Article **ECORFAN Journal-Mexico**
June 2022, Vol.13 No.28 1-10

Application of visualization methods of audit risk assessment in developing an audit strategy

Aplicación de métodos de visualización de evaluación de riesgos de auditoría en el desarrollo de una estrategia de auditoría

SHVYREVA, Olga†*, PETUKH, Aleksei and PETUKH, Mikhail

Kuban State Agrarian University, Krasnodar, Russian Federation.

ID 1st Author: *Olga, Shvyeva* / **ORC ID:** 0000-0002-2964-3187

ID 1st Co-author: *Aleksei, Petukh* / **ORC ID:** 0000-0003-4273-6879

ID 2nd Co-author: *Mikhail, Petukh* / **ORC ID:** 0000-0003-0254-0118

DOI: 10.35429/EJM.2022.28.13.1.10 Received: January 10, 2022; Accepted: February 28, 2022

Abstract

Objectives

This study aims to formalize developing a risk-based audit strategy and planning effective and rational audit procedures that reduce the risks of material misstatements and formalize these in a sufficiently detailed and understandable form to ensure the audit engagement high quality. The applicability of different materiality levels to parameterize the significance of risks of material misstatement is substantiated. A scenario mechanism for sufficient auditor actions in response to specific characteristics of the risk factor based on the risk heat map was developed.

Methodology

The new method of the risk complex visualization – spectrum analysis of the assessed risk factors of material misstatement to develop an audit strategy was proposed.

Contribution

The usefulness of the study results is to develop and test on a specific example of the audit engagement the risk-oriented approach that allows the most rational use of the audit organization resources. The methodology is also applicable for managing the risks of material misstatement in the internal audit.

Risks of material misstatements in reporting. Parameterization of risks. Procedures in response to assessed risks

Resumen

Objetivos

Este estudio tiene como objetivo formalizar el desarrollo de una estrategia de auditoría basada en el riesgo y planificar procedimientos de auditoría efectivos y racionales que reduzcan los riesgos de inexactitudes materiales y formalizarlas de una forma suficientemente detallada y comprensible para garantizar la alta calidad del compromiso de auditoría. Se justifica la aplicabilidad de diferentes niveles de materialidad para parametrizar la importancia de los riesgos de inexactitud material. Se desarrolló un mecanismo de escenario para suficientes acciones de auditoría en respuesta a características específicas del factor de riesgo basado en el mapa de calor de riesgo.

Methodología

Se propuso el nuevo método de visualización del complejo de riesgos: análisis del espectro de los factores de riesgo evaluados de errores materiales para desarrollar una estrategia de auditoría.

Contribución

La utilidad de los resultados del estudio es desarrollar y probar en un ejemplo específico del compromiso de auditoría el enfoque orientado al riesgo que permite el uso más racional de los recursos de la organización de auditoría. La metodología también es aplicable para gestionar los riesgos de inexactitud material en la auditoría interna.

Riesgos de inexactitudes materiales en la presentación de informes. Parametrización de riesgos. Procedimientos en respuesta a los riesgos evaluados

Citation: SHVYREVA, Olga, PETUKH, Aleksei and PETUKH, Mikhail. Application of visualization methods of audit risk assessment in developing an audit strategy. ECORFAN Journal-Mexico. 2022. 13-28:1-10.

* Correspondence to Author (E-mail: shvyreva.olga-researcher@yandex.ru)
† Researcher contributing as first author.

Introduction

One of the most important aspects of applying professional judgment in the implementation of the audit engagement is the identification, risk assessment of material misstatement and the further procedures in response to the assessed risks. Risk assessment in the application of International Standards of Auditing (ISA) becomes an element of audit planning and implementing audit procedures for substantive tests, the development, and justification of the audit opinion.

