

**CNAO Country Paper**  
**ON**  
***LEVERAGING TECHNOLOGY TO ENHANCE AUDIT QUALITY AND***  
***EFFECTIVENESS***

## **1. Introduction**

Information Communication Technology (ICT) is transforming the economic structures, modes of production and lifestyles of our society with unprecedented impact, spread and penetration. IT development, as represented by cloud computing and big data, has exerted profound influence on all sectors of the world, and become a key impetus for social and economic progress. Nowadays IT systems have served as the basis for the day-to-day operations of various industries, without which some industries cannot even exist. However, issues concerning the reliability and security of IT systems are getting increasingly complex, with dramatic increase in data volume, which poses challenge to the national economic security. Therefore, only by upgrading the capacity of IT application and follow new circumstances and new problems arising in relation to IT development, can audit institutions perform their duties effectively.

It has always been one of the priorities of the National Audit Office of China (CNAO) to push forward the integration of ICT with audit activities and enhance the capacity building of auditors. With the implementation of Phase I and Phase II of the Golden Audit Project, CNAO has gradually improved the Field Audit Implementation System and Audit Project Management System, and carried out the engineering of online audit, which has facilitated the transformation of audit in three aspects, i.e. from post audit to the mix of post audit and concurrent audit, from static audit to the combination of static audit and dynamic audit, and from field audit to the integration of field audit and remote audit. Hence, the capacities for audit supervision on the part of Chinese audit institutions have been strengthened.

In 2012, the *CNAO Guideline on Further Accelerating the Development of IT Application in Auditing* put forward that "Researches shall be carried out to explore ways to build a national e-audit system in accordance with the overall deployments of national e-Government development." Also, in 2014, the State Council released the *Opinions of*

*the State Council on Strengthening Audit Work*, stating for the first time that "Relevant departments, financial institutions, state-owned enterprises and public institutions shall, in accordance with the requirements of audit work, provide electronic data and technical documents regarding the performance of their duties to audit institutions. They shall cooperate with audit institutions to conduct online auditing in the context of data and information security," and that "efforts shall be made to accelerate the IT application in auditing and increase auditors' competence by centralizing data further and building a national audit database". Furthermore, CNAO's *National Auditing Standards* have attached special attention to IT systems and IT-based audit. All in all, the provisions above have cleared the way for aggregating big data in the government audit cause in China, provided directives for upgrading audit technologies, and thus guaranteed the proper development of government auditing in China.

## **2. Usage of Information Technology and Its Impact in Government Auditing in China**

CNAO, together with other government departments, has attached importance to IT application, and thus ICT has become an effective weapon to enhance audit quality and efficiency. Meanwhile, the IT application in various audited entities has also brought about new challenges to government auditing. To cope with that, CNAO has put forward the establishment of a national audit data system and accelerated IT development in auditing, so as to boost supervision through auditing, give full play to the role of auditing in promoting the implementation of major national decisions, deployments and relevant policies and measures, better serve reform and development, maintain sound economic order, and push forward the sustainable development of economy and society.

### **2.1 The Progress and Application of ICT Pose Huge Challenge to Government Auditing.**

In 2012, the issuance of *Guidelines of the National Informatization Steering Committee on China's E-Government Development* marked the beginning of a phase of rapid development of E-Government. In the past decade, various E-Government systems have become important channels for enhancing governance capacity and building a service-oriented government. Currently, 70% of China's central and provincial governments provide E-government services. However, E-government in China is still

fragmented, and lacks proper planning, with insufficient information sharing and business coordination. At the same time, E-government systems involve national secrets and highly sensitive core government affairs, and constitute the technical basis for the steady development of China's economy and society, which have become a new battlefield of national security in the Internet context. For the banking sector and real economy, IT systems have served as the key vehicle and core competitiveness of various operations, while the capital flow, business flow and management flow are all reflected as electronic information. Hence, great attention has been paid by Supreme Audit Institutions (SAIs) to auditing the security, reliability and economy of E-Government systems and to ensuring the truthfulness, accuracy and completeness of electronic data.

## 2.2 The Application of and Innovation in Audit Technologies Boost the Audit Quality and Efficiency, and Provided a Development Opportunity for the Audit Cause.

