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RESEARCH ON THE FACTORS THAT DETERMINE THE QUALITY OF ENVIRONMENTAL MANAGEMENT SYSTEMS IMPLEMENTATION IN THE CASE OF ROMANIAN ORGANIZATIONS

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Abstract

Today companies face great challenges due to continuous change of the environment. This dynamic change leads directly or indirectly to a flexible behavior of organizations. This organizational behavior could be characterized by: reducing the response time between demand and offer, quickly adaptation to market dynamics, fast „modernization” of the management, more flexible organizational structures, customer orientation, environmental orientation, and so on. Although there are numerous works in literature that analyze the Environmental Management System (EMS), there are very few studies that approaches all integrated environmental practices, and analyze the EMS quality by considering the factors that influence it and also characterizes the organization’s orientation to environmental issues.

In the present paper, we conducted a research that addresses the implementation quality of EMS under the influence of various internal and external environment factors at the level of the largest organizations that are situated in NE area of Romania. The analysis was elaborated at the level of largest organizations that are developing predominantly industrial activities. For our study we have selected a sample of 178 managers. In this context, one of the main objectives of this research was to build a model for the architecture of the relationship among the influence factors and the implementation of EMS quality. Practical contributions of this research consist in specific information regarding the following issues: what factors strongly influence the implementation of EMS quality; what measures should be taken to increase the implementation quality; where are the limitations to the potential growth of the quality regarding the EMS implementation.

Key words: EMS implementation quality, environmental management, industrial organizations

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1. Introduction

Every organization can be seen as a complex entity that has on its base, a process of continuous interconnected systems (designed, implemented, integrated, monitored, audited and adapted to the different levels) that use the organization’s resources to achieve the proposed objectives and targets. Therefore all the substantial differences between organizations, characterize the difficulty of

Environmental management system implementation and integration, and justify the complexity of this type of system.

Also, it should be mentioned that the EMS plays a critical role for the organizations. EMS is directly linked, both positive (Al-Tuwaijri et al., 2004; Christmann, 2000; Heras-Saizarbitoria et al., 2010; Lupu et al., 2012; Melnyk et al., 2003; Wahba, 2008) or negative (González-Benito and González-Benito, 2005; Heras-Saizarbitoria et al., 2010; Link

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and Naveh, 2006; Watson et al., 2004), as well as strong or weak, to the overall financial performance of any organization (together with other environmental practices, such as those included in the category of: planning and organization and/ or the communicative practice (Gonzalez-Benito and Gonzalez-Benito, 2005)). Therefore, it is absolutely necessary to analyze the implementation and integration of EMS quality, through the influences of various factors (on internal level/ external level), because otherwise, an independent assessment of internal quality of EMS could lead to a superficial results at a certain moment (Herghiligiu, 2013).

The literature shows a multitude of classifications of endogenous and exogenous factors that influence directly or indirectly the implementation of an EMS (Babakri et al., 2003; Darnal, 2001; Kaur, 2011; Kitazawa and Sarkis, 2000; Zutshi and Sohal, 2004). Nevertheless it can be seen a diversity in the selection and the analysis of these factors, which can lead to the lack of clear understanding regarding the investigated phenomenon.

Moreover, there are very few specialized works that analyze, in a unified manner, the factors that influence undeniable the EMS implementation quality. In this context, it is necessary to evaluate and analyze any relationship among the factors that characterize the organizations orientation toward environmental issues, as well as EMS total implementation quality.

This paper aims to develop an instrument in the form of a model, able to provide a reliable tool in the management of an organization in order to improve the EMS implementation/integration. Therefore the paper identifies the factors that influence the quality of implementation of an Environmental management system by using quantitative and qualitative analyses.

The specific objectives of the paper address the following issues:

- identification of the major internal and external factors that influence the quality of implementation of an EMS at organizations level together with the aspects that characterize the environmental orientation of organizations (F_1);
- identification of the aspects which describe the global quality of implementation of an EMS (C_C);
- identification of the connections and the influence intensity between the first set of factors (F_1) and/ on the quality of implementation of an EMS (C_C).

The vast majority of authors address either to the various external factors that influence the orientation of the organization to change the environmental strategy, or to the internal factors that have a role in determining the quality of environmental management issues, but not specifically analyze the factors that influence the EMS implementation quality.

