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Internal Managerial Control – Perspectives on Some Modern Methods of Reducing the Risk of Fraud in Public Administration

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ABSTRACT

Once it has been implemented according to the legal provisions, the national legislation in Romania offers only a few indications regarding the development and adaptation of the internal managerial control to the evolution of the risks to which public institutions are subjected in their daily activity. Thus, the development of internal control refers only to its continuation, from year to year, to the full implementation of the standards related to the five components of internal control. The risk of fraud is not treated separately, but aggregated, together with the other risks identified by the entity and mentioned in the risk register. The purpose of this paper is to draw attention to somewhat new methods for public entities (certainly already used in the private sector) and to see how total integration of internal control in current activities and innovations in this field can lead in diminishing the risk of fraud.

1. Introduction

An entity's internal control, like the financial statements presented, is important interested parties, both inside and outside the organization. There are various researches that show that influences on internal managerial control can also have various external factors, although this is a process until the following internal organizations. These external factors contain elements related to the professional auditors (Bedard & Graham, 2014), the way of implementing the recommendations made following the audit reports (Mao & Yu, 2015), the specific national culture (Kanagaretnam et al., 2018) and the laws in vigor (Sarens & Christopher, 2010). However, we must note that internal audit is a component of internal control, therefore any influence related to its quality can only be internal to control and not external. Another important role in the development of internal control can be played by the trust with which the entity is credited by society.

Another aspect that must be considered when we talking about the development of internal control, its five components and the 16 existing standards (according to the Romanian national legislation) is the cost. Categorically, internal managerial control can be developed in such a way that it can prevent most of the identified risks (we can never prevent 100% the occurrence of all risks to which an institution's activity is subject). However, the development of internal control must be balanced with the probability of the occurrence of risks and their value impact, so that the cost of developing the managerial internal control system does not exceed the value of the risks prevented from occurring, because achieving the goals for which these public entities were created must be done in an efficient and economical way. A factor that can lead to the reduction of the development costs of internal managerial control is the trust that society gives to the respective institution, there are works that show that, the higher it is, the less willing its managers are to get involved in fraudulent activities (Liu et al., 2022).

In the following, we will present some perspectives on some methods less used by entities from the local public administration in Romania in the improvement of internal control activities against the risk of fraud. Also, the opinion of public entities from the local public administration in Romania will be analyzed both in terms of the implementation and development of internal control and the adoption of such *new* methods, as factors to reduce the risks of fraud to which they are subjected in their activity daily.

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2. Literature review

2.1 Warning signals (red flags) and materiality

The phenomenon of fraud continues to remain one of the major problems facing society today, affecting both the public and private sectors, as shown in various specialized studies.

PriceWaterHouseCoopers (PriceWaterHouseCoopers, 2009) showed in a report published in 2009 that approximately 30% of entities, whether public or private, have experienced economic crime. One of the most recommended methods by various regulatory authorities in various states to combat fraud is the use of fraud risk indicators, warning signals (or red flags). However, there are some studies in the literature that warn about the accuracy and limits of this method in fraud detection and prevention (de exemplu Pincus, 1989).

These red flags are "events, conditions, situational pressures, opportunities, or personal characteristics that may cause management or employees to commit fraud" (Gullkvist & Jokipii, 2013).

An important element in checking for red flags is the concept of materiality. Materiality has a particularly important role in any decision-making system, but especially in the audit field. We can define materiality or, as it is also called, the threshold of significance, as that value that can be considered significant, so that its omission or distortion could influence in one way or another those who make decisions based on the content financial statements concluded by an entity. Considering the fact that the level of materiality influences the procedures and the volume of samples analyzed in the execution phase, the determination of the level of materiality is based on the professional judgment of the personnel who perform the audit or those who investigate the occurrence of possible fraud.

In Romania, according to legal provisions, the level of materiality is influenced by three factors: by value (here we take into account the acceptable value of errors, so that those who make decisions based on financial statements are not affected in this process), by nature of identified problems (represents the situation in which, regardless of the value level of the detected error, this deficiency must be disclosed due to its nature, fraud clearly falling here) or by general context (this represents the assessment of certain errors as significant due to the context and the impact on which they have).

