

BAI of Korea's IT Audit System for Effective Audit

1. IT Audit Environment in Korea

Since 2001, the Korean government has continuously carried out the e-government project to renovate the governmental work process and to provide advanced administrative services by selecting it as one of its major government projects.

As shown in the Table1, a total of 6,430 e-government projects were carried out in 2013. The central government spent KRW 2trillion 997.7 billion for 730 projects and the local government spent KRW 916.3 billion for 5,700 projects.

[Table1] Status of e-government Projects in 2013

| | | Total | Types of Projects | |
|--------------|------------------------|---------------|-------------------|---------------|
| | | | New | Continuous |
| Total | No. of Projects | 6,430 | 1,196 | 5,234 |
| | Budget | 39,140 | 3,173 | 35,967 |
| Central | No. of Projects | 730 | 68 | 662 |
| | Budget | 29,977 | 1,115 | 28,862 |
| Local | No. of Projects | 5,700 | 1,128 | 4,572 |
| | Budget | 9,163 | 2,058 | 7,105 |

As a result, the government implemented the digital system throughout almost all sectors, not only for the database for specific areas, such as NEIS (education), Happiness-um (welfare), Korea e-Procurement System (procurement), but including whole governmental database systems, such as the Digital Budget and Accounting System (dBrain) and the local finance system (e-hojo).

As an example, the Digital Budget and Accounting System (dBrain), established in January 2007, is an integrated financial management information system. It administers all the

national financial activities, including the budget formulation, execution and settlement. Through the dBrain system, approximately 15 thousand of central and local governmental officials process 200,000 budget execution cases, amounting to KRW 3trillion on average, per day.

As a result of these efforts, Korea ranked 15th in the field of e-government in 2001, according to the UN. The ranking continued steadily to rise, resulting in Korea ranking first in realizing e-government from 2010 to 2014. Along with the changes in the audit environment, the Board of Audit and Inspection of Korea (BAI) has also developed audit foundations and audit methodologies.

2. BAI's IT Audit Foundation

In correspondence to the changes in the audit environment, the BAI established an information system to support auditing. Additionally, it has established an IT audit department and provided IT utilization training to build and enhance the capacity of the auditors.

(1) Establishment of the Information System

Since adopting the central computerized processing system in 1977, the BAI has made efforts to transfer hard data (such as collected audit materials) into soft data.

More specifically, the BAI launched the e-audit system in 2004, comprehensively supporting all processes of audit administration, from the planning stage of audit to the implementation stage of the audit results.

Moreover, the BAI proclaimed "the establishment of IT-based audit system" as a major audit strategy and launched the improved version of the information system, also known as OASYS¹, to share information on audit methodologies and recommendations.

¹Open Audit SYStem

(2) Establishment of the IT Audit Department

The BAI classified IT audit into two categories: audit of the computerized data and audit of the computerized system. In 2014, the BAI established “Advanced IT Audit Support Team” and “IT Audit Bureau” as the IT audit departments. [Table.2]

The advanced IT audit support team provides assistance in "auditing with computerized data" by collecting the digitalized data from the auditees and analyzing the DB structure of the digital system using the Digital Budget and Accounting System (dBrain) and the local finance system (e-hojo). The IT audit bureau conducts direct audits on 18,000 IT systems operated by public entities.

[Table 2] IT Audit Department

| Teams | Advanced IT Audit Support Team | IT Audit Bureau |
|-----------|---|--|
| Personnel | 24 | 26 |
| Functions | <ul style="list-style-type: none"> ● Collect, manage and analyze digitalized data ● Develop analytical methodologies and tools ● Provide support in analyzing digitalized data | <ul style="list-style-type: none"> ● Audit on ICT policies ● Audit on ICT projects |

(3) Capacity Building on IT Audit

The BAI conducts following measures to strengthen auditors' capacity in IT audit and to promote audit performance.

