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CONTENTS

THE INTERRELATIONSHIP BETWEEN MATERIALITY AND AUDIT RISK IN PUBLIC-SECTOR INTERNAL AUDITING AND THEIR APPLICATION WITHIN A UNIFIED METHODOLOGICAL FRAMEWORK

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Abstract. This article examines the theoretical foundations of materiality and audit risk in public-sector internal auditing and analyses the relationship between these concepts. The study addresses the insufficient development of an integrated methodological framework for determining materiality and audit risk levels in national practice. Using comparative analysis, a systems approach, conceptual abstraction, and mathematical modelling, the study proposes an inverse relationship between materiality and audit risk, expressed as $(M = K/R)$, analyses the components of the multiplicative audit risk model, and formulates refined definitions adapted to the specific characteristics of the public sector. The findings may contribute to improving the methodological guidance and working documents used by public-sector internal audit services.

Keywords: internal audit, materiality, audit risk, public sector, materiality threshold, risk assessment, ISSAI, methodological framework.

Аннотация. В статье исследуются теоретические основы существенности и аудиторского риска во внутреннем аудите государственного сектора, а также анализируется взаимосвязь между данными понятиями. Рассматривается проблема недостаточной разработанности в национальной практике комплексной методологической основы определения уровней существенности и аудиторского риска. На основе сравнительного анализа, системного подхода, концептуальной абстракции и математического моделирования предложена обратно пропорциональная зависимость между существенностью и аудиторским риском, выраженная формулой $(M = K/R)$, проанализированы компоненты мультипликативной модели аудиторского риска и сформулированы уточнённые определения, учитывающие особенности государственного сектора. Полученные результаты могут способствовать совершенствованию методических рекомендаций и рабочих документов, используемых службами внутреннего аудита государственного сектора.

Ключевые слова: внутренний аудит, существенность, аудиторский риск, государственный сектор, порог существенности, оценка риска, ISSAI, методологическая основа.

INTRODUCTION

The large-scale reforms being implemented in Uzbekistan's public administration and public financial management systems highlight the need to further strengthen the public-sector internal audit function. The establishment of internal audit services under Resolution No. PQ-3231 of the President of the Republic of Uzbekistan of 21 August 2017, "On Further Improving the Mechanism for Financing Educational and Medical Institutions and the System of State Financial Control" [1], and the adoption of Law No. O'RQ-677 of the Republic of Uzbekistan of 25 February 2021, "On Auditing Activities" [2], represented important steps towards aligning auditing activities with international standards. Nevertheless, a unified and scientifically grounded methodology for determining materiality and audit risk remains insufficiently developed in current public-sector internal audit practice.

Although materiality and audit risk are central concepts in international auditing standards, including ISA 320 and ISSAI 1320, their integrated application in national practice remains an area for further methodological development. In many cases, these concepts are considered separately and rely substantially on the auditor's professional judgement. A more structured approach could support closer alignment between the assessed level of risk and the scope and depth of audit procedures, contribute to the efficient allocation of audit resources, and improve the comparability of audit findings. Accordingly, the study addresses the need to provide a theoretical

basis for the relationship between materiality and audit risk in the public sector and to examine their application within a unified methodological framework.

The purpose of this study is to provide a theoretical justification for the relationship between materiality and audit risk in public-sector internal auditing and to propose refined definitions that reflect the specific characteristics of the public sector. To achieve this purpose, the study undertakes a comparative analysis of the development of the concept of materiality and contemporary theoretical approaches to its interpretation; examines the structure and components of the audit risk model; expresses the functional relationship between materiality and risk in mathematical terms; and develops definitions that integrate the two concepts within a unified methodological framework.

The study focuses on internal audit services operating within public-sector entities, including ministries, higher education institutions, and budgetary organisations. The following sections present a review of the relevant literature, the research methodology, the findings and their discussion, and the resulting conclusions and recommendations.

