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INDICATORS SYSTEM FOR ASSESSING THE ORGANIZATIONAL KNOWLEDGE ACQUISITION PROCESS

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Abstract

In recent years the organizations' has gone from resource-based economy to a knowledge based economy. Likewise the organizations' success in this turbulent environment depends on its sustainable orientation which implies integration of various management practices. Such a management practices considered to be a driving force to sustainable development are environmental management system (EMS) and knowledge acquisition. In this context, it's required to measure the organizational knowledge management performance and to identify viable knowledge acquisition metrics.
This paper aim to develop a managerial instrument in order to measure each steps of knowledge acquisition process. Therefore the main objective is to elaborate an indicators system with the purpose to assess the environmental knowledge acquisition process. The main results of this approach are: (1) development of a methodology in order to elaborate an indicators system associated to knowledge acquisition process; (2) development of an indicators system in order to assess the steps which characterizes the environmental knowledge acquisition process. The results are based on a research that addresses knowledge acquisition process within organization from NE area of Romania; the research sample was 182 respondents. This research approach is innovative and original because in the literature are not being identified indicators which organizational assess each of the environmental knowledge acquisition stages.

Key words: environmental knowledge acquisition process, indicators system/ metrics, knowledge management

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1. Introduction

The report "Climate change, impacts and vulnerability in Europe 2016 (http://www.eea.europa.eu/ro/highlights/schimbarile-climatice-reprezinta-un-factor), made public in January 2017, underlines the important impact which climatic changes have on ecosystems, economy and people's health. Likewise worldwide there exist an increasing concern regarding the companies' impact on the environment (Farneti and Guthrie, 2009; Comăniţă et al., 2015; Dominguez et al., 2016; Ghinea et al., 2016; Istrate et al., 2017). Basically, this means that at each organization level the environmental policies should become a daily activity vector, while the environmental management system (EMS) should become an important part of the general management system. Also, the environmental performance should be as close as possible to the imposed targets**.**

Likewise it should be mention that the success of any organization in this turbulent environment depends on its sustainable orientation which implies integration of various management practices. Such management practices considered to be a driving force to sustainable development and knowledge acquisition (Herghiligiu, 2017) is EMS - design according with ISO 14001 (Sebhatu and Enquist, 2007) or with EMAS (Wijesooriya et al., 2011). In this context, the

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ISO 14001 EMS implementation constitutes a desirable outcome that every organization has to reach. This organizational practice it's integrated in the context in which the society has evolved from the resource based economy to knowledge based economy; organizations leaders (i) have to deal every day with large amounts of information, (ii) have to select and manage it in order to identify and assimilate fast the necessary knowledge, and (iii) to adopt suitable decisions in order to achieve organizations' objectives.

Thus, in knowledge based economy paradigm, knowledge management is the organization performance core; also equally in environment management the correct interpretation and measurement regarding the knowledge acquisition process, it's a necessity.

In the literature we did not find representative researches regarding organizational knowledge acquisition assessment (associated to knowledge management field), and much less in the field of environment management. Therefore the aim of this paper is to present an evaluation indicators system for each of the stages associated to environmental knowledge acquisition that is considered to be a primordial process in the environmental knowledge management. Likewise it's should be mention the fact that a real organizational EMS integration it's based on an efficient and effective environmental knowledge management process that has as its core the knowledge acquisition. Also a real integration of such an environmental practice (EMS) bring multiple benefits such: market share, employees motivation, customer loyalty and trust, cost reductions, operation and process efficiency, business reputation, profitability, and so on (Halis and Halis, 2016; Herghiligiu, 2013; Tari et al., 2012; Vaute-Samanni and Grevêche, 2015).

Therefore, a clear and efficient evaluation indicators system associated to environmental knowledge acquisitions process can be considered a very useful managerial instrument, with direct correlation on environmental decision making processes.

The paper is structured in 3 sections, as follows: section 1 – Material and methods, which include (i) the literature review regarding the importance and necessity associated to the environmental knowledge acquisition process assessment, and (ii) the research methodology; section 2 – Results and discussions; and section 3 – Conclusions.

2. Material and methods

2.1. Importance and necessity of environmental knowledge acquisition process assessment

Environmental knowledge can be addressed in simple terms as *"… what people know about the environment, key relationships leading to environmental aspects or impacts, an appreciation of "whole systems", and collective responsibilities necessary for sustainable development"* (Fryxell and Lo, 2003). Taking into account the fact that managers can influence directly the organizational environmental orientation, the environmental knowledge acquisition and the organizational ability to assess such information "would appear to be inherently desirable" (Fryxell and Lo, 2003; Kaplan, 2000). Literature presents an increasing role of knowledge management in "key areas of environmental management" (Boiral, 2002). Roome and Wijen (2006) argue that a "superior environmental performance" requires capabilities "to process new information … and to adapt the organization to contexts". Organizational integration of different knowledge management instruments associated to environmental issues becomes an essential process for SMEs (Roy and Thérin, 2008). Even if the literature on environmental management and SMEs is growing (Hitchens et al., 2003; McKeiver and Gadenne, 2005; Rothenberg and Becker, 2004), few studies have focused on the knowledge acquisition process (Roy and Thérin, 2008). For elaborating this paper we started with a more extensive previous researches (Luca, 2016; Luca et al., 2016a, 2016b, 2016c) that addresses (investigation, analysis and improvement) knowledge acquisition process within organization from NE area of Romania; the research sample was 182 respondents. This research involves elaboration of quantitative and qualitative working instruments, methodologies and methods (Fig. 1). The research aimed a qualitative and quantitative analysis regarding the relation between various organizational components (intellectual capital) and the stages of the organizational knowledge acquisition process.

The statistical study established the influences between the variables that describe these connections, leading to various solutions with the main purpose to improve the organizational knowledge acquisition process. Following this extensive analysis the necessity of elaborating an evaluation indicators system for the organizational knowledge acquisition process became obvious.