Also, is necessary to mention that the terminological approach regarding the association between EMS and the term “quality” is based upon

the fact that this type of management system is implemented and integrated into the general management of an organization. This phase – EMS implementation/ integration – is the most important for on organization because the environmental practices (Gonzalez-Benito and Gonzalez-Benito, 2005) developed are applied to organizational operations globally, and are continually evaluated for improvement opportunities.

In the same way of thoughts we could mention the fact that the EMS in organizational management terms, can be seen as a complex process (the association between the activities belonging to a certain **system** and a certain concept / name – a certain **process**, according to Bizzo and Bernardi (2003), should not represent a matter of concern; the decision to aggregate/ put together the activities (of a system) into a process has a managerial nature) that could be characterized and evaluated through the prism of Total Quality Environmental Management (TQEM) philosophy; so the association between these two terms mentioned above is justify.

2. Materials and methods

The research methodology structure entailed the following targets: a) determination of the most important factors that influence the quality of implementation of an EMS; b) determination of the essential aspects that resume the quality of implementation and integration of an EMS; c) analysis of the connection between F_1 si C_C and design a model for the architecture of all influences among the variables that describe the environmental orientation of the organization and the synthetic variable that describe the EMS implementing and integration quality.

The research plan presented in this paper had the following steps:

1. for determining the most important factors that influence the EMS implementation quality, and
2. for determining the essential aspects that resume the quality of implementation and integration of an EMS the research techniques have consisted in identification of the type and the source of information that need to be studied as is it follows: (a) secondary data sources: the literature, environmental documentation from some of the biggest organizations in the NE area of Romania, and so on; (b) primary sources of information: interviews with specialists from several organizations from NE area of Romania.
3. for analysis of the connection between F_1 si C_C and designing a model that present the architecture regarding all of this influences, (A) the research techniques have consisted in identification of the type and the source of information to be studied as is follows: (a) secondary data sources: the literature, and so on, (b) primary sources of information: questionnaire with 179 items applied to 171 managers (specialists and/or with experience in different environmental activities) at the level of

biggest organizations in the NE area of Romania; the questionnaire has three parts: for F_I : 96 items, for C_C : 74 items, and for the general variables (the interviewee and the organization) – 10 items; (B.) the qualitative analysis was accomplished through a quantitative analysis of data using SPSS 16 (testing internal consistency for the instrument variables used in the research/ testing the normality of variables distribution using One-Sample Kolmogorov-Smirnov Test/ using Spearman nonparametric tests/ partial correlation test and so on.); (C.) outcome of research: model development that presents the architecture regarding the connections between F_I and C_C .

The originality of the paper result (a) from the construction investigation methodology, (b) the model used (highlighted in Fig. 1), (c) from the variables considered, (d) from the dimensions designed for variable, (e) from the items built for the variables chosen, (f) from the originality approach the EMS implementation quality in NE region organizations of Romania.

In order to be most clear and transparent the presentation approach of the research methodology, in the following is described: the original variables designed for the structural correlations research model (Fig. 1), the proposed hypothesis, the sample used and the statistical analyzes. So in the context of developing the research model it's necessary to mention that the literature shows that the authors carried out researches focusing only on certain impact factors concerning the EMS implementation success.

They paid attention a) to the environmental certification delivered to the organizations and to the EMS adoption at the organizational level; b) to the

environmental certification level in case of different organizations; c) to the impact of the environmental certification on the environmental performance.

We did not find in the analyzed works a simple and efficient pattern that addresses to the process of investigating the factors that influence the EMS implementation quality; such a pattern would have been easily understood by any researcher or specialist in the environmental management field who would like to carry out an investigation concerning the mentioned subject.

Thereby the proposed model (Fig. 1), contains two major types of variables (I and II) and a secondary one (III), as it follows:

(I) variables that characterize the implementation quality of EMS (dependent variables - C_C), as follows (Herghiligi, 2013): 1) *Implementation of environmental policies and programs* (Christman and Taylor, 2006; Ionescu, 2000; Lupu et al., 2006); 2) *Compliance with environmental regulations* (Lupu et al., 2006; Zobel and Burman, 2004); 3) *Environmental financial performance* (Lupu et al., 2006); 4) *Environmental operational performance* (Al-Tuwaijri et al., 2004; Christmann, 2000; Heras-Saizarbitoria et al., 2010; Melnyk et al., 2003; Nawrocka and Parker, 2009; Wahba, 2008); 5) *The relationship with various external entities* (Darnal, 2001); 6) *The relationship between organizational activities and state of the environment* (Lupu et al., 2006; Zobel and Burman, 2004);