LITERATURE REVIEW

The emergence of materiality as a scholarly concept dates back to the first half of the twentieth century. The concept was first introduced in the *Tentative Statement of Accounting Principles*, published by the American Accounting Association in 1936. Mautz and Sharaf subsequently developed its theoretical foundations in their seminal work on the philosophy of auditing, interpreting materiality as a set of factors capable of influencing the decisions of financial statement users (Mautz and Sharaf, 1961). This interpretation continues to underpin the definitions adopted in contemporary international auditing standards.

Four major theoretical approaches to materiality have emerged in the international literature. Under the information-based approach, materiality is regarded as a criterion reflecting the value of information to users of financial statements (Libby, 1981). The decision-making approach defines materiality in terms of its capacity to influence a particular economic decision (Arens and Loebbecke, 1991). This approach was subsequently developed within an integrated framework of auditing and assurance services (Arens et al., 2017). The economic approach associates materiality with the magnitude of economic consequences (Adams, 1995), whereas the systems approach regards it as an integral element of the overall control system (Sokolov, 1996). The distinctive features of public-sector internal auditing are also discussed comprehensively in the professional guidance provided by K. H. Spencer Pickett (Pickett, 2010).

The foundations of risk theory were established by F. Knight, who was among the first scholars to distinguish between “risk”, understood as an event whose probability can be estimated, and “uncertainty”, understood as an event whose probability cannot be reliably quantified (Knight, 1921). The multiplicative audit risk model was formally introduced in Statement on Auditing Standards No. 47, issued by the American Institute of Certified Public Accountants (AICPA, 1983), and was theoretically substantiated in analytical studies conducted during the same period (Cushing and Loebbecke, 1983). A comprehensive risk management framework was subsequently developed within the integrated model proposed by the Committee of Sponsoring Organizations of the Treadway Commission (COSO, 2004). The principal international regulatory and methodological sources relevant to the present study include ISA 320 (IFAC, 2018), ISSAI 1320 for public-sector auditing (INTOSAI, 2019), the Lima Declaration in relation to public accountability and qualitative considerations (INTOSAI, 1977), and the updated Global Internal Audit Standards (IIA, 2024).

In the national academic literature, the organisational and methodological aspects of public-sector internal auditing have been examined by a number of scholars. Existing studies have addressed the theoretical foundations of budgetary control and auditing (Ibragimov and Sugirbayev, 2010), the organisation of internal audit in budgetary institutions (Mehmonov, 2015), and the relationship between internal control, risk management, and internal audit functions (Khamidova, 2020; Borisova et al., 2022). However, these studies have generally examined materiality and audit risk as separate categories. Existing research has paid limited attention to the comprehensive examination of materiality and audit risk as interrelated elements of a unified methodological framework tailored to the specific characteristics of the public sector. The literature review therefore highlights the need to address this research gap and provides the basis for the research questions examined in the present article.

RESEARCH METHODOLOGY

The research philosophy is based on a pragmatic approach combining elements of positivism and interpretivism. On the one hand, the relationship between materiality and risk is expressed through an objective mathematical function; on the other hand, the assessment of qualitative materiality requires the exercise of

professional judgement by the auditor. The research design is theoretical and conceptual in nature and follows a deductive approach, whereby specific conclusions for national practice are derived from international standards and fundamental theories.

The following methods were employed in the study: historical and logical analysis was used to examine the genesis and evolution of the concepts of materiality and risk; comparative analysis was applied to compare theoretical approaches and the requirements of international standards, particularly ISA 320 and ISSAI 1320; the systems approach was used to examine materiality and risk as interrelated elements of a unified methodological framework; conceptual abstraction and generalisation were employed to formulate the author's definitions; mathematical modelling and graphical methods were used to express and illustrate the inverse proportional relationship; and the findings were systematised and presented in tabular form.

The study relied on secondary data sources, including international auditing standards, documents issued by INTOSAI and the IIA, international and national academic literature, and the regulatory legal acts of the Republic of Uzbekistan. The reliability of the research is ensured by the official and authoritative nature of the sources used and the replicability of the analytical procedure. Its validity is supported by the consistency of the conclusions with the requirements of international standards and by the logical coherence of the analysis. Academic integrity was maintained through the consistent citation of all sources and the standardised preparation of bibliographic references.

