

Article

The Role of Audit Services in the Economics of Service Sectors and the Scientific Interpretation of Efficiency Criteria

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Abstract: the article examines audit services as a knowledge-intensive component of the service economy and substantiates a scientifically grounded system of criteria for evaluating the efficiency of audit service provision. The theoretical part positions the audit within the classical attributes of services and demonstrates that three attributes specific to assurance engagements the credence character of the product, the partially mandated nature of demand and the separation between the paying client and the beneficiary user make the direct transfer of conventional service-productivity measures inappropriate. On the empirical side, the structural and dynamic parameters of the audit services market of Uzbekistan for 2021–2025 are analyzed on the basis of the registers maintained by the Ministry of Economy and Finance, and a three-group system of economic, social-qualitative and institutional criteria is proposed. The criteria are aggregated into an integral efficiency index and tested on the financial results statements (Form No. 2) of six audit organizations. The calculations show that the number of market participants grew 1.77 times and the number of certified auditors 2.27 times over the period, while economic productivity and the quality of engagements remain almost uncorrelated ($r = 0.13$) within the surveyed group. The article concludes with proposals on multi-criteria ranking, quality-weighted procurement of audit services and the disclosure of audit quality indicators.

Keywords: audit services, economics of service sectors, efficiency criteria, audit quality, integral index, productivity of services, credence goods, audit market, economic entities, professional services, quality control

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1. Introduction

The structural transformation of national economies over the past three decades has been driven primarily by the expansion of the service sector, and within it the fastest growth has occurred in knowledge-intensive business services consulting, legal advice, engineering, information services and audit. These activities do not merely accompany material production; they shape the institutional environment in which production decisions are taken. Audit occupies a particular position in this group because its product is not consumed by the entity that pays for it: the economic entity purchases an audit, but the value of the resulting assurance accrues to shareholders, creditors, tax authorities, investors and the state. This asymmetry between payer and beneficiary is what turns the efficiency of audit service provision into a problem of the economics of service sectors rather than a narrow accounting question [1].

In the Republic of Uzbekistan, the institutional framework of auditing has been rebuilt substantially since 2018. The Resolution of the President of the Republic of

Uzbekistan No. PQ-3946 of 19 September 2018 diagnosed a low level of confidence in audit organizations, the perception of an audit as a burdensome administrative procedure rather than a guarantee of the reliability of financial statements, and the spread of unfair including price-based competition in tenders for audit services [2]. The Law of the Republic of Uzbekistan No. ZRU-677 of 25 February 2021 "On Auditing Activity" consolidated the fragmented regulation into a single act, defined auditing activity explicitly as the entrepreneurial activity of audit organizations in providing audit services, introduced the registers of audit organizations and auditors, and established the ranking of audit organizations and the external control of the quality of their work as permanent regulatory instruments [3]. The gradual transition of economic entities to International Financial Reporting Standards and of audit organizations to International Standards on Auditing has further raised the professional requirements placed on the sector.

These reforms have produced visible quantitative results. Between the beginning of 2021 and the end of 2025, the number of audit organizations entered in the register rose from 99 to 175, and the number of certified auditors from 572 to 1,296 [4]. Yet quantitative expansion of a service market is not equivalent to a growth of its efficiency. A larger number of small providers competing mainly on price may coexist with a stagnant or even declining quality of engagements, and the aggregate social effect of auditing the reduction of information asymmetry in the economy may not improve at all. The central methodological difficulty is that the category of "efficiency of audit service provision" has no settled interpretation. In the accounting literature it is usually reduced to audit quality; in the economics of services, it is measured through productivity ratios that ignore the public-interest dimension; in management practice it is often equated with the revenue of the audit firm. These three interpretations coexist without being reconciled, which makes both the evaluation of individual organizations and the design of sectoral policy inconsistent [5].