(II) variables that describe/characterize the organizations orientation related to environmental issues (independent variables/ influence factors, F_I), such as:

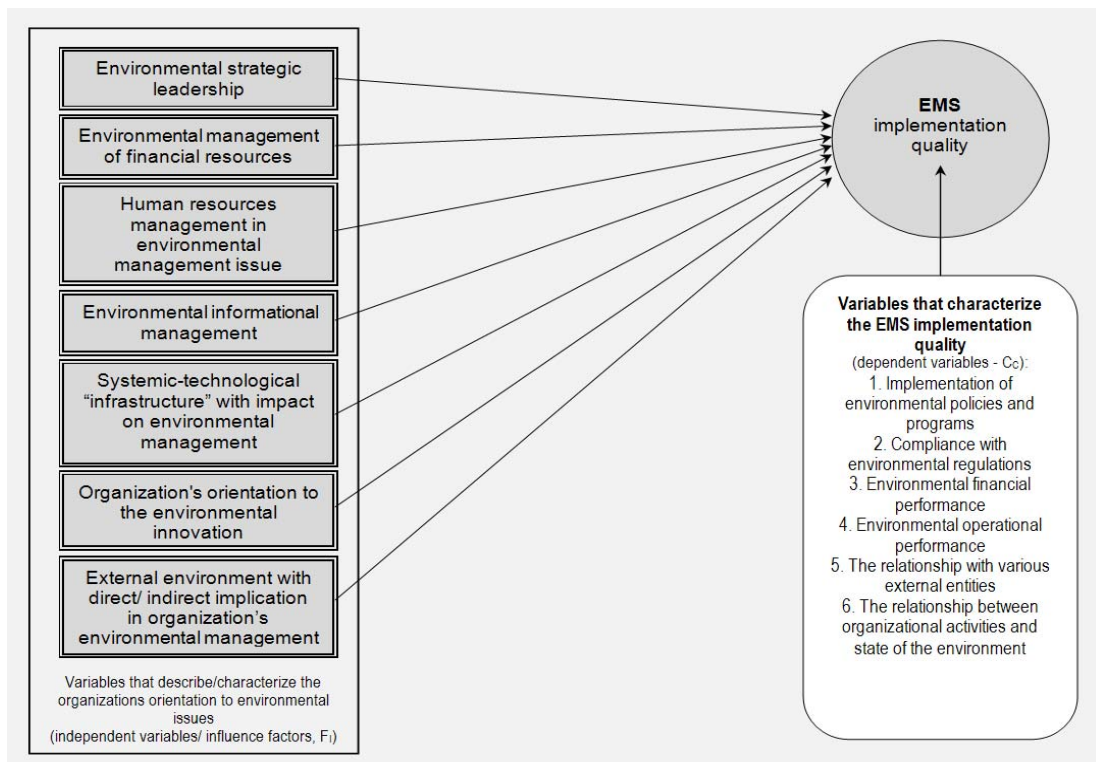


Fig.1. Correlations in the research model

1) *environmental strategic leadership* – considering only the management and not human resources, F_1 (Aslan et al., 2011; Daily et al., 2007); 2) *environmental management of financial resources*, F_2 (Lupu, 2008); 3) *human resource management in environmental management*, F_3 (Daily et al., 2007; Kaur, 2011); 4) *environmental informational management*, F_4 (Appelt et al., 2011; Herghiligi and Lupu, 2012a, b; Lupu et al., 2006); 5) *systemic-technological “infrastructure” with impact on environmental management*, F_5 (Klassen and Angell, 1998); 6) *organization's orientation to the environmental innovation*, F_6 (Wagner, 2008); 7) *external environment with direct/ indirect implication in organization's environmental management*, F_7 (Christmann and Taylor, 2001; Sarkis et al., 2010); (III) categorical/ general variables: 1) features of the respondent, and 2) general features regarding the organization.

Also, for the questionnaire designed it's necessary to specify that was used 171 original items in the form of different statements which addresses the variables mention previously above.

Regarding the structural correlations research model (Fig. 1), it must be mentioned that was hypothetical considered that each of the independent variables develop a connection with each dependent variable, and thus ultimately with the EMS implementation quality.

In determining the research hypothesis it was considered appropriate to apply a synthetic approach, in an econometric manner, where (Herghiligi, 2013):

H_0 : EMS implementation quality is not directly and positively influenced by each of the variables: $II.1.(F_1) - II.7(F_7)$;

alternative hypothesis:

H_1 : EMS implementation quality is directly and positively influenced by each of the variables: $II.1.(F_1) - II.7(F_7)$;

where: EMS implementation quality = variables I.1. - I.6. (Table 1).