ANALYSIS AND RESULTS

To clarify the meaning of materiality, it is first necessary to systematise the theoretical approaches that have been developed in relation to this concept. The results of the comparative analysis demonstrate that each approach highlights a particular dimension of materiality; however, no single approach fully reflects all the specific characteristics of the public sector (Table 1).

Table 1

Contemporary Theoretical Approaches to the Concept of Materiality

No.	Approach	Key Scholar	Core Meaning
1	Information-oriented approach	R. Libby, 1981	Materiality reflects the significance of information to users of financial statements.
2	Decision-making approach	Arens and Loebbecke, 1991	Materiality is determined by the capacity of information to influence a specific economic decision.
3	Economic approach	Adams, 1995	Materiality reflects the magnitude of potential economic consequences.
4	Systemic approach	Sokolov, 1996	Materiality is regarded as an integral component of the overall control system.

Source: Compiled by the author based on Libby (1981), Arens and Loebbecke (1991), Adams (1995), and Sokolov (1996).

As the analysis presented in the table demonstrates, the existing approaches are primarily based on the interests of users of private-sector financial statements. The definitions provided in international standards reflect a similar perspective. According to ISA 320, misstatements in financial statements are considered material if, individually or in aggregate, they could reasonably be expected to influence the economic decisions of users (IFAC, 2018). ISSAI 1320, which is specifically designed for the public sector, interprets materiality as a key criterion for ensuring public oversight of government funds (INTOSAI, 2019). Materiality in the public sector therefore has a broader meaning than in the private sector, as users include not only decision-makers but also budget allocation authorities, oversight institutions, and the general public.

Another distinctive feature of materiality in the public sector is the need to combine its quantitative and qualitative dimensions. Violations of laws and regulations, the misuse of public funds, and instances of corruption may be considered material by their nature or context, even where the monetary amounts involved are relatively small. This approach is reflected in the Lima Declaration, according to which public-sector auditing should take into account not only quantitative thresholds but also violations of legal requirements, abuses of official authority, and cases of corruption, which may be considered material by their nature (INTOSAI, 1977). Within the framework of this study, six dimensions of materiality were systematised (Table 2).

Table 2
Quantitative and Qualitative Dimensions of Audit Materiality

No.	Dimension	Description	Examples
1	Quantitative materiality	Calculated as a percentage of relevant financial indicators.	5% of budget expenditures; 2% of total assets
2	Qualitative materiality	Considered material by its nature, irrespective of the monetary amount involved.	Legal violations, corruption, fraud
3	Sector-specific materiality	Assessed in relation to a particular balance-sheet item or operational area.	Employee remuneration, public procurement
4	Contextual materiality	Evaluated according to the circumstances of a specific situation.	Organisational restructuring, newly adopted legislation
5	Dynamic materiality	Materiality that evolves over time in response to changing conditions.	Emerging sectors, innovations
6	Systemic materiality	Determined by the extent to which an issue affects the system as a whole.	Governance, IT infrastructure

Source: Developed by the author based on IFAC (2018), INTOSAI (1977), and INTOSAI (2019).

In international practice, the following benchmark ranges are commonly used to determine quantitative materiality thresholds: 5–10 per cent of profit, 0.5–1 per cent of operating revenue, or 0.5–2 per cent of total assets for overall materiality; 50–75 per cent of overall materiality for performance materiality; and 0.5–10 per cent of overall materiality for specific materiality. In the public sector, these benchmarks are adapted to the volume of budget expenditures. Materiality thus forms a three-level hierarchical structure. Overall quantitative materiality establishes the initial threshold for the audit; specific materiality enables particular significant transactions or areas to be examined separately; and qualitative materiality occupies the highest level, as it applies irrespective of the monetary amount involved. Only when all three levels are applied together as an integrated system can the risk of the auditor failing to detect material errors or misstatements be reduced.

