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ANALYSIS OF THE POSSIBILITY OF PROVIDING A COMPLEX MOTIVATIONAL SYSTEM FOR PUBLIC INTERNAL AUDITORS BY MANAGEMENT

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Abstract: *This action displays a scientific research on statistical analysis based on Spearman's correlation coefficient, in order to show the management possibility of implementing a complex motivational system for public internal auditors. The analysis was based on the results of the questionnaires sent by e-mail to public pre-university and university education audit structures, and on the establishing the mathematical analysis model of the results and their review. The analysis results are summarized in the conclusions drawn from empirical research.*

Keywords: *correlation coefficient, complex motivational system, public internal audit, statistical analysis, logical analysis, regression, descriptive analysis.*

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I. INTRODUCION

The importance of the research stays in the ensuring of the possibility of implementing a complex motivational system (Nicolescu O., Verboncu I., 2008, pp. 291 – 292) [6] for public internal auditors by the public entity management from the research field. This analysis is part of the scientific approach of the activity and public internal audit structure management, in order to maximize the audit contribution to the assuring of the public entity performance, by assuring the management of efficient and effective risk inventory and the efficient, effective and economic use of public entity

resources. *This approach was born from the need to adapt the public internal audit to the new demands of economic, social and technical development, which are also subject to public entities. Analyzing the possibility of ensuring the management of the public entity of a complex motivational system for the auditors, leads to the determination of the motivational necessities of the auditors, the identification of the factors underlying the possibility of implementing a complex motivational system and providing knowledge to the public internal audit performance research field.*

The research field of this scientific endeavor, is featured by the public entities of public pre-university and university education, components of the national education system, which organized, according to The Law (Law 672-2002, art. 11-12) [8], public internal audit structures. Our approach includes the public internal audit structures within the school boards and the public universities, without the public internal audit structures within the Ministry of National Education and within the special education (military education). In this approach where involved 31 audit structures, out of a total of 42 school boards, 36 public university audit structures, out of 49 universities and 4 audit structures from within the public local administration structures and some decentralized public entities. To ensure confidentiality the schools participating in the research were numbers.

Research method. The research was based on setting goals and working assumptions (Chelcea S., 2007, pp. 108-122) [3], establishing the research method based on the statistic analysis methods and techniques, establishing conclusions and communication / disseminating these concerning the execution or invalidation of the established hypothesis.

The way of analyzing the results based on applied statistic methods and techniques (Green E., 1922) [4], was based on analyzing the research results through regression link between the variables method (Chareille P., Pinault Y., 1996) [2].

The objective of the research is the possibility of the management to ensure a complex motivational system for the internal auditors within the research field. Implementing a complex motivational system to the public entities is difficult, due to the reduction of the financial resources, blocking the free posts, promotion based on degrees and levels of the staff within the budgetary entities, is uphill due to the regulatory framework and the correlation of the needs, aspirations, personal interests of auditors (training, promotion, awards, etc.), with the entity objectives is a sensitive issue. From this point of view arises the question which also

represents our working hypothesis: Is there any possibility for the management to ensure a complex motivational system for the public internal auditors within the educational system?

II. ANALYSIS OF THE MANAGEMENT POSSIBILITY OF ENSURING A COMPLEX MOTIVATIONAL SYSTEM FOR THE PUBLIC INTERNAL AUDITORS

2.1. General information on conducting empirical research

The analysis of the management possibility to ensure a complex motivational system for the public internal auditors started by questioning the 72 audit structures within the research area, out of 92 structures, with 8 closed questions contained in Table 1. The items used in the empiric research have 4 possible answers, as shown below: 1 = Never, 2 = Sometimes, 3 = Often, 4 = Always, shown in Table 2. Research results. The questionnaires were sent towards the units within the research field, through e-mail, to each structure, between 15 – 31.05.2013, and the answers were collected between 15.06 – 15.07.2013 and 01.10.2013 – 15.11.2013.