In order to (a) confirm or invalidate the hypotheses set, that are emerged from H_1 or H_0 , and (b) analyze each relationship between influence factors and the EMS implementation quality, were undertaken the following statistical analysis (Herghiligi, 2013):

a) confidence test of the internal consistency for the considered constructs (mean/ standard deviation/ Cronbach alpha index);

b) an assessment of zero-order partial correlations between each of the factors that characterize the organizations orientation to environmental issues ($F_1 - F_7$) and the variable that describe the EMS implementation quality;

c) an assessment of partial correlations between EMS implementation quality and the factors that influencing it, in the conditions of using of control variables.

The sample used, depending on the activity profile of the organizations has the following structure: 78.36% of respondents works in industrial organizations; 18.71% of respondents works in organizations that are in services area; 1.75% of respondents works in organizations that are in agriculture field; 1.75% of respondents works in organizations that are in commercial field (Fig. 2); from a total of 178 managers.

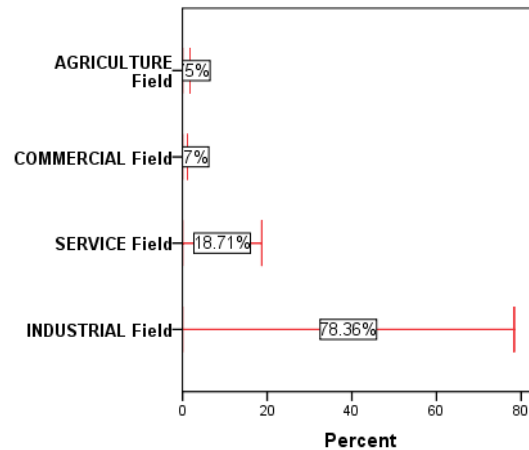


Fig. 2. Sample structure

3. Experimental

In order to test the statistical reliability regarding the constructs of the research instrument was analyzed Cronbach Alpha index, mean, and standard deviation, as can be observed in Table 1 and 2. Therefore was found that Cronbach Alpha index for all variables is situated at an acceptable level of confidence: greater than 0.5 (Jaba and Grama, 2004; Hodge and Shankar, 2014).

To evaluate the zero-order correlations between each of the factors that characterize the organizations orientation to environmental issues ($F_1 - F_7$) and the variable that describe the EMS implementation quality, wasn't used any control variables and thereby could be determine that besides the factor *External environment with direct/ indirect implication in organization's environmental management* ($\text{sig}=0.602 > 0.05$), all other six factors significantly correlates with the variable that describe the EMS implementation/ integration quality ($\text{sig}=0.000 < 0.05$).

Thereby, the EMS implementation/ integration quality is significantly correlated with: (i) *environmental strategic leadership* ($r=0.752$, $p < 0.01$) - explaining 56.5% of the variance, (b) *environmental management of financial resources* ($r=0.749$, $p < 0.01$) - explaining 56.1% of the variance, (c) *human resource management in environmental management* ($r=0.755$, $p < 0.01$) - explaining 57% of the variance,

Table 1. Reliability measurements for variables that describe the implementation quality of EMS

<i>Construct</i>	<i>Average</i>	<i>Standard deviation</i>	<i>Cronbach Alpha</i>
I.1. Implementation of environmental policies and programs	5.03	0.55	0.734
I.2. Compliance with environmental regulations	5.20	0.60	0.65
I.3. Environmental financial performance	3.80	0.99	0.729
I.4. Environmental operational performance	3.99	0.53	0.595
I.5. The relationship with various external entities	4.13	0.82	0.61
I.6. The relationship between organizational activities and state of the environment	3.82	0.97	0.832

Table 2. Reliability measurements for variables that describe the factors that influence the implementation quality of EMS

<i>Construct</i>	<i>Average</i>	<i>Standard deviation</i>	<i>Cronbach Alpha</i>
II.1(F ₁) Environmental strategic leadership	4.95	0.63	0.671
II.2(F ₂) Environmental management of financial resources	3.95	1.56	0.717
II.3(F ₃) Human resource management in environmental management	4.61	1.14	0.86
II.4(F ₄) Environmental informational management	5.11	0.74	0.9
II.5(F ₅) Systemic-technological “infrastructure” with impact on environmental management	4.68	0.61	0.57
II.6(F ₆) Organization's orientation to the environmental innovation	4.55	1.65	0.904
II.7(F ₇) External environment with direct/ indirect implication in organizations environmental management	4.41	0.72	0.736

