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IMPROVING THE RISK-BASED METHODOLOGY FOR PREPARING ANNUAL INTERNAL AUDIT PLANS IN THE PUBLIC SECTOR

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Abstract. This article develops a risk-based methodology for preparing annual internal audit plans in the public sector. The study addresses the limited differentiation of audit objects and the allocation of audit resources according to assessed risk levels in existing planning practices. Using a systems approach, comparative analysis and modelling, the proposed methodology classifies audit objects according to the threshold values of an integrated risk index, allocates audit resources among high-, medium- and low-risk groups in a 60:30:10 ratio, and provides for the semi-annual updating of risk assessments and the risk map. Scenario-based calculations indicate that, subject to the assumptions and data used in the model, the methodology may reduce the average duration of audit engagements by approximately 38 per cent and increase the number of documented audit findings by approximately 54 per cent. The proposed methodology may serve as a practical planning tool for public sector internal audit services.

Keywords: risk-based auditing, annual audit plan, integrated risk index, audit resources, dynamic risk assessment, internal audit, public sector, risk map.

Аннотация. В статье разработана риск-ориентированная методика составления годовых планов внутреннего аудита в государственном секторе. Исследование направлено на решение проблемы недостаточной дифференциации объектов аудита и распределения аудиторских ресурсов в соответствии с оценёнными уровнями риска в существующей практике планирования. На основе системного подхода, сравнительного анализа и моделирования предложенная методика классифицирует объекты аудита по пороговым значениям интегрального индекса риска, распределяет аудиторские ресурсы между группами высокого, среднего и низкого риска в соотношении 60:30:10, а также предусматривает полугодовое обновление оценок рисков и карты рисков. Сценарные расчёты показывают, что при принятых в модели предпосылках и исходных данных методика может сократить среднюю продолжительность аудиторских заданий примерно на 38 процентов и увеличить количество документально оформленных результатов аудита примерно на 54 процента. Предложенная методика может служить практическим инструментом планирования для служб внутреннего аудита государственного сектора.

Ключевые слова: риск-ориентированный аудит, годовой план аудита, интегральный индекс риска, аудиторские ресурсы, динамическая оценка рисков, внутренний аудит, государственный сектор, карта рисков.

INTRODUCTION

The Development Strategy of New Uzbekistan for 2022–2026, approved by Presidential Decree No. PF-60 of 28 January 2022, identified the more efficient use of public funds and the enhancement of the results-oriented approach to public financial control as priority objectives [1]. The institutional framework for public sector internal audit in Uzbekistan was initially established by Presidential Resolution No. PP-3231 of 21 August 2017 [2] and was subsequently developed through Presidential Resolution No. PP-128 of 14 February 2022 [3], Cabinet of Ministers Resolution No. 416 of 1 August 2022 [4], and the National Internal Audit Standards approved by Order No. 52 of the Minister of Finance of 3 October 2022 and registered by the Ministry of Justice under No. 3394 on 24 October 2022 [5]. Collectively, these regulatory instruments

define the organisational status, responsibilities, operating procedures and professional requirements of public sector internal audit services.

The National Internal Audit Standards require annual internal audit plans to be developed on the basis of risk analysis, taking into account the available time and human resources [5, para. 26]. The effectiveness of internal audit therefore depends to a considerable extent on the quality of annual planning, as the plan determines the areas and entities to be audited, the allocation of audit resources and the frequency of audit engagements.

The analysis conducted in this study indicates that there are several opportunities to further improve national audit-planning practices. In some cases, annual internal audit plans continue to be prepared according to a rotational schedule or primarily on the basis of professional judgement without the consistent application of standardised risk-assessment criteria. Audit resources may also be distributed relatively evenly among audit entities, with limited differentiation according to their respective risk levels. In addition, annual plans may not always be updated during the year to reflect changes in organisational activities and risk profiles.

As a result, audit attention may be concentrated on areas with comparatively lower levels of risk, while higher-risk organisations and activities may receive less coverage than their risk exposure requires. This situation represents a key methodological issue addressed by the study and highlights the relevance of developing an enhanced risk-based methodology for preparing annual internal audit plans.