In the international regulations issued by the International Federation of Accountants, namely ISA no. 320 (International Federation of Accountants (IFAC), 2010a) and ISA no.450 (International Federation of Accountants (IFAC), 2010b) we also find guidance on how auditors should determine materiality depending on the type of entity under review. ISA 320 provides two examples of differentiating the materiality threshold: 5% of gross profit for profit-oriented entities and 1% of total revenues or expenses for a non-profit entity.

However, materiality usually does not have an objective and immutable pattern, the interpretations of those directly involved in the use of this concept on materiality are varied, depending on the surrounding circumstances involving both quantitative and qualitative analyses.

It was found that qualitative factors, such as trends in the various fields of activity, the personal characteristics of the auditors, the experience they have in the audited field and the structure of the audit firm affect professional judgment and, implicitly, the level of materiality.

The concept of materiality (or significance threshold) is a basic one for external auditors throughout the audit process. As we have shown above, the level of materiality is initially established in the planning phase, influencing the procedures used later and the volume of samples analyzed. But the level of materiality is also used later, in the execution phase of the audit mission, when determining the effect that the identified errors have on the accuracy of the financial statements. Also, the reporting of the level of errors identified at the initially established level of materiality also influences the opinion that is issued following the execution of the audit mission. In the planning phase, the auditor determines a general value of materiality, which is used to determine the scope of the audit and the procedures used. And this is because there is an inversely proportional relationship between the significance threshold and the audit risk, which affects the volume and nature of the procedures used in the execution stage. National and international auditing standards impose the requirement to use both qualitative and quantitative factors in assessing the materiality threshold. Thus, the auditors' responsibility in detecting fraud is limited by the concept of materiality, which gives them the possibility to ignore deviations smaller than this threshold.

The above shows the importance of professional judgment and experience in determining the level of significance / materiality threshold. Considering the somewhat imprecise provisions of the regulations contained in the standards, when determining materiality, the auditors are mainly based on establishing the types of risks identified and how they can have an influence on the entity's activity and on the prepared financial statements. And among the evaluated risks, an important role, which is even evaluated separately, is played by the risk of fraud. However, one of the most important methods used for the importance of red flags still remains professional judgment (Gullkvist & Jokipii, 2013).

2.2 Reporting mechanisms / integrity whistleblowers

Another method used in fraud detection is their reporting by those who have become aware of the existence of such a phenomenon.

The institution of the integrity whistleblower thus acquires (also in our country) the due importance in discouraging potential fraudsters, thus putting pressure on public or private entities to develop and improve control activities [(Bowen et al., 2010), (Wilde, 2017)] in in order to detect suspicious activities.

The major risk or limitation of using this method is that whistleblower claims are not always substantiated, resulting in the loss of resources used to verify their veracity. Although this fraud detection method is increasingly used both by public entities and by those that have control powers, it is still necessary to reduce the risk of identifying justified complaints. A plus that this method brings, however, is represented by the improvement of the internal controls of the entities and the increase of the integrity of the employees (Heese et al., 2021).

2.3 Decision tree

Currently there are various data extraction techniques used for fraud detection, used especially in the banking sector but also in public finance. However, applications used by internal control in fraud detection are rarer. Data mining is a technique for sorting large databases in order to find patterns and relationships between the various variables that influence them. These techniques are mostly used in identifying future trends and patterns of behavior in order to improve decisions.

Data mining from large databases is a component of data analysis and a fundamental part of data science, its main purpose being to identify useful information for decision-makers in the various data sets available at the level of organizations / entities.

Currently, along with the exponential development of the information technology sector, there has also been a sharp development of artificial intelligence. It was originally programmed to make people's work easier, but today it uses more computer science and statistics, with programming algorithms being developed that rely on learning by experience instead of being given step-by-step detailed instructions (as in the case of ordinary computer programs so far). Algorithms used in artificial intelligence lead to predicting trends without being programmed step by step, as in a regular computer program. However, they *train* before being used on large data sets on a small sample (Bahzad & Adnan, 2021). The use of these algorithms is diverse, one of them being predictive data mining.

In this usage, the algorithm basically learns on a data model, where the input and output attributes are defined, discovers the relationships between them to build a model that is later applied to the large data set analyzed.

