

Government Information System Audit Should Focus on E-government

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Abstract—Government information system audit, as the frontier field of computer audit carried out by national audit institutions has developed rapidly in recent years. However, it prefers state-owned financial institutions and large state-owned enterprises to e-government affairs. This paper reviews the e-government audit carried out by the top audit institutions of various countries, analyzes the problems in the construction and operation of e-government in China, according to which it puts forward that the audit of government information system should be put more on e-government at the present stage, and proposes suggestions on how to strengthen the audit of e-government information system by the national audit institutions.

Keywords—Government audit; electronic government; information system auditing

I. GOVERNMENT INFORMATION SYSTEM AUDIT AND E-GOVERNMENT

Information system audit refers to the examination on auditee' information system and its planning, research and development, implementation, operation, and maintenance, and the determination of its information security, effectiveness and economical efficiency of the system and whether the information system can effectively utilize organizational resources and help to realize the organizational goals^[1]. There are many organizations in China carrying information system auditing. Most of them are the state audit institutions, internal audit institutions, accounting firms, management consulting companies and other social intermediary organizations. According to the subjects of information system audit, they can be assorted into government, internal and social levels. The e-government in this paper, in the generalized sense, refers to the government investment information construction process and the formation of hardware and software information assets and services. In addition to the website of the government, e-government system also includes government key information construction projects like the "12 golden project" and various information system invested by the state for public services. Government information system audit, as a new frontier, on which national audit institutions carry out the computer audit, has been mainly focusing on the state-owned financial institutions and large state-owned enterprises in recent years, such as the China Development Bank, SINOCHEN, and China Eastern airlines. It also gained great achievement on their information system audit, but kept a close eye on the electronic government affairs. Auditing is only carried out on financial informatization in the financial revenue

and expenditure of a province, social security information system in social security fund, department budget implementation in the department informatization construction, and the new rural cooperative medical care system in the new rural cooperative medical care. So far, the national audit office has not organized the information system audit of the "12 golden projects" national key e-government projects, such as golden tax and golden customs.

The author made an investigation on the information system and auditing of some financial institutions, enterprises and administrative institutions. It can be seen from the results that organizations like financial institutions, large state-owned enterprises and the listed companies do better in informatization and their internal auditing department perform well in information system auditing. These organizations, generally, face relatively low risks in information system as they can empower their internal audit or entrust the intermediaries to carry out it. Whereas, administrative institutions, the main body of investing the construction and operation of e-government, face high risks in information system, due to the facts that they are weak to conduct internal auditing with regards to the personnel quality and cadres' attitude toward it, and they are reluctant to turn to the intermediaries.

To recap, the author believed that the national audit institutions should strengthen the information system audit of e-government, take e-government as the main channel of government information system audit to promote the sound development of e-government and informatization construction in China.

II. INTERNATIONAL E-GOVERNMENT AUDIT PRACTICES

From the audit practices of the international organization of supreme audit and some national supreme audit institutions, it can be seen that the national audit institutions attach great importance to the information system audit of their own e-government, however, with different emphases.

A. *The long-term concern on e-government auditing by supreme international audit organization*

In recent years, the international organization of the supreme audit institution and its IT working group have always taken e-government audit as the focus of IT audit, and held meetings to study and discuss how to promote the

e-government audit of the supreme audit institutions of each country.

In April 2004, the audit committee of the international organization of the supreme audit institutions held its fourth working meeting on effectiveness audit in Moscow. The topic was how to carry out effectiveness audit on e-government. The conclusion it reached was that e-government is a transformation of government services, so the government faces the redesign of business processes. In a word, the expansion of audit objectives of audit institutions leads to its own new challenges.

On April 15, 2010, the IT audit team of world organization for audit held the 19th annual meeting in Beijing with the theme as "Performance Indicators of IT project effectiveness and Investment Success", China's audit office put forward that with the rapid development of China's information industry, e-commercial and e-government project is increasing, and national economic management informationization gains momentum, which pose severe challenges for the means of audit work. Therefore, it is necessary to establish an applicable and widely recognized measurement index system to promote the standardization of IT project performance audit.

In 2013, the 21st world audit congress was held in Beijing. It had approved the IT audit manual of the supreme audit organization, taking e-government audit as an emerging field and key content of IT audit.

B. The E-government audit focuses on government information security.

The United States government attaches great importance to the development of e-government. Since 1993, presidents like Clinton and Bush have adopted a series of measures to make the United States the most developed country in e-government. Correspondingly, the General Accounting Office (GAO) puts the e-government audit high on the agenda. According to the statistics, from fiscal year 2008 to 2018, the GAO have issued a total of 55,108 audit reports, including 2,682 e-government audit reports with 773 information management reports, 459 information security reports and 1,450 information technology reports.

