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A METHODOLOGY FOR THE COMPOSITE ASSESSMENT OF THE MATURITY OF INTERNAL AUDIT FUNCTIONS IN COMMERCIAL BANKS

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Abstract. This article proposes a composite assessment methodology for quantitatively measuring the maturity of internal audit functions in commercial banks. The methodology comprises twenty indicators grouped into four dimensions: organisational and institutional, methodological, human resources, and technological. It incorporates a scoring scale with indicator-specific verbal anchors, theoretically justified weighting coefficients, and a four-level maturity classification. The objectivity and replicability of the methodology are supported by a two-source assessment procedure combining a structured questionnaire with documentary analysis, as well as by a conservative scoring rule, a minimum-threshold mechanism, and sensitivity analysis. The study also develops a four-dimensional framework for identifying factors that constrain the development of internal audit and links these factors to corresponding improvement measures. A feedback mechanism is proposed to transform the assessment process into a continuous management cycle.

Keywords: internal audit, commercial bank, composite assessment, maturity level, maturity model, indicator system, weighting coefficients, scoring scale, development constraints, management cycle.

Аннотация. В статье предложена методика интегральной оценки, позволяющая количественно измерить уровень зрелости функций внутреннего аудита в коммерческих банках. Методика включает двадцать показателей, объединённых в четыре направления: организационно-институциональное, методическое, кадровое и технологическое. Она предусматривает балльную шкалу с вербальными критериями для каждого показателя, теоретически обоснованные весовые коэффициенты и четырёхуровневую классификацию зрелости. Объективность и воспроизводимость методики обеспечиваются двухисточниковой процедурой оценки, сочетающей структурированный опрос и анализ документов, а также консервативным правилом присвоения баллов, механизмом минимального порогового значения и анализом чувствительности. В исследовании также разработана четырёхкомпонентная система выявления факторов, ограничивающих развитие внутреннего аудита, и определены соответствующие меры по их устранению. Предложен механизм обратной связи, преобразующий процесс оценки в непрерывный управленческий цикл.

Ключевые слова: внутренний аудит, коммерческий банк, интегральная оценка, уровень зрелости, модель зрелости, система показателей, весовые коэффициенты, балльная шкала, ограничения развития, управленческий цикл.

INTRODUCTION

Under national banking regulations, commercial banks are required to maintain an internal audit function as an independent structural unit directly accountable to the supervisory board and the audit committee [1; 2]. Despite this common institutional framework, the actual maturity of internal audit functions varies considerably across banks in terms of governance arrangements, audit-cycle discipline, staff capacity, and technological enablement. A composite indicator that places these dimensions on a common measurement scale is therefore needed to support meaningful comparisons, monitor development over time, and inform management decision-making.

The relevance of this issue has been further reinforced by the Global Internal Audit Standards, which came into effect on 9 January 2025. The Standards establish requirements for ensuring internal audit quality through ongoing internal monitoring and periodic assessments, as well as for developing indicators to evaluate the performance of the internal audit function [4]. At the same time, the existing assessment mechanisms do not fully address this need. The Central Bank's supervisory assessment is external and mandatory and primarily serves prudential objectives, while the independent external assessment required by the Standards is conducted at least once every five years. Although such an assessment is comprehensive, it is relatively infrequent. However, a practical instrument that can be applied annually, at limited cost, and using a bank's own

resources remains insufficiently developed in the national banking context.

The purpose of this article is to develop and substantiate an assessment methodology that enables the level of development of internal audit functions in commercial banks to be measured quantitatively through a single composite indicator integrating organisational, methodological, human resource, and information technology criteria. To achieve this objective, the study defines the methodological design requirements, develops a system of indicators and a scoring scale, substantiates the weighting coefficients, proposes a calculation algorithm and maturity-level classification, and formulates a management cycle that links assessment results to the analysis of factors constraining further development.