In this context, the main objective of the paper consists in elaborating an evaluation indicators system for the process of organizational environmental knowledge acquisition.

Economic realities place organizations in the situation in which they have to face a very large amount of information, and the competitive advantage nowadays is given by the originality of the way in which they use this information. Segarra-Cipres et al. (2014) notices the fact that the competitive advantage of an organization is directly linked to the capacity of identifying valuable external knowledge and integrated it in its own innovation process. Ulrey (2015) states the fact that the recent rebirth of the field of environmental knowledge acquisition is no coincidence, but rather the results of an explosion of the social medial and of the pressure placed on organizations by the economic crisis.

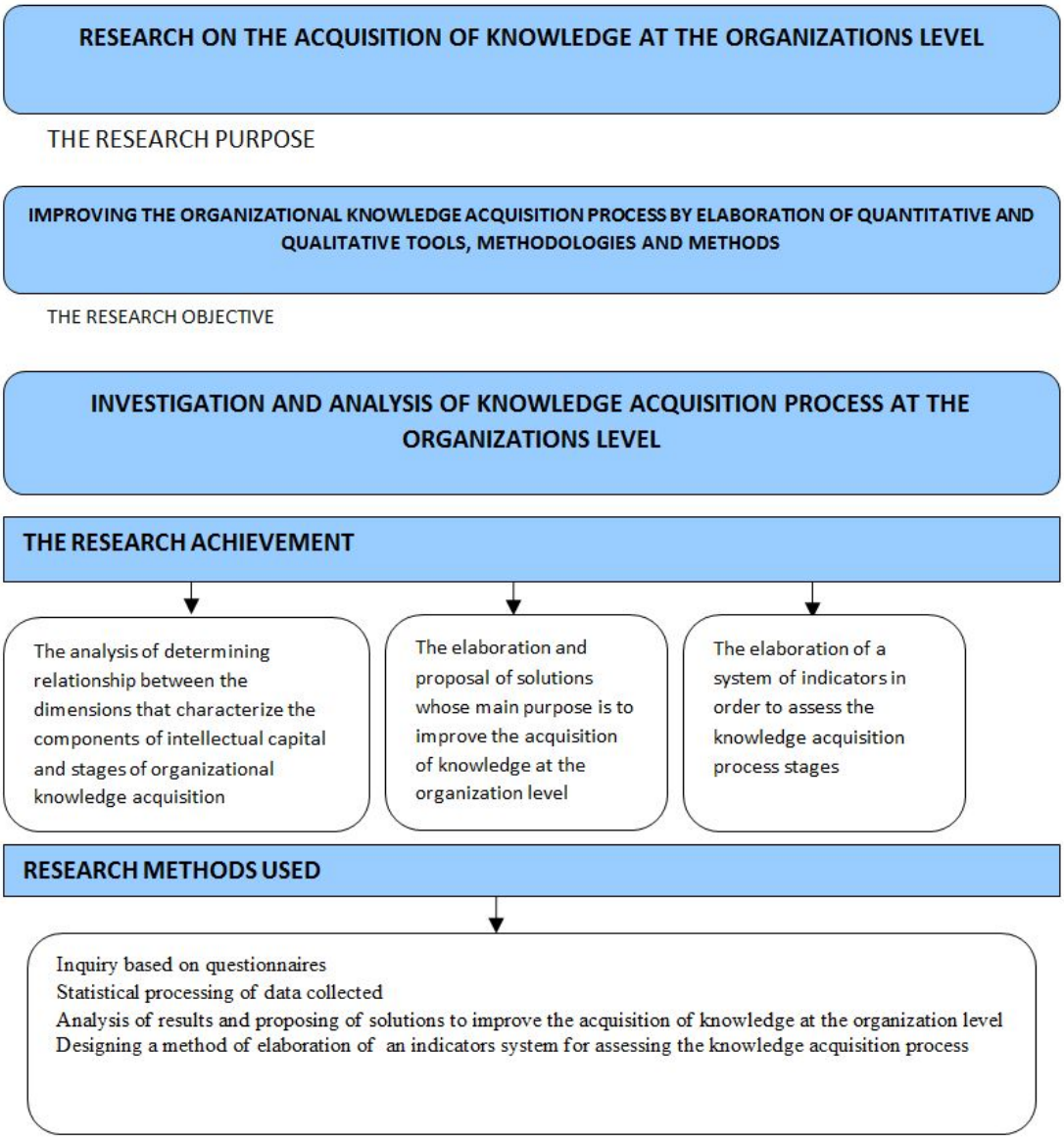

Fig. 1. General scheme regarding the research on organizational knowledge acquisition process

The literature provides numerous attempts to measure knowledge management, most of the times this being reflected by the number of innovations (Arvanitis et al., 2015; Segarra-Cipres et al., 2014; Silva et al., 2013 etc.), investments in research and development, number of researchers, number of patents, the existence of partnerships with research institutes and universities (Silva et al., 2013), the speed, frequency and magnitude of innovation, continuous or periodical expertise reports, technical reports, presentations, documents, task books, studies (Hawkins et al., 2014), business performance (financial performance), productivity, price, product mix, value created for clients, growth in core competences and promoting responsibility. A study conducted and published in 2014 by Andrea Hurtado-Ayala and Carlos Hernan Gonzalez-Campo (González-Campo and Ayala, 2014) notices that knowledge management was measured over time in the specialty literature through the research-development activity (the intensity of the research-development process, investments in research-development, technological information, personnel and departments/ activities involved in research-development, investments in infrastructure), individual characteristics (technical and professional personnel and personnel training), scientific production (number of scientific publications and number of patents/ registers and trademarks), networks (number of partners/ affiliations, alliances with research institutes, use of scientific journals) and organizational structure (use of manuals / policies, human resources practices, organizational forms, bonus systems) (Luca, 2016).