The aim of the present research is to substantiate the place of audit services within the economics of service sectors and, on this basis, to develop a scientific interpretation of the criteria for evaluating the efficiency of audit service provision that is operational for the reporting practice of economic entities in Uzbekistan. The aim determines the following objectives: to identify the attributes that distinguish audit services from other services of the market infrastructure; to systematize the existing approaches to the measurement of efficiency in professional services; to analyze the structural and dynamic parameters of the audit services market of Uzbekistan for 2021–2025; to formulate a multi-level system of efficiency criteria and to aggregate it into an integral index; and to verify the applicability of the proposed index using the financial results statements of operating audit organizations [6].

The scientific novelty of the work consists in the interpretation of the efficiency of audit service provision as a three-dimensional category that simultaneously covers the economic result of the provider, the qualitative result of the engagement and the institutional conformity of the process, and in the construction of an integral index computable from the standard national reporting form No. 2. The practical significance lies in the possibility of using the proposed criteria in the ranking of audit organizations, in the selection procedures applied by economic entities and in the monitoring carried out by the authorized state body.

The scholarly discussion relevant to the subject develops along four relatively independent lines, and the absence of a bridge between them constitutes the research gap addressed in this article.

The first line concerns the nature and measurement of audit quality. The classical definition proposed by DeAngelo treats audit quality as the joint probability that the auditor will detect a breach in the client's accounting system and will report that breach,

thereby linking quality simultaneously to professional competence and to independence [7]. Watts and Zimmerman derived the demand for auditing from agency relations within the firm, showing that the audit arises as a mechanism of contract enforcement rather than as an administrative obligation [8]. Francis systematized the accumulated empirical evidence and argued that audit quality should be understood as a continuum extending from failed audits to high-quality engagements, with inputs, processes and outcomes producing observable proxies at every level. Knechel and co-authors developed this logic into a framework of audit quality indicators grouped into inputs, process, outcomes and context, explicitly warning against the use of any single indicator as a summary measure. The Framework for Audit Quality issued by the International Auditing and Assurance Standards Board follows the same architecture and adds the dimension of interactions among the participants of the financial reporting chain. What this literature does not provide is a measure of the efficiency of the audit organization as an economic unit: quality is examined largely independently of the resources consumed to attain it [9].

The second line is the economics and management of services. Grönroos formulated the distinction between technical and functional quality, demonstrating that in professional services the perception of the process is at least as important as the perception of the result. Parasuraman, Zeithaml and Berry operationalized the perceived quality of services through the gap model and the SERVQUAL instrument, whose dimensions of reliability, assurance and empathy are directly transferable to the auditor-client relationship. Vargo and Lusch reframed the entire exchange in terms of service-dominant logic, in which value is co-created by the provider and the beneficiary rather than delivered unilaterally a proposition of particular relevance to auditing, where the quality of the engagement depends substantially on the quality of the client's accounting system. Gallouj and Weinstein proposed a characteristics-based model of innovation in services, while Djellal and Gallouj demonstrated the structural difficulty of applying industrial productivity measures to service activities whose output is intangible, heterogeneous and frequently not separable from its use. Miles and colleagues introduced the concept of knowledge-intensive business services, within which audit is classified as a professional service with a strong institutional component [10].

The third line comprises the formal measurement of efficiency. Farrell introduced the decomposition of efficiency into technical and allocative components and the notion of the efficient frontier, an idea formalized by Charnes, Cooper and Rhodes in data envelopment analysis and extended by Banker, Charnes and Cooper to variable returns to scale. These methods require a large and homogeneous sample of decision-making units, a condition difficult to satisfy in a market where a substantial share of organizations employ fewer than ten auditors.

The fourth line is specific to the economics of assurance markets. Akerlof's analysis of markets with asymmetric quality information explains why, when buyers cannot observe quality before purchase, competition tends to shift to price and average quality deteriorates. Causholli and Knechel showed that the audit possesses the properties of a credence good: the client is unable to assess the quality of the service either before or after its delivery, because the absence of detected misstatements is observationally equivalent to the absence of effort. This result is essential for the present study, since it implies that market-based indicators alone revenue, price, client numbers cannot serve as measures of the efficiency of audit services and must be complemented by institutional indicators generated outside the transaction [11].