The analysis of the answers was based in a statistic adaptation which allows a simple and synthetic description (Bailes C. 1998) [1], using the Statistical Package for the Social Sciences program (SPSS).

The statistic analysis was performed by selecting the items (the asked questions) concerning the methodological factor and the management factor and governance, which define the general characteristic of the analyzed variable (Y). In order to avoid errors in the SPSS program performance we ciphered the items, as shown in Table 1. Items used in the empiric research.

For the statistic analysis of the empiric research we used Spearman's correlation factor, because from all the studied correlations, at least one variable is ordinal. As a result, the use of the correlation factor can be unfit, especially for estimating the



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possibility of rejecting the void hypothesis (p-value). Like so, the causality relation between the implied variables were analyzed by using the Methodical Logit Model (MLO) (Hosmer D.W., Lemeshow S., Sturdivant R.X. 2013, p. 528) [5]. The choice of methodology is not random, it is assessed by the variables' nature, which are not quantitative, asserted by concrete measuring, but their values can be ranked. In case of obtaining a positive value and statistic eloquent for the coefficient of the factor variable X_j , it can be said that a accession of the values if this variable leads to accession of the possibility of obtaining high values for Y variable. In case of obtaining a eloquent negative factor, the interpretation is contrary; if the factor acquired is statistically insignificant, we can't reveal a casual relation between X_j and Y, no matter the factor sign.

In general form, MLO can be written as:

$$\text{Prob}(y_i = j | x, b, c) = F(c_{j+1} - x_i b) - F(c_j - x_i b)$$

$$\text{Prob}(y_i = j | x, b, c) = \frac{\exp(c_{j+1} - x_i b)}{1 + \exp(c_{j+1} - x_i b)} - \frac{\exp(c_j - x_i b)}{1 + \exp(c_j - x_i b)}$$

where,

$i = \overline{1, N}$ indexes respondents to the questionnaire

y_i = value of the endogenous variable (item that we consider as a result)

$y_i = 1$ if the respondent answered "never" $y_i = 2$ if the respondent answered "sometimes"

$y_i = 3$ if the respondent answered "often"

$y_i = 4$ if the respondent answered "always"

x_i = vector of explanatory variables (items that we consider as factors)

b = vector coefficients

$c_j, j = \overline{1, 5}$ threshold values estimated by model $c_1 = -\infty, c_j \leq c_{j+1}, c_5 = +\infty$ conditions that ensure that the sum of the probabilities for each respondent equals 1.

2.2. Statistic analysis of the empirical research results

The analysis was based on representative factors:

- a) Based on the methodological factor, we research the influence of the audit activities which tries to defers the legal regulation within the field Item 2), the capacity of the audit to accomplish in time the intern audit tasks and goals established by the management (item 4) and deferring the professional etic Code in the current audit activity (item 6), on the management attention to ensuring a complex motivational system (item 1), where $Y = 1, Y = f(2, 4, 6)$ Table 1. Items used in the empirical research);
- b) Based on the management and governance factor, we research the negative influence of the lack of resources on the audit activities (item 3), accomplishing the goals established by the auditors alongside with the management, through audit reports (item 5), accomplishing the external audit missions for evaluating the public internal audit (item 7) and for the management to advocate the professional preparation of the auditors (item 8), on the management's concern for ensuring a complex motivational system (item 1), where $Y = 1, Y = f(3, 5, 7, 8)$ (Table 1. Items used in the empirical research);

By applying the regression method we acquired factors, either positive or negative.

(according to the regression tables). These factors can be taken as given, if only p-value is under 0,1 or 0,05. Otherwise, we can consider these coefficients as zero. Hence, two

cases:
a) p-value > 0,1 there is no link between X and Y;

b) p-value < 0,1 if the factor is positive, then X arises, which implies Y to arise(decrease if the factor is negative).