At the same time, scientific works in the areas of risk identification and assessment in the development of audit strategy of domestic (Kochinev, Vinogradova, 2013; Sungatullina, 2014; Itygilova, 2015; Agarkov, Bessonov, Sukhikh, et al., 2016; Shvyreva, Petukh, and Kruglyak, 2016) and foreign scientists (Bowlin, 2011; Bhaskar, 2020), experience in risk parameterization and response scenarios (Curtis, Hayes, 2002; Yudintseva, 2014; Rautiainen, Saastamoinen, and Pajunen, 2014; Kochinev, 2016; Klinova and Sungatullina, 2018; Shvyreva and Petukh, 2018; Lashchinina, 2020) differ significantly in terms of the methodologies and judgments used. The volatility of risk-based approaches applied by different auditors negatively affects not only the audit quality but also the opinion of a wide range of users of audit reports, as it inevitably entails the possibility of manipulating the auditor's opinion (Hollingsworth, Li, 2012; Hoffman, 2016; Vinson, Robertson, and Cockrell, 2019; Páez Calderón, J. T., and Cuadros Flórez, L. J., 2022; Rodriguez Lopez, G. R., 2022).

This study aims to substantiate developing a risk-based audit strategy and planning effective and rational audit procedures that reduce the risk of material misstatements and ensure the audit engagement high quality. Following the paper goal, the following tasks were solved:

- To study the regulatory framework and practical experience in identifying and assessing the risks of material accounting misstatements.
- To develop technology for applying the risk heat map tool to formalize audit procedures for identifying, assessing the probability and significance of risks.
- To determine the appropriate, sufficient, and proper actions of the auditor following the risk position on the risk heat map.
- To model the processes for determining the key parameters of a comprehensive audit strategy, including the workload and competence of audit team members based on the risks of auditing individual balances, groups of homogenous operations, and disclosures.

Methods

The study object was international auditing standards adopted by the International Federation of Accountants (IFAC) and their application by auditing organizations. The study was conducted using the abstract-logical method, content analysis methods, systematization, classification, graphical method of data visualization. A distinctive feature of the author's method is the modeling of identification, assessment of material misstatement risks, and action strategy in response to assessed risks using methods of risk heat map visualization, spectrum risk analysis (developed by the authors), focused on reducing the negative impact of professional judgment in the choice of appropriate sufficient audit procedures through risk scenario analysis.

As a part of the study, the internal audit methodologies of two major audit networks (Deloitte and Ernst & Young), audit tools used in the most demanded Russian auditing programs (AuditXP, IT-Audit) were questioned and critically analyzed. The theory and practice of identifying and assessing risks in the audit and the scenario of the audit engagement caused by them, and the mechanism of influence of the author's risk-based approach on the development of an effective audit strategy were investigated.

Results and Discussion

General approaches to risk identification in auditing

Audit risk management as a set of methods, techniques, and measures that allow a certain degree of prediction of the presence of material misstatements in the accounting (financial) reporting and to take measures to identify them and/or modify the audit report, accordingly, should be based on two interrelated components of probability and significance of the risk.

ISSN-Print: 2007-1582
ISSN-On line: 2007-3682

Under 2019 revised ISA 315, the critical aspects of identifying risks and developing the need for action in response to assessed risks are:

(1) 1 – Probability of the risk event (unfavorable event).

(2) 2 – Significance of the risk (degree of impact on the reliability of reporting).

Different models can determine the probability of a risk event. Thus, the model of the Deloitte auditing company includes five levels of risk (Table 1) (Deloitte Insights, 2019).

Risk level	Characteristics of the risk event	Level parameters
5	Very likely	Event probability is 90% or higher
4	Probably	Event probability is from 65% to 90%
3	Possible	Event probability is from 35% to 65%
2	Unlikely	Event probability is from 10% to 35%
1	Rarely	Event probability is less than 10%

Table 1 Probability gradations in assessing audit risk
Source: Search data

Other auditing organizations also use the method of expert assessments because the *historical* accumulation of information about unfavorable events in auditees is usually absent, as well as the certification of internal control systems, including risk management, is very rare (Bowlin, 2011). Therefore, for a more reliable assessment of risk probability, under conditions of *brief acquaintance* with the auditee and limitations inherent in the audit, it is reasonable to apply a three-level model. At that, the most traditional representation for domestic assessment models is *from low to high* (Svitkin, 2010; Risk Assessment according to ISA, 2021) (Table 2).

Risk level	Characteristics of the risk event	Level parameters
1	Rarely	Event probability is less than 35 %
2	Possible	Event probability is from 35 % to 65%
3	Very likely	Event probability is 65% or higher

Table 2 Expert model for assessing the risk probability in auditing
Source: Search data

As for the risk significance, in auditing, the most understandable and transparent criterion that defines its scope may be the materiality of information (Risk Assessment according to ISA, 2021). Deloitte defines five levels of risk significance depending on the expected consequences of events of the risks being assessed: catastrophic, significant, moderate, insignificant, and immaterial (Deloitte Insights, 2019).