The purpose of this study is to develop an improved methodology for preparing annual internal audit plans in the public sector. The proposed methodology is based on the threshold values of an integrated risk index, the proportional allocation of audit resources across risk groups, and a mechanism for the dynamic updating of the risk map.

To achieve this purpose, the study addresses the following objectives: to synthesise the theoretical foundations and international requirements of risk-based audit planning; to substantiate the types of audit programmes, audit frequency and resource limits applicable to different risk groups; to compare the proposed stratified resource-allocation model with the baseline equal-distribution model used for comparative purposes in this study; to develop an algorithm for the dynamic reassessment of the risk map; and to provide a quantitative assessment of the expected effectiveness of the proposed methodology.

The object of the study is the activity of internal audit services within public sector organisations. The subject of the study comprises the methodological relationships arising in the process of preparing annual audit plans and allocating audit resources. The subsequent sections of the article present the literature review, research methodology, the content of the proposed methodology, a comparative analysis and discussion of the expected results, followed by conclusions and practical recommendations.

LITERATURE REVIEW

The concept of risk-based auditing has developed as an important component of contemporary audit theory since the 1990s. Its central premise is that the scope, depth and frequency of audit procedures should be determined in proportion to the level of risk associated with each audit object. Under this approach, risk assessment constitutes the starting point of the audit process, while decisions regarding audit coverage, procedures and resource allocation are based on the results of that assessment (Arens et al., 2017).

In internal audit practice, risk-based planning has become an explicit requirement of professional standards. The Global Internal Audit Standards require the chief audit executive to develop an internal audit plan that reflects the organisation's strategies, objectives and risk profile and to revise the plan in response to changes in risks and organisational priorities (The IIA, 2024). The principles governing the planning of financial and public sector audits are also addressed in the professional standards and methodological guidance issued by the International Organization of Supreme Audit Institutions (INTOSAI, 2021).

The contemporary risk-management framework establishes a close relationship between organisational strategy, performance and risk assessment. Risks should be evaluated in the context of organisational objectives and performance, thereby providing a basis for informed decisions concerning the allocation of financial, human and audit resources (COSO, 2017). In public sector practice, the importance of directing audit attention towards high-risk areas is also reflected in the methodological guidance of the U.S. Government Accountability Office and the Council of the Inspectors General on Integrity and Efficiency (GAO and CIGIE, 2018).

The responsibilities of internal audit functions in relation to planning, the selection of audit engagements, the development of audit programmes and the management of limited audit resources are examined extensively in professional literature. Pickett (2010) emphasises that an effective internal audit plan should be aligned with

the organisation's principal risks and should ensure that available audit capacity is concentrated on the areas requiring the greatest degree of assurance.

Within the academic literature of Uzbekistan, researchers have examined the theoretical foundations of budgetary control and auditing (Ibragimov and Sugirbayev, 2010), the theoretical and practical aspects of organising internal audit in budget-funded organisations (Mehmonov, 2015), and measures to improve financial control and internal audit services in public sector organisations (Khamidova, 2020). Issues relating to the planning and organisation of public sector audits have also been considered in more recent studies (Sherimmatov, 2024).

Nevertheless, the reviewed academic and regulatory sources do not provide an integrated methodology that links annual internal audit plans to clearly defined threshold values of an integrated risk index, quantitatively determines audit frequency and resource limits for different risk groups, and provides for the dynamic revision of the plan throughout the year. Thus, although international and national standards establish the general requirement for risk-based planning, a specific calculation and resource-allocation mechanism adapted to the conditions of Uzbekistan's public sector remains insufficiently developed. The present study seeks to address this methodological gap.

RESEARCH METHODOLOGY

The study is grounded in a pragmatic research philosophy and applies a deductive approach. A specific planning methodology adapted to national practice is derived from the general principles and international requirements of risk-based auditing. The research design is methodological and practice-oriented and comprises three interrelated components: the development of a conceptual model of the methodology, a comparative analysis of the proposed model and the baseline model adopted for analytical purposes, and a quantitative assessment of its expected effects.