National research on auditing in Uzbekistan has concentrated primarily on the methodology of audit procedures, the harmonization of national standards with International Standards on Auditing and the organization of quality control, while the annual reviews of the audit services market published by the Ministry of Economy and

Finance provide the statistical basis for monitoring [12]. A synthesis of the four lines identified above an interpretation of efficiency that simultaneously accounts for the economic result of the provider, the qualitative result of the engagement and the institutional conformity of the process, and that can be computed from nationally available reporting forms has not so far been proposed. This is the gap addressed here.

2. Materials and Methods

The research is designed as a mixed qualitative–quantitative study carried out in three consecutive stages.

At the first stage, a content analysis of more than forty scholarly publications and normative documents was performed in order to identify the attributes ascribed to audit services and the indicators used to evaluate their efficiency. The methods of logical generalization, comparison, analogy and scientific abstraction were applied to construct a taxonomy of criteria. The resulting taxonomy was verified for completeness against the elements of the Framework for Audit Quality and for measurability against the reporting obligations established for audit organizations in Uzbekistan.

At the second stage, the structural and dynamic parameters of the national audit services market for 2021–2025 were analyzed using the data of the Register of Audit Organizations and the Register of Auditors maintained by the Ministry of Economy and Finance. Absolute growth, growth rates, the compound average annual growth rate and the density indicator the average number of certified auditors per audit organization were calculated. The compound average annual growth rate was computed as

$$\text{CAGR} = (X_n / X_0)^{1/n} - 1, \quad (1)$$

where X_0 and X_n are the values of the indicator at the beginning and at the end of the period and n is the number of years.

At the third stage, the proposed criteria were tested on the financial results statements (Form No. 2) of six audit organizations for the period 2021–2025. The organizations are designated AO-1 to AO-6; their names are not disclosed, since the data were obtained under a confidentiality arrangement. Five indicators representing the three groups of criteria were selected for aggregation: revenue per certified auditor, profitability of services, the qualification coefficient of the staff, the score obtained in external quality control and the client retention ratio. Revenue per auditor was calculated as

$$P_a = R / A, \quad (2)$$

where R is the net revenue from audit and related services and A is the average number of certified auditors employed during the period. The profitability of services was determined as

$$R_s = [(R - C) / C] \times 100, \quad (3)$$

where C denotes the cost of services sold as reported in Form No. 2. The qualification coefficient was computed as the ratio of auditors holding an internationally recognized professional certificate to the total number of certified auditors of the organization.

Because the selected indicators are expressed in different units, they were normalized with respect to the best value observed in the sample:

$$x'_{ij} = x_{ij} / \max x_{ij}, \quad (4)$$

where x_{ij} is the value of the j -th indicator for the i -th organization. Normalisation with respect to the maximum, rather than min–max scaling, was preferred because with a sample of six units the latter mechanically assigns a zero score to the weakest organization on every indicator and thereby exaggerates the dispersion of the composite measure.

The integral efficiency index was then calculated as a weighted linear aggregate:

$$I_e = \sum w_j x'_{ij}, \quad \sum w_j = 1. \quad (5)$$

Two weighting scenarios were applied. In the first, equal weights were assigned to all five indicators, which corresponds to the absence of a priori assumptions about their relative importance. In the second, weights of 0.25, 0.20, 0.15, 0.25 and 0.15 were assigned to revenue per auditor, profitability, the qualification coefficient, the quality-control score and client retention respectively, reflecting the double priority of economic productivity and demonstrated quality. The comparison of the two scenarios serves as a sensitivity test: if the ranking of organizations is preserved under both, the composite measure may be regarded as robust with respect to the weighting assumption.

The limitations of the design should be stated explicitly. A sample of six organizations does not permit data envelopment analysis or panel regression with a meaningful number of degrees of freedom; the analysis of the group is therefore illustrative of the methodology rather than representative of the market. The cost structure of engagements is treated as reported, without adjustment for differences in accounting policy. Calculations were carried out in Microsoft Excel and verified in Python.