In the Russian jurisdiction, the more traditional embodiment of risk significance is the magnitude of misstatement size: potential or detectable already at the stage of familiarity with the accounting system in the organization (Petukh, 2019). An unfavorable event considered in the audit is a material misstatement, which at the stage of developing an audit strategy has a probabilistic nature and can be described by the terms “expected misstatement” and “expected consequences of misstatements”. Expected misstatements are the auditor's predicted deviations in the presentation and disclosure of information in the accounting (financial) reporting prepared by the audited entity from the alternative information in the hypothetical reporting prepared according to the concept of faithful representation. Summarizing the provisions of ISA 450, we can distinguish such accounting estimates of expected misstatements:

- The abnormal misstatement value as a result of a single (atypical) violation of the conceptual principles of accounting and preparation of accounting (financial) reporting.

- The extrapolated misstatement value as a result of systematic (typical) violation of the conceptual principles of accounting and preparation of accounting (financial) reporting.

- Variance between the accounting estimate formed and presented in the accounting (financial) reporting by the management of the audited entity and the expert and/or analytically calculated accounting estimate formed by the auditor or an independent expert of the auditor based on the concept of faithful representation. In the event of possible application of two or more alternative methodologies for reliable determining the accounting estimate, the one with the lowest variance shall be used.

ISSN-Print: 2007-1582
ISSN-On line: 2007-3682

- Analytically calculated impact of the value of uncorrected misstatements at the beginning of the audited period on the balances and turnovers on accounts. Based on this, the data on the accounting (financial) reporting items for the audited period (at the end of the audited period) are formed.

Following the methodology detailed in (Shvyreva, Petukh, 2018), several levels of materiality are defined. However, for the identification, assessment, and interpretation of risks, two seem useful: the materiality level for financial reporting as a whole (ML_{FR}) and the level of clearly trivial misstatement (L_{CTM}) (Table 3). The scenario for determining the materiality level for financial reporting is based on the information needs of the priority users of those reports. ISA 320 recognizes that such users must have a sufficiently high level of competence to use the reporting information for their purposes. The size of the materiality level for financial reporting as a whole is influenced by the selected core indicator and the materiality level for that indicator as a percentage (Lashchinina, 2020). The algorithm for determining the core indicator should be established by the auditing organization's (auditor's) internal standard and may look as follows, for example:

- To establish the priority user(s) of the financial reporting and his (their) key information needs (Hoffman, 2016).

- To determine the most important indicator(s) influencing their economic decisions. This can be both a separate reporting item of the completed period, as well as the planned and calculated, industry average or other calculations-based and significant for users value.

- If the selected indicator is volatile in time or significantly differs from the expected value (industry average, planned, etc.), it is advisable to consider other options for the core indicator.

- If several core indicators are selected, it is advisable to set a materiality level for each of them. Depending on the required level of confidence, take the minimum of them or calculate the average value.

Materiality level	Application at different audit phases		Auditor's duties to establish the value of the materiality level	Calculation of the value
	Planning	Assessment of misstatements on the final phase		
Materiality level for financial reporting as a whole (ML_{FR})	Calculated and used to calculate other levels	The core indicator for deciding on the materiality of cumulative misstatements and modification of the audit report	Mandatory indicator (clause 10 of ISA 320), set at the planning phase, revised as necessary	$ML_{FR} = \frac{B_{BП} \times y_C}{100}$, where V_{CI} – the value of core indicator, L_M – level of materiality for the core indicator, %.
Level of clearly trivial misstatement (L_{CTM})	Based on the methodology, it should be established no later than assessing the risks of material misstatement. However, ISA does not set the specific phase of application in a particular audit engagement	Used as a value below which misstatements will be judged as clearly trivial	Mandatory indicator (clause 15 of ISA 450).	$L_{CTM} = \frac{ML_{FR} \times L_{MM}}{100}$, where L_{MM} – minimum level of materiality, % usually set at 5-10%.

