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RISK-BASED INTERNAL AUDIT METHODOLOGY FOR PUBLIC PROCUREMENT

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Abstract. This article develops a risk-based methodology for the internal audit of public procurement. The author proposes a five-stage methodology based on assessing audit risk as the product of its probability (P) and impact (I), expressed as R = P × I. The methodology also involves distributing audit objects into three risk zones using a risk matrix, or heat map, and maintaining a risk register.

The proposed approach makes it possible to direct audit resources toward high-risk procurements, reduce subjectivity in the selection of audit objects, and focus audit procedures on the most significant areas. The research results contribute to improving the effectiveness of public procurement audits and ensuring their scientifically grounded organization.

Keywords: public procurement, internal audit, risk-based audit, audit risk, risk matrix, probability, impact, risk register, materiality, budgetary organizations.

Аннотация. В статье разработана риск-ориентированная методология внутреннего аудита государственных закупок. Автор предлагает пятиэтапную методологию, основанную на оценке аудиторского риска как произведения вероятности (P) и степени воздействия (I), выражаемого формулой R = P × I. Методология предусматривает распределение объектов аудита по трём зонам риска с использованием матрицы рисков (карты рисков, heat map), а также ведение реестра рисков.

Предлагаемый подход позволяет сосредоточить аудиторские ресурсы на наиболее рискованных закупках, снизить субъективность при отборе объектов аудита и сфокусировать аудиторские процедуры на наиболее существенных направлениях контроля. Результаты исследования способствуют повышению эффективности внутреннего аудита государственных закупок и обеспечивают его научно обоснованную организацию.

Ключевые слова: государственные закупки, внутренний аудит, риск-ориентированный аудит, аудиторский риск, матрица рисков, вероятность, степень воздействия, реестр рисков, существенность, бюджетные организации.

INTRODUCTION

Public procurement is an area in which a significant share of budget funds is spent and where the risk of violations is relatively high. Due to the large number and volume of procurement transactions carried out in budgetary organizations, it is practically impossible to audit all of them fully and to the same extent. Therefore, the organization of internal audit requires a scientifically grounded approach that directs audit resources to the most significant and risk-sensitive areas.

The volume of public procurement in Uzbekistan is increasing year by year, with large-scale procurements being carried out in education, healthcare, construction, and other sectors. Given limited audit resources, it is not feasible to cover such procurement activities completely. Therefore, the risk-based approach, which directs available resources toward the highest-risk procurements, has become one of the main principles of modern internal auditing.

In modern internal audit practice, the leading methodological basis is risk-based internal auditing. This approach aligns audit activities with the risks inherent in an organization's operations and provides for the priority and more in-depth examination of high-risk areas. However, a comprehensive and practical methodology for applying risk-based auditing in public procurement has not yet been sufficiently developed.

In the context of reforms in the public procurement system of the Republic of Uzbekistan and the development of the internal audit institution, organizing procurement audits on a risk-based basis is of particular importance. In practice, the selection of audit objects is often based on subjective considerations, which may

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reduce audit effectiveness. The purpose of this article is to develop a risk-based methodology for the internal audit of public procurement and substantiate the mechanism for its practical application.

LITERATURE REVIEW

Risk-based auditing and risk management have been examined in numerous studies. In the field of internal auditing, Sawyer (2012) and Moeller (2016) identify the risk-based approach as the foundation of modern internal audit. They argue that audit planning and execution should be based on the risks inherent in an organization's activities. Kazakova (2019) summarizes the concept of audit risk and methods for its assessment.

The COSO Enterprise Risk Management model defines risk assessment in terms of probability and impact and provides the basis for constructing a risk matrix (COSO, 2017). This model serves as the theoretical foundation for risk-based audit methodology. Issues related to risk assessment in the public sector have also been considered in the works of Burtsev (2000).

Risks and violations in public procurement have been analyzed in foreign studies and documents of international organizations (Arrowsmith, 2014; Thai, 2009). In particular, the Open Contracting Partnership systematizes risk indicators in public procurement (Open Contracting Partnership, 2024). INTOSAI's ISSAI 4000 standard and GUID 5280 guideline determine that the selection of audit objects in compliance audits should be based on risk and materiality.

The concept of audit risk is also central to international auditing standards. The audit risk model represents audit risk as a combination of inherent risk, control risk, and detection risk, allowing the auditor to adjust the scope of audit procedures according to the level of risk. In public procurement audits, this model should be applied with due consideration of the specific characteristics of the procurement process.

The concept of Risk-Based Internal Auditing (RBIA) links internal audit with an organization's risk management system. Under this approach, the audit plan is developed with priority given to high-risk areas. The Global Internal Audit Standards of the Institute of Internal Auditors also require risk-based audit planning (IIA, 2024). This methodological framework can be effectively applied to public procurement audits.