LITERATURE REVIEW

The need for a composite assessment of the maturity of the internal audit function has long been recognised in international practice. Stage-based models describing the development of the function have become widely used. One of the most widely recognised examples is the Internal Audit Capability Model (IA-CM), developed by the research foundation of the Institute of Internal Auditors, which describes the development of the internal audit function across five maturity levels, ranging from the initial to the optimised stage [5]. The Global Internal Audit Standards have established a normative basis for composite assessment by reinforcing the requirements for a quality assurance and improvement programme and for performance measures [4]. The Internal Audit Code of Practice issued by the Chartered Institute of Internal Auditors links the assessment of the effectiveness of the internal audit function to the oversight responsibilities of the board and the audit committee [7]. The Basel Committee on Banking Supervision has established the principle of proportionality in assessing the internal audit function, according to which requirements should be proportionate to the size and risk profile of the bank [6]. The Three Lines Model, in turn, defines the organisational boundaries of the subject being assessed [8].

In the national economic literature, the organisation and improvement of internal audit have been examined by a number of scholars. A.K. Ibragimov explored the organisational foundations of internal audit in commercial banks based on international auditing standards [9]. N.F. Karimov investigated methodological issues relating to internal audit in banks [10]. G.D. Tashmanov proposed approaches to improving internal audit functions in accordance with international standards [11]. A.N. Turaev examined the development of internal audit organisation and methodology in business entities [12]. S.U. Mekhmonov developed approaches to improving internal audit methodology in budget-funded organisations [13], while N.Sh. Khajimuratov investigated issues relating to the development of audit methodology [14].

A synthesis of the existing approaches leads to two conclusions. First, the principal strength of international maturity models lies in the clarity of their developmental progression, whereas their main limitation is that they do not adequately reflect national regulatory requirements or sector-specific characteristics. Second, national studies have generally assessed the effectiveness of internal audit through individual dimensions, such as organisational structure, methodology, or human resources. However, an integrated methodology that combines these dimensions within a single quantitative indicator, reflects the operating environment of commercial banks, and aligns national regulatory requirements with the Global Internal Audit Standards remains insufficiently developed. This article aims to address this methodological gap.

RESEARCH METHODOLOGY

Five requirements were observed in designing the methodology. Objectivity: each indicator must be based on observable evidence, such as a document, a verifiable fact, or an auditable practice. Measurability: clearly defined verbal anchors must be established for each level of the assessment scale. Comparability: indicators must be formulated so that they are interpreted consistently across all banks, while scale-dependent indicators must be expressed in relative terms. Replicability: coding rules must be documented to ensure that comparable results are obtained when the assessment is conducted by another researcher or independently by the bank itself. Proportionality: the methodology must be applicable to banks of different sizes, with differentiation applying to the form of implementation rather than to the level of the requirement itself [6].

The study employed scoring assessment, weighted composite indexing, grouping, and systems analysis. In determining the weights, substantive and logical justification was combined with mandatory sensitivity analysis. Alternative approaches, including expert surveys, pairwise comparisons, and equal weighting, were also comparatively evaluated. The methodology specifies two primary sources of assessment data: a structured questionnaire to be administered to internal audit staff and an analysis of banks' internal documents, including internal audit charters, plans, reports, and registers. The regulatory and methodological framework is based on the Global Internal Audit Standards [4] and national banking regulations [1–3].

ANALYSIS AND RESULTS

It is appropriate to begin by clarifying the position of the proposed methodology among the existing assessment mechanisms. The Central Bank's supervisory assessment is external and mandatory, covers the bank as a whole, and serves prudential objectives, with internal audit considered as one component of the overall assessment. The independent external assessment required by the Standards is conducted at least once every five years and confirms conformance with the Global Internal Audit Standards. Although it is comprehensive, it is infrequent and does not specifically measure the national context [4]. The proposed composite assessment fills a third gap: it is designed to be conducted annually, either internally or for research purposes, and is specifically intended to support the management of the internal audit function's development trajectory. Its purpose is not to issue a binary judgement of "conforming" or "non-conforming", but to provide a map showing where improvement is required and how extensive that improvement should be. The three mechanisms do not compete with one another; rather, they are complementary. The composite assessment provides an internal indicator of readiness for external assessment and complements supervisory review by identifying areas requiring early improvement.