Table 3 Materiality levels applicable for assessing the significance of identified risks
Source: Developed by the authors based on content analysis of ISA 320 and ISA 450

The procedure for setting the materiality level as a percentage for the core indicator needs to be fixed in an internal corporate standard (Curtis, Hayes, 2002; Kochinev, 2016). At the same time, the recommended values can be found in the Application Manual and other explanatory materials to ISA 320 (p. A7):

(1) For volume indicators (value of assets, revenues, costs), it is advisable to use the level of 1-2%;

(2) For profit indicators – no more than 5%;

(3) For separate value indicators (structural elements of assets, liabilities, money flows, etc., for example, net assets) – 5-10%.

The level of clearly trivial misstatements is determined by par. 5 of ISA 450: the auditor needs to accumulate distortions, ignoring those that are clearly trivial. The purpose of calculating L_{CTM} is to determine the threshold of values in the examined items that are considered clearly trivial for a given audit engagement. It is usually determined as 5-10 % of ML_{FR}. This interval can be justified by the guidance given in par. A2 of ISA 450: clearly trivial is not another expression for "immaterial". Small distortions are at least 10 times or more below the materiality level, regardless of size, nature or circumstances. Developing the application of the criterion for the audit rationalization, we can recommend its use to exclude from the audit certain obviously insignificant objects at the stage of the audit planning, under the conditions that:

ISSN-Print: 2007-1582
ISSN-On line: 2007-3682

- There is no or negligible risk of fraud in reflecting these accounting items.

- The accounting object is not a marker of important requirements of regulations, which violation may lead to significant financial penalties and/or the threat of violation of the business continuity principle of the organization.

Thus, the risk criteria by the degree of significance can be presented in the audit as follows (Table 4).

Level of risk	Risk characteristic	Criteria	
		in amount	on qualitatively major consequences
1	Insignificant	The size of the expected error is below the level of clearly trivial misstatements	Misrepresentation (violation) does not result in significant financial penalties, and there are no threats to business continuity due to suspension of the organization, license, SPO membership, franchise, loss of key personnel, business reputation
2	Moderate	The size of the expected error is above the level of clearly trivial misstatements but below the level of materiality for financial reporting as a whole	Misstatement (violation) can lead to tangible financial penalties, and there are separate threats associated with changes (restructuring) of activity, loss of key personnel, loss of business reputation
3	Significant	The size of the expected error is above or close to the materiality level for financial reporting as a whole or approaching it	Misrepresentation (violation) leads to significant financial penalties, threats to business continuity arise due to suspension of the organization, license, SPO membership, franchise, loss of key personnel and business reputation

Table 4 Expert model for assessing the significance of risk in the audit. *Source: Author's development.*

Modeling a risk management system of material misstatement using a risk heat map tool

Understanding the probability and significance of risk should be reflected in a comprehensive risk model to establish the necessary and sufficient response to that risk. A risk heat map is an effective solution to the problem of documenting the assessment of audit risks and thereby ensuring the transparency of audit quality, expressed as a necessary and sufficient response of the audit team to the identified risks of material misstatement in the accounting (financial) reporting of the auditee.

In the classic risk management theory, a risk heat map is a visual description of a limited number of organization risks located in a rectangular table. Its one axis shows the strength of the impact or significance of the risk, and the other – probability or rate of its occurrence (Figure 1).

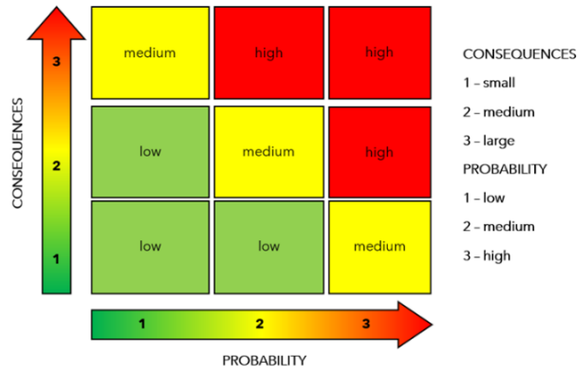

Figure 1 The risk heat map used in risk management theory *Source: Compiled by the authors based on publication (Svitkin, 2010)*

In our view, the methodology of risk map in management is close to the audit methodology: the risk of material misstatements is nothing other than the probability of existence in the accounting (financial) reporting of the audited entity distorted or undisclosed information necessary for management decision making by users; significance, as well as materiality, is a formalized expression of the possible consequences of misstatements. At the same time, a *pure* management theory of risk map in the audit is not applicable. The development of the *audit risk map* methodology requires solving the following applied problems:

1) Mapping problems, namely:

- Establishment of parameters for dividing areas of probability and significance.