The following research methods were employed. A systems approach was used to design audit planning as an integrated process comprising risk assessment, risk classification, resource allocation and ongoing monitoring. Modelling was applied to develop the conceptual framework for annual audit planning by risk group and to construct the dynamic risk-reassessment algorithm. Comparative analysis was used to compare the proposed stratified resource-allocation model with the baseline equal-distribution model adopted for analytical purposes in this study and to assess the consistency of the proposed approach with the general principles of international risk-based audit practice. Statistical grouping was employed to classify public sector organisations according to their risk levels. Forecasting methods were used to assess the expected effects of implementing the proposed methodology, while tabular and graphical methods were applied to present the research findings in a clear and systematic manner.

The information base of the study consists of international professional standards and methodological documents issued by The IIA, INTOSAI, COSO, the GAO and CIGIE; relevant international and national academic literature; regulatory and legal acts of the Republic of Uzbekistan; and aggregated data obtained from risk assessments of public sector organisations.

The methodological transparency of the study is supported by the detailed documentation and reproducibility of the proposed algorithm. The internal consistency and practical relevance of the model were assessed by examining the resulting resource distributions in relation to the general principles of risk-based auditing and selected benchmark indicators. Further pilot implementation and empirical testing are required to evaluate the external validity and practical effectiveness of the methodology across different public sector settings. Research ethics were observed through the appropriate acknowledgement and citation of all sources in accordance with the referencing format adopted in the study.

ANALYSIS AND RESULTS

The conceptual foundation of the proposed methodology is the preparation of the annual internal audit plan based on the results of an integrated risk index (IRI) calculated for each audit object. The IRI is derived from an eight-factor risk-assessment matrix and expressed on a 100-point scale. Based on the resulting scores, public sector organisations are classified into three risk groups. For each risk group, the methodology specifies the appropriate type of audit programme, the frequency of audit coverage and the applicable audit resource limit (Figure 1).