RESEARCH METHODOLOGY

The study analyzes international risk assessment and risk management methodologies and adapts them to public procurement audits. A systematic approach was used to develop the risk-based methodology as an integrated system. Through comparative analysis, traditional and risk-based audit approaches were compared.

ANALYSIS AND RESULTS

The central concept of the risk-based audit methodology is audit risk. Audit risk refers to the probability that a violation, error, or inefficient use of funds may occur in the procurement process and remain undetected during the audit. A risk-based approach increases audit effectiveness by directing audit resources toward high-risk areas.

Audit risk consists of several components. Inherent risk is the risk associated with the complexity of the procurement type and the specific characteristics of the sector, before considering control measures. Control risk is the probability that the existing internal control system will not prevent or detect the risk in a timely manner. Detection risk is the probability that audit procedures will not identify an existing violation or error. A risk-based methodology requires audit planning to take these components into account.

In a traditional non-risk-based audit, all procurements are examined to the same extent or selected randomly. This approach is inefficient in conditions of limited audit resources, because auditor time may be spent on low-risk procurements while high-risk procurements remain insufficiently examined. The risk-based methodology addresses this shortcoming by focusing attention on procurements with the highest level of risk.

In the methodology proposed by the author, audit risk is assessed using two dimensions: the probability of occurrence (P) and the impact (I) if the risk occurs. The risk level is calculated as the product of these two dimensions: $R = P \times I$. Probability and impact are assessed on a defined scale, for example: 1 — low, 2 — medium, 3 — high. As a result, a risk score is determined for each procurement or procurement stage, making it possible to compare them by risk level.

Probability (P) reflects the likelihood of risk occurrence and depends on factors such as procurement type, number of participants, and previously identified violations. Impact (I) reflects the level of potential damage, including financial, legal, and reputational consequences, if the risk occurs. The criteria for assessing probability and impact are presented in Table 1.

Table 1
Scale for assessing audit risk probability (P) and impact (I)[1]

Level	Probability (P)	Impact (I)
High	The risk is likely to occur (e.g., a large single-party purchase)	Considerable financial loss, illegality or serious reputational risk
Medium	There is a medium probability that the hazard will occur	Moderate amount of damage or partial violation
Low	Risk is unlikely to occur (e.g. simple standard purchase)	A small amount of damage or a small deviation

When assessing probability, a number of factors specific to public procurement are taken into account. These include high procurement value, a limited number of bidders, the use of a non-competitive or single-source procurement method, previous violations by the supplier, and frequent changes to the procurement plan. The more numerous and significant these factors are, the higher the probability of risk is assessed.

Impact assessment considers various aspects of potential damage if the risk occurs. Financial impact is measured by the amount of possible budget loss, legal impact by the seriousness of the violation, and reputational impact by the potential loss of trust in the organization and the public procurement system. The impact level is assessed as high for large and socially significant procurements.

After assessing probability and impact, each procurement is placed in a risk matrix, or heat map. A risk matrix is a tool that visually displays the level of risk at the intersection of probability and impact and categorizes risks by color. The proposed three-level risk matrix is presented in Table 2.

Table 2
Public procurement audit risk matrix[2]

Impact (I) \ Probability (P)	Low (1)	Medium (2)	High (3)
High (3)	3	6	9
Medium (2)	2	4	6
Low (1)	1	2	3

The matrix shows that procurements with a risk score of 1–2 are classified as low risk and placed in the green zone. Procurements with a score of 3–4 are classified as medium risk and placed in the yellow zone, while procurements with a score of 6–9 are classified as high risk and placed in the dark yellow and red zones. This classification allows the auditor to prioritize procurements according to their risk level.

The methodology can be explained through a practical example. Suppose a procurement has a single bidder, which indicates a high probability of risk (P = 3), and involves a large budget, which indicates a high impact (I = 3). In this case, the risk score is R = 3 × 3 = 9. Therefore, the procurement falls into the red zone and should be subject to intensive review as a priority. In contrast, for a simple, low-value, competitive procurement, where P = 1 and I = 1, the risk score is R = 1. Such procurement falls into the green zone and requires only minimal review.

The advantage of the risk matrix lies in its simplicity and visual clarity. It allows procurements to be categorized by risk level without complex calculations. If necessary, the matrix can be expanded to a five-level 5×5 scale, which would increase the accuracy of assessment. However, the three-level matrix is more convenient for practical application due to its simplicity.

Identified and assessed risks are recorded in the risk register. The risk register is a document that systematically reflects the risk description, probability, impact, risk score, and measures taken to address the risks. Its sample structure is presented in Table 3.