- Specification of the scenario mechanism (in the triplex "object of vulnerability + trigger mechanism (risk factors) + possible consequences").

- Definition of the *risk appetite* tolerance (in other words: resistance or tolerance to risk).

2) Problems of interpretation of identified and assessed risks – the strategy of auditors' actions in response to assessed risks.

ISSN-Print: 2007-1582
ISSN-On line: 2007-3682

We propose the following risk map format (Figure 2) as documentation for audit risk management.

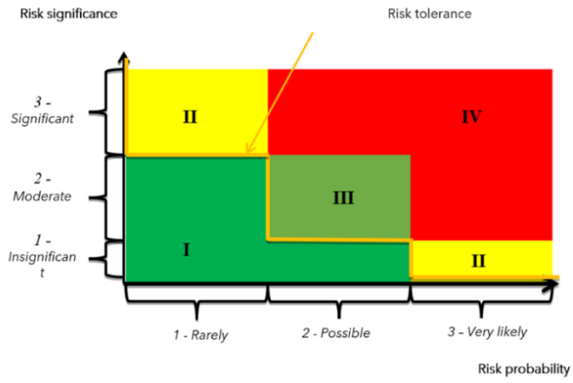

Figure 2 Audit risk management map
Source: Author's development

Thus, the boundaries of analysis in mapping the audit risk management are proposed to be set as follows:

- Axis X (risk probability of material misstatements in reporting) – traditional boundaries of risk assessment of material misstatements: low (up to 0.35), medium (from 0.35 to 0.65), high (from 0.65 to 1) (according to Table 2);

- Axis Y (significance of possible consequences of misstatements) – the parameters given in Table 4 as boundaries of analysis.

The risk tolerance boundary (risk appetite) limits the areas separating factors and events that do not affect audit planning, audit procedures, and finally, the audit opinion and areas requiring the auditor to ensure adequate audit quality by modifying audit procedures. In some cases, it limits the opinions and certainly justification of the investigation final results of the identified factors and events as a result of the substantive audit procedures, whatever they may be - affecting or not affecting the reporting reliability by the auditor's working papers. Audit risk mapping is not an end in itself but a means of justifying the sufficiency and appropriateness of subsequent audit procedures. Therefore, the most important step in the proposed methodology is the auditors' strategy responding to the assessed risks.

In the classical theory of risk management, there are four strategies of action in response to the project assessed risks: avoidance strategy, reduction strategy, transfer strategy, risk acceptance. In auditing, we are talking about the risk of material misstatement of reporting due to misrepresentation and incomplete disclosure of information that can affect the opinion of qualified users of the reporting.

- *Risk avoidance* in the audit context is informing the users of the financial reporting about material misstatements of a highly probable nature, events that threaten the going concern of the audited entity or can significantly change its normal operation.

- *Risk reduction* in auditing involves developing response procedures that confirm or refute an initial judgment about the risk likelihood and significance.

- *Risk transfer* is the possibility of ensuring the auditor's liability provided by the Federal law of auditing activities in case of poor-quality auditing services (in the context under consideration, it is the failure to detect material misstatements, if any). Nevertheless, this type of *risk transfer* cannot eliminate reputational risk.

- *Risk acceptance* is putting aside the risks of the possible impact of misstatements. “Plan B” of the auditor (detailed tests) becomes relevant only when material misstatements in unexpected turnovers, balances, and disclosures are identified.

Let us formalize the auditor's actions in response to assessed risks in the form of a scheme (Table 5).

Graphically, the table identifies four zones: I – inside the tolerance zone to audit risk; II, III, and IV – outside the tolerance zone. The color explanation of the response zones is inextricably linked to the positioning of the risk factor on the map (Figure 2).

ISSN-Print: 2007-1582
ISSN-On line: 2007-3682

Audit risk management tool		Necessary and sufficient reaction procedures in response to to assessed risks			
		Reporting to the management and persons responsible for corporate governance of the audited entity on material weaknesses in the Internal Control Service	Modification of audit procedures for substantive tests (detailed tests, inclusion of more reliable audit procedures)	Reporting to the management and persons responsible for corporate governance on the need to correct misstatements and make proper disclosures	Inclusion of information in the audit opinion
Audit risk zone	I	-	-	-	-
	II	+	+	-	-
	III	+	+	+	-
	IV	+	+	+	+
Standards defining the duties of auditors		ISA 265	ISA 240, 250, 500, 530, 540	ISA 260, 580	ISA701, 570

Table 5 Strategy for auditors' actions to respond to assessed risks**.** *Source: Author's development based on content analysis of ISA requirements*.