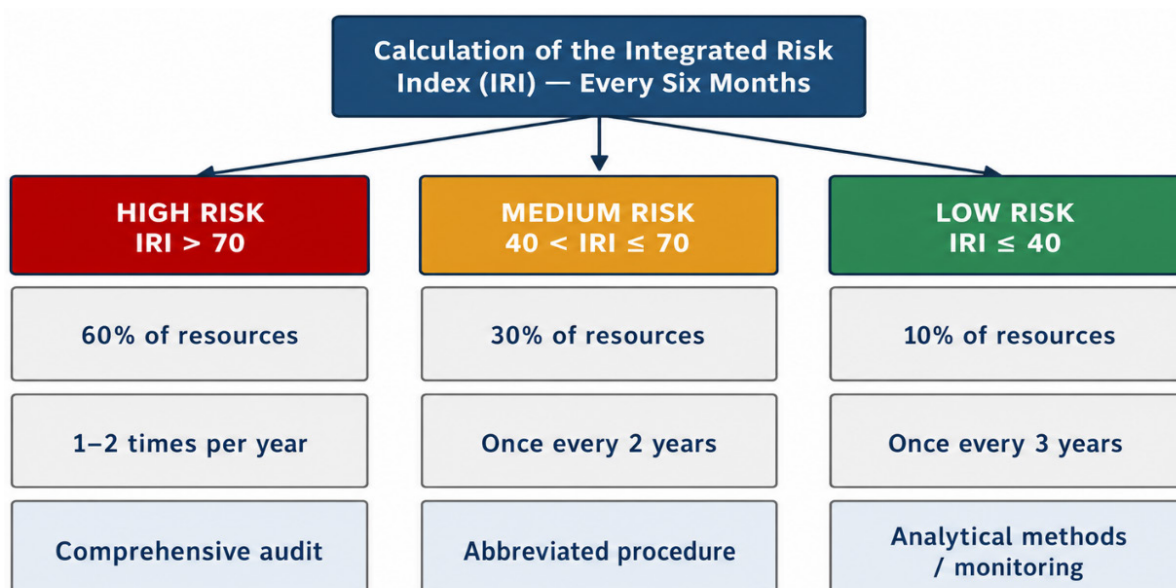


Figure 1. Conceptual Model for Preparing an Annual Audit Plan by Risk Group¹

As illustrated in Figure 1, the proposed methodology allocates 60 per cent of available audit resources to high-risk organisations with an integrated risk index exceeding 70 points ($IRI > 70$). These organisations are subject to a full-scope comprehensive audit once or twice a year, depending on the severity and dynamics of their risk profile.

Medium-risk organisations with an integrated risk index above 40 but not exceeding 70 points ($40 < IRI \leq 70$) are allocated 30 per cent of total audit resources. These organisations are audited once every two years under a reduced-scope audit programme.

The remaining 10 per cent of audit resources are allocated to low-risk organisations with an integrated risk index of 40 points or below ($IRI \leq 40$). Such organisations are subject primarily to analytical procedures, remote review or risk monitoring, with a full audit generally conducted once every three years.

The proposed parameters were calibrated to the organisational distribution and assumptions adopted in the study and are summarised in Table 1.

Table 1
Key Parameters of the Annual Audit Plan by Risk Group²

No.	Risk group	Share of organisations, %	Share of audit resources, %	Audit frequency	Type of audit programme
1	High risk ($IRI > 70$)	4.8	60	Once or twice a year	Full-scope comprehensive audit
2	Medium risk ($40 < IRI \leq 70$)	25.6	30	Once every two years	Reduced-scope audit programme
3	Low risk ($IRI \leq 40$)	69.6	10	Once every three years	Analytical procedures and monitoring
4	Total	100.0	100	—	—

The analysis presented in Table 1 reflects the central logic of the proposed methodology. Although the high-risk group comprises only 4.8 per cent, or 342, of the 7,150 public sector organisations, it receives 60 per cent of the total audit resources. This concentration of resources is justified by the fact that these audit objects

¹ Source: developed by the author based on the assumptions and organisational distribution adopted in the model.

² Source: author's calculations.

are characterised by comparatively higher exposure to potential non-compliance, control weaknesses and financial risks.

The proposed allocation reflects the general principle of risk-based auditing, according to which audit attention and available resources are prioritised on the basis of assessed risk exposure. The specific 60:30:10 allocation represents an author-developed model parameter adapted to the assumptions and organisational distribution used in this study.

The differentiation of audit programme types is another important feature of the methodology. A full-scope comprehensive audit covers the entire range of an organisation's financial and operational activities. By contrast, a reduced-scope audit programme focuses only on areas identified as presenting elevated risk. Analytical procedures involve the remote monitoring and assessment of key indicators without conducting a full on-site audit. Such differentiation helps avoid a disproportionate audit burden on lower-risk organisations while directing available audit resources towards areas requiring greater assurance.

To demonstrate the advantages of the proposed methodology more clearly, the stratified resource-allocation model was compared with the baseline equal-distribution model used for comparative purposes in this study (Figure 2).