Addressing two key methodological concerns associated with composite indicators enhances the reliability of the proposed methodology. The first criticism concerns the subjectivity of weights, since any weighting system inevitably reflects the judgement of its developer. In response, the rationale for assigning the weights is stated transparently, and sensitivity analysis is incorporated as a mandatory step. This analysis determines whether the conclusions remain stable when the weights are varied within reasonable limits. The second criticism concerns the compensation effect, whereby a high score in one dimension may conceal a deficiency in another within the aggregate result. Two safeguards are introduced to mitigate this risk. First, the composite score is never reported in isolation; it is always presented together with a four-dimensional profile. Second, a minimum-threshold rule is applied: if the score for any dimension is below 1.0, the bank's maturity classification is reduced by one level, regardless of the range within which the composite score falls. An internal audit function cannot be classified as mature when one of its core dimensions remains below the established minimum threshold.

The proposed methodology differs from international maturity models in three respects. First, it is specifically adapted to the operating environment of commercial banks, with its indicators derived from banking regulation and the risk profile of the institution. Second, the data sources are embedded in the methodology itself, as each indicator is linked to a specific item in the questionnaire and to a corresponding element of the documentary review. Third, the methodology integrates the requirements of the Global Internal Audit Standards and national regulations within a single system of indicators [4; 2]. At the core of the methodology is a system of twenty indicators grouped into four dimensions (Table 1). The organisational and institutional dimension measures the status of the internal audit function and its governance relationships; the methodological dimension assesses the maturity of the audit cycle; the human resources dimension evaluates human capital; and the technological dimension measures the function's level of digital enablement.

Table 1
System of Indicators for the Composite Assessment of the Maturity of the Internal Audit Function

Criterion group (weight)	Indicators	Data source
K1. Organisational and institutional dimension ($w_1 = 0.25$)	1.1. Direct functional accountability of the internal audit function to the supervisory board and the audit committee; 1.2. Appointment and dismissal of the chief audit executive by the supervisory board, and performance evaluation and remuneration at the level of the supervisory board or the audit committee, as applicable; 1.3. Interaction with the audit committee, including the frequency of meetings and private sessions; 1.4. Approval of the internal audit budget by the supervisory board or the audit committee, as applicable, together with a documented resource-request process; 1.5. Completeness of the internal policies and procedures governing the internal audit function.	Questionnaire; documentary analysis

K2. Methodological dimension ($w_2 = 0.30$)	2.1. Maintenance of the audit universe and application of a documented risk-assessment methodology; 2.2. Responsiveness of the internal audit plan to changes in the bank's risk profile, including periodic review during the year; 2.3. Tailoring of engagement work programmes to the audited area, including the linkage between identified risks and audit procedures; 2.4. Quality of audit findings and reports, including report structure, classification of findings by significance, and clarity of conclusions; 2.5. Follow-up monitoring system, including a register, evidence-based closure of findings, and analysis of recurring issues.	Questionnaire; documentary analysis
K3. Human resources dimension ($w_3 = 0.25$)	3.1. Adequacy of staffing based on the audit-hours budget; 3.2. Proportion of internal audit staff holding internationally recognised professional certifications; 3.3. Annual professional training hours per internal auditor; 3.4. Balance of professional experience and workforce composition; 3.5. Availability of a specialist with expertise in information technology auditing.	Questionnaire
K4. Technological dimension ($w_4 = 0.20$)	4.1. Implementation of an audit management system; 4.2. Extent of the use of data analytics tools; 4.3. Use of full-population data analysis in internal audit engagements; 4.4. Availability of a performance and monitoring dashboard for the audit committee; 4.5. Controlled read-only access to relevant information systems.	Questionnaire; documentary analysis

Source: developed by the author.

The weights assigned to the four dimensions were determined on the basis of their contribution to the value created by the internal audit function and their ability to differentiate between banks under national conditions. The methodological dimension was assigned the highest weight of 0.30, since the discipline of the audit cycle represents the core of functional maturity and is expected to show the greatest variation across banks. The organisational and institutional dimension and the human resources dimension were each assigned a weight of 0.25. The technological dimension received a weight of 0.20. Although technological capability is likely to become decisive in the future, at the current stage it cannot generate independent benefits without an adequate level of maturity in the other dimensions.