A decision tree is a sorting method, based on a tree structure that divides the data starting from the root according to certain characteristics, finally reaching the leaf nodes, where a Boolean result is obtained and the data is not, they can still separate.

In data mining, such decision tree classification algorithms can handle large data/information sets, being used for hypothesis generation and data classification.

Such a decision tree structure is shown in figure 1 below.

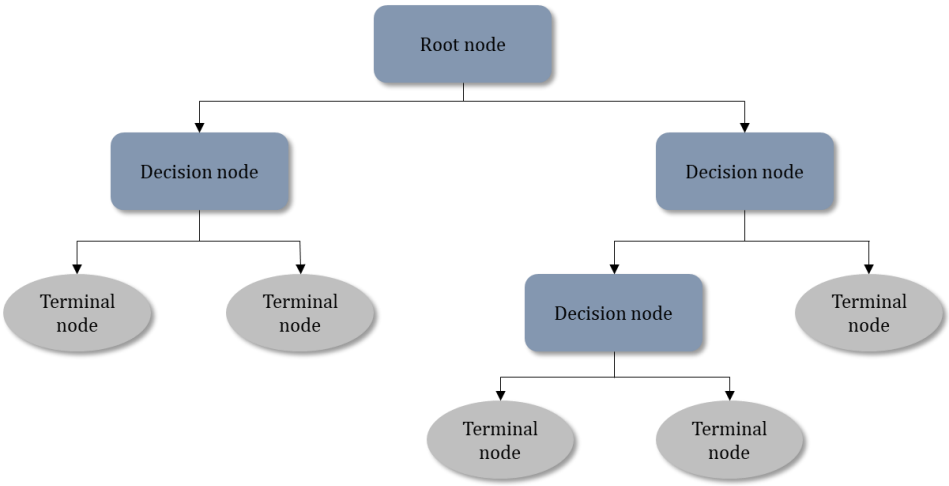

Fig.1. Decision tree

Source: authors' processing after (Bahzad & Adnan, 2021))

Nodes and branches are the basic components of the decision tree. The characteristics of the data to be classified are represented by nodes and the values that the data can take from each decision node form its branches. An example of a decision tree is shown below.

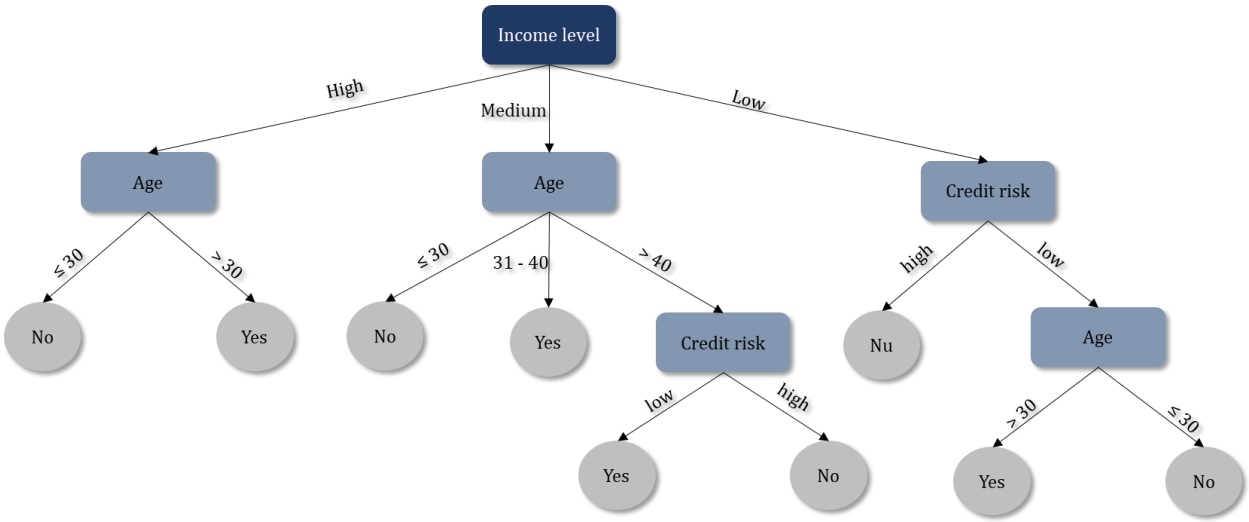

Fig. 2. Example of decision tree

Source: authors' processing after (Bahzad & Adnan, 2021)

There are several types of algorithms used for the construction of decision trees. Decision trees used in data mining can be divided into two broad categories: classification trees and regression trees.