Table 3. Zero-order correlations established between influences factors (F₁) and EMS implementation quality (C_c)

<i>Control Variables</i>			<i>EMS implementation quality</i>	<i>Environmental strategic leadership</i>	<i>Environmental management of financial resources</i>	<i>Human resource management in environmental management</i>	<i>Environmental informational management</i>	<i>Systemic-technological “infrastructure” with impact on environmental management</i>	<i>Organization's orientation to the environmental innovation</i>	<i>External environment with direct/ indirect implication in organization's environmental management</i>	
-non-e a (z)	EMS implemen tation quality	Correlation	1.000	.752	.749	.755	.746	.330	.571	-.040	
		Significanc e (2-tailed)	.	.000	.000	.000	.000	.000	.000	.000	.602
		df	0	169	169	169	169	169	169	169	169
		R ²		56.5 %	56.1%	57%	55.6 %	10.9%	32.6%		

(d) *environmental informational management* (r=0.746, p<0.01) - explaining 55.6% of the variance, (e) *systemic-technological “infrastructure” with impact on environmental management* (r=0.330, p<0.01), - explaining 10.9% of the variance, (f) *Organization's orientation to the environmental innovation* (r=0.571, p<0.01) - explaining 32.6% of the variance (Table 3).

Although it would be possible to build a structural model which presents the architecture of these correlations (considering Table 3 as a source) each correlation between X (independent variable considered) and Y (dependent variable = EMS implementation quality) was assessed for a more accurate prediction of the association direction (causality), given that the effect of other independent variables, Z is “controlled”.

4. Results and discussion

The implementation and integration quality of an EMS, characterized by the sum of its characteristics fall into a complex subject, and it's the

one that indicates directly (a) the effectiveness and functionality of the system integration, and indirectly (b) the various features of the organizations that implement such a system.

Following the statistical evaluation of the collected data was elaborated the structural correlation model – Figure 3; and considering the proposed hypothesis we could analyze the final aspects (FA), related to the *EMS implementation quality*:

a. it is directly and positively influenced (significantly) by the factor *environmental strategic leadership* (F₁); the alternative hypothesis is partially confirmed;

b. it is directly and significantly positively influenced by the factor *environmental management of financial resources* (F₂); H1 is partially confirmed;

c. it is directly and significantly positively influenced by the factor *human resource management in environmental management* (F₃); the alternative hypothesis is partially confirmed;

d. it is directly and positively influenced (low intensity) by the factor *environmental informational*

management (F₄); the alternative hypothesis is partially confirmed;

e. it isn't directly and positively influenced by the factor *Systemic-technological "infrastructure" with impact on environmental management* (F₅); H₀ is partially confirmed;

f. it isn't directly and positively influenced by the factor *Organization's orientation to the environmental innovation* (F₆); H₀ is partially confirmed;

g. it is directly influenced, but in a negative way, by the factor *external environment with direct/indirect implication in organization's environmental management* (F₇); this partially confirms H₁, but in the negative sense.

Following the quantitative and qualitative analysis of collected data, some important remarks could be mentioned:

- although the reality and the literature mentions that the informational management system plays a defining role in organizations, our research shows that the *environmental informational management* determines only a small percentage (4%) from the variance of EMS implementation quality (considering the point FA-d). Therefore, this phenomenon could be explained only if it is taking into considerations the fact that organizations don't developed an effective environmental decisions/information knowledge system, and the environmental monitoring and control is purely formal;

- analyzing the lack of connection between *systemic-technological "infrastructure" with impact on environmental management*, and the *orientation of organizations toward environmental innovation* (point FA-e/ FA-f), with the EMS implementation

quality, the indifference of human resource of the organizations to these aspects can be observed. This behavior of organization it caused probably by the higher costs related to clean technologies and innovation process;

- it is extremely important to note that the quality of EMS implementation decreases as the environmental regulatory requirements and stakeholder pressure increase. This fact shows the real relationship between EMS and organizations; this type of management system is seen as a "necessary burden" of organization interests and not as a result of environmental awareness. The probable causes of this paradoxical phenomenon could be: (a) excessive routinization (as a negative effect), seen as an effect of EMS integration, (b) exceeding the tolerability point regarding the EMS implementation and operation costs, (c) the lack of medium and long-term vision, (d) high degree of resistance to change, and so on.