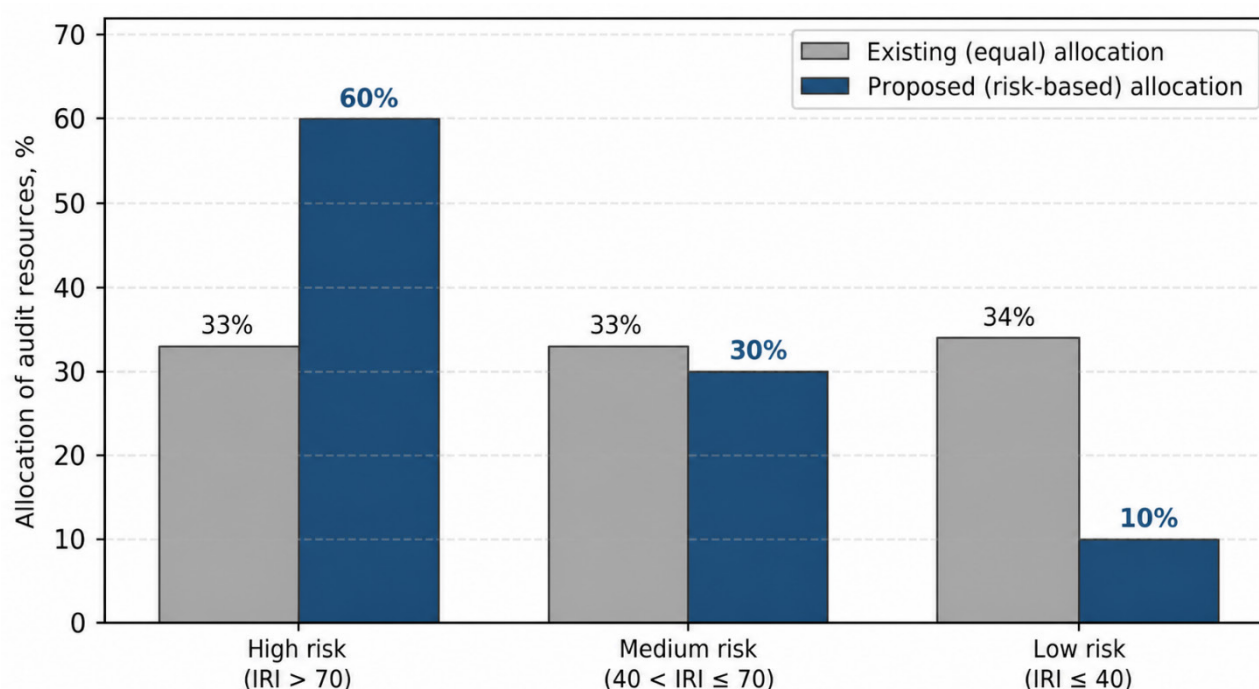


Figure 2. Comparison of the Baseline and Proposed Models for the Allocation of Audit Resources³

Figure 2 presents the baseline equal-distribution model used for comparison, under which each of the three risk groups is allocated approximately 33–34 per cent of the available audit resources. Consequently, low-risk organisations receive almost the same level of audit attention as high-risk organisations, despite the substantial difference in their risk exposure.

Under the proposed model, audit resources are allocated in proportion to the assessed level of risk. The share assigned to the high-risk group increases to 60 per cent, which is almost twice the proportion allocated under the baseline model. By contrast, the share allocated to the low-risk group declines to 10 per cent, which is less than one-third of the share assigned under the baseline model.

This reallocation produces two principal benefits. First, high-risk audit objects are examined more frequently and in greater depth, thereby increasing the likelihood that material audit findings, control weaknesses and potential financial exposures will be identified in a timely manner. Second, reducing the frequency and scope of lower-priority engagements in comparatively low-risk areas may ease the audit workload and allow auditors to redirect their time and professional capacity towards analytical procedures, risk monitoring and other higher-value activities.

³ Source: compiled by the author based on the calculations performed.

The second key component of the proposed methodology is the mechanism for the dynamic reassessment of the risk map. Under some existing annual planning practices, the audit plan may not be systematically updated after its initial approval at the beginning of the year. However, conditions within the public sector may change rapidly as a result of changes in organisational management, revisions to budgetary parameters, the implementation of new programmes and the emergence of previously unidentified high-risk transactions.

To ensure that the annual audit plan remains responsive to such developments, the proposed methodology provides for the reassessment of the risk map every six months. This reassessment is conducted through an algorithm comprising six consecutive stages, as presented in Table 2.