The audited entities of government auditing have generally accelerated the process of informatization, posing major challenges to auditing, which SAIs must handle with their own IT development. CNAO has formed an overall framework with one application system that meet the demands of audit tasks and audit management, one batch of data resources that support audit businesses and management, one online system that facilitates hierarchical communications and information sharing, one safeguards system that maintains information security and system operations, one service system that guarantees system maintenance and applications, and one audit team that adapts to the needs of IT development. These achievements have laid a solid foundation for the implementation of Phase III of Golden Audit Project and for the establishment of national audit digital system, and provided technical support to the rational development of the audit cause. Against this background, during the 11<sup>th</sup> Five-Year Plan, the number of audited entities increased by 14.6%, audit-driven revenue increase or expenditure reduction amounted to 327%, number of transferred leads or cases raised by 109%, and the number of improved mechanisms or systems grew by 40%, which have all been achieved with no significant increase in audit personnel. Although those were clearly induced by various factors, yet IT development constitutes one of the key and fundamental causes.

### **3. CNAO Major Practices in ICT-aided Auditing**

#### **3.1 Performance Audit of E-Government to help build an open, transparent and service-oriented government**

To facilitate the role of E-Government in building an open, transparent and service-oriented government, it has been explicitly stated in the *CNAO 12<sup>th</sup> Five Year Plan on Audit Development* and *Opinions of the State Council on Strengthening Audit Work* that audits concerning the safety, reliability and economy of IT systems shall be carried out. Recently, CNAO has adopted the following practices in auditing E-Government systems.

##### **3.1.1 Associate E-Government Audit with Financial Audit**

Financial Audit has been one of CNAO's priorities for long. In association with financial audit, CNAO conducted audits of IT development in financial departments and of the IT systems of social security and housing provident fund, to reflect the compliance of audited entities in fund application, use and management, and business processes, as well as the influence of those IT systems and data on the truthfulness and compliance of audited entities' financial revenues and expenditures.

##### **3.1.2 Attach Importance to Auditing IT System Application and Controls, with a Focus on the Reliability of Functions**

The latest version of *National Auditing Standards* clearly pointed out that "design defects of IT systems" deserves the special attention of materiality judgment in auditing. CNAO's E-Government audit shall attach importance to the overall business processes, output and input, parameter setup and the reliability of interfaces in application systems, to ensure the compliance, correctness and accuracy of their function design and system control, to disclose flaws in the design and implementation of E-Government systems and thus to urge audited entities to improve on functions of IT systems.

##### **3.1.3 Pay attention to Auditing E-Government Projects, with an eye to Boost Project Quality and Performance**

The proper application of E-Government requires constant upgrading and development of systems, which means the approval, implementation and acceptance of IT projects are regular activities. CNAO conducted key audits concerning the decision-making,

investment, approval, tendering and acceptance, to assess whether the E-Government projects meet the stipulations of national policies and regulations and requirements as set by competent departments, and whether they are economical and in compliance with disciplines and regulations.

#### 3.1.4 Conduct Audit and Audit Investigation of E-Government development, to Reveal Outstanding Problems

Through audit and audit investigation of E-Government development and IT development in key departments, CNAO has revealed the common and outstanding problems of E-Government sector, and made relevant audit recommendations, which has facilitated the improvement of E-Government management systems and disclosed systematic and macro issues through those audits.

### **3.2 Strengthen audit supervision and assurance through ICT-based audit technical innovations**

It was stated in *the Guidelines of the National Informatization Steering Committee on China's E-Government Development* that the Golden Audit project shall be accelerated. It was also asserted in the *12<sup>th</sup> Five-Year Plan on the IT Development of National E-Government Engineering* that key IT systems including Golden Audit project shall be continuously sped up. Moreover, it was put forward in the *Opinions of the State Council on Strengthening Audit Work* that IT application in auditing shall be accelerate and a national audit database shall be built, to increase auditors' competence; ways shall also be explored to apply big data technology to audit practices; efforts shall be strengthened to utilize big data comprehensively and improve the ability of using information technology to examine problems, to judge, and to macro-analyze information; innovations shall be made in electronic audit technology, to improve the ability, quality and efficiency of audit work.

In accordance with those requirements as made by the central government, CNAO has adopted the following practices in audit technical innovation and application.

#### 3.2.1 Push forward the IT application in Audit Operations, to Boost the Transformation from Traditional to Modern Audit

CNAO made an overall planning on the development of the Golden Audit Project. After over a decade of development and application, the Phase I and II of the Golden Audit Project have been successfully implemented, whereas the Phase III is under planning, which has facilitated the establishment of audit informatization. CNAO's extensive application of IT audit technologies has facilitated the transformation from traditional audit to modern audit, boosted the improvement of audit supervision, and played an irreplaceable role in all types of audits, especially in nationwide large-scale audit projects. For example, in the 2011 audit of local government debt, with the aid of ICT, CNAO was able to complete the audit of 86,000 audited entities, over 73,000 projects and 2,454,600 debts across China within four months; in the 2012 nationwide audit of social security funds, it took CNAO only more than three months to finalize the entire audit project, after collecting data of three categories and 18 entries, making overall analysis and separate verifications.