The paper focuses on representative aspects related to knowledge acquisition process and associated to environment management practices. Taking into account the fact that EMS integration requires a substantial knowledge input, both to managers as well as non-management personnel, we considered absolutely relevant the evaluation associated to the environmental knowledge

acquisition process; thus providing a specific methodology to this evaluation, as a measuring instrument for the efficiency of the environmental knowledge acquisition process. Therefore the paper bring a methodological contribution to knowledge management and environment management fields; and propose a new metrics approach to knowledge – environmental issue "entities" ("organizational management entities" that have a direct influences in environmental decision making process).

Based on extensive researches (Luca, 2016; Luca et al., 2016a, 2016b, 2016c; Lupu et al., 2006) and the previous brief literature review, it is evident the fact that few studies have focused on the knowledge acquisition process, and relevant metrics associated to organizational environmental knowledge acquisition stages, have not been developed/ presented. For this reason, this paper presents/ proposes a developed indicators system for measuring the process of environmental knowledge acquisition/ stages of knowledge acquisition.

2.2. Research methodology

By designing this indicators system we intended the evaluation of each stage associated to the environmental knowledge acquisition process, as well as the possibility of weighing the importance of each of these indicators, according to the specificity and characteristics of each organization. This initiative is taken due to the fact that environmental knowledge acquisition process can be considered an essential stage in the environmental knowledge management, with an extremely important impact over the environmental performance.

The elaboration of this indicators system started with evaluating the performance of each stage in the environmental knowledge acquisition process, viewed through the defining elements – the knowledge acquisition stage; the hierarchy of the indicators was established according to general criteria, as well as to specific criteria's associated to organizations. Tracking the organizations general objectives, we could customize knowledge acquisitions, for linking it to organizational environment protections issues.

Therefore, the study aims to design an indicators system for evaluating the stages of the environmental knowledge acquisition process. When developing the methodology for designing **the indicators system for evaluating each stage of the of environmental knowledge acquisition process** we took into consideration the results of previous research (mentioned before) on knowledge acquisition. The methodology presents a phased approach according to figure below (Fig. 2).

3. Results and discussion

3.1. Indicators for evaluation of environmental knowledge acquisition process

The evaluation indicators of the environmental knowledge acquisition process are established according to the organizations' environment policy, commitment, objectives and targets.

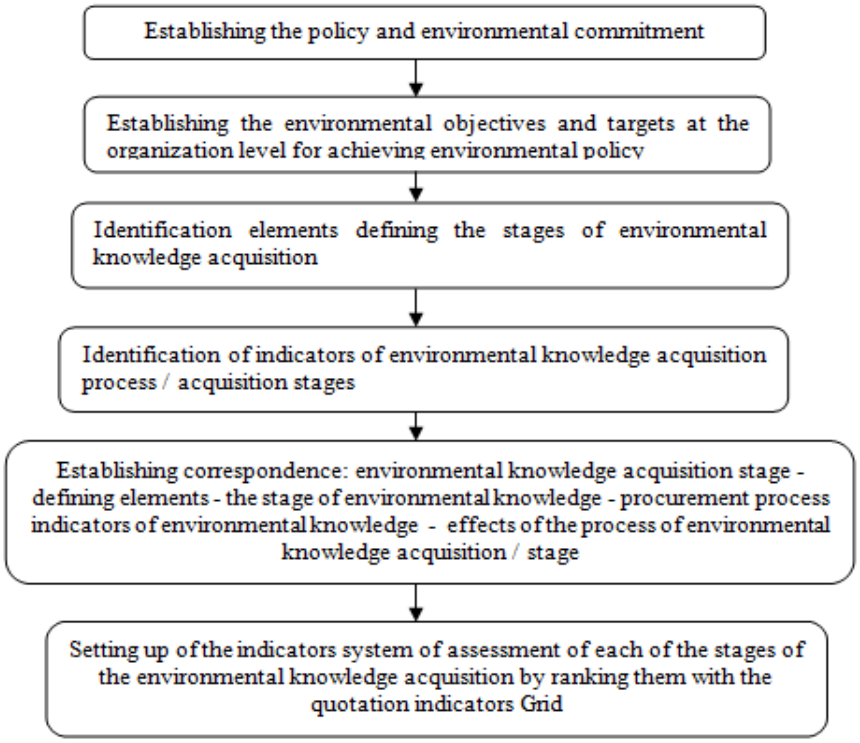

Fig. 2. The methodology for establishing the system of assessment indicators regarding each stages associated to organizational environmental knowledge acquisition

The stages are:

- *Establishing the organizations' environment policy, commitment, objectives and targets*

The purpose of these stages is to identify the necessary environment knowledge that should be acquired at the level of each organisation. The dimension and content of this was the object of previous research (Luca, 2016). Placing these stages within the methodology of designing the indicators system is necessary to underline the specific features of environmental knowledge which influence the accomplishment of the stages in the knowledge acquisition process.

- *Identifying defining elements of the environmental knowledge acquisition stages*

In accomplishing this stage, managers have to take into consideration a series of established general organizational objectives, such as reducing the costs involved in the phase of strategic search for knowledge at organisation level, reducing the time allotted to the phase of decoding/ recoding the acquired knowledge, increasing the revenues generated by the acquired environmental knowledge or reducing the costs generated by the environmental knowledge acquired and not yet capitalised. In general terms, this identification was performed according to (Table 1).

- *Identifying indicators for the environmental knowledge acquisition process/ acquisition stages*

The approach of this stage was based on an analysis of the requirements expressed by the respondents who participated in the survey that the methodology was built on (Luca, 2016). When analysing the answers we noticed a lack of correlation between the stages of the knowledge acquisition process found in literature and the practical process performed in organisations. Following the findings are based on a qualitative analysis of these expressed opinions, we proposed the indicators for the environmental knowledge acquisition process, structured on acquisition stages. The current paper constitutes a presentation of these indicators, the calculus, relationship and measurement unit.