Green zone (I) is the field in which the identified factors and events are positioned, whose occurrence is possible (with a medium degree of probability) but insignificant (the expected consequences are below the level of clearly trivial misstatements or will not lead to changes in the normal activities of the economic entity), or with insignificant expected consequences (below ML_{FR} and the unlikely possibility of occurrence.

Yellow zone (II) includes events and circumstances with potentially high significance (above ML_{FR} but low probability of occurrence, or with high probability but low significance. The *yellow zone* factors require the auditor to increase the degree of professional skepticism and due diligence because of the potential danger of the audited entity's "veiling" of circumstances relevant to risk assessment (ISA 240), lack of objective assessment by the audited entity's management of the consequences of regulatory violations (ISA 250), inadequate recognition and measurement of estimated values (ISA 540), increased likelihood of missing significant audit objects in the audit sample (ISA 530). Then, to provide reasonable assurance, the auditor needs to change the planned procedures to more reliable ones, perhaps increasing the sample or changing the approach to forming it.

Orange zone (III) includes risk factors with a medium degree of probability and significance. This zone is singled out as a separate one, largely since most of the expected misstatements are assessed below the level of materiality, and when in doubt about the probability assessment, its level is defined as medium. Therefore, this zone usually includes the largest number of identified risks.

Due to the potentially high complex effect of the combination of expected misstatements on the reliability of the financial reporting, in addition to action (II), management should be informed about the need to correct misstatements or, if it is a matter of non-disclosure in the notes, to include the necessary disclosures in the notes. ISA 260 requires the auditor to report material misstatements identified that could lead to a modified opinion in the audit opinion. However, here, if it is not possible to accurately assess the impact of misstatements of *average significance*, it is appropriate to inform on a combination of factors or as part of the indication to the causes of potentially material misstatements in the weaknesses of the Internal Control Service (ISA 265).

Red zone (IV), in addition to the above actions, includes factors, events, and conditions that highly likely can lead to a modification of the opinion in the auditor's report or the inclusion of additional information.

In particular, if there are probable and significant risks, whether they relate to – misstatements or the continuation of the entity's normal activities – this information (about risks) may be recognized as qualitatively material to users and subject to disclosure according to IFRS 7 Financial Instruments: Disclosures.

Suppose there are high risks of liquidity and solvency. In that case, even if they are disclosed in the audited entity's reporting, the auditor is obliged, according to ISA 570, to conduct appropriate procedures and include a paragraph "Significant uncertainty about the continuity of operations" in the audit opinion. In case of information non-disclosure (inadequate disclosure), there is an obligation to modify the opinion in the audit report.

ISSN-Print: 2007-1582
ISSN-On line: 2007-3682

When auditing economic entities that issue and place securities on organized markets, auditors have an obligation under ISA 701 to disclose key audit matters in the audit report. Key matters are nothing more than areas of material misstatement risk that require the auditors' attention and the actions taken in response to those risks. Thus, the *red zone* risks, even if the hypothesis of a material misstatement is not confirmed in reporting, require the auditor to form an audit opinion usually different from the unmodified form presented in ISA 700, and, as a result, proper documentation of additional processes to assess the audited entity's business continuity, a more thorough evaluation of qualitatively material disclosures, formulation of key issues in the audit opinion and additional interaction with persons responsible for corporate governance.

Visual presentation of assessed risks of material misstatement is not crucial. The auditor needs to understand in what risk zone the assessed circumstance of the economic life of the audited entity falls, as it allows systematically, according to the standards, to plan effective but at the same time rational actions in response to risks "outside the tolerance zone", redistributing labor intensity towards verification of the prerequisites of the accounting (financial) reporting, subject to material misstatement.