While analyzing the link between the variables, by using Spearman's factor, issues $z < 0,3 =$ weak link $0,3 < z < 0,7 =$ medium link $z > 0,7 =$ strong link. We can also consider that there is a link between the variables, if p-value < 0.01 sau 0.00.

Table nr. 1. Items used in the empirical research.

Nr. crt.	Variable code	Explanation
Item 1	COMPLEX_MOTIVATIONAL_SYSTEM	The management task is to ensure a complex motivational system, decent for the auditors
Item 2	RESPECTING_LEGAL_REGULATION	Does your audit activity concern respecting the legal regulation within the field?
Item 3	IMPACT_RESOURCE	Was your internal audit activity affected by the lack of resources needed for its' well function?
Item 4	TASKS_AUDIT_DEADLINE	Were the goals and tasks, established by the management for you, accomplished in time?
Item 5	GOALS_ENTITY_RELATION	Do the relations compiled by you respond well to the goals established with the management?
Item 6	ETHICAL_CODE	In your current work, have complied with the Code of Ethics for auditors?
Item 7	AUDIT_EXTERNAL_EVALUATION	In the past five years, were there external audit missions of your entity?
Item 8	ASSURANCE_PROFESSIONAL_PREPARING	Does the management support the work of professional training of auditors?

Source: Author Protected

Table nr. 2. Research results

Nominal and percentage values	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8
Answer 1	13	4	23	9	8	3	17	9
Answer 2	22	7	19	5	2	9	11	20
Answer 3	20	7	18	25	14	7	24	16
Answer 4	17	54	12	33	48	53	20	27
Answer 1 (%)	18,1	5,6	31,9	12,5	11,1	4,2	23,6	12,5
Answer 2 (%)	30,6	9,7	26,4	6,9	2,8	12,5	15,3	27,8
Answer 3 (%)	27,8	9,7	25	34,7	19,4	9,7	33,3	22,2
Answer 4 (%)	23,6	75	16,7	45,8	66,7	73,6	27,8	37,5

Source: Authors' calculation



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2.2.1 Analysis based on the methodological factor, tries to explain the influence of the factors that define the methodological factor (items 3, 5, 7, 8 from Table 1. Items used in the empiric research), on the management concern for ensuring a complex motivational system (item 1) by establishing the regression function, as $Y = 1$, where, $Y = f(2,4,6)$ (see Table 1).

Out of 72 respondents, 54 auditors are concerned about respecting the field regulations, which is 75%, 33 auditors answered that the audit goals and tasks established by the management are “always” completed in time, which represents 45,8% and 25 auditors answered “often” to this item, which is 34,7 %, and 53 auditors answered that the audit activity always respects the etic professional Code, which represents 73,6%.

From this descriptive analysis we can conclude that the values acquired from the scientific approach are above average ($M = 36$), the auditors always try to respect the current legal regulations ($x_i = 54$) and always respect the etical proffesional Code ($x_i = 53$), except the audit tasks and goals established by the management, which are always completed ($x_i = 33$) and “often” ($x_i = 25$) in time, which, taken individually, are beneath average $M = 36$. From this approach we can say that the auditors respecting the tasks and goals established by the management, with values beneath average, contribues to respecting the ensurement of the audit independence, by avoinding the tasks and goals established by the management for the auditors, which will make the audit subject in a future stage.

Table nr. 3. Regression calculation

Endogenous variable (Y): COMPLEX_MOTIVATIONAL_SYSTEM				
Factor variable	Coef.	Std.Er.	z	p-value
RESPECTING_LEGAL_REGLEMANTATIONS	***1.171	0.426	2.75	0.006
TASKS_AUDIT_DEADLINE	***1.223	0.357	3.43	0.001
ETHICAL_CODE	**0.712	0.363	1.96	0.050
N = 72 ; pseudo $R^2 = 0.2723$				

***, **, * : considerable statistic at an apron of 1%, 5% si 10%. All the factorial variables are statistically considerable and positive. Source: Author calculation using SPSS