The analysis now turns to its second fundamental category—audit risk. In internal auditing, risk is generally understood as uncertainty that may adversely affect the achievement of an organisation's objectives. Audit risk, however, has a more specific meaning: it is the risk that the auditor may fail to detect a material error or misstatement. Risk theory distinguishes between events whose probability can be estimated, classified as risk, and events whose probability cannot be quantified, classified as uncertainty (Knight, 1921). Under the contemporary integrated approach, risk is interpreted more broadly as a category encompassing both adverse consequences and potential opportunities (COSO, 2004). The classical component model of audit risk is expressed by the following multiplicative formula:

$$AR = IR \times CR \times DR,$$

where **AR** denotes audit risk, **IR** denotes inherent risk, **CR** denotes control risk, and **DR** denotes detection risk.

This model was first formally incorporated into SAS No. 47 (AICPA, 1983) and substantiated in analytical studies conducted during the same period (Cushing and Loebbecke, 1983). It is currently embedded in ISA 200 and ISSAI 1200. The acceptable level of audit risk should generally not exceed 5 per cent, which corresponds to the conventional margin of error adopted in statistical confidence theory and a 95 per cent confidence level. For high-risk matters involving significant decisions, this threshold may be reduced to 1 per cent. The sources of the individual risk components and the extent to which they can be managed by the auditor are systematised in Table 3.

Table 3
Characteristics of Audit Risk Components

No.	Type of Risk	Source	Degree of Controllability
1	Business risk (BR)	Nature and operating conditions of the organisation	Cannot be controlled by the auditor
2	Control risk (CR)	Deficiencies in the internal control system	Partially controllable

3	Detection risk (DR)	Auditor's working methods and professional competence	Fully controllable
4	Uncertainty risk	External environmental factors	Uncontrollable
5	Sampling risk	Composition of the selected audit sample	Fully controllable
6	Non-sampling risk	Auditor error	Partially controllable

Source: Compiled by the author based on AICPA (1983) and IFAC (2018).

As shown in the table, detection risk is the component of audit risk most directly influenced by the auditor. It can be adjusted through the nature, timing, and extent of audit procedures, including the size of the audit sample, the depth of examination, and the quality of the procedures applied. Inherent risk cannot be altered by the auditor; however, an appropriate assessment of inherent risk enables the auditor to determine a suitable level of detection risk and to design responsive audit procedures. Control risk also cannot be directly controlled by the auditor, but it can be assessed through tests of the design and operating effectiveness of the internal control system. The assessment of internal controls is therefore an important stage of public-sector internal auditing, as weaknesses in the control environment may increase the risk of material misstatements or non-compliance. Accordingly, public-sector internal auditors should begin the audit process by obtaining an understanding of the internal control system and evaluating its design and operational effectiveness.

A key finding of the study concerns the relationship between materiality and audit risk. From a theoretical perspective, these two categories are inversely related: the higher the level of risk, the lower the materiality threshold should be, and vice versa. The theoretical basis for this relationship was formally established in SAS No. 47 (AICPA, 1983) and subsequently developed in ISA 320 and ISSAI 1320. For the purposes of this study, the relationship was expressed for Uzbekistan's public sector through the following function:

$$M = K/R,$$

where **M** denotes the materiality threshold, expressed as a percentage; **R** denotes the level of audit risk, expressed as a percentage; and **K** is a proportionality constant calculated for Uzbekistan's public sector on the basis of the author's empirical research, with **K = 5** adopted in the model. A graphical representation of the function is presented in Figure 1.