Technology for comprehensive implementation of risk maps on separate balances, groups of similar operations, and disclosures in developing an audit strategy

Application of this methodology to all *audit areas* makes it possible to perform a spectrum analysis of risks (Figure 3) of different audit objects and prerequisites for reporting on groups of homogenous operations, account balance, and disclosures can contribute to the formation of adequate strategic approaches to audit planning. If to arrange the results of the assessment of audit risks based on separate significant accounting areas: groups of homogenous operations, balances, significant individual assumptions of their formation, in a single *digital* document (spectrum risk analysis), by building a hierarchy of these objects from their tendency to the red spectrum to the green, we can establish and *digitize* at least the following strategic aspects of the audit:

1 To determine the *tendency* of the audit area to risk; at this the share of "green zone" factors determined by the significance of "1", "yellow zone" - "2", "orange zone" - "3", "red zone" - "4".

2 To determine the *weights* of the examined accounting area in the total labor intensity of the audit based on the sum of the spectrum analysis values for all the objects.

3 To plan the amount of work in person-hours based on the total labor intensity of the audit. For example, in the scheme under consideration, 11 risk factors are assessed concerning the accounting object "Revenue", of which three are in the green zone (weight – 0.27), three – in the yellow zone (weight – 0.27), one – in the orange zone (weight – 0.09), four – in the red zone (weight – 0.37). Then, the cumulative spectrum score is defined as follows:

$$0.27 + 0.27\times2 + 0.09\times3 + 0.37\times4 = 2.56 \approx 2.6$$

The cumulative level of spectra of all audited objects is 22.4. Then the share accounted for the revenue audit is 11.6%, which at the total labor intensity of the audit engagement of 200 man-hours makes it possible to plan 22 man-hours for this object.

In addition, the positioning of audit objects according to the risk spectrum makes it possible to plan the ratio of the most time-consuming detailed tests and less reliable analytical procedures and the composition of the audit team. For example, it is reasonable to define in the internal regulations of an audit firm the assignment of the most experienced auditors to the objects with a risk spectrum greater than 2.5, and for the least experienced auditors to provide for the possibility to check any objects with a risk spectrum of 1.5 and below.

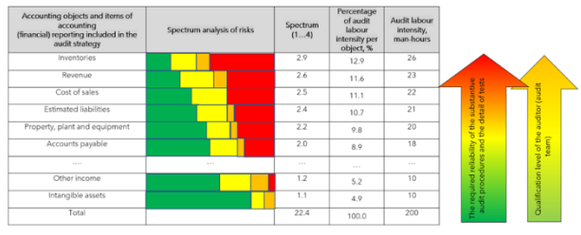

Figure 3 Impact of assessed audit risks on the development of audit strategy
Source: Methodology developed by the authors

ISSN-Print: 2007-1582
ISSN-On line: 2007-3682

Conclusions

With the reform of risk-based audit standards, there is a need for new technologies to identify, assess, visualize risks, and find sufficiently reliable, effective, but rational procedures to identify material misstatements in the reporting of auditees. Modeling the audit risk management system, in our opinion, should be based on the following principles:

- Identification of the maximum possible number of threats to the prerequisites for the formation of accounting (financial) reporting items.

- Assessment of their probability and significance according to the risk heat map of material misstatement model of the 3×3 format, where the horizontal axis represents the probability gradation of occurrence of unfortunate events that may affect the reporting, and the vertical axis represents the significance assessed according to the cost and qualitative criteria of materiality.

- Defining tolerance limits for unlikely and insignificant risks, "sweeping away" substantive testing procedures for assertions where they are found.

- Development of a clear ISA-based response to yellow, orange, and red zone risks planning sufficient substantive test procedures.

- Overall assessment of risk heat maps in the spectrum analysis summary table to build an effective audit strategy aimed at mitigating the risks of material misstatement while also a rational audit strategy.

The developed models of audit risk heat map and generalized map of "spectrum" risk analysis are the most practical tools for the implementation of the following aspects of the audit:

- For developing a scientific-based audit strategy with a focus on high-risk areas.

- For substantiating sufficient appropriate procedures for the risk management of material misstatements at all phases of the audit, from planning to summarizing the results.

- For forming a sufficiently complete and transparent audit file.

- To justify the consistency of the audit opinion with the audit evidence gathered.

References

Agarkov, G.A., Bessonov, D.A., Sukhikh, V.S., Khanova, A.R. & Yurieva, L.V. (2016), International models of risk management: possibilities of application and results. *International Accounting*, *13* (403), 52-68.