The robustness of the assigned weights is tested through sensitivity analysis. If the ranking of banks remains unchanged when the weights are varied within a range of ± 0.05 , the conclusions are considered to be sufficiently independent of the selected weighting structure. Within the human resources dimension, the availability of an information technology auditor was included as a separate indicator because, in an increasingly digital environment, the absence of this competence may restrict the overall scope of internal audit. The indicators within the technological dimension form a logical sequence consisting of an audit management system, data analysis tools, full-population testing, performance dashboards, and direct access to information systems. A low score therefore makes it possible to identify the specific point at which this technological sequence is interrupted.

A uniform scoring scale is applied to all indicators. A score of 0 indicates that the relevant element is absent. A score of 1 represents an initial stage, at which the element is applied only occasionally or exists solely in documented form. A score of 2 indicates partial implementation, where the element is used in practice but not systematically or comprehensively. A score of 3 represents full and sustainable implementation, where the element is documented, regularly applied, and supported by verifiable evidence.

Indicator-specific verbal anchors were developed for each score. For example, under Indicator 2.1, a score of 0 means that no audit universe is maintained and the audit plan is prepared on the basis of established practice rather than formal risk assessment. A score of 1 means that a list of auditable entities exists, but the risk assessment process is not documented. A score of 2 means that a documented methodology is available, although the assessment is conducted only once a year and its linkage to the audit plan remains incomplete. A score of 3 means that the audit universe is regularly updated, each auditable entity is scored using formal criteria, and the frequency of audits is determined by the resulting risk ranking. The use of such verbal anchors makes the assessment replicable and promotes consistent results across different assessors.

The assessment procedure was also designed to satisfy the requirement of replicability. The score for each indicator is determined independently using two sources: responses to the structured questionnaire and documentary evidence. Where the two sources produce different results, the lower value is applied in accordance with the principle of conservatism. A formally documented element that is not supported by evidence of practical implementation cannot qualify for the maximum score.

Where a discrepancy arises, supporting evidence is first requested. If the evidence is insufficient, the lower

score is retained. If disagreement remains, the issue is clarified through a brief interview, and the final decision is recorded in the assessment protocol. For selected indicators, parallel assessments by two independent assessors are used to verify the clarity and consistency of the scoring anchors.

The calculation algorithm consists of four steps. In the first step, a score, denoted by b , is assigned to each indicator. In the second step, the score for each dimension is calculated as the arithmetic mean of the five indicators included in that dimension:

$$K_i = (b_{i1} + b_{i2} + b_{i3} + b_{i4} + b_{i5}) / 5, \text{ where } i = 1, 2, 3, 4. \quad (1)$$

In this formula, K_i represents the average score for the i -th dimension, while b_{ij} represents the score assigned to the j -th indicator within the i -th dimension.

In the third step, the composite indicator is calculated as the weighted sum of the four dimension scores:

$$I = 0.25 \times K_1 + 0.30 \times K_2 + 0.25 \times K_3 + 0.20 \times K_4. \quad (2)$$

The resulting composite indicator is then converted into a percentage scale:

$$I\% = (I / 3) \times 100. \quad (3)$$

In the fourth step, the resulting percentage is assigned to one of four maturity levels. A result of up to 40 per cent corresponds to the initial level, at which an institutional structure exists but the function remains predominantly focused on compliance and inspection activities. A result from 40 to 60 per cent corresponds to the developing level, at which certain elements of the audit cycle are operational, although the system has not yet become fully integrated. A result from 60 to 80 per cent corresponds to the mature level, at which the risk-based audit cycle is fully operational, resources are generally sufficient, and technological tools have been partially implemented. A result above 80 per cent corresponds to the advanced level, at which internal audit practices meet the advanced requirements of the Global Internal Audit Standards, including a quality assurance and improvement programme, the use of technology, and the measurement of functional performance.

These maturity-level descriptions translate numerical results into the language of governance and management. For a supervisory board, the description "mature level, with scope for improvement in the technological dimension" is more informative than the numerical result of "68 per cent" presented in isolation.