3. Results

Audit services belong to the service sector by all formal criteria, yet a direct application of the standard service attributes to auditing produces an incomplete picture. Table 1 juxtaposes the four classical attributes of services with their concrete manifestation in auditing and adds three attributes that are specific to assurance engagements and that fundamentally affect the measurement of efficiency.

Table 1. Specific features of audit services within the system of service sector attributes

Attribute	Manifestation in auditing	Consequence for efficiency measurement
Intangibility	The product is a professional opinion expressed in the auditor's report	Output cannot be measured in physical units; proxies are required
Inseparability	The engagement is performed at the client's premises with the client's participation	Part of the productivity depends on the client's accounting system
Heterogeneity	Scope and complexity differ with the size and industry of the entity	Comparison requires normalisation by complexity, not by number of engagements
Perishability	Assurance relates to a specific reporting period and cannot be stored	Capacity utilisation is strongly seasonal; idle capacity is not recoverable
Credence character	Quality is not observable by the client before or after delivery	Market indicators alone are insufficient; institutional indicators are needed
Partly mandated demand	Mandatory audit is prescribed for defined categories of entities	Demand is inelastic in the regulated segment and price-driven in the rest
Separation of payer and	The entity pays; users of the statements benefit	Efficiency has a social dimension not captured by

beneficiary

the provider's revenue

These three additional attributes explain why the efficiency of audit services cannot be measured in the same way as that of transport or catering services. Where demand is partly mandated and quality is unobservable, an increase in the volume of services sold is not in itself evidence of value creation: it may equally reflect the formal fulfilment of a statutory obligation at the lowest available price [13].

The quantitative parameters of the national market for the period under review are presented in Table 2. The market has expanded continuously throughout the period, and the expansion has been driven by regulatory factors as much as by demand: the requirement to be entered in the Register of Audit Organisations in order to operate, the minimum staffing requirements established for audit organisations and the extension of the list of entities subject to mandatory audit.

Table 2. Dynamics of the main indicators of the audit services market of the Republic of Uzbekistan, 2021–2025

Year	Audit organisations, units	Growth, units	Certified auditors, persons	Auditors per organisation, persons
2021*	99	–	572	5.8
2022	126	+27	881	7.0
2023	138	+12	1 003	7.3
2024	153	+15	1 154	7.5
2025**	175	+22	1 296	7.4
2025 to 2021, times	1.77	×	2.27	1.28
CAGR, %	12.1	×	17.8	5.0

Source: compiled and calculated by the author on the basis of the registers and annual market reviews of the Ministry of Economy and Finance of the Republic of Uzbekistan.

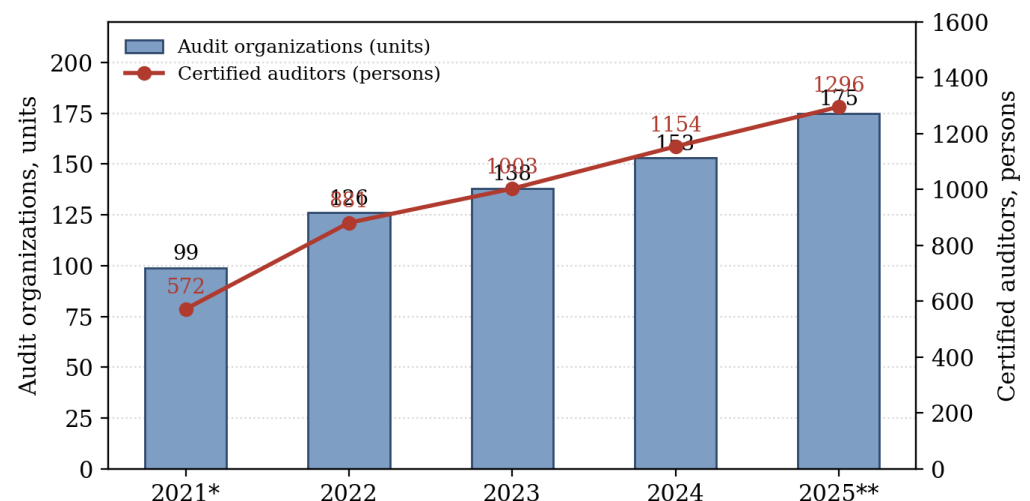


Figure 1. Dynamics of the number of audit organisations and certified auditors in the Republic of Uzbekistan, 2021–2025