Bhaskar, L.S. (2020). How do Risk-Based Inspections Impact Auditor Behavior Experimental Evidence on the PCAOB's Process. *Accounting Review*, *95* (4), 103-126.

Bowlin, K. (2011). Risk-Based Auditing, Strategic Prompts, and Auditor Sensitivity to the Strategic Risk of Fraud. *The Accounting Review*, *86* (4), 1231–1253.

Curtis, M.B. & Hayes, T. (2002). Materiality and audit adjustments. *CPA Journal*, *72* (4), 69.

Hoffman, C.W. (2016). Revising the Conceptual Framework of the International Standards: IASB Proposals Met with Support and Skepticism. *World Journal of Business and Management*, *2* (1).

Hollingsworth, C. & Li, C. (2012). Investors' Perceptions of Auditors' Economic Dependence on the Client: Post-SOX Evidence. *Journal of Accounting, Auditing & Finance*, *27*, 100-122.

ISA Risk Assessment. (2021). ISA Audit Automation in IT Audit: Enterprise. Retrieved from https://audit-soft.ru/risk.

Itygilova, E.Yu. (2015). Methodological aspects of the audit risk assessment taking into account the factors of "action," "event," and "limitation." *International Accounting*, *25*, 47-58.

ISSN-Print: 2007-1582
ISSN-On line: 2007-3682

Klinova, E.A. & Sungatullina, R.N. (2018). Justification of benchmarks to determine the materiality for the financial reporting as a whole. *The Auditor*, *9*, 11-16.

Kochinev, Yu.Yu. (2016). Assessment of the materiality threshold. *Auditor*, *8*, 12-15.

Kochinev, Yu.Yu. & Vinogradova, O.I. (2013). Assessment of the material misstatement risk due to errors or fraud. *The Auditor*, *3*, 45-48.

Lashchinina, E.A. (2020). Materiality in audit: levels, principles, parameters. *IFRS and ISA in Credit Institution*, *1*.

Deloitte Insights. (n.d.). *Managing Cyber Risk in the Electric Power Sector*. Retrieved from https://www2.deloitte.com/us/en/insights/industry/power-and-utilities/cyber-risk-electric-power-sector.html.

Páez Calderón, J. T., & Cuadros Flórez, L. J. (2022) La auditoría ambiental como instrumento de control y evaluación para la toma de decisions. Universidad Santo Tomás, Bucaramanga

Petukh, A.V. (2019). Materiality in auditing: an approach based on priorities and limitations. *Bulletin of Voronezh State Agrarian University*, *12* (61), 182-195.

Rautiainen, A., Saastamoinen, J. & Pajunen, K. (2021). Do key audit matters (KAMs) matter? Auditors' perceptions of KAMs and audit quality in Finland. *Managerial Auditing Journal*, *36* (3), 386-404.

Rodriguez Lopez, G. R. (2022). Auditoría de cumplimiento en la gestión administrativa en una institución pública del sector vivienda, Lima-Perú.

Shvyreva, O.I. & Petukh, A.V. (2018). Methodology for determining materiality in audit and applying it when assessing detected misstatements. *Journal of Applied Economic Sciences*, *13* (59), 1260-1267.

Shvyreva, O.I., Petukh, A.V. & Kruglyak, Z.I. (2016). Realization of the risk-based approach to the audit work in conditions of application of the international auditing standards. *British Journal for Social and Economic Research*, *1* (2), 5-18.

Sungatullina, R.N. & Gogoleva, O.L. (2014). Identification of the material misstatement risks of information about economic life facts in the internal control system. *The Auditor*, *12*, 38-49.

Svitkin, M. (2010). Building of company risk management system. *Quality Management Methods*, *2*.

Vinson, J.M., Robertson, J.C. & Cockrell, R.C. (2019). The Effects of Critical Audit Matter Removal and Duration on Jurors' Assessments of Auditor Negligence. *Auditing-A Journal of Practice & Theory*, *38* (3), 183-202.

Yudintseva, L.A. (2014). Determination of audit objects within the risk-based approach in auditing. *The Auditor*, *5*, 59-62.

ISSN-Print: 2007-1582
ISSN-On line: 2007-3682

SHVYREVA, Olga, PETUKH, Aleksei and PETUKH, Mikhail. Application of visualization methods of audit risk assessment in developing an audit strategy. ECORFAN Journal-Mexico. 2022