- *Establishing the correspondence: environmental knowledge acquisition stages – defining elements – the acquiring environmental knowledge stage – indicators for the environmental knowledge acquisition process – effects of the environmental knowledge acquisition process/ stage* **–** will take into consideration aspects connected to the relevance of the results returned by the respective indicators and to the resources implied by this correspondence.

Within this approach we understood the necessity of quantifying through evaluation the knowledge acquisition process, and environmental knowledge implicitly. As a consequence, the design of indicators was performed for each stage in the knowledge acquisition process. The evaluation of the stages associated to the environmental knowledge management process follow the structure presented in (Fig. 3).

- *Constituting the indicators system for the evaluation of each stage in the environmental knowledge acquisition process, by hierarchizing those with the help of the indicators ranking grid.*

In order to facilitate the evaluation process of each of the stages associated to the knowledge management process, we propose a methodology of ranking the indicators according to their individual importance. The necessity of this stage resulted from the analyses undertook which led to the conclusion that not all evaluation indicators are relevant and necessary in relation (i) to the organisation particularity, (ii) to the environment issue development, (iii) to the degree of the knowledge acquisition process development.

The methodology for hierarchizing evaluation indicators for each of the stages associated to the knowledge acquisition process involved the identification of hierarchizing criteria's - the evaluation of each criteria of the indicators importance its' on 1 to 5 scale [1 meaning that the criteria have a very little importance for organisation, and 5 meaning that the criteria is very important; followed by the sum of scores]. The least important criteria will have the lowest score and the most important will have the highest score.

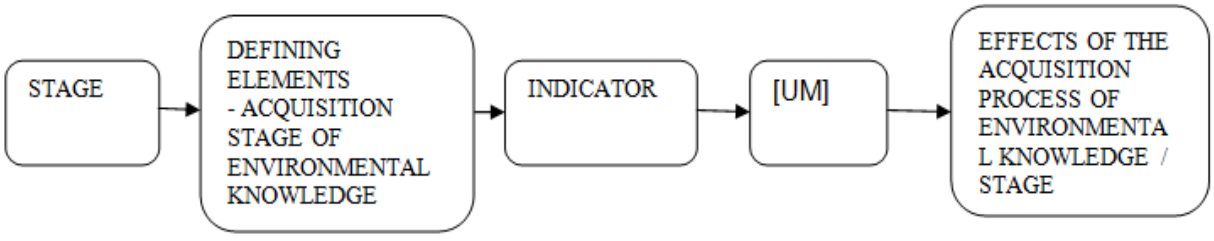

Fig. 3. Establishing correspondence: environmental knowledge acquisition stage - defining elements - the environmental knowledge stage - environmental knowledge indicators - effects of the environmental knowledge acquisition process/ stage (Table 1)

Table 1. Correspondence: environmental knowledge acquisition stage - defining elements - the environmental knowledge stage - environmental knowledge indicators - effects of the environmental knowledge acquisition process / stage

Stage	***Defining elements - acquisition stage of environmental knowledge***	***Indicator***	***[UM]***	***Effects of the acquisition process of environmental knowledg / stage***
Strategic stage for the environmental knowledges search needed to the organization	Share of time in which are identified the environmental knowledge necessary to the organization T_M	$T_M = T_{cMv}/T_{cMs}*100$ (%) T_{cMv} – the time required to identify environmental knowledge which were valued (hours) T_{cMs} – time spent for the strategic search (hours) Ideal: $T_{cMv} = T_{cMs}$	[% hours] [% hours spent for identifying the environmental knowledge valued]	-reducing the time with identify the environmental knowledge acquired and unused - incorrect evaluation of the potential of some environmental knowledge with effects in losing sight of possibilities to organization development - loss of interest of employees on continuous learning - identifying of the rhythm breaks for identification of the environmental knowledge needed by the organization
	Share costs with the environmental knowledge needed to identify the organization related to the cost with obtaining environmental knowledge valued C_M	CM= CcMv/CcMs*100 (%) Ccv – costs with identification of the environmental knowledge capitalized (lei) Ccs – the costs of the strategic search stage of the environmental knowledge necessary to organization (lei) Ideal: CcMv = CcMs	[%Monetary units] [% expenditures achieved with identifying of environmental knowledge valued in the total amount of the expenditure achieved in obtaining environmental knowledge]	
	Share costs with the infrastructure necessary to identify the environmental knowledge needed to organization $Ic_M s$	$Ic_M S=(Ic_M S_{n+1} - I_{cMsn})/I_T *100$ (%) $Ic_M S$ – value of infrastructure needed to identify the necessary environmental knowledge (lei) I_{cMsn+1} - value of existing infrastructure in the organization at the end of the identification phase of environmental knowledge (lei) Ics_n – value of existing infrastructure organization at the begining of the strategic search stage of environmental knowledge (lei) I_T – the total value of existing infrastructure within the organization (lei)	[%Monetary units] [% value of infrastructure used in the strategic search phase of environmental knowledge regarding with the total amount of organization infrastructure]	
Stage for the environmental knowledge acquisition through the purchase of environmental know-how	Share value of the environmental knowledge acquired through the acquisition of know-how and valued in relation to the total amounts budgeted for the environmental knowledge acquisition stage through acquisition of know-how V_{kMakh}	$V_{kMakh}=V_{khMv}/V_{khMb}*100$ (%) V_{kMakh} – environmental knowledge acquisition value share through the acquisition of know-how (lei) V_{khMv} – the amounts resulting from valuing acquired of environmental know-how (lei) V_{khMb} – the amounts budgeted for the acquisition of environmental knowledge by acquiring know-how (lei)	[%Monetary units] [%amounts resulting of valuing knowledge acquired through the acquisition of know-how in relation to the amounts budgeted for acquisition of know-how]	- potential possibilities of organization development using the know-how acquired - the potential of know-how that the organization has
	The expected period of exploitation of the know-how in relation to the acquired of environmental know-how TexpkhM	TexpkhM=TexpkhMsf-TexpkhMif TexpkhM - the exploitation period of the environmental know-how acquired (operating hours) TexpkhMsf – the removal time from exploiting of the acquired environmental know-how TexpkhMif - time of placing into exploiting of the acquired environmental know-how	[operating hours]	
	Identification number of activities that should be proceeding at the	Npn= N_{TaM}-Nap Npn – the number of procedures necessary due to the	[number of activities that require the	

