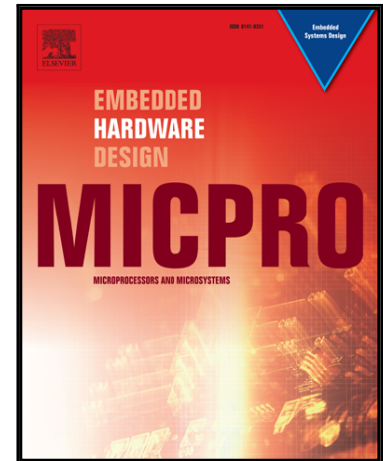


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# Measurement of Internal Audit Effectiveness: Construction of Index System and Empirical Analysis

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**Abstract:** This study starts with the architecture design of the internal audit effectiveness measurement index system, taking internal audit effectiveness as the measurement target, from the three dimensions of audit performance, audit capability, and audit "three systems" effectiveness to build a set of 10 components and 30 measure indexes indicator system for internal audit effectiveness measurement. And we take the internal audit of colleges and universities as the research sample, and make an empirical analysis of the built-up internal audit effectiveness measurement index system using the AHP-Fuzzy method to measure the model. We found that the existing problems of internal audit effectiveness are mainly reflected in the obstacles of the audit management system, large losses and waste, ineffective audit rectification and lagging audit innovation. Based on this result, China should take the reform of the internal audit management system as a breakthrough point, promote full internal audit coverage, increase audit supervision and rectification, improve audit innovation capabilities, and establish an internal audit effectiveness measurement index system to strengthen the internal audit effectiveness management responsibility system.

**Key words:** Internal Audit; Efficiency Measurement; Index System; Empirical Analysis

## 1. THE PROPOSAL OF THE QUESTIONS

The modernization of national governance systems and governance capabilities have posed new challenges to internal auditing. The Third Plenary Session of the 18th

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CPC Central Committee proposed that the overall goal of comprehensively deepening reform was to improve and develop the socialism with Chinese characteristics, and to promote the modernization of the national governance system and governance capacity. This is the new mission put forward by the Party Central Committee on auditing as it deployed and advanced the modernization of national governance system and governance capabilities. And the new mission means the new challenge. As far as internal audit is concerned, it is facing challenges such as how to promote full audit coverage, how to improve audit capabilities, and how to carry out audit technological innovation.

The national implementation of a high-quality development strategy places new requirements on internal audit. The report of the 19th National Congress of the Communist Party of China made an important judgment that the Chinese economy had shifted from a high-speed growth stage to a high-quality development stage. This not only has indicated the direction for the reform and development of various industries in China, but also has put forward new requirements on how to achieve high-quality development for them. The new requirements would eventually be reflected and be implemented in various industries and units. In view of this, the key issue for internal audit to meet the new requirements of the country's implementation of a high-quality development strategy is achieving its own high-quality development.

China's internal audit is facing practical problems and dilemma. At present, in the era of comprehensively deepening reform and innovative development, China's internal audit is in full swings and has made great progress. China's internal audit is also facing many practical problems and dilemmas, such as: inadequate internal audit institutions, lagging quality and skills of auditors, low audit quality, and low audit effectiveness. Additionally, such "repeated offense after repeated trial" weird audit situation still exists to varying degrees. All these restrict the normal development and high-quality development of China's internal audit.

At present, the above-mentioned challenges and problems faced by China's internal audit can essentially focus on a key issue: whether the effectiveness of internal audit can be achieved normally. Then, solving this problem, we must know the crux of this

problem. We believe that the crux of the problem mainly is: how to define the desired state (standard value) and actual state (actual value) of internal audit effectiveness to measure and judge whether it is normal or not; how to analyze the formation mechanism and elements of internal audit effectiveness to build an internal audit effectiveness measurement index system; how to analyze the influencing factors of internal audit effectiveness to explore the specific path of internal audit effectiveness. It is obvious that to answer and solve these problems, it is undoubtedly necessary and urgent for solving these problems to build a set of internal audit effectiveness measurement index system that is suitable for it. At the meantime, it is also an urgent task facing the academic and practical circles. Based on this, this paper considers how to build an internal audit effectiveness measurement index system and its measurement model. At the same time, in view of the active development of internal audit in China's universities and its strong representation in China's internal audit, this study takes university internal audits as research samples to conduct an application and an empirical analysis of the internal audit effectiveness measurement index system and its measurement model.