The design and the implementation of this research lead to the following proposed solutions for improving the EMS implementations quality – at the level of the NE Romanian organizations: increasing the internal organizations regulations flexibility, shifting the environmental decision-making paradigm - from the traditional to a fractal one (Herghiligiu et al., 2013), determining and expressing a clear environmental vision, setting more clearly the environmental objectives and targets and linking them with the general objectives of organizations, real use of the results obtained from environmental audits, and increase the level of environmental performance monitoring (considering the point FA-a), and so on.

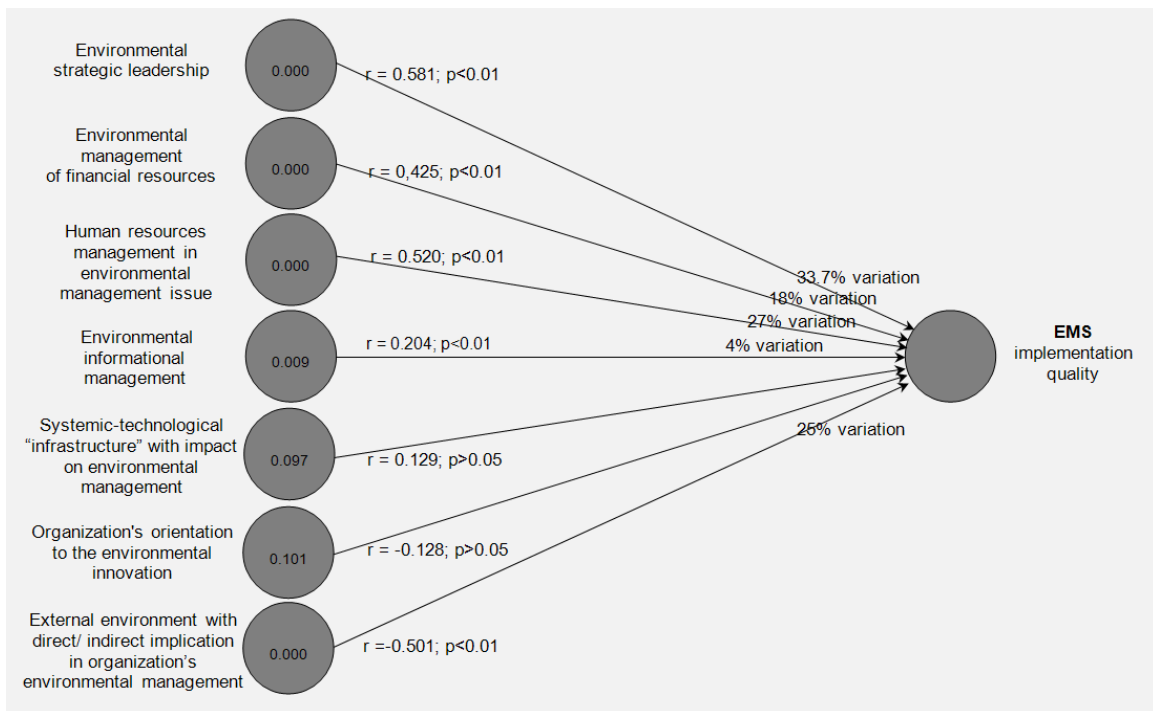


Fig. 3. Estimated structural correlations model

Also it should be mentioned that the EMS implementation quality could be improved by: establishing clearly the environmental responsibilities, integrating the environmental performance in employees' motivation system, and setting the goals of environmental trainings for the organizations employees only after it's measured their environmental knowledge level.

5. Conclusions

This research, conducted within some Romanian organizations in the North-East region of Romania is an original and singular study because (a) it shows the particularities of these organizations by describing the state of fact, and (b) it clarifies what factors influence the EMS implementation quality, the degree of influence, and the meaning of this influences (positive/ negative). The originality of the research results also from the methodology design, from the statistical analysis that was made, and from the proposed solutions for the managers of organizations that have the purpose to improve the EMS implementation quality.

The conclusions are extracted from the qualitative and quantitative analysis of the relationship between: a) the organization's interest in the environmental management issues, and b) the implementation quality of the environmental management system. These considerations may be considered as starting points in the development of various measures with a practical character for any environmental manager. Also, the research results can contribute to the transformation of the current environmental management system in some Romanian organizations into an efficient one so as to represent "an advantageous lever" for the organizations.

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