	organization level due to acquisition of environmental knowledge through the acquisition of know-how Npn	knowledge acquisition by acquiring environmental know-how (number of activities that require the development of operational procedures N_{TaM} – total environmental activity within the organization (number of activities) Nap – number of procedural activities across the organization (number of operating procedures)	development of operational procedures]	
	The time preparation till entry into operation environmental know-how acquired TexplkhM	TexplkhM= TiexplkhM – TakhM TexplkhM – the time to set into operation of the acquired environmental know-how (hours) Tiexplkh – the time to set into operation of the acquired environmental know-how Takh – time of purchase of environmental know-how	[hours]	
	Share procedures that were changed along with the acquisition of environmental knowledge through the acquisition of environmental know-how in relation to the total number of activities across the organization Npkh	Npkh= Npn/ N_{Ta}*100 (%) Npkh - Share procedures that were changed along with the acquisition of knowledge by acquiring environmental know-how Npn – the number of procedures required due to knowledge acquisition through the purchase of environmental know-how (number of procedures) N_{Ta} – total number of procedural activities within the organization (number of procedures)	[%procedures] [%modified procedures in the total of procedures]	
	Number of workers who do not have coverage with loads within the organization along with the purchase of environmental know-how N_{LkhM}	N_{LkhM}= N_{Ln}-N_{Ln+1} N_{Lkh} . Number of workers who do not have coverage with loads within the organization along with the purchase of environmental know-how (no. workers) N_{Ln} – the number of workers in the organization before the acquisition of environmental know-how (no. workers) N_{Ln+1} - the number of workers in the organization after implementing of the existing environmental know-how acquired	[number of workers]	
The environmental knowledge acquisition stage by hiring experts	Share of proceeds from valorisation acquired environmental knowledge by hiring experts in relation to the total budgeted amount of the environmental knowledge acquisition stage by hiring experts V_{kaMex}	V_{kaMex}=V_{Mexv}/V_{Mexb}*100 (%) V_{kaMex} – share acquisition of environmental knowledge by hiring experts V_{Mexv} – the amounts resulting from valorisation of environmental knowledge acquired through hiring experts (lei) V_{Mexb} – the budgeted amounts value for the acquisition of environmental knowledge by hiring experts (lei)	[%Monetary units] [%lei income generated by the acquisition of environmental knowledge by hiring experts compared with the amounts allocated to the acquisition of environmental knowledge by hiring experts]	- correct identification of experts needed to achieve the environmental organization's objectives - continuous learning within the organization - the time that the experts need to integrate into the organization
	The share of new /amended procedures at the	P_{pex}= Np_Mex/ N_{Ta}*100 (%) P_{pex} - Share procedures that were changed along with the	[%procedures] [% modified procedures across	

	experts proposal of total procedures Ppex	acquisition of environmental knowledge by hiring experts NpMex – the number of new /modified procedures due to the acquisition of environmental knowledge by hiring experts, on their proposal (no. procedures) N_{Ta} – total number of procedural activities within the organization (no. procedures)	the organization due to environmental knowledge acquisition through employment of experts]	
The assimilation stage through the decoding / recoding of the acquired environmental knowledge	The share of employees who need training due to the acquisition of environmental knowledge in relation to the total number of employees within the organization **A_{LsdrM}**	$A_{LsdrM}= N_{Lsdr}/N_{Lo}*100$ (%) A_{LsdrM} – the share of employees who need further clarifications following the acquisition of environmental knowledge N_{Lsdr} – the number of workers that require further clarification in the decoding / re-encoding stage (number of employees) N_{Lo} – number of employees within the organization (number of employees)	[% employees] [% employees who need training due to the acquisition of environmental knowledge in relation to the total number of employees within the organization	- availability of language used in the stage decoding / encoding for other members of the organization - losing sight of the potential of some of the acquired environmental knowledge due to stage decoding / recoding - decoding / recoding erroneous of the environmental knowledge acquired - the time to required recoding / encoding when the operation is performed solitary
	The allotted time to the decoding / recoding operations of environmental knowledge in total acquisition time T_{drM}	$T_{drM}= (T_{imp}-T_{ach})/T_{oka}$ T_{drM} - The allotted time to the decoding / recodind operations operations of environmental knowledge in total acquisition T_{imp} – time of implementation into procedures of the acquired knowledge T_{ach} – time of purchase T_{oka} – time spent on the acquisition of environmental knowledge within the organization	[hours]	
The assimilation stage throught the implementation into procedures of acquired environmental knowledge	Share of time for implementing the environmental knowledge acquired in total time spent on the process of knowledge acquisition $T_{kasimpM}$	$T_{kasimpM}= (T_{ivM}-T_{fdrM})/T_{oka}*100$ (%) $T_{kasimpM}$ – Share of time for implementing the environmental knowledge acquired in total time spent on the process of knowledge acquisition T_{ivM} – the stage of the time of initiation of valuing the acquired environmental knowledge T_{fdrM} – the moment of the final stage of decoding / recoding of environmental knowledge T_{oka} – time spent on the acquisition of environmental knowledge within the organization	[% hours] [% hours needed to implement acquired environmental knowledge in relation to the total time allocated to acquisition of knowledge within the organization]	- the potential of the use of acquired environmental knowledge - freedom given to professionals in identifying of new ways of interpretation and use of the working procedures of the organization - the personality stamp of each worker in the knowledge domain
	Implementation degree in the work procedures of the organization of the acquired environmental knowledge GiM	GiM=Npm/Nap*100 (%) GiM - Implementation degree in the work procedures of the organization of the acquired environmental knowledge Npm – the number of modified procedures (number of procedures) Nap – number of procedural activities within the organization (number of procedures) Npm= NpexM+ NpkhM NpexM – the number of new / modified procedures due to the acquisition of environmental knowledge by hiring experts on their proposal (no. procedures)	[%] [% share of modified procedures due to the acquisition of environmental knowledge in relation to all existing procedures within the organization]	