From the MLO regression analysis, Table 3 Regression calculation, you can see that there are links between the probability of ensuring a complex motivational system, respecting the current regulations, completing the goals established by the management and

respecting the ethical professional Code. From a statistical point of view, by applying the regression analysis and Spearman’s correlation factor, where $p\text{-value} < 0,1$, shows that the biggest probability for the management to ensure a complex motivational system, is

possible by completing the tasks and goals established by the management (p-value = 0,001, at a considerable apron at 1 %) and with a link calculated using Spearman's factor $z = 0,357$, followed by respecting the current regulations (p-value = 0,006, at a considerable apron of 1 % and $z = 2,75$) and by respecting the professional ethical Code (p-value = 0,050, at a statistical considerable apron of 5 % and $z = 1,96$).

Theoretically, we think that respecting the ethical code, would have had values close to completing the management tasks by the audit and respecting the legal regulations, concerning the statistic research. On a logical aspect, completing the goals and tasks established by the management is based on respecting the regulation and normalization field. If the legal regulations are being respected, then the ethical code is also respected, which shows that the respondents gave this aspect a thought.

Logically thinking, the audit completing the tasks and goals established by the management, respecting the professional ethical code and the current regulations, adds to the management ensuring a complex motivational. In the public internal audit practice (UCAAPI, 2007-2012) [7], on a national level, it is considered that the management appreciates more completing the entity tasks and goals established, which adds to ensuring the fulfilling the public entity goals, conditions which grant respecting the professional ethic code. Also, we presume that respecting the professional ethical code also implies respecting the regulation and normalization field of the public internal audit.

Preliminary conclusions. In the education system, the static analysis showed that the probability for the management to ensure a complex motivational system by completing the tasks and goals established by the management, respecting the regulation and

normalization field and the professional ethical code, concerning the national practice which establishes a complex motivational system (salary, promotion, bounty, sanction), is ensured by respecting the professional ethical code, then by respecting the legal field.

The descriptive analysis shows that the auditors keep their independence by avoiding completing the goals and tasks established by the management, other than the audit activity.

The management cared more about ensuring a complex motivational system for the auditors, by setting the auditors tasks and goals, which leads to defying the auditors independence by involving them in future audit activities

2.2.2. Analysis based in the management and governance factor, tries to explain the influence of the factors of management and governance (items 3, 5, 7, 8, Table 1. Items used in empirical research) on the management concern in ensuring a complex motivational system (item1). The analysis was based on establishing the regression function, as $Y = 1$, where, $Y = f(3, 5, 7, 8)$ (see Table 1).

Based on the descriptive analysis of the items, which affects the ensuring of a complex motivational system for the auditors, the resources impact did never affect negatively the audit activity for 23 auditors (31,9%) and sometimes for 19 auditors (26,4%), the reports always answer adequate to the goals established with the management for 48 auditors (66,7%) and often for 14 auditors (19,4%). The values are beneath average ($M = 36$), which shows that the management did not always support the professional training of the auditors (27 auditors being 37,5% and often for 16 auditors, being 22,2%), and the external evaluation of the audit was always considered useful for 20 auditors, being 27,8% and for 20 auditors often, being 33,3%.



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Table 4. Regression calculation

Endogenous variable (Y): COMPLEX MOTIVATIONAL SYSTEM				
Factor variable	Coef.	Std.Er.	z	p-value
IMPACT RESOURCES	*0,374	0,231	1,62	0,105
GOALS ENTITY RAPORTS	***1,130	0,303	3,73	0,000
EXTERNAL AUDIT EVALUATION	***1,017	0,251	4,04	0,000
ENSURING PROFESSIONAL TRAINING	***0,889	0,269	3,31	0,001
N = 72 ; pseudo R ² = 0.2395				