In particular, the United States thinks highly of the government information security. In December 2002, after the enactment of the E-government Act, the United States implemented FISMA (the Federal Information Security Management Act of 2002) which is the chapter 3 of the Act to ensure the information security of its government agencies. The national audit office of the United States has conducted the information system audit of the Federal Reserve from 2010 to 2017, and found a total of 16 general control defects, mainly in access control, configuration management and security management and other aspects (shown in TABLE I). On this basis, it has raised 16 suggestions on auditing^{[2][3]}.

TABLE I. DEFECTS IN THE FEDERAL RESERVE'S FINANCIAL INFORMATION SYSTEM CONTROL FOUND BY THE NATIONAL AUDIT OFFICE FROM 2010 TO 2017

Year	Number of control defects	Where the defects exist	Defect nature	Number of suggestions on auditing
2017	2	Access control and configuration management	General control defects	2
2016	3	Security management and configuration management	General control defects	4
2015				
2014	4	Access control and configuration management	General control defects	4
2013	2	Security management	General control defects	
2012				
2011	1	Access control	General control defects	1
2010	4	Security management access control and	General control defects	5

C. UK audit office's focus shifting from IT performance to IT risks management

The audit practice of the UK audit office on e-government projects began in 1984, mainly focusing on the performance of the information technology service management. For example, in 2002, the report named Providing Better Public Services through E-government was submitted^[4].

Since 2011, the UK audit office has submitted 27 e-government audit reports, focusing on how the UK government deals with specific challenges and risks when providing information technology services. The Government Digital Transformation released in 2017 shed light on the difficulties and challenges that the British government faces in the mathematical transformation^[5]. The 2016 audit report "Protecting Government Information" pointed out that the cabinet, government and public departments need new methods to deal with the risk of government information leakage caused by network crimes^[6]. In 2013, Manage Risk from Legacy Public Service Information System indicated that the costs and

risks of various legacy critical public service information systems should be properly dealt with^[7].

III. CURRENT DEVELOPMENT OF E-GOVERNMENT REQUIRES INTENSIFIED AUDIT OF GOVERNMENT INFORMATION SYSTEM

A. National audit department's responsibility of intensifying audit of e-government, reflecting governance's role of immune

After more than a decade's construction with the gross investment of over 600 billion RMB up to 2014, China's construction of e-government system have achieved great progress with booming development.

The government has attached great importance to the construction of e-government system and dominates the work at the outset. According to *Guidance of National Informatization Leading Group on China's Construction of E-government*, the government should lead national economy and social development into informatization when the construction of e-government system is the key emphasis in it.

It is also referred in *The Report of the 17th National Congress of CPC* to improve the government responsibility system and the public service system, promote e-government and strengthen social management and public services. As *The 13th Five-year Plan on National Government's Informatization* claims, an integrated governmental information platform, a public infrastructure with joint construction and sharing, must be established to satisfy the need of E-government application at the end of the 13th five-year plan.

It is national auditors' obligated responsibility and inevitable requirement of governance's role of immune system to conduct e-government audit based on its importance, finance resource, investment entity and project implementer.

B. Strengthening audit of e-government system for national information security

E-government has become the security weak link of national information due to endless network attack, weak safety awareness, incomplete protection measures and lack of internal supervision. National information security is confronted with severe challenge when the confidential stealing is of frequent occurrence. Taking government portal website for example, *2017 China Internet Security Report*, issued by National Internet Emergency Center, shows that there were 20,111 distorted domestic websites in 2017, presenting a 20.0% increase from 16,758 in 2016, in which government portal websites accounts for 3.1%, showing an increase of 0.3 percent point, and the number growths from 467 to 618, up 32.3% from 2016. In 2017, 29,396 booby-trapped domestic websites were detected, 1339 government portal ones accounting for 4.6%^[8]. Disturbed by increasing defacement and back doors, government portal websites have become chief targets of attack from cyber hackers and criminals.

Audit on e-government information system can help state auditors discover loopholes and hidden dangers in design, construction, management, maintenance and procedures of e-government to reduce risk of secret leak and safeguard state information security. In 2007 September, China National Audit Office's (CNAO's) Defense Industry Audit Office conducted audit on construction, service and maintenance condition of information system in a central department over recent five years, only to find potential safety hazard existing in the national information system, drawing great concern from the State Council and relevant departments. This action made a successful attempt in audit on e-government information system and protection of national information security.

C. Strengthening audit of e-government system to ensure governments' responsibility fulfillment

China's E-government Framework, released by national leading group on informatization, clearly points out that e-government is the key emphasis in national informatization, an important measure for further administrative restructuring and an effective means in supporting party committees at all levels, the National People's Congress, the Chinese People's Political Consultative Conference, governments, courts and procuratorates in their performance. In addition to application system providing technical support of e-government to finance, taxation, customs, public security, social security and other

departments, establishment of service system open to the public, enterprises and institutions also needs consideration. Therefore, as the core of government agency's daily performance, information system's regular operation directly affects efficiency and reliability of organization works. At present, a range of issues, such as fragmented and repeat construction with irrational structure, low level of operation system, limited application and service, lagging development of information resource, poor interconnection and sharing and others, seriously impacting e-government's efficiency and reliability.