		NpkhM – the number of new / modified procedures due to the acquisition of environmental knowledge through the acquisition of know-how (no. procedures)		
The stage of valuing the acquired environmental knowledge	The time where the environmental knowledge are valued TvalM	TvalM= (TvM-Tcs)/Toka TvM – the time of valuing of acquisition environmental knowledge (the moment when the acquired environmental knowledge bring financial revenue to the organization) TcsM- the time when it was initiated the strategic environmental knowledge search	[hours]	- losing sight of new opportunities to value the acquired environmental knowledge - loss of market segments or even entire markets
	Share of revenues by valorisation environmental knowledge acquired in relation to the overall revenues of the organization VvM	VvM= $(Vv_{Mn+1}-Vv_n)/V_T*100$ (%) VvM - Share of revenues by valorisation environmental knowledge acquired Vv_{Mn+1} – company recorded income immediately after valuing of acquisition of environmental knowledge (lei) VvM_n - previously recorded income by the company before of valuing of acquisition environmental knowledge (lei) V_T – total revenues recorded in the organization (lei)	[%Monetary units] [% lei incomes obtained by valorisation the environmental knowledge acquired in relation to the total revenues generated by the organization]	

Table 2. Grid listing indicators

Process stage of environmental knowledge acquisition	***Defining elements - acquisition stages of environmental knowledge***	***Indicator***	***Criteria of correspondence/ selection***								***Total score/ Indicator TI***	***Total score/stage TE***	***Share indicators in the system indicators***
			Score										
			A	B	C	D	E	F	G	H			
Strategic stage for the environmental knowledges search needed to the organization	Share of time in which are identified the environmental knowledge necessary to the organization T_M	$T=T_{cMv}/T_{cMs}*100$ (%)											
	Share costs with the environmental knowledge needed to identify the organization related to the cost with obtaining environmental knowledge valued C_M	$C_M= C_{cMv}/C_{cMs}*100$ (%)											
	Share costs with the infrastructure necessary to identify the environmental knowledge needed to organization $Ic_M s$	$IcMs=(IcMs_{n+1}-IcMs_n)/I_T*100$ (%)											
Stage for the environmental knowledge acquisition through the purchase of environmental know-how	Share value of the environmental knowledge acquired through the acquisition of know-how and valued in relation to the total amounts budgeted for the environmental knowledge acquisition stage through acquisition of know-how V_{kMakh}	$V_{kMakh}=V_{khMv}/V_{khMb}*100$ (%)											

	The expected period of exploitation of the know-how in relation to the acquired of environmental know-how TexpkhM	TexpkhM=TexpkhMsf-TexpkhMif											
	Identification number of activities that should be proceeding at the organization level due to acquisition of environmental knowledge through the acquisition of know-how Npn	Npn= N_{TaM}-Nap											
	The time preparation till entry into operation environmental know-how acquired TexplkhM	TexplkhM= TiexplkhM – TakhM											
	Share procedures that were changed along with the acquisition of environmental knowledge through the acquisition of environmental know-how in relation to the total number of activities across the organization Npkh	Npkh= Npn/ N_{Ta}*100 (%)											
	Number of workers who do not have coverage with loads within the organization along with the purchase of environmental know-how N_{LkhM}	N_{LkhM}= N_{Ln}-N_{Ln+1}											
The environmental knowledge acquisition stage by hiring experts	Share of proceeds from valorisation acquired environmental knowledge by hiring experts in relation to the total budgeted amount of the environmental knowledge acquisition stage by hiring experts V_{kaMex}	V_{kaMex}=V_{Mexv}/V_{Mexb}*100 (%)											
	The share of new /amended procedures at the experts proposal of total procedures Ppex	Ppex= NpMex/ N_{Ta}*100 (%)											
The assimilation stage through the decoding / recoding of the acquired environmental knowledge	The share of employees who need training due to the acquisition of environmental knowledge in relation to the total number of employees within the organization A_{LsdrM}	A_{LsdrM}= N_{Lsdr}/N_{Lo}*100 (%)											
	The allotted time to the decoding / recoding operations of environmental knowledge in total acquisition time T_{drM}	T_{drM}= (T_{imp}-T_{ach})/T_{oka}											
The assimilation stage throught the implementation into procedures of acquired environmental knowledge	Share of time for implementing the environmental knowledge acquired in total time spent on the process of knowledge acquisition $T_{kasimpM}$	$T_{kasimpM}$= (T_{ivM}-T_{fdrM})/T_{oka}*100 (%)											

	Implementation degree in the work procedures of the organization of the acquired environmental knowledge GiM	GiM=Npm/Nap*100 (%) Npm= NpexM+ NpkhM											
The stage of valuing the acquired environmental knowledge	The time where the environmental knowledge are valued TvalM	TvalM= (TvM-Tcs)/Toka											
	Share of revenues by valorisation environmental knowledge acquired in relation to the overall revenues of the organization VvM	VvM= (VvM_{n+1}-VvM_n)/V_T*100 (%)											
Total score													