Three observations follow. First, the number of auditors grew considerably faster than the number of organizations 17.8 per cent a year against 12.1 per cent which indicates that the staffing of existing organizations was reinforced in parallel with the

entry of new participants. Second, the density indicator rose from 5.8 to 7.4 auditors per organization, but its growth slowed and even reversed slightly in the final year; the market remains dominated by small providers, and the average organization is still below the threshold at which a full internal system of quality control becomes economically sustainable. Third, the number of organisations belonging to international audit networks rose from 19 to 34, and the proportion of auditors holding an international professional certificate reached approximately 38 per cent: the qualitative upgrading of the profession is real but concentrated in a narrow segment of the market [14].

The interpretation of efficiency proposed in this article proceeds from the position that the three attributes identified in Table 1 require three parallel groups of criteria rather than a single measurement scale. Economic criteria capture the result obtained by the provider relative to the resources consumed. Social-qualitative criteria capture the result obtained by the user of the audited financial statements. Institutional criteria capture the conformity of the process to the standards that substitute for the client's inability to observe quality directly. The complete system is set out in Table 3 and its logical structure is shown in Figure 2.

Table 3. System of criteria and indicators for evaluating the efficiency of audit service provision

Group of criteria	Indicator	Method of calculation	Information source
Economic	Revenue per certified auditor	Net revenue / average number of auditors	Form No. 2, staffing records
	Profitability of services	(Revenue – cost of services) / cost × 100	Form No. 2
	Cost of an audit hour	Cost of services / total chargeable hours	Engagement time records
	Capacity utilisation	Chargeable hours / available working time	Engagement time records
Social-qualitative	Qualification coefficient of staff	Auditors with international certificates / all auditors	Register of Auditors
	Client retention ratio	Repeat clients / total clients × 100	Engagement register
	Share of modified opinions	Modified reports / total reports issued × 100	Audit activity report
Institutional	External quality control score	Score awarded by the authorised body or professional association	Quality control materials
	Compliance with International Standards on	Share of engagements without identified	Internal and external control

Auditing	departures	
Transparency of disclosure	Completeness of the published information on mandatory audits	Official website of the organisation
Professional liability coverage	Sum insured / aggregate revenue from engagements	Insurance contracts

Source: developed by the author.