### 3.2.2 Give Continuous Impetus to the Digitalization of Audit Management, to Enhance Control Standards

CNAO developed an office automation system (OA) for audit management to digitalize its work. The OA system has embodied the concept of paperless office for the document management process from drafting and approval to browsing, enquiry and filing, for the audit management process from audit planning, project execution, assurance review and to statistics and filing, and for the administrative management process from human resources, online training to instant messaging. With tailor-made modules, audit management has been digitalized and communication facilitated.

### 3.2.3 Take a proactive Approach to Aggregate Cross-cutting, Cross-sector Audit Data through Multiple Channels and Build a Big Data Center, to Strengthen the Analytical Capacity of Audit Data

It was put forward in the *Opinions of the State Council on Strengthening Audit Work* for the first time that relevant departments, financial institutions, state-owned enterprises and public institutions shall provide intact, accurate, and authentic electronic data in accordance with the requirements of audit work. Based on that provision, CNAO is actively aggregating, analyzing and utilizing data across various sectors and departments and at multiple levels, to push forward the building of a big data center and analytical models, support the representation of cross-sector and multidimensional data

analysis, and enhance the comprehensive analytical capacity of audit data. For instance, we could construct large data sets with databases including government debt data, social security data, macro economic data, financial market data, and etc., apply analytical tools such as data digging, and make cross analysis of various databases to examine events relating to the macro economy.

Besides, as unstructured data takes up 60-80% of all the data in our society, its integration with structured data will help increase audit institutions' ability to identify risks in national economy and society and serve as early alarm. Moreover, it can easily locate issues of social concerns and enhance the relevance of auditing. We are exploring the application of new analytical technologies to unstructured data like images and texts during auditing. For example, we used Geographic Information System (GIS) and Global Positioning System (GPS) in investment auditing, to realize the global observation, positioning and geographic measurement of surface objects, and provide a brand new perspective and means for the management of engineering projects; in enterprise audits, we analyzed textual data including the audited entities' internal regulations, meeting minutes, annual work reports, notes to financial statements, and external audit reports, to determine with high efficiency the scope and priorities of substantive testing.

#### 3.2.4 Hold Audit Technical Trainings of Various Kinds, to Enhance Innovative Thinking of Audit Managers and Cultivate IT Audit Experts

Audit institutions in China have attached great importance to the training of personnel skilled in IT auditing, and provided enormous inputs to attain good results. In terms of IT training, we have persisted in the combination between practices and prospective studies, between IT expertise and audit operations, and between pervasive training and specialties, so as to form a multi-layered training system with clear priorities. Since 2001, CNAO has held 43 IT audit trainings in total, with an average length of roughly 600 hours; more than 4500 people have passed CNAO high-grade IT audit exams and received certifications, which covered network technologies, database application, audit data collection and analysis, ERP system auditing and so on. Furthermore, we have followed closely the latest development in ICT, and held follow-up trainings on IT system audit, senior training on big data audit analysis, and workshops on audit technical innovations. Those training and workshops have helped greatly sharpen the IT

skills of auditors in China's audit institutions, improved the structure of auditors' IT knowledge and skills, and built teams with masters in IT auditing and information management.

#### 4. Future Prospects

Today, with the emerging of new technologies, new industries and new applications as represented by ultra-fast broadband, next generation mobile networks, cloud computing and Internet of Things, the development of new audit technologies and applications has become the inevitable choice of government auditing. Without the informatization of audit supervision or the digitalization of audit management, we will be exercising "slash and burn" under new circumstances.

The technical innovation and application in auditing are not only a technical issue but also involve many aspects including data resources, human resources and innovation incentives. CNAO is devising relevant measures and strategies, to create an atmosphere that facilitates audit technical innovations and promote further IT development. For instance, CNAO is applying for the Phase III of Golden Audit Project against the background of big data; we have built a professional team for big data analysis, and held senior audit seminars for big data analysis, to nurture the analytical skills of government auditors for big data. We believe that, standing at the new beginning of the next generation of ICT development, we will be able to reach a new height of audit technical application and innovation.

#### References

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