D. Strengthening audit of e-government system to increase investment benefits of informatization

According to *Guidance of the General Office of the State Council on Promoting the Coordinated Development of E-government (2014, No. 66)*, thematic e-governance performance evaluation should be conducted by audit, finance, and development and reform departments, further building assessment system, to lead e-government into healthy development.

According to the statistics from Gu Dawei, deputy director of High-tech Industry Division of National Development and Reform Commission, since 2002 August, when *Guidance of China's Construction of E-government (No. 17)* was officially issued by national informatization leading group, total investment in national construction of e-government has been over 30 billion RMB by the end of 2009, 13 billion of which is from central government. As is well known, as a complicated system program of large scale in long term, e-government would face with enormous risks in construction, operation, maintenance and other phases, with success rate of approximately 40% based on foreign experience. It is called economic sink hole due to high input with come-out not meeting expectations. So that effective risk control matters a lot and deserves attention from information system audit.

IV. IMPROVING MEASURES OF E-GOVERNMENT INFORMATION SYSTEM AUDIT STATE AUDITING DEPARTMENT CAN IMPLEMENT

A. Integrating point and sphere in active audit

To conducting project audit in flexibility arrangement according to plan and resource. On the one side, more content and requirements should be taken into consideration in the audit of financial revenue, expenditure and profit of e-government, implementing a combined information system audit, to extend audit coverage. On the other side, some audit experts can be invited together to conduct independent audit on golden tax, golden gate and other major national e-government project, further exploring audit techniques and methods with Chinese characteristic and establish a performance evaluation index system^[9]. With the point and the sphere integrated, e-government information system audit can development in both breadth and depth.

B. Perfecting the laws and regulations and expanding audit authority

E-governance in national audit institution is still restricted by inadequate legal authorization. According to article No.32

in *Audit Law of the People's Republic of China 2006* and *Notice of General Office of the State Council on Issues of Audit Work with Computer Information Systems (2001, No.88)*, audit institution has right to inspect electronic data and information system of the audited entity using computer to manage fiscal and finance revenue and expenditure.

However, inspection and audit are only allowed in fiscal and finance revenue and expenditure information system, which is far from adequate. In fact, a complete information system is consists of programmer, project life cycle, service availability, information assets protection and other parts. *Guidance of National Audit Office on Inspection of Information Systems*, issued recently, also suggests that the audit should pay more attention to data and interface, backup for disaster recovery, construction management and performance, function and operation of information system, security management including physical environment and software security and other aspects. If limited in fiscal and finance revenue and expenditure system when conducting audit, the national audit institution cannot get adequate evaluation in security, validity and economy efficiency of e-government.

Numerous issues and defects have been found in information system during audit practice, but it is hard for auditors to implement qualitative analysis and other process on them since the lack of legal provisions, including laws on self-correcting requirement. It will further impede audit on government information system if a large number of relevant issues are only subordinate to finance auditing at the end of audit report.

In this condition, audit authority is supposed to be expanded and Audit Law be amended to clarify national audit institution's right and response to conduct audit on e-government information system instead of limiting in systems related to fiscal and finance revenue and expenditure. In South Korea, it is specified in that the government computer network items must be audited by the Korean Audit and the Control Yuan^[10]. Therefore, we should strive to add the clauses that strengthen the regulation on auditing in the upcoming *E-government Law of the People's Republic of China*^[11].

C. Strengthening personnel training for professional skills

Although highly motivated in audit work, audit institutions still suffer from bottleneck of professional talents since technical procedures and methods require knowledge structure of high level. There are three levels for audit institutions, the first level is for computer professional, the second for personnel who passing medium level computer examination organized by audit commission, and the third for personnel certificated by Audit Office (AO). However, there is still a limited quantity of auditors equipped with audit capability of

information system at present since the two-examination mentioned above have not involved content about it. Audit of information still faces with tremendous risk due to virtualized network information processing, dynamic evidence captures, complicated content control and auditors' simplex knowledge structure.

Talents can be cultivated by following two ways. Firstly, they are encouraged to take part in Certified Information System Auditor (CISA), organized by Information System Audit and Control Association (ISACE). Having published 16 audit standards, 39 guidelines and 11 procedures, the exam has been widely recognized around the world and become the professional standard of practice in information system audit. Secondly, more contents about information system audit should be added into medium level computer examination to enable professional technique in large-scale e-government audit.

Based on analysis and summary of Chia's audit on government information system, contents and features of e-government audit conducted by supreme audit organizations in the USA and UK, this paper suggests that China should focus on e-government audit and improve it by strengthening law system and talent team. However, learning practical experience from other countries, China still has to improve itself in fundamental mode, technique specification, audit standard and other specific aspects of e-government audit.

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