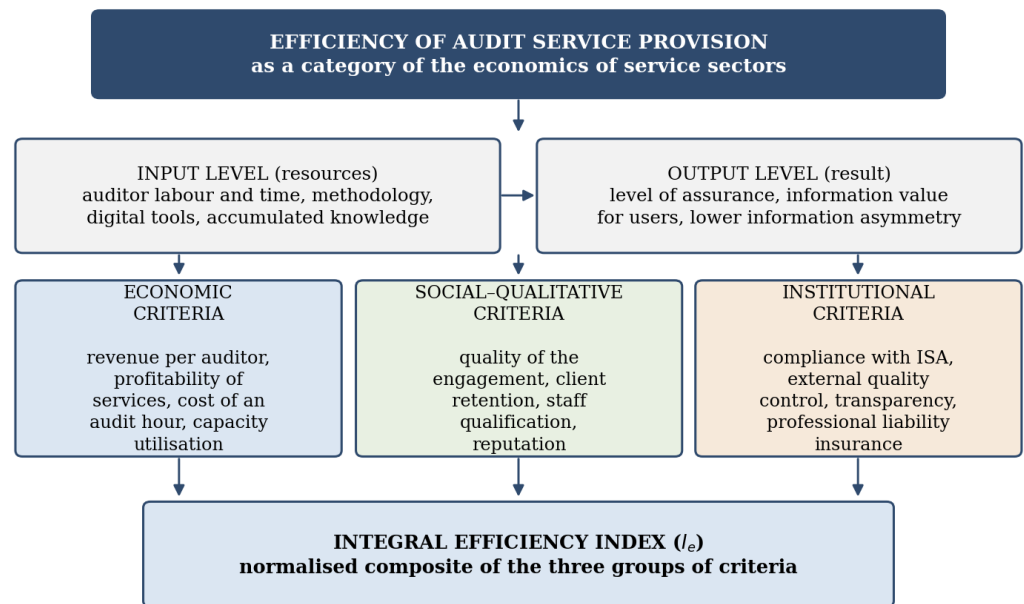


Figure 2. Conceptual scheme of the efficiency of audit service provision

The results of applying the proposed index to the six audit organizations of the sample are presented in Table 4. The reported values are the normalized scores obtained with formula (4) and the integral indices computed with formula (5) under the two weighting scenarios described in the methodology.

Table 4. Calculation of the integral efficiency index for the audit organisations of the sample

Organisation	Revenue per auditor	Profitability	Qualification	Quality control	Client retention	Ie, equal weights	Ie, expert weights
AO-1	0.889	0.969	0.873	0.935	0.945	0.922	0.922
AO-2	1.000	1.000	0.620	0.739	0.781	0.828	0.845
AO-3	0.721	0.875	1.000	1.000	1.000	0.919	0.905
AO-4	0.564	0.500	0.493	0.696	0.742	0.599	0.600
AO-5	0.781	0.844	0.775	0.870	0.874	0.829	0.829
AO-6	0.627	0.607	0.690	0.826	0.847	0.720	0.715
Group average	0.764	0.799	0.742	0.844	0.865	0.803	0.803

Source: calculated by the author on the basis of the financial results statements (Form No. 2) of six audit organisations for 2021–2025; the names of the organisations are not

disclosed.

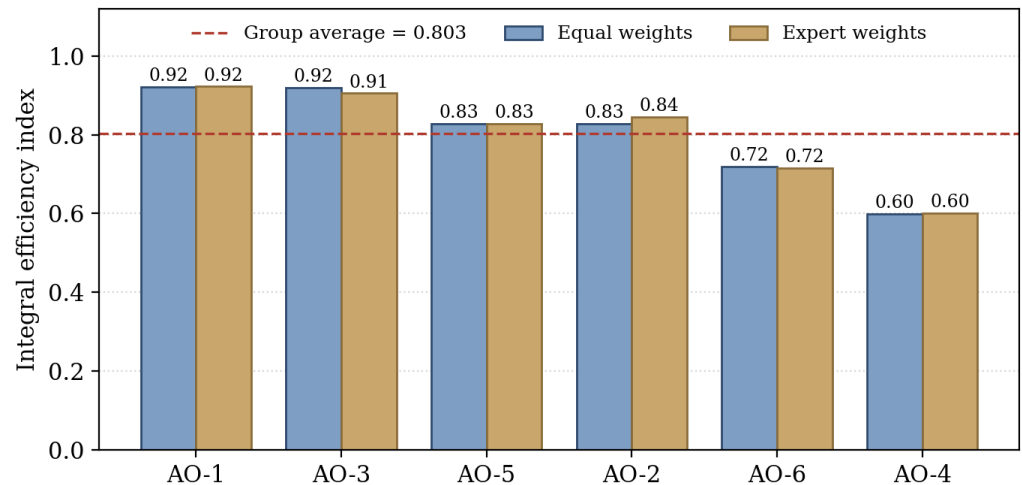


Figure 3. Integral efficiency index of the audit organisations of the sample under two weighting scenarios

The average value of the integral index for the group is 0.803 with a standard deviation of 0.125, that is, a coefficient of variation of 15.6 per cent. The dispersion is moderate: the organizations belong to a single quality stratum, and the gap between the leader and the weakest participant does not indicate structurally different business models. The ranking obtained under the two weighting scenarios is almost identical the linear correlation between the two series of indices is 0.997 and only one pair of adjacent organizations, AO-2 and AO-5, changes places when the weights shift towards economic productivity. The composite measure may therefore be considered robust with respect to the weighting assumption, an important property for a measure intended for ranking procedures [15].