The calculation procedure may be illustrated using a hypothetical example. Assume that a bank receives the following dimension scores: $K_1 = 2.2$, $K_2 = 1.8$, $K_3 = 2.0$, and $K_4 = 1.2$. The composite value is calculated as follows:

$$I = 0.25 \times 2.2 + 0.30 \times 1.8 + 0.25 \times 2.0 + 0.20 \times 1.2 = 1.83.$$

The composite value is then converted into a percentage:

$$I\% = (1.83 / 3) \times 100 = 61.0\%.$$

According to the maturity scale, this result corresponds to the lower boundary of the mature level. The minimum-threshold condition is then assessed. None of the dimension scores is below 1.0, with the lowest score being $K_4 = 1.2$. The assigned maturity level therefore remains unchanged.

The managerial interpretation is derived from the dimension profile. The bank demonstrates comparatively strong organisational and human resource arrangements, while further opportunities remain to strengthen the methodological dimension and expand technological capabilities. The same example also illustrates the operation of the minimum-threshold rule. In a hypothetical case where $(K_4 = 0.8)$, the bank would be classified at the developing level, even if its overall composite score fell within the range corresponding to the mature level.

To communicate the results to management, a one-page assessment scorecard was developed. It presents the composite value and maturity level, the four-dimensional profile compared with the system-wide average, the result of the minimum-threshold assessment, changes from the previous assessment period, and three priority measures for the next period.

A four-axis radar chart is particularly suitable for presenting the dimension profile. It provides an immediate visual representation of strengths and weaknesses and, when the results of several years are superimposed, reveals the development trajectory of the internal audit function over time.

The assessment results are interpreted from four perspectives. The first is the profile perspective, which compares the bank's functional profile with the system-wide average. The second is the dynamic perspective, under which annual reassessments are used to monitor the development trajectory. The third is the target-setting perspective, under which target scores for each dimension are incorporated into the performance plan of the head of internal audit. The fourth is the system-wide perspective, under which aggregated results across banks identify priorities for regulatory measures and professional development initiatives.

In this way, a single measurement framework generates useful information at the individual bank, peer-group, and banking-system levels.

While the composite assessment answers the question of where the internal audit function currently stands, its logical continuation is to identify and systematise the causes of low scores. A consolidated map of the factors constraining development was therefore structured into four areas, each of which was linked to corresponding

remedial measures, as presented in Table 2.

Table 2

Factors Influencing the Development of Internal Audit and Corresponding Improvement Measures

Factor group	Main manifestations	Improvement measures
Institutional factors	Continued reliance on inspection-oriented practices; greater emphasis on identifying individual responsibility than on improving processes; performance incentives based primarily on the number of findings; limited practical involvement of the audit committee.	Formalisation of the expectations of the supervisory board and the audit committee; introduction of balanced performance indicators; strengthening of the audit committee's operating procedures.
Resource factors: human resources and budget	Staffing growth not fully aligned with organisational expansion; limited availability of certified professionals and information technology audit specialists; constraints affecting budgetary flexibility.	Resource planning based on an audit-hours budget; support for professional certification and structured training; use of co-sourcing arrangements where appropriate.
Methodological factors	Limited availability of standardised risk-assessment methodologies, terminology guidance, model documents, and structured professional training.	Development of a scoring methodology for risk-based planning; preparation of standard documentation templates; methodological guidance coordinated through the professional community.
Technological and external factors	Limited use of audit management systems and data analytics tools; variations in data quality; an external assessment framework that remains at an early stage of development.	Development of continuous auditing capabilities and monitoring tools; implementation of a quality assurance and improvement programme; further development of independent external assessment procedures.

Source: developed by the author.

Understanding the interrelationships among these factors is important for determining an appropriate sequence of improvement measures. Institutional factors constitute the foundational layer because management expectations, governance arrangements, and performance incentives influence how internal audit methodologies are applied in practice. Resource factors may either facilitate or constrain the implementation of the selected development approach. Methodological and technological factors represent implementation mechanisms whose effectiveness depends on appropriate institutional arrangements and sufficient resources. Accordingly, improvement measures should generally be sequenced by first strengthening institutional arrangements, then developing methodological capacity, and subsequently expanding technological capabilities.

A prioritisation matrix is used to refine this sequence. Each constraining factor is assessed along two dimensions: the magnitude of its expected impact and the complexity of implementation. This approach makes it possible to distinguish high-impact measures that can be implemented within a relatively short period, such as strengthening the audit committee's operating procedures, from longer-term strategic initiatives involving substantial institutional and resource requirements, such as developing a professional training system and establishing an independent external assessment framework.