## **2. LITERTURE REVIEW**

Judging from the domestic data consulted, experts and scholars have a very scarce research literature on internal audit effectiveness measurement, which are limited to the concerns about the implementation and evaluation methods of internal audit effectiveness. In some aspects, we may learn from the research results of national (government) auditing. The first is the research on the improvement of internal audit effectiveness. Zhou S L (2020) hold the view that the implementation of internal economic responsibility auditing also needs to form a guarantee mechanism from improving the political positions of leading cadres, improving internal auditing posts, clarifying the positioning of internal auditing, deepening theoretical research, and strengthening internal systems and information construction. Sun W (2018) believed that the specific ways to achieve audit effectiveness were: scientifically allocate audit

resources, strengthen audit staff training, strengthen audit information construction, strengthen project management and assessment, and cultivate a new audit culture. Shen (2019) emphasized that specific strategies for improving the effectiveness of internal audit include: establishing an independent audit organization system and standing in the spirit of auditing; increasing investment in information technology and establishing a business with innovation and standardization; strengthening training for auditors and building confidence in themselves. Xia W N (2017) argue that measures to improve the effectiveness of internal audit supervision included: optimizing the audit environment and improving the status of internal audit supervision; highlighting the focus of audits, strengthening internal audit quality management; promoting the use of audit results, and playing a role in integrity risk prevention and control. Ma X X (2015) proposed to adopt appropriate audit methods, implement continuous monitoring and early warning, implement audit ratings and audit quality assessment and use of results to improve internal audit effectiveness<sup>0</sup>. The second is the selection of internal audit effectiveness evaluation indicators and the exploration of evaluation methods. Yang Q L et al. (2015) selected indicators from the four dimensions of finance, customers, business processes, learning and growth, and combined the expert consultation method and the analytic hierarchy process to set the index weights for improving the value-added internal audit effectiveness evaluation index system. The third is the research on the efficiency measurement of national (government) audit institutions. Qian R (2018) used the DEA evaluation model to measure the efficiency of audit institutions at various levels of the country from the exposure function, the defense function, and the precaution function, and used the Malmquist index to analyze the current status, regional distribution, and change trends of audit institutions at various levels in different years. Based on the perspective of production factor theory, we constructed an audit input-output model and an audit efficiency evaluation index, used data envelopment method to measure the audit efficiency of provincial audit institutions from 2007 to 2014, and used the Tobit regression model to empirically test provincial audit the degree of influence of internal and external factors on the audit efficiency of provincial audit institutions (Wang J, 2018). While

Guo Z Y (2018) used the analytic hierarchy process to select 8 indicators at three levels (this is omitted) from input indicators, outcome indicators and social influence indicators, and used software statistical analysis to measure the audit effectiveness of local governments<sup>0</sup>.

Foreign experts and scholars have conducted relevant explorations on the internal audit effectiveness measurement indicators and measurement methods. Dominic and Nonna (2011) proposed that the internal audit participation in enterprise operations and value-added activities should be used as an internal audit effectiveness measurement indicator. Badea and Spineanu (2013) advocated starting from the "3E Principle" (Economy, Efficiency, Effectiveness) and restructuring a set of internal audit effectiveness measurement index system from the three dimensions of resource consumption, audit effect and audit efficiency. Munteanu (2014) argued that in order to find a balance between providing value-added consulting services and internal audit operating costs, the increase in value to the enterprise should be an important dimension of internal audit performance measurement. Qasim M Z (2014) conducted a questionnaire survey of listed companies and found that these listed companies used a combination of qualitative and quantitative indicators to measure the effectiveness of internal audits; some important indicators of qualitative and quantitative indicators both have provided valuable information for measuring the internal audit effectiveness. Ivana and Boris (2016) started by examining the correlation between the effectiveness of internal audit and the supportive environment. Using statistical analysis to survey the 54 large companies in Croatia, they found that internal audit effectiveness is more effective in a supportive environment. Moreover, the results of the survey analysis revealed a statistically significant correlation between perceived levels of internal audit effectiveness and higher-level supportive environments<sup>0</sup>.