The most instructive result concerns the internal structure of the index rather than its level. Organization AO-2 occupies the first position on both economic indicators, yet ranks only third or fourth overall because its qualification coefficient, quality-control score and client retention are below the group average. AO-3 displays the opposite configuration: it leads on all three social-qualitative and institutional indicators while remaining in the lower half of the sample in revenue per auditor. Only AO-1 combines high values across the whole set of criteria, and it is this combination not the maximum on any single dimension that produces the highest integral score.

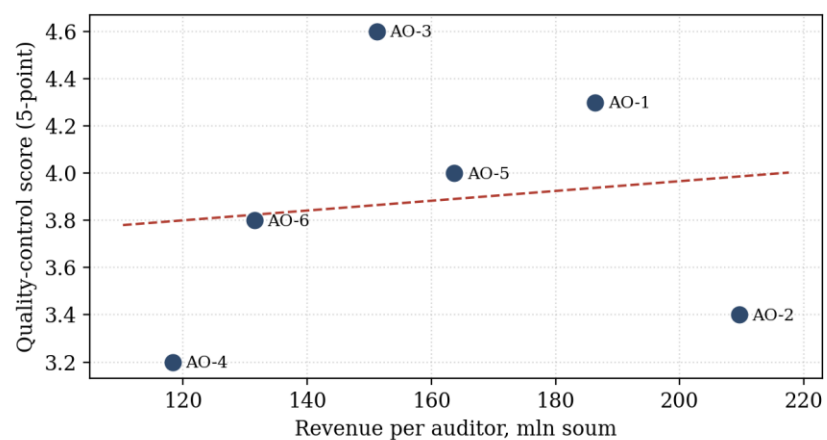


Figure 4. Relationship between revenue per auditor and the external quality-control score

The linear correlation coefficient between these two variables is 0.13, that is, they are practically independent within the sample. This finding, although obtained on a small group of organizations, has a clear economic interpretation: in the current state of the market a high volume of revenue per auditor is achieved primarily through the number and speed of engagements rather than through the depth of procedures, and it therefore does not signal a higher quality of assurance. Any evaluation system that relies on financial indicators alone would consequently rank the organizations of this sample in an order that differs materially from the order produced by the full set of criteria [16].

4. Discussion

The results obtained are consistent with the theoretical expectations derived from the literature and, at the same time, specify them for the conditions of a developing assurance market. The near-independence of economic productivity and demonstrated quality reproduces at the level of individual organizations the mechanism described by Akerlof for markets with asymmetric information about quality and by Causholli and Knechel for the audit in particular. If the purchaser of an audit cannot observe the quality of the service either before or after its delivery, the only dimension along which providers can compete visibly is price. Competition then drives down the fee, the fee constrains the number of hours that can be devoted to the engagement, and the reduction in hours affects precisely those procedures whose absence the client is least able to detect. Revenue per auditor rises, the quality of the engagement falls, and no market signal corrects the divergence. The preamble to Resolution No. PQ-3946, which states that selection procedures generate unfair, including price-based, competition and that the quality of audit services declines as a result, describes exactly this mechanism in regulatory language.

The implication is that efficiency cannot be raised by instruments acting on the supply side alone. The growth documented in Table 2 expands capacity, but capacity without an observable quality signal intensifies price competition rather than mitigating it. This explains an apparent paradox of the period: a market that has more than doubled its professional personnel is still characterized, in official assessments, by a low level of confidence in audit organizations. The missing element is the institutional infrastructure that makes quality observable external quality control with published results, multi-criteria ranking, and disclosure that allows users of financial statements to distinguish between providers [17].