The decision tree is a classification method that has been proposed for use in various fields, such as medicine (analysis of various diseases), image analysis, pattern recognition, statistics, fraud (money laundering, fraudulent loans, etc.

Examples of such uses of the decision tree:

- prediction of diabetes (Zou et al., 2018);
- fraud detection from the internal time sheets of a company with an organizational structure based on projects (Pejić Bach et al., 2018);
- analysis of consumer behavior according to personal choices, using real data from individual users' phones, reaching a prediction accuracy of 90% (Sarker et al., 2020);
- identification of suspected cancer (Sathiyanarayanan et al., 2019);
- detection of cyber-attacks related to disruption of normal traffic of servers and computer networks DDos (Ramadhan et al., 2020)
- detection of health insurance fraud (Joudaki et al., 2015)
- improving internal control methods against the risk of fraud in oil companies (Zakaria et al., 2016).

According to these studies, the decision tree provides a satisfactory overall accuracy (going up to 99.93%), providing the management of the entities with important information that allows them to focus on various particular aspects in the detection of fraud, internal or external. In general, it can be concluded that this method of data extraction and classification can be used for internal fraud detection, indicating the particular utility it can have for internal control.

3. Quantitative analysis

Through quantitative research, we set out to find out what is the perception of employees in the local public administration in Romania on internal control, seen as a managerial tool that can act, if it is fully implemented and used properly, both before as well as after the occurrence of frauds, both for the prevention but also for the detection of this real scourge that ultimately affects the entire society as a whole. Additionally, this research is desired to find out the opinion of the above-mentioned respondents regarding some internal control techniques less used in the public sector.

Through this study, we aimed to test a number of 17 hypotheses, namely that an implemented and functional internal managerial control system favors:

1. the establishment by management of the types of behaviors and actions desired and accepted in the institution, as well as communication and commitment by all staff;
2. the reduction of detection of irregularities by external control bodies;
3. the formulation of all the duties and attributions of the job in the job description;
4. the existence of sufficiently detailed internal work procedures;
5. the existence of sufficiently rigorous internal work procedures;
6. the existence of well-developed internal procedures as a tool to prevent / detect fraud phenomena;

7. the existence of rigorous controls as a tool to prevent / detect fraud phenomena;
8. the possibility of anonymous reporting of fraud as a tool to prevent / detect fraud phenomena;
9. the conduct of training for employees as a tool for preventing / detecting fraud phenomena;
10. favors the supervision of sensitive tasks by another employee as a tool to prevent / detect fraud phenomena;
11. the supervision of all activities as a tool to prevent / detect fraud phenomena;
12. the supervision of tasks that come out of the usual patterns as a tool to prevent / detect fraud phenomena;
13. the maintenance of an unexpected nature of controls, a tool for preventing / detecting fraud phenomena;
14. the use of artificial intelligence as a tool to prevent / detect fraud phenomena;
15. the periodic rotation of the staff in an institution in the positions held so that the possibility of fraud could be reduced;
16. the grouping of a significant number of vacation days so that the possibility of fraud could be reduced;
17. the verification of operations by a person from a different department than the person who performs them.

The method used in this research was that of the questionnaire. In its design we used both open and closed questions, it was distributed to all territorial administrative units and with its help we wanted to summarize mainly:

- respondents' perception of how the internal control system is designed, implemented and used;
- if the methods used by the internal control are sufficient and adequate for the prevention and detection of fraud;
- the respondents' opinion on several methods generally recognized as effective in combating the phenomenon of fraud.

In designing the questionnaire questions, we used the Likert scale with 5 levels of appreciation. This was addressed to 2,794 territorial administrative units of the commune type, 217 town halls, 103 town halls and 41 county councils.