The existing domestic and foreign literature results provide the necessary research basis and useful reference for this article. At the same time, due to the lack of research literature on the design and empirical analysis of the internal audit effectiveness measurement index system, its research results are relatively limited, and it stays at the level of audit effectiveness realization, internal audit effectiveness evaluation

index selection and evaluation method. Therefore, this not only has indicated the direction for the research in this paper, but also has provided a broad research field. Compared with the results of existing research literatures, the marginal contribution of this article lies in: first, exploring and thinking from multiple levels, different angles and connotation depths, and building a set of internal audit effectiveness measurement index system. Second, in view of the internal audit effectiveness measurement index system, there are both qualitative and quantitative indicators. This paper uses the AHP method and Fuzzy technology to establish the AHP-FUZZY method measurement model. The third is the empirical analysis of the internal audit effectiveness measurement index system and its measurement model based on the university internal audit as a research sample.

### **3. CONSTRUCTION OF INTERNAL AUDIT EFFECTIVENESS MEASUREMENT INDEX SYSTEM**

#### **3.1. PRINCIPLES OF INDEX SYSTEM CONSTRUCTION**

The internal audit effectiveness measurement index system is a dynamic system with a structural hierarchy, rich content, and extensive extension. In view of this, this article believes that it should be explored and considered from multiple levels, different angles and its connotative depth, and consider the characteristics of the indicators in the indicator system that are all independent and related, and strive to build an internal audit. The effectiveness measurement index system is comprehensive and systematic. Based on this, in the process of constructing the internal audit effectiveness measurement index system, we should follow the following principles:

- (1) Scientific principles. The scientificity of the internal audit effectiveness measurement index system is the basis for ensuring that the measurement conclusions are true and accurate. Whether the measurement conclusion is scientific or not largely depends on whether the measurement price index, measurement standard and measurement method are scientific and reasonable.

Therefore, when constructing an internal audit effectiveness measurement index system, we must fully consider the overall structure of the internal audit effectiveness measurement index system, the scientific elements of the measurement elements and their specific indicators, and reflect the independence, representativeness, reliability, and relevance of the specific indicators.

- (2) Systematic principles. As an indicator system, it should be systematic in itself. For this reason, when considering the specific indicators used in the internal audit effectiveness measurement indicator system, we not only design the indicator architecture from different levels, different angles, and different dimensions, but also pay attention to the organic combination of quantitative indicators and qualitative indicators.
- (3) Comparable principles. We construct the internal audit effectiveness measurement index system, which is designed to comprehensively measure the general situation of China's internal audit effectiveness. Therefore, when designing the indicator system, this article should take full account of the universal applicability of specific indicators among various industries in China, that is, the spatial scope, content connotation, measurement caliber and measurement method of the indicators should be comparable. The horizontal comparison between industries must also facilitate the vertical comparison of various industries.
- (4) Data availability principle. The specific measurement indexes in the internal audit effectiveness measurement index system are both quantitative and qualitative. If it is a quantitative indicator, it is necessary to be able to obtain true and reliable data information; if it is a qualitative indicator, it is necessary to have a well-defined measurement standard, and to find a suitable review expert to evaluate objectively.
- (5) Operational principles. At present, it is an urgent need for audit practice to carry out internal audit effectiveness measurement. Therefore, it is imperative to construct an internal audit effectiveness measurement index system. Based on



this, the internal audit effectiveness measurement index system should have strong practical operability. When designing specific indicators, we not only consider the practicality of indicators in the internal audit of various industries, but also analyze that indicators can be adjusted appropriately for the particularity of individual industries or individual units and selected to achieve the organic unification of commonality and personality.

### 3.2. INDICATOR ARCHITECTURE DESIGN

According to the above principles, considering the overall systemic and structural hierarchical characteristics of the internal audit effectiveness measurement index system, combined with the actual situation of quantitative indicators and qualitative indicators coexisting in the internal audit effectiveness measurement, this paper takes the internal audit effectiveness as the measurement goal, audit capability, and audit "three systems" effectiveness in three dimensions, constructing a set of internal audit effectiveness measurement index system consisting of 10 constituent elements and 30 measurement indicators. Its structural design is shown in Figure 1-1.

The above-mentioned internal audit effectiveness measurement index system constructed by the internal audit effectiveness measurement index system diagram starts from the internal audit effectiveness measurement dimensions and constituent elements, and designs the internal audit effectiveness measurement indicators at multiple levels and from multiple angles. It is not difficult to find that the measurement index system has three significant characteristics. The first is comprehensively systematic. The index system is hierarchically decomposed and designed according to the dimensions of internal audit effectiveness measurement and its constituent elements, so the structure level is clear and comprehensively systematic. The second is practical operability. The selection of specific measurement indicators in the indicator system is in line with the actual situation of China's internal audit,





































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**Conflict of interests**

The authors declare that they have no competing interests in this section.

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