From the standpoint of the economics of service sectors, the results support the position of Djellal and Gallowj concerning the limited applicability of industrial productivity measures to service activities. Revenue per auditor is a genuine productivity indicator, but in the case of a credence service it measures the intensity of resource use without measuring the value created. The three-group system proposed in Table 3 responds to this difficulty not by abandoning productivity measures but by embedding them in a broader structure in which they are balanced by indicators generated outside the transaction by the register of auditors, by external quality control and by disclosure. In terms of the service-dominant logic of Vargo and Lusch, such a structure recognizes that the value of an audit is co-created by the auditor and the audited entity and therefore cannot be attributed entirely to the revenue of the provider.

Two practical properties of the proposed index deserve comment. Its robustness to the weighting scheme means that disagreement among experts about the relative importance of the criteria will not, within reasonable bounds, alter the resulting ranking, which is a necessary condition for any measure intended for regulatory use; and its computability from Form No. 2 and from data already collected by the authorized body means that its introduction would impose no additional reporting burden on small providers. The index is, however, linear and compensatory: a very low value on one

criterion can be offset by high values elsewhere. For regulatory application it should therefore be supplemented with minimum thresholds on the institutional criteria [18].

Several limitations qualify these conclusions. The empirical part rests on six organizations, so the correlation structure observed cannot be generalized to the market without a larger sample; the quality-control score is an ordinal variable treated here as cardinal; and client retention is affected by factors unrelated to quality, such as rotation requirements. Further research should extend the analysis to a representative sample, apply data envelopment analysis to estimate the efficient frontier, and complement provider-side data with a survey of the users of audited financial statements, whose perception of assurance value remains the least documented element of the system [19].

5. Conclusions

The study permits the following conclusions. Audit services belong to the knowledge-intensive segment of the service economy, but three attributes the credence character of the product, the partially mandated nature of demand and the separation between the paying client and the beneficiary user distinguish them from other services and make the direct transfer of conventional productivity measures methodologically inadmissible. The efficiency of audit service provision should accordingly be interpreted as a three-dimensional category comprising the economic result of the provider, the qualitative result of the engagement and the institutional conformity of the process.

The audit services market of Uzbekistan expanded rapidly over 2021–2025: the number of audit organizations increased 1.77 times and the number of certified auditors 2.27 times, with compound average annual growth rates of 12.1 and 17.8 per cent respectively. The average number of auditors per organization rose from 5.8 to 7.4 persons, so that the market continues to be dominated by small providers. Quantitative expansion has not been accompanied by a comparable improvement in the observable quality of services, and within the surveyed group economic productivity and the external quality-control score are practically uncorrelated.

The integral efficiency index constructed from five indicators of the three criteria groups proved to be robust with respect to the weighting scheme and capable of distinguishing organizations whose financial indicators are similar but whose quality profiles differ. Its computation requires no information beyond the standard reporting form No. 2 and the data already held by the authorized body.

On the basis of these conclusions the following proposals are formulated. First, it is advisable to base the ranking of audit organizations on a multi-criteria composite measure of the type proposed above, with the results published annually, rather than on indicators of revenue or number of engagements. Second, in the selection procedures applied by economic entities, and particularly by entities with a state share, the weight of the price criterion should be limited and a qualification threshold based on institutional indicators introduced, so that competition is displaced from price to demonstrable quality. Third, the results of external quality control should be disclosed in a standardized form accessible to the users of financial statements, which is the most direct way of reducing the information asymmetry that generates price competition. Fourth, audit organizations should be encouraged to introduce internal management accounting of chargeable time, without which the economic criteria of the proposed system cannot be calculated reliably. Fifth, minimum staffing and qualification requirements should be linked to the complexity of the engagements undertaken rather than applied uniformly, so as to avoid a formal enlargement of organizations that does not affect the quality of work. Sixth, the annual review of the audit services market published by the authorized body should be extended to include aggregated quality indicators alongside the existing quantitative parameters, providing a basis for monitoring efficiency in its full three-dimensional interpretation.

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