Notations:
A - correct assessment of the degree of achievement of each of the stages of acquisition of environmental knowledge within the organization
B - direct appreciation the degree of realization of each of the stages of acquisition of environmental knowledge within the organization
C - easy appreciation the degree of achievement of each of the stages of environmental knowledge acquisition
D - relevance in assessing the degree of achievement of each of the stages of environmental knowledge acquisition
E - the indicator relevance for activity of the company
F - availability of existing resources within the organization to allow monitoring the indicator
G - availability of managers in assessing the impact of the indicator on the company activity
H - possibilities for rapid assessment of evolution of the indicator
Total indicator TI - is obtained by summing the scores given per element
Total stage TE - is obtained by summing the scores given to each item, per stage
Total Share of indicators in the total process – TI/ΣTE/100 (%)

The criteria's proposed for this hierarchy should take into consideration general appreciation criteria (the returned results correctness, use and interpretation, and so on), and organisation specific criteria (relevance to the organisation activity, monitoring availability, managers' interest in evaluating the performances of each stage in the environmental knowledge acquisition process, possibilities for a rapid evolution of current situation and anticipation of the indicator evolution and so on).

In Table 2 we presented a ranking grid model with a view to select the indicators needed to evaluate in each stage in the environmental knowledge acquisition process, in accordance to/ and satisfying best the organisation needs.

All these methodologies are intended to be instruments which can facilitate the evaluation of each stage associated to the environmental knowledge acquisition process, and allow managers to adopt the best decisions in allotting time, financial and human resources for achieving the organisation environmental objectives.

3.2. Synthetic presentation of the evaluation indicators system for each stage associated to the environmental knowledge acquisition process

The framework from Fig. 4 and Fig. 5 presents a synthetic approach of the indicators for each stage. The indicators hierarchy is done according to their share, their importance and the detailed components of the environmental knowledge acquisition process.

This evaluation system of each stage in the process of environmental knowledge acquisition stage at organisation level allows managers to quantify and establish with precision the important indicators in their own organisation and to act accordingly on them. Moreover, we elaborated a methodology for selecting the indicators used in the evaluation of each stage in the process of environmental knowledge management and a ranking grid for hierarchizing those indicators and their importance.

4. Conclusions

Knowledge management is a part of integrated management and environmental knowledge management and occupies an important place within the managerial strategy of each organisation. Measuring the organizational process of knowledge acquisition sits at the core of predicting its performance, and measuring each stage in the process of knowledge acquisition allows the identification of some instruments for the evaluation of each indicator in relation to organisation objectives.

EMS ISO 14001 implementation is worldwide important and environmental knowledge management it's relevant for any organisation. In this context, the organizational management staffs have to take into consideration the elaboration and use of an indicators system for evaluating the environmental knowledge acquisition process. Likewise such a managerial instrument could be used to anticipate the future evolution of this process, and basically for achieving the organisation objectives, with minimum time and financial resources. Thus, organizational managers (i) have the possibility to have an indicators system, according to their own necessities, and (ii) have the possibility to evaluate the importance of each indicator in relation to organisation objectives.

