EMS but also to increase ecological effectiveness in the area of the discussed functioning system.

Another interesting case was one of the companies, which was a supported employment enterprise (2/3 of its employees were people with disabilities).

The incentive to introduce EMS in this company was, quoting its agent: "an accident." According to him, the company introduced and certified EMS only because it was a relatively cheap addition to the required attestation of holding a quality management system: "(…) if by introducing this system we could have two certificates for just a slightly higher price we decided to do so."

The presented analysis of the incentives to introduce and certify EMS, in regards to the entities' size criterion, allowed for outlining further differences between specific groups of researched companies (figure 2).



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Note: All researched companies expressed their opinions in this matter. The answers do not sum up to 100% as respondents were allowed to give multiple answers.
Source: Own work based on results of empiric research.

Fig. 2 Incentives to introduce and certify EMS according to the ISO 14001 standard based on the researched companies' size criterion

In regards to the group of small companies, the competition incentives – presented by P. Bansal and K. Roth [11]- were clearly outlined. As the analysis of the author's own research results shows, for 80% of small companies the incentive of customers' and business partners' expectations was as important as the increase of their share in the market. These types of incentives create a chance for increasing income as well as continuous forming of the competitive edge. (Along with the potential presented here, significant threats of losses, if the stated declarations shall not result in operation motivations, appear with it).

It is worth adding that 60% of the small companies researched decided to gain a formal EMS to increase the competitive edge and the company's credibility as well as because of environmental protection. For 40% of the respondents from this group the reasons for introducing EMS were the conformity with the legislation, increasing export possibilities, saving materials and energy, a concept of constant improvement and increasing pro-ecologic awareness of the personnel. 20% of the agents representing small companies declared that the introduction of EMS was a result of a set development strategy. 41,7% of respondents from the group of medium companies as well as 46,2% of agents representing the group of large companies declared this as well. The analysis of the EMS functioning effects in the researched companies shall show in what part these were declarations, and in what part inducements to take up specific actions. This matter shall be undertaken by the author in future papers.

V. Conclusion

"Greening the economy" plays an important role in EU politics. Decision makers realize more and more often that the matter of external effects is a serious problem in modern economy. In this context, the role of national administration, which should create and offer substantive and financial support to companies, especially small ones, that wish to implement and certify EMS according to the ISO 14001 standard, is very important. This support may result in covering the costs connected with consulting and certification, creating databases containing information about scientists who are involved in counseling in the matter of EMS, eco-innovativeness, etc. Moreover, a change of attitude is required towards companies introducing organizational eco-innovations in the public procurement system, where the actual, documented pro-ecological attitude of a company should be highly valued.

Polish universities, high schools, junior highs, primary schools and kindergartens have much to achieve in the field of increasing ecological awareness of the society, especially that of management executives. In fact, because of the way the former political-economical system functioned, till 1989 the matters of environmental protection were seen by Polish citizens as nothing more than expense. It is important to make future managers aware that a formal EMS can be: an effective method of increasing the competitive edge and a modern tool in the field of risk management as well as a bargaining counter in negotiations with different groups of stakeholders.

The problem is that the customers' expectations are not focused on the effects of the EMS's functioning. This has both positive and negative results. Requiring only a formal confirmation of an operating EMS creates a serious risk as, due to the amount of certifying units which function on the market, certificates could be given to companies which do not fulfill the ISO 14001 standard's postulates fully. On the other hand, the results of the author's own research showed that respondents put emphasis on quality, not the ease of certification. In the Podkarpackie voivodeship most EMS certificates accordant with the ISO 14001 standard have been given by TÜV Nord Polska. Its share on the certificate market reached 40%. One of the reasons companies from Podkarpackie chose this certifying unit was its worldwide recognition (the TÜV Nord Group operates in 70 countries across Europe, America, Asia and North Africa as well as the Middle East). For those companies which export products to different countries, the recognition of the certifying unit is very important, and in some cases decisive, in the matter of taking up international cooperation. Moreover, this company is a member of the Avian Valley cluster operating in the South East of Poland, which also influences the recognition and choice of this certifying unit by other members of the cluster.

When analyzing the results of the research concerning the incentives to introduce EMSs it must be underlined that these systems may be successful instruments used to help increase the economy's innovativeness. Properly introduced and improved EMSs may lead to creating eco-innovations. Their principal source should be an honestly introduced methodology of choosing significant environmental aspects. The policy of generating eco-innovative solutions must be based in the company's strategic management and result from the company's socially accepted responsible vision and mission. This may not be an illusion of taking up pro-ecological actions. A system approach to environmental management, which would pervade the management's decisions, may have a positive influence on the company's economical, ecological and social results, especially when planned for a longer period of time. In the time of a global crisis introducing EMS may be a successful source for seeking savings.

References

[1] Zarząd Województwa Podkarpackiego, *Strategia rozwoju województwa podkarpackiego na lata 2007-2012*, Rzeszów październik 2006, pp. 5.

[2] Ibid., pp. 6, pp. 10, pp. 12. (compare also English updated version of that document: Executive board of the Podkarpackie Voivodeship, *Development Strategy For The Podkarpackie Voivodeship 2007-2012*, Rzeszów August 2010 – available online)
[3] D. Silverman, *Prowadzenie badań jakościowych*, Wydawnictwo Naukowe PWN, Warszawa 2009, pp. 27-37 and 399-403.
[4] M. Szydłowski (red.), *ISO 14001 Badanie i ocena polskich organizacji w zakresie efektywności zarządzania środowiskowego*, Narodowa Fundacja Ochrony Środowiska, Warszawa 2004, pp. 8-9.
[5] A. H. Verschoor, L. Reijnders, "Toxics reduction in processes. Some practical examples", *Journal of Cleaner Production*, Vol. 9, No. 3, 2001, pp. 278.
[6] S. Curkowic, R. Sroufe, S. Melnyk, "Identifying the factors which affect the decision to attain ISO 14000", *Energy*, Vol. 30, No. 8, 2005, pp. 1387-1407.
[7] http://www.dolinalotnicza.pl/en/1/1/
[8] Zarząd Województwa Podkarpackiego, Op. Cit. , pp. 9
[9] Ibid., pp. 33.
[10] M. Urbaniak, „Globalizacja a systemy zarządzania jakością", *Ekonomika i Organizacja Przedsiębiorstwa*, nr 7/2008, pp. 59-64.
[11] P. Bansal, K. Roth, "Why companies go green: A model of ecological responsiveness", *Academy of Management Journal*, Vol. 43, No. 4, 2000, p. 717-736.

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