A number of 302 employees from all counties and from all administrative levels responded to the questionnaire prepared and distributed in this way, as we can see in figure 3 below, as follows:

- from the point of view of the position held, 79 hold management positions and 223 executive positions;
- from the point of view of the specifics of the activity, 2 employees hold functions of holding physical goods and monetary values, 28 perform functions that involve the processing of accounting information, 24 have control functions (involves the verification of decision operations, holding goods, accounting), 40 have decision-making functions (which involve the entity's commitment to partners, employees, etc.), 17 have functions directly involved in public procurement procedures and 191 are other types of functions, as shown in figure 3;

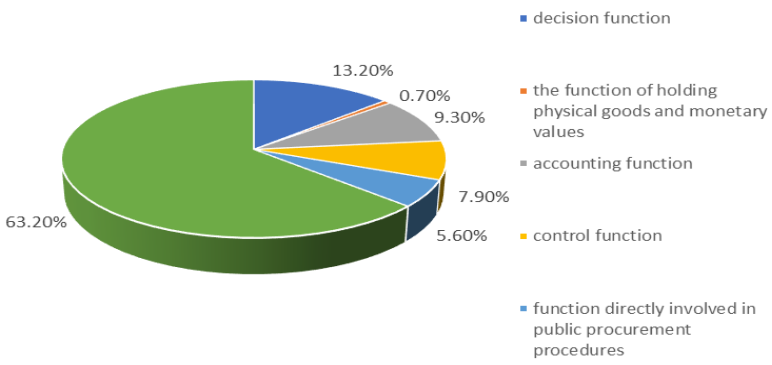

Fig. 3. The structure of the respondents according to the position held within the public entity
Source: authors' processing

- depending on their age, the most numerous participants were those between 51-60 years old (33.4%), followed by those between 41-50 years old (32.8%) and between 31-40 years old (20.9%), the rest of the age groups having a smaller number of respondents (up to 30 years 6.6%, over 60 years 6.3%), as shown in figure 4 below;

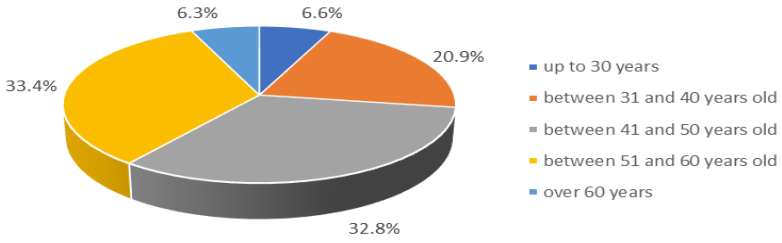

Fig.4. Structure of respondents according to age

Source: authors' processing

- the geographical distribution of the answers is approximately uniform, with higher weights in the total number of answers appearing in the counties of Călăraşi (12.3%), Suceava (8.3%), Arad (7.3%), Sibiu (6.6%), Hunedoara (6.3%) and Ialomita (5%), the rest of the counties lower contributions.

To analyze the data obtained with the help of the questionnaire, we used the SPSS (*IBM SPSS Statistics (Statistical Package for the Social Sciences)*, 2001) software from IBM.

3.1 Hypothesis testing using SPSS. Statistical analysis of indicators.

Before analyzing the validity of the 17 hypotheses presented previously, we analyzed the internal consistency of the database. For this, we used the Cronbach's Alpha indicator, with the help of which we can find out how closely related the analyzed data are. Because the value obtained for this indicator was higher than 0.7, as we can see in table no. 1 below, the correlation of the analyzed data is high.

Table 1. Cronbach's Alpha index

Reliability statistics

Cronbach's Alpha	Cronbach's Alpha based on standardized items	No. of items
0.789	0.809	18

Source: authors' processing after SPSS results

The next step in the analysis was to check the sampling. For this we did two tests:

- the Kaiser-Meyer-Olkin (KMO) sampling adequacy test – the value of 0.805 was obtained for this test. Because the value we obtained is close to level 1, the test result shows the usefulness of the data analysis;
- the Bartlett sphericity test - where we obtained a value that tends to 0. The significance of this test is as follows:
  - the test shows the suitability of the factor analysis for a set of analyzed data;
  - the existence of a relationship between the analyzed variables is necessary so that the factor analysis method can be used;
  - the adequacy of the factor analysis is correct only for significance values lower than 0.05.
- - because, in our case, the significance value tends to zero, the adequacy of the factor analysis is considered valid, as showed in table 2;

Table 2. KMO and Bartlett tests

KMO and Bartlett tests

Kaiser-Meyer-Olkin measure of sampling adequacy.		,805
Bartlett's test of sphericity	Approx. Chi-Square	2353,810
	df	153
	Sig.	,000

Source: authors' processing after SPSS results

Because the variables that make up the analyzed data set have been validated by both sampling tests, we can consider factor analysis useful in the following stages of analysis.