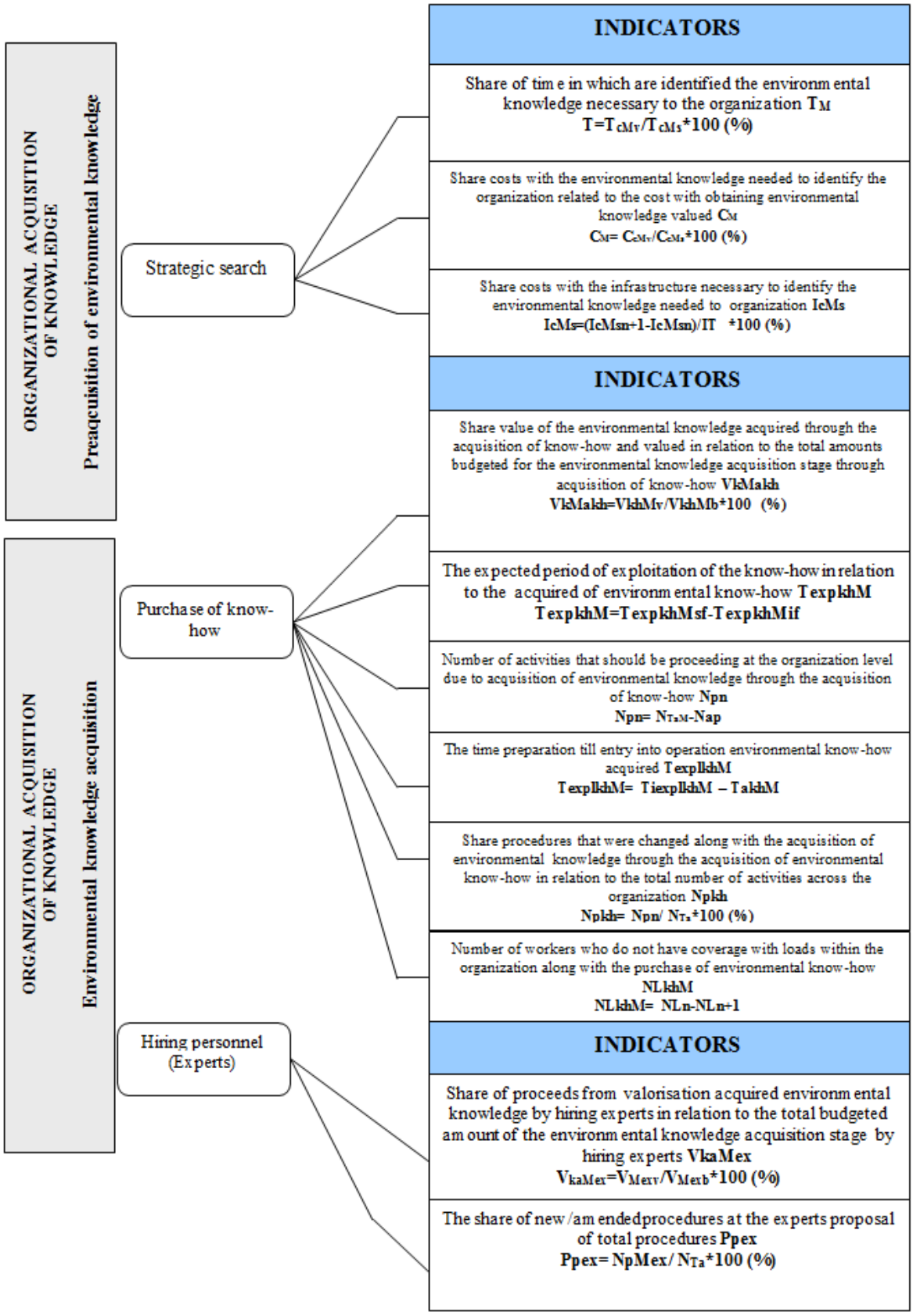

Fig. 4. Indicators proposed to evaluate each of the stages of knowledge acquisition process (pre acquisition stage and procurement stage)

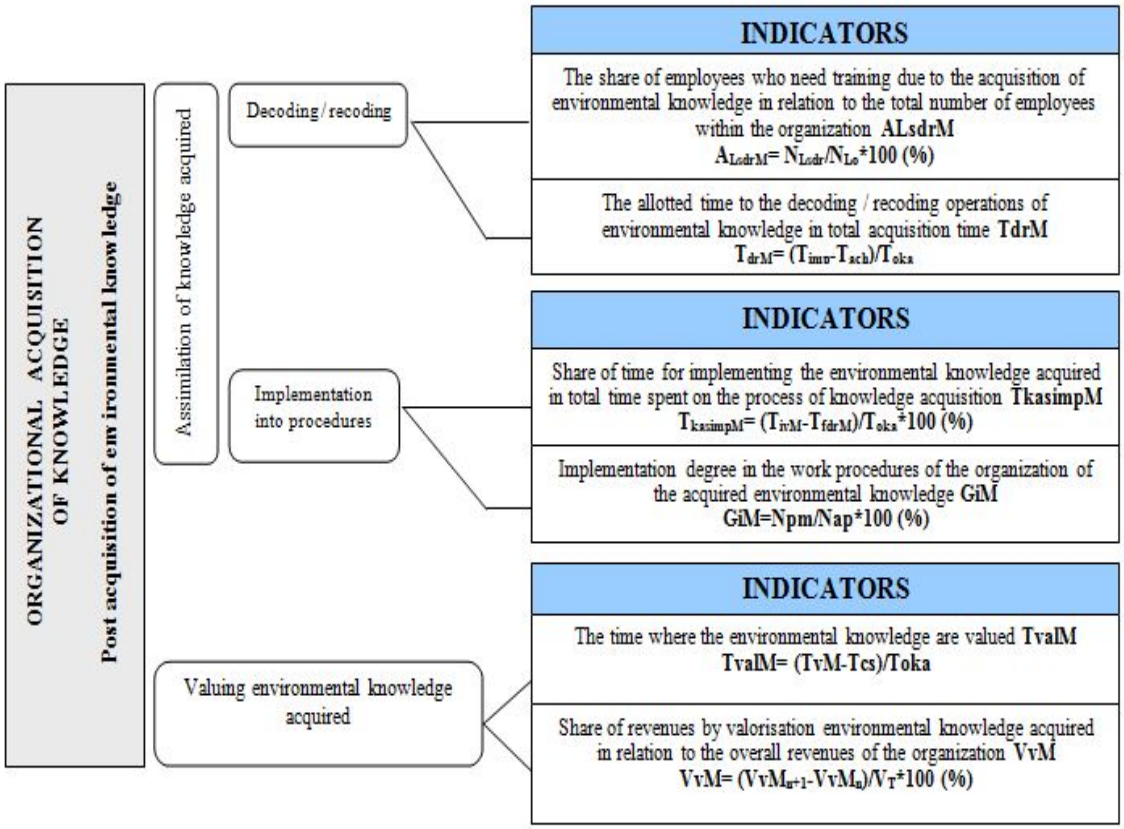

Fig. 5. Indicators proposed for the evaluation of the post-acquisition stage in the process of environmental acquisition stage

Following this indicator selection, organizations can weigh and identify those relevant to their objectives, within the environmental knowledge acquisition process. In this paper framework we approached aspects related to environmental knowledge acquisition, the stages of this process, the necessity of environmental knowledge acquisition, as well as the evaluation of each stage in the organizational knowledge acquisition process, based on the indicators necessary to this evaluation (1). This study was based on previous extensive research regarding organizational knowledge acquisition (2). The methodology for indicators hierarchy wishes to be a managerial instrument used by managers in order to identify correctly the most important indicators for each stage in the environmental knowledge acquisition process, according to the particularities and the needs of each organization (3).

The novelty of this approach resides from the fact that such aspects have not constituted the object of previous research. In addition, it equips managers with a methodology for designing an indicators system for the evaluation of each stage in the environmental knowledge acquisition process and for hierarchizing them according to their organizational needs.

Taking into account that reducing the environmental negative impact generates high costs and also must be one major objective of all organisations, the EMS ISO 14001 implementation represents a very important strategic objective. Consequently, environmental knowledge acquisition must be an activity for which any organisation should allocate resources (4).

Concluding it could be said that "designing a system to connect data, analysis, and people presents an unprecedented opportunity to formalize … in a business setting" the environmental issue (Wernick, 2002).

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