***, **, * : considerable statistic at an apron of 1%, 5% and 10%. Source: Author calculation by using SPSS

The analysis of the probability for the management to ensure a complex motivational system for the public internal audit by applying the regression analysis based on Spearman's factor of management and governance (where p-value < 0,1), showed that the biggest probability to ensure a complex motivational system for the public internal auditors is the external public audit evaluation which affects the most (p-value = 0,000, at a considerable statistic level of 1 %) with a link (Spearman's factor, z = 4,04) followed by reported entity goals (p-value = 0,000, at a considerable statistic level of 1% and z = 3,73) and by ensuring the professional training, p-value = 0,001 (at a considerable statistic level of 0,001 and z = 3,31) the last one being the resources impact (p-value = 0,105 at a considerable statistical level of 10% and z = 1,62), and according to the condition, p-value > 0,1, the resources impact do not affect the management ensuring a complex motivational system for the public internal auditors.

From a logical point of view, ensuring the resources, could have had a stronger influence on ensuring a complex motivational system as we thought in the beginning of the analysis. As the analysis shows, the external evaluation of the audit is the most important element that can add to ensuring a complex motivational system, being known that the

territorial structures of the Romanian Account Court and the evaluations of the audit Services from MEN, finds problems and adds to their extermination, with an impact in ensuring the public internal audit from the research area. We consider that the research of the audit reports on the audit structure goals, are based in the auditors capacities and the knowledge of the audit structure, finding the problems and drawing recommendations, relevant and according to the goals established by the management. The professional training, adds to the management ensuring a complex motivational system by discovering the training needs of the auditors, according to the activity subject of the entity with direct implications in ensuring the goals established by the management through objective recommendations, relevant and according to the reality. We can see that the resources impact does not affect as much as the other variable the ensuring of a complex motivational system, which draws the conclusion that the auditors ensure their professional training by their own means (attending to courses, increasing their degrees – master, doctor's degree, publishing materials in public magazines etc.), ensuring the audit missions with existing resources.

Preliminary conclusions. From the descriptive analysis, we can see that the

management is not concerned with the professional training of the auditors, but it has the biggest influence on ensuring a complex motivational system for the auditors, also the audit evaluations every 5 years and the resources impact, can add to ensuring a complex motivational system for the public internal auditors from the research area.

III. CONCLUSIONS

Statistically, the empirical research we did and the results based on the Logit Methodic Model, shows the probability of the management to ensure a complex motivational system for the public internal auditors in the educational system, by respecting the regulation field. The tasks that the management established for the auditors, completing the public entity goals established through audit reports, the external evaluation of the audit and the professional training of the auditors, are elements with a higher probability to add to ensuring a complex motivational system for the public auditors, based on the statistical links between them.

The static analysis through the regression method, was based on the information from the respondents from the research area, and the results defer from the results acquired from the logical descriptive analysis. The regression analysis shows that these can affect the variable that the analysis is based on. Logically, it is essential for ensuring the public internal audit performance, to keep the auditors independence, by avoiding for the management to establish tasks for the public internal auditors, which in the audit practice (The similar law of the Minister of Education, Research, Teenage and Sports, Minister of Administration and Interns and Minister of Public Finances nr 4576 / 230 / 2445 / 2011) [10], there are trade-offs done to ensure the independence of the auditors, while the pre-university auditors are forced [9] to validate the staff states and pays of the public pre-university staff, which is audit subject, or rearranging the tasks if the disposed paid staff as an effect of the staff politics (OU 77 / 2013) [9].

The management ensuring the professional training of the auditors and the resources impact, are sensitive spots for the public entities, while the approved budgets are more and more diminished, fact also shown by the descriptive statistic of this variable.

From this approach we can draw the conclusion that it is a very big probability for the management to ensure a complex motivational system for the public internal audit, in contradiction to reality, which proves that the resources impact (financial through the approved and given budgets, human resources through the staff politics of the Ministry of Education) can not ensure the professional training, and satisfy the auditors expectations according the audit and public entity goals.

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