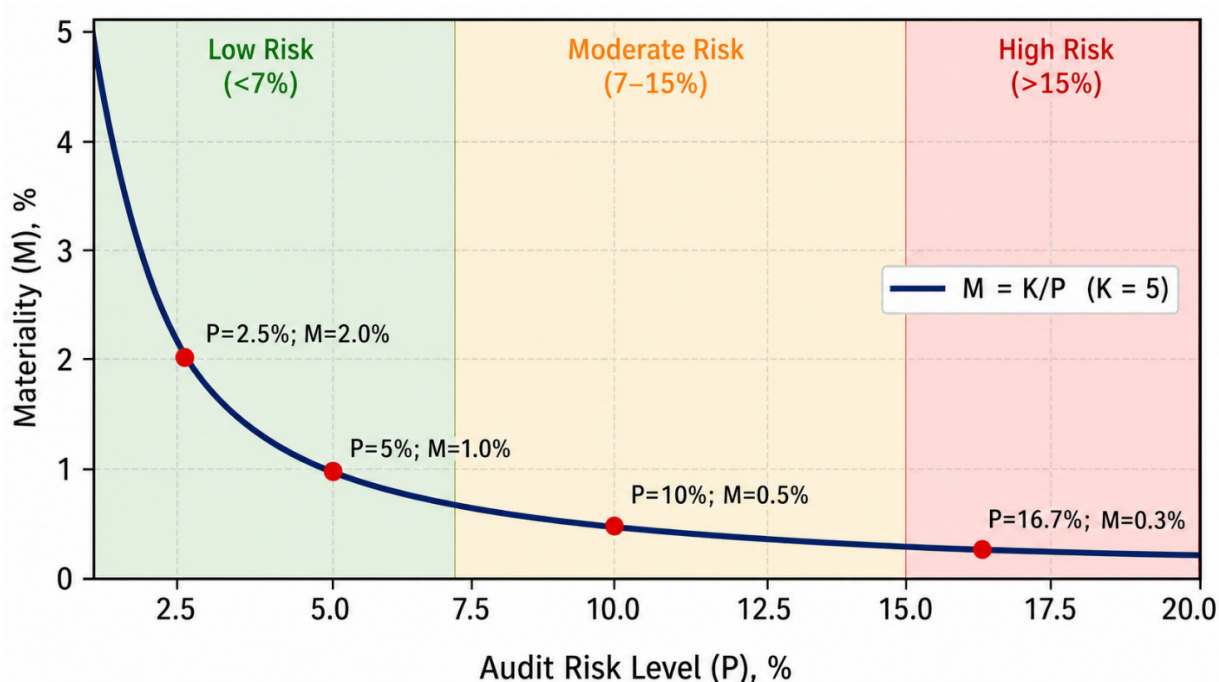


Figure 1. Inversely Proportional Relationship Between Materiality and Audit Risk Levels ($M = K/P$, $K = 5$)

Source: Developed by the author.

As illustrated in the figure, under high-risk conditions ($R > 15\%$), the auditor may need to establish a relatively

low materiality threshold, generally around 1–2 per cent, and obtain a greater volume of audit evidence. Under low-risk conditions ($R < 7\%$), however, a higher materiality threshold may be established, allowing the scope of the audit to be reduced. The relationship between materiality and risk therefore becomes a primary criterion for determining the scope of the audit and the overall audit strategy. The recommended audit scope for each combination of risk and materiality levels is summarised in Table 4.

Table 4

Determining the Scope of an Audit Based on the Relationship Between Materiality and Risk Levels

No.	Risk Level	Materiality Level	Audit Scope	Recommended Method
1	High (>15%)	Low (1–2%)	Extensive	Full-scope audit
2	Moderate (7–15%)	Moderate (3–4%)	Medium	Sample-based audit
3	Low (<7%)	High (5%)	Limited	Analytical procedures
4	Very low (<3%)	Very high (>5%)	Minimal	General review and conclusion

Source: Developed by the author.

As shown in the table, a specific audit scope and audit approach are prescribed for each combination of risk and materiality. This approach is fully consistent with the concept of risk-based auditing, which is widely applied in contemporary audit theory. Under this concept, the auditor begins each engagement by assessing risk and determines the scope, depth, and methods of the audit in proportion to the assessed level of risk. Risk-based auditing is also established as a fundamental principle in the updated Global Internal Audit Standards (IIA, 2024). Its application enables audit resources to be allocated efficiently and helps optimise both the duration of audit procedures and staff workloads.

The preceding analysis demonstrates that defining materiality and audit risk separately is methodologically incomplete, as both categories acquire their full meaning only when considered in relation to one another. On this basis, the main contribution of the study is the development of refined definitions that reflect the specific characteristics of the public sector that reflect the specific characteristics of the public sector and integrate materiality and audit risk into a unified methodological framework.