Finally, a feedback loop is established between the composite assessment and the analysis of development constraints. Each measure designed to address a particular factor is formalised in a structured record based on the sequence "factor–measure–expected change in indicator scores". For example, the introduction of a risk assessment methodology in response to a methodological constraint is expected to improve the scores for Indicators 2.1 and 2.2. Similarly, the implementation of a monitoring register system in response to a technological constraint should be reflected in Indicators 2.5 and 4.1.

The annual reassessment then determines whether these expected improvements have materialised. If the relevant scores increase, the measure may be regarded as effective. If no improvement is observed, the implementation of the measure may have been incomplete, or the initial diagnosis may require further refinement. In this way, the methodology evolves from a stand-alone measurement tool into a continuous management cycle comprising assessment, identification of development constraints, implementation of corrective measures, and reassessment.

The limitations of the methodology should also be recognised. First, the reliability of the composite assessment depends on the quality and completeness of the underlying data. Second, the assessment is intended as a management and diagnostic tool rather than as a formal quality certification mechanism and therefore does not replace an independent external assessment or supervisory review. Third, presenting the

results as a public comparative ranking may place excessive emphasis on score optimisation rather than substantive improvement. This risk can be mitigated through evidence-based scoring anchors, periodic external verification, and the confidential use of bank-level results.

CONCLUSION AND SUGGESTIONS

The study produced the following conclusions.

First, the existing mechanisms for assessing the maturity of internal audit functions in commercial banks — supervisory assessment and independent external assessment conducted at least once every five years — leave a gap for an annual instrument specifically designed to manage the development trajectory of the function. The proposed composite assessment methodology fills this gap. Unlike existing approaches, it evaluates the effectiveness of internal audit not through isolated dimensions, but as an integrated system.

Second, the core of the methodology is a system of twenty indicators grouped into four dimensions: organisational and institutional, weighted at 0.25; methodological, weighted at 0.30; human resources, weighted at 0.25; and technological, weighted at 0.20. A four-point scale ranging from 0 to 3, supported by indicator-specific verbal anchors, was developed for each indicator. The use of two evidence sources — a structured questionnaire and documentary analysis — together with the principle of conservatism prevents formal documentary compliance that is not supported by operational evidence from receiving an excessively high score. The robustness of the assigned weights is verified through sensitivity analysis.

Third, converting the composite indicator into a percentage scale and combining it with a four-level classification — initial, developing, mature, and advanced — translates the assessment into language that is readily usable for governance and management purposes. The four-dimensional profile and the minimum-threshold rule mitigate the compensation effect: an internal audit function cannot be classified as mature if the score for any dimension falls below the established minimum threshold.

Fourth, the four-dimensional framework of development constraints and the proposed hierarchy of foundational, resource-related, and implementation factors establish a clear link between diagnosis and corrective action. The use of “factor–measure–expected change in indicator scores” records, together with annual reassessment, transforms the methodology from a single-period assessment exercise into a comprehensive management cycle.

On the basis of these findings, the following recommendations are proposed. The methodology should be introduced in banks as an annual self-assessment procedure, with the results submitted to the audit committee in the form of a one-page assessment scorecard. Target scores for each dimension should be incorporated into the performance plan of the head of internal audit. At the level of the professional community, standardised scoring-anchor tables and assessment protocol templates should be developed and disseminated. Aggregated results across banks should be used to identify system-wide priorities, including the development of professional training platforms and methodological guidance. Once sufficient practical evidence has been accumulated, the weighting coefficients should be recalibrated using empirical data.

The proposed methodology may serve as a measurement framework for further research on the development of internal audit quality assurance and improvement programmes and systems of performance indicators.

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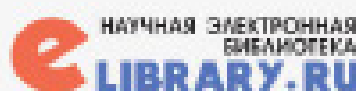
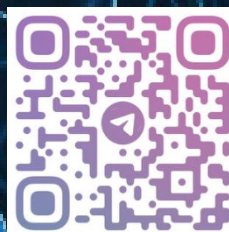
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