Table 2
Stages of the Dynamic Risk-Map Reassessment Algorithm⁴

No.	Stage	Description
1	Initial data collection	Updating financial statements, management information and prior audit data
2	Assessment of risk factors	Reassessing the eight risk factors using a five-point ordinal rating scale
3	Application of weighting coefficients	Multiplying each factor score by its corresponding weighting coefficient
4	Calculation of the integrated risk index	Aggregating the weighted scores and normalising the result to a 100-point scale
5	Risk classification	Assigning each audit object to a risk group based on the established threshold values
6	Risk-map updating	Incorporating the reassessment results into the risk map and adjusting the annual audit plan accordingly

In the illustrative application of the proposed algorithm, the assessment of a single organisation required approximately 30–45 minutes. This result suggests that the procedure may be operationally feasible, although the actual time required will depend on data availability, organisational complexity and the level of automation.

Following the semi-annual reassessment, the annual audit plan is adjusted for organisations whose risk classification has changed. An audit object whose risk level has increased is included in the list of priority or special audit engagements, whereas the audit frequency for an object whose risk level has declined may be reduced accordingly.

To support the ongoing monitoring of plan implementation, the methodology also incorporates a risk-monitoring dashboard. The dashboard comprises four principal segments: the number and trend of identified risks, presented through key performance indicators; the distribution of risk categories; monthly risk dynamics; and the distribution of risks across sectors. This structure enables management to obtain a concise and integrated overview of the current risk environment. In addition, a separate risk register is maintained for each high-risk audit object and is updated regularly with new monitoring data.

The practical implementation of the methodology is organised as an annual planning cycle. First, the integrated risk index is calculated for all audit objects, after which the organisations are classified into the relevant risk groups. Second, a list of audit objects is prepared for each risk group within the established resource-allocation limits of 60, 30 and 10 per cent. The high-risk group is covered in full, while organisations in the medium- and low-risk groups are selected according to their descending risk scores, changes in risk indicators and the prescribed maximum intervals between audit engagements.

Third, the type of audit programme, the duration of the engagement and the responsible audit personnel are determined for each selected object, after which the annual audit plan is formally approved. Finally, the plan is revised on the basis of the results of the semi-annual risk reassessment. The expected effects of implementing the proposed methodology were quantified and are presented in Table 3.

⁴ Source: developed by the author.

Table 3
Scenario-Based Projection of the Potential Effects of the Risk-Based Audit Planning Methodology⁵

No.	Indicator	Baseline scenario	Model-based scenario	Relative change
1	Projected audit quality score, %	65	85	+20 percentage points (+30.8%)
2	Projected rate of timely risk identification, %	62	88	+26 percentage points (+41.9%)
3	Average audit engagement duration, days	45	28	-37.8%
4	Potential financial effect of corrective measures, UZS billion	182.6	320.0	+75.2%
5	Number of documented audit findings	1,200	1,850	+54.2%
6	Assessed auditor workload level	High	Moderate	Qualitative improvement

Note: The values presented in the table are scenario-based projections derived from the assumptions of the proposed model and do not represent the results of completed nationwide implementation or an experimental causal assessment.

The scenario-based assessment presented in Table 3 indicates the potential effects of the proposed methodology under the assumptions incorporated into the model. The projected audit quality score increases from 65 to 85 per cent, representing an increase of 20 percentage points, while the projected rate of timely risk identification rises from 62 to 88 per cent, or by 26 percentage points. The average duration of an audit engagement is projected to decrease by approximately 37.8 per cent. The potential financial effect of corrective measures and the number of documented audit findings are projected to increase by approximately 75.2 and 54.2 per cent, respectively. These estimates should be interpreted as model-based projections and require validation through pilot implementation and subsequent empirical assessment. Under the assumptions of the model, the projected effects are expected to arise primarily from the reallocation and more efficient use of existing audit capacity. Nevertheless, practical implementation may require additional investment in staff training, data quality, digital infrastructure and process automation.

From a broader analytical perspective, the results are consistent with the conclusions of the literature review. The preparation of an internal audit plan based on the organisation's risk profile and its regular updating are explicit requirements of the updated Global Internal Audit Standards (The IIA, 2024). Similarly, the allocation of audit resources in proportion to assessed risk represents a practical application of the principles of risk-based auditing discussed in the academic and professional literature (Arens et al., 2017; Pickett, 2010).