3.2 Synthesis and analysis of quantitative study results

Following the analysis of the correlations between the independent variable and the dependent variables, as well as the regression analysis between the predictor variable and the dependent variables, a total of 6 hypotheses were validated, as follows:

1. a properly implemented managerial internal control system favors the establishment by management of the types of behaviors and actions desired and accepted in the institution, as well as communication and commitment by all staff;

3. a correctly implemented internal managerial control system favors the formulation of all job duties and attributions in the job description;

4. a properly implemented managerial internal control system favors the existence of sufficiently detailed internal work procedures;

5. a properly implemented managerial internal control system favors the existence of sufficiently rigorous internal work procedures;

6. a correctly implemented internal managerial control system favors the existence of well-developed internal procedures as a tool for preventing / detecting fraud phenomena.

The rest of the analyzed hypotheses present, from the point of view of the respondents, a series of particularities, as can be seen in table no. 3.

Table 3. Particularities of the hypotheses tested

Indicator	Hypotheses
Negative / inverse correlation between the analyzed variables (due to the negative value of the Spearman coefficient, between -0.026 and -0.108)	2, 11
The analyzed hypotheses are not correlated (due to the fact that, in their case, the value of the Spearman coefficient is 0)	12, 14
The correlational analysis did not validate the analyzed hypotheses (because a value higher than the threshold of 0.05 was obtained for the asymptotic significance coefficient and because the tabular value in the context of 16 degrees of freedom in our case was higher than the obtained value of Pearson Chi Square indicator)	7, 8, 9, 14, 15, 17
The regression analysis did not validate the processed hypotheses (for the Pearson R correlation coefficient values between 0.003 and 0.186 were obtained, values lower than the accepted threshold of 0.6 which shows the absence of a correlation or its negligible level. The way in which the variation the dependent variable is explained by the independent variable is established with the help of the coefficient of determination, and the values obtained in the case of these hypotheses, between 0 and 0.034 show us that this dependence only takes values between 0 and 3.4%.	9, 10, 11, 12, 13, 14, 15, 16, 17
The regression analysis did not validate the processed hypotheses (according to the ANOVA tests performed, the dependent variable is not predicted in the regression analysis, because the value obtained for the p index, between 0.189 and 0.965 is higher than the accepted level of 0.05 from which we can say that we have a non-existence of a correlation between the predictor and the dependent variable).	9, 11, 12, 13, 14, 15, 17

Source: authors' processing after SPSS results

4. Discussion

From the analysis and interpretation of the above presented data we can draw the following conclusions:

- in the case of all hypotheses, we are talking about methods of developing internal control in order to prevent and detect fraud, methods that are firstly demonstrated by the studies carried out by various authors and, secondly, logically lead to the reduction of this phenomenon;
- regarding the inverse correlation between the independent variable (a correctly implemented managerial internal control system) and the dependent variables within hypotheses 2 and 11 shows that, the fact that we have an implemented and functional control system leads to an increase in the number of errors detected by external institutions with control attributions and to a decrease in the supervisory functions of the analyzed entities, according to the opinion of the respondents to the questionnaire;
- an explanation for these views may be the way in which internal control is sometimes mistakenly seen by employees of public entities, namely as an unnecessary additional activity that must be performed, which makes their work difficult, and not as a process that should practically integrated into all the current activities they perform

- similarly, the lack of correlation between the variables presented in hypotheses no. 12 and no. 14 can be explained;

The unvalidated hypotheses in the correlation analysis and in the regression analysis, as well as the small determination coefficient values of 0.000 and 0.034, which indicate that only 0% - 3.4% of the variation in the dependent variable can be accounted for independent variable, can have several causes:

- one would be how employees and management of public entities view internal control, as shown above;
- another cause could be the experience gained so far by the employees of the public system with this control system, often seen as useless and useless documentation, instead of being seen as the main system through which they can reduce (not eliminate in totality) the risk of fraud;
- another cause could be the resistance to change to new methods and techniques to reduce this risk, resistance that should be combated primarily by the management of the entity, which internal control helps primarily to achieve the objectives for which these entities were established.