1 Prepared by the author
2 Author development

Table 3
Model structure of public procurement audit risk register[3]

Index	Contents
Risk description	A brief description of the identified risk (e.g. price gouging)
Purchase stage	The stage to which the risk applies (plan, price, method, evaluation, contract, execution)
Probability (P)	Rating on a scale of 1–3
Impact (I)	Rating on a scale of 1–3
Risk Score (R = P × I)	Multiplier of probability and impact
Danger zone	Green / yellow / red
Control measure	Action taken or recommended to reduce the risk

The risk register is not a static document, but a continuously updated tool. It is updated when new procurements are carried out, measures are taken to address previously identified risks, or circumstances change. This allows the auditor to monitor risk dynamics and adjust audit activities in a timely manner.

The proposed risk-based methodology consists of five sequential stages. At the first stage, risks in the procurement process are identified. At the second stage, each risk is assessed in terms of probability (P) and impact (I). At the third stage, the risk score is calculated using the formula R = P × I, and procurements are classified using the risk matrix. At the fourth stage, high-risk procurements are examined first and in greater depth. At the fifth stage, risks and the measures taken to address them are monitored, and the risk register is updated.

Each stage of the methodology includes specific tasks. At the risk identification stage, procurement documents, previous audit results, and data from electronic systems are analyzed. At the assessment stage, the probability and impact of risk factors are determined. At the classification stage, procurements are ranked by risk score, and an audit plan is developed. At the inspection stage, appropriate audit procedures are applied to high-risk procurements. At the monitoring stage, the results are analyzed, and the methodology is improved.

The monitoring stage ensures the continuous improvement of the methodology. Based on audit results, risk factors and their impact are reviewed, and assessment criteria are refined. This iterative process makes the methodology more accurate and effective over time and adapts it to changing conditions.

A key advantage of this methodology is that it replaces subjective judgment in selecting audit objects with a transparent and repeatable calculation. The auditor determines a risk score for each procurement on an objective basis, which helps different auditors reach comparable conclusions. In addition, the methodology makes it possible to allocate audit resources in proportion to the risk level of each procurement.

The risk-based methodology improves audit quality in several ways. First, it places audit planning on a scientific basis. Second, it increases the reliability of audit results, since high-risk areas are examined more thoroughly. Third, it ensures proper documentation and accountability of audit activities. Fourth, it forms a unified approach among different auditors.

The risk-based methodology is closely linked to the materiality approach. For high-risk procurements, a lower materiality threshold is set and the audit scope is expanded; for low-risk procurements, a higher materiality threshold is applied and a limited audit is performed. This relationship ensures more efficient use of audit resources.

The proposed methodology takes into account the specific features of the public procurement sector. Procurement-specific indicators, such as procurement value, number of participants, procurement method, previous violations, and contract amendments, are used as risk factors. This makes the methodology specifically suitable for public procurement audits and distinguishes it from a general risk-based approach.

However, certain difficulties may arise when applying the risk-based methodology. Risk assessment depends to some extent on the auditor's professional judgment, which may preserve an element of subjectivity. In addition, the methodology requires reliable data and appropriate auditor qualifications. To overcome these difficulties, risk assessment criteria should be standardized, and auditors should receive relevant training.

The digitalization of risk-based methodologies can further enhance their effectiveness. South Korea's Bid Rigging Indicator Analysis System (BRIAS) and the KONEPS e-procurement platform demonstrate the possibility of automatically identifying procurement risks based on data. In Uzbekistan, using data from the xarid.uzex.uz electronic procurement system to automatically calculate risk factors and classify procurements by risk level is a promising direction.

3 Author development

The proposed methodology complies with the requirements of international auditing standards. According to the ISSAI 4000 compliance audit standard, the auditor selects audit objects based on risk and materiality. The GUID 5280 Public Procurement Audit Guide also recommends a risk-based approach to procurement audits. Thus, the methodology proposed by the author is based on international standards and adapted to the public procurement sector of Uzbekistan.

CONCLUSIONS AND RECOMMENDATIONS

As a result of the research, the following conclusions were drawn regarding the risk-based internal audit methodology for public procurement.

First, due to the large volume of procurement in budgetary organizations, a risk-based approach is needed to focus audit resources on high-risk areas. This approach significantly increases audit efficiency.

Second, in the methodology proposed by the author, audit risk is assessed as the product of probability and impact ($R = P \times I$), while procurements are classified into three risk zones using a risk matrix, or heat map. This ensures objectivity and transparency in the selection of audit objects.

Third, maintaining a risk register enables systematic risk management, monitoring of risk status, and documentation of measures taken to address identified risks.

Fourth, the proposed five-stage methodology is closely linked to the materiality approach and takes into account the specific risk factors of the public procurement sector. It is recommended that the research results be used in planning and organizing public procurement audits, as well as in developing methodological manuals for internal audit.

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