At the same time, several limitations of the proposed methodology should be acknowledged. The quality of the annual audit plan depends directly on the reliability of the integrated risk index calculations. Since the scoring of individual risk factors retains an element of professional judgement, each assessment should be supported by objective indicators, clearly justified and appropriately documented. This requirement is essential to reduce subjectivity and ensure the consistency and reproducibility of risk classifications.

The practical effectiveness of the methodology could be further strengthened by integrating it with a methodology for determining materiality thresholds. While the risk classification determines the frequency of audit coverage and the amount of resources allocated to an audit object, the materiality threshold determines the scope, depth and extent of the audit procedures to be performed within each engagement. The automation of the methodology through an integrated IT audit platform could also transform the current semi-annual reassessment process into continuous or near-real-time risk monitoring. This issue constitutes an important direction for future research.

⁵ Source: author's calculations.

CONCLUSIONS AND RECOMMENDATIONS

The findings of the study provide a basis for the following principal conclusions and provide the basis for the following principal conclusions.

First, a conceptual model was developed for preparing annual internal audit plans on the basis of the threshold values of the integrated risk index. The model clearly defines the type of audit programme, the frequency of audit coverage and the resource limit applicable to each risk group. High-risk objects are allocated 60 per cent of audit resources and are subject to a full-scope comprehensive audit once or twice a year. Medium-risk objects receive 30 per cent of audit resources and are audited once every two years under a reduced-scope programme. Low-risk objects receive 10 per cent of audit resources and are primarily subject to analytical procedures and monitoring, with audit coverage generally provided once every three years.

Second, the study established that the proposed stratified resource-allocation model differs substantially from the baseline equal-distribution model used for comparative purposes, under which the three risk groups receive approximately 33, 33 and 34 per cent of the available resources. Under the proposed model, audit capacity is concentrated on the relatively small group of high-risk organisations. This group accounts for 4.8 per cent of the total audit population.

Third, a six-stage algorithm was developed for reassessing the risk map every six months. The estimated assessment time of approximately 30–45 minutes per organisation suggests that the algorithm may be operationally feasible. However, the actual time required will depend on organisational complexity, data availability and the level of automation.

Fourth, a four-segment risk-monitoring dashboard and an enhanced risk-register format were proposed to support the ongoing monitoring of annual audit plan implementation. These instruments enable internal audit management to track risk trends, changes in risk classifications, monthly dynamics and the distribution of risks across sectors.

Fifth, the scenario-based quantitative assessment indicates the potential practical effects of the proposed methodology. Under the assumptions used in the model, its application may reduce the average duration of audit engagements by approximately 38 per cent, increase the number of documented audit findings by approximately 54 per cent and strengthen the potential financial effects of corrective measures. These projections require validation through pilot implementation and subsequent empirical assessment.

Based on the research findings, the following recommendations are proposed:

The Ministry of Economy and Finance may consider developing and approving a regulatory and methodological document entitled the “Procedure for Preparing a Risk-Based Annual Internal Audit Plan” for public sector internal audit services. The document could establish the threshold values of the integrated risk index and formalise the proposed 60:30:10 resource-allocation framework.

The semi-annual reassessment of organisational risk profiles and the corresponding revision of annual audit plans may be introduced as a standard component of the planning process.

The risk-monitoring dashboard and the enhanced risk register may be incorporated into the standard working documentation of public sector internal audit services.

A practice-oriented module on risk-based audit planning may be included in professional training and continuing development programmes for internal auditors.

The study also identifies several areas for future research. These include integrating the proposed planning methodology with a methodology for determining materiality thresholds within a unified methodological framework; automating the semi-annual reassessment process and transitioning towards real-time risk monitoring through an IT audit platform; and empirically assessing the applicability and generalisability of the methodology by testing it in public sector organisations operating in different areas, including healthcare, construction and local government.

Further research in these areas can build upon the methodology developed in this study and contribute to enhancing the efficiency, responsiveness and overall effectiveness of internal auditing in the public sector.

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