In addition to the data presented and analyzed above, from the analysis of the other questions included in the questionnaire distributed at the level of territorial administrative units in Romania, the following results were also obtained:

- prevention and deterrence measures, the application of which reduces the possibility of fraud occurring, are considered more important than measures to detect fraud after it has occurred (for example, intensifying anti-fraud controls, increasing the number of internal audit missions, using the institution of the whistleblower integrity, etc.);
- in order not to have only a formal character, the periodic training of employees regarding the phenomenon of fraud should contain: concrete examples regarding the types of fraud that can occur in their field of activity, methods of combating fraud according to of the specific field of activity, deepening sessions of the work procedures, concrete examples of the consequences of fraud, both for the one who commits fraud and for the defrauded institution, understanding the reasons why a person would resort to committing fraud, presenting statistics and any other relevant information in creating the profile of a fraudster (gender, average age, position within the entity, department where the employee worked, level of education, etc.);
- if possible elements of the appearance of fraud are noticed, the employees' action is directed towards presenting the respective problem to the direct superior rather than to presenting the respective aspects to colleagues, notifying the respective problem to other institutions (prosecutor's office, police, Court of Accounts, etc.);
- if the occurrence of fraud is noticed, the best method of notifying the institution / other competent bodies (prosecution office, police, Court of Accounts, National Integrity Agency, etc.) is the direct notification, in favor of notification through a method to ensure anonymity;
- surprisingly, if elements of fraud are reported in the institution where the respondents work and it would be produced by the management of the institution itself, it is preferred to present the respective problem to the management of the institution itself, in favor of other actions such as notification to other competent bodies (prosecution, police, Court of Accounts, etc.), anonymous presentation of the notification or inaction (so as not to jeopardize the job);
- regarding the independence and objectivity of the internal audit, the answers converge towards ensuring this activity through the department organized at the level of the institution, rather than through the organization as a structure independent of the institution.

Among the most interesting answers to the open question addressed to the respondents to submit any other method by which internal managerial control can be improved so that it can prevent or detect the phenomenon of fraud, we mention the following ones:

- staff training;
- remunerating staff so that they are not tempted to commit fraud;
- psychological testing of staff in order to detect the traits of a possible fraudster;
- unexpected controls;
- exercise of the audit by an independent structure;
- raising staff awareness through less formal means such as newsletters, posters, intranet sites or regular group meetings;
- sanctioning officials who do not fully comply with the requirements and attributions in the matter, without any tolerance;
- understanding the importance of internal control by the management of public entities and making them responsible through prior preparation for occupying management positions;
- fraud being an effect, the cause should be removed, through a civic education supported as a state policy, at the level of all educational institutions, starting with preschool and ending with higher education;
- rigorous selection of employees;

- the existence of a rigorous legislative, normative and procedural framework that offers real protection to employees who report a possible fraud situation, so that they are encouraged to report the respective situations, but also to be sanctioned if it is proven that the fraud situation fraud was not reported, although the employees were aware of the situation;
- annual real employee performance evaluation.

5. Conclusions

Awareness of the risk, determining the response to it as well as finding the appropriate fraud detection methods, suitable for each organization, remain the responsibility of the management of each public entity.

The implementation of internal control is the task of the management, and its application in the daily activity is the task of each employee, ultimately leading to the spending of funds only for the purpose for which the respective entities were established, under conditions of efficiency, economy and effectiveness.

Even if the national legislation does not provide much information on how to develop internal control in order to reduce the extent of the fraud phenomenon, the scientific literature and the practical experience of the private sector can be of real use in the implementation of new methods of prevention and detection, which can keep up with the evolution of this phenomenon in continuous movement and transformation. And diminishing the existing level of fraud and increasing the functionality and adequacy of internal control within public entities can lead to at least two achievements: achieving the goals for which the respective institutions were established in conditions of efficiency, effectiveness and economy, as well as protecting their own employees and, above all, of their managers, of the possible unwanted civil or criminal consequences that they should bear in the event of fraud in their entities.

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