The author's definition of materiality: materiality in public-sector internal auditing is the quantitative or qualitative significance of a misstatement or violation in information relating to the generation and use of budgetary funds that may influence the economic and managerial decisions of financial statement users, budget allocation authorities, and the general public, or reduce the effectiveness of public oversight of government funds. In this context, qualitative matters—including violations of laws and regulations, indications of corruption, and abuses of official authority—are regarded as material irrespective of the monetary amount involved.

The author's definition of audit risk: audit risk in public-sector internal auditing is the probability that a misstatement or violation exceeding the materiality threshold established by the auditor will remain undetected. It is expressed as the product of inherent risk, control risk, and detection risk ($AR = IR \times CR \times DR$) and, together with its inverse proportional relationship with the materiality threshold ($M = K/R$), forms a unified methodological framework.

The distinctive features of the proposed definitions over existing interpretations are evident in three respects. First, they explicitly incorporate the specific characteristics of the public sector, including the broad range of users and the function of public oversight, whereas existing definitions are primarily oriented towards users of private-sector financial statements. Second, the precedence of qualitative materiality over monetary thresholds is established directly within the definition, which is broadly consistent with the principles reflected in the Lima Declaration. Third, and most importantly, the functional relationship between materiality and risk ($M = K/R$) is incorporated as a structural element of the definitions. Consequently, the two categories can be applied in practice as an integrated methodological system: materiality cannot be determined without first assessing risk, while the materiality threshold determines the scope of the audit and the quantity of audit evidence required. This feature provides the methodological basis necessary for applying the proposed approach in national internal audit practice and contributes to addressing the research gap identified in the literature review.

CONCLUSIONS AND SUGGESTIONS

The findings of the study support the following conclusions. First, a comparative analysis of the four theoretical approaches to materiality—the information-based, decision-making, economic, and systems approaches—showed that none of them fully reflects the specific characteristics of the public sector. Second, it was established that materiality in the public sector should incorporate both quantitative and qualitative dimensions and that qualitative considerations may warrant the classification of a matter as material irrespective

of the monetary amount involved. Third, analysis of the components of the multiplicative audit risk model ($AR = IR \times CR \times DR$) showed that control risk accounts for the largest share of variation, at 40 per cent, while detection risk is the component most directly influenced by the auditor. Fourth, the inverse proportional relationship between materiality and audit risk was mathematically expressed through the function $M = K/R$, and a procedure was developed for determining the scope of the audit on the basis of the risk–materiality relationship. Fifth, refined definitions proposed in this study were formulated to integrate the two categories into a unified methodological framework.

Based on the findings of the study, the following recommendations are proposed:

The Ministry of Economy and Finance should develop *Guidelines for Determining Materiality and Risk Levels in Public-Sector Internal Auditing* in accordance with the requirements of ISSAI 1320. The guidelines should incorporate the proposed definitions and formalise the $M = K/R$ relationship.

Methodological documents used by public-sector internal audit services, including audit plans, materiality memoranda, and risk maps, should require materiality and risk to be applied as elements of a unified methodological framework.

A specialised module on the relationship between materiality and risk should be incorporated into the professional education and continuing development programmes for internal auditors.

The following areas have been identified for future research: the development of an indicator-based methodology for determining materiality in the public sector ($M = B \times K \times S \times A$); the construction of a multifactor risk assessment matrix and an integrated risk index; and the automation of procedures for determining materiality and risk levels through modern information technologies. These areas build on the theoretical foundation established in this article and are intended to contribute to further improvements in the effectiveness of public-sector internal auditing.

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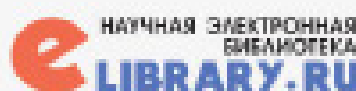
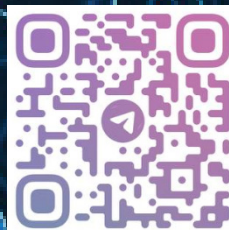
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