Firstly, training on IT audit methodologies is frequently provided to all staff members at the BAI. This applies especially to newly-recruited staff, as they are provided with an intense month-long practical training. In 2012, a book of IT utilized audit cases was published, containing major audit cases and specific audit approaches. The book was disseminated to BAI members and internal audit units in an effort to improve and enhance the IT audit capacity at the BAI.

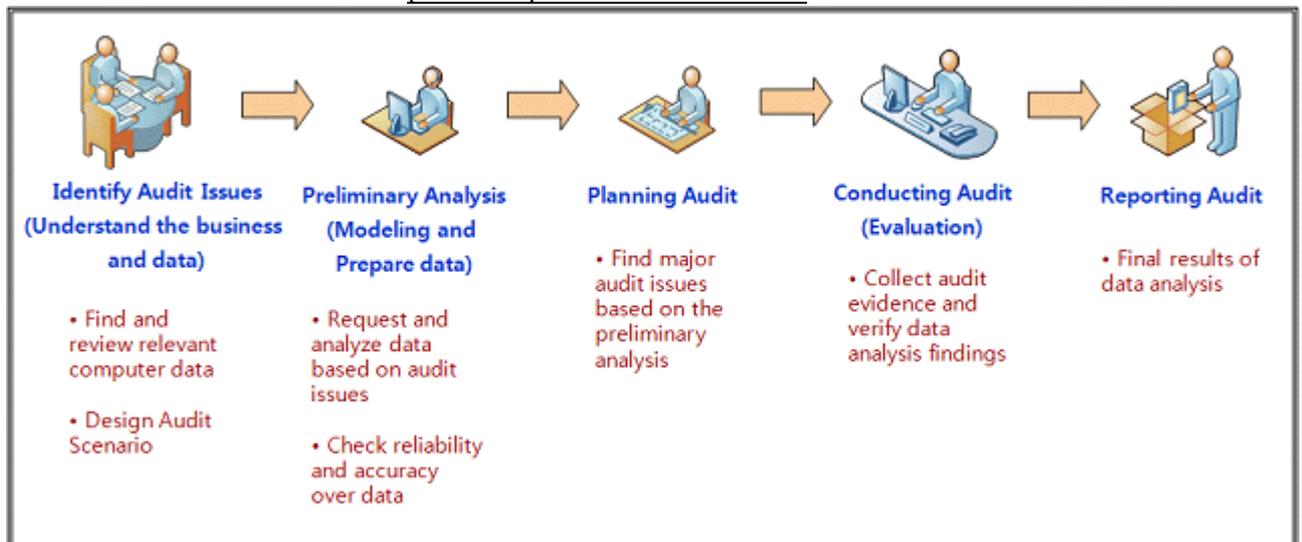
Secondly, the BAI hires IT specialists to increase audit capacity and performance of the IT systems audit. In addition, the BAI compensates its staff for the cost incurred from IT education or from acquiring IT-related certificates.

3. BAI's IT Audit Procedures

IT audit is composed of the following procedures: identification of audit issues, preliminary analysis, audit planning, audit practice and audit reporting.

In the stage identifying audit issues, the whereabouts of the necessary materials are defined. Based on this, the audit scenario is devised. In the preliminary analysis stage, data requests and data analysis are carried out. The reliability and accuracy of the data are verified. While planning the audit, there is a focused emphasis on suspicious cases based on the result of the data analysis. In performing the audit, evidences of suspicious cases are collected and the final verification is conducted. Finally, on the stage of reporting the audit, the BAI provides finalized results of the data analysis and appropriates necessary recommendations.

[Picture1] IT Audit Procedures



4. BAI's IT audit methodologies and Tools

To effectively perform IT audit, it is essential for the BAI to utilize IT tools and apply appropriate analytic methodologies to facilitate collecting large-scale data and analyze it within a limited span of time.

(1) IT Audit Methodologies

The BAI of Korea applies various methodologies to analyze large-scale data, such as data matching, data mining and geo-spatial information system analysis, etc.

. **Data Matching:** It integrates more than two variables to find out logical fallacies and contradictions. It is the most widely used method, not only in Korea, but also in other supreme audit institutions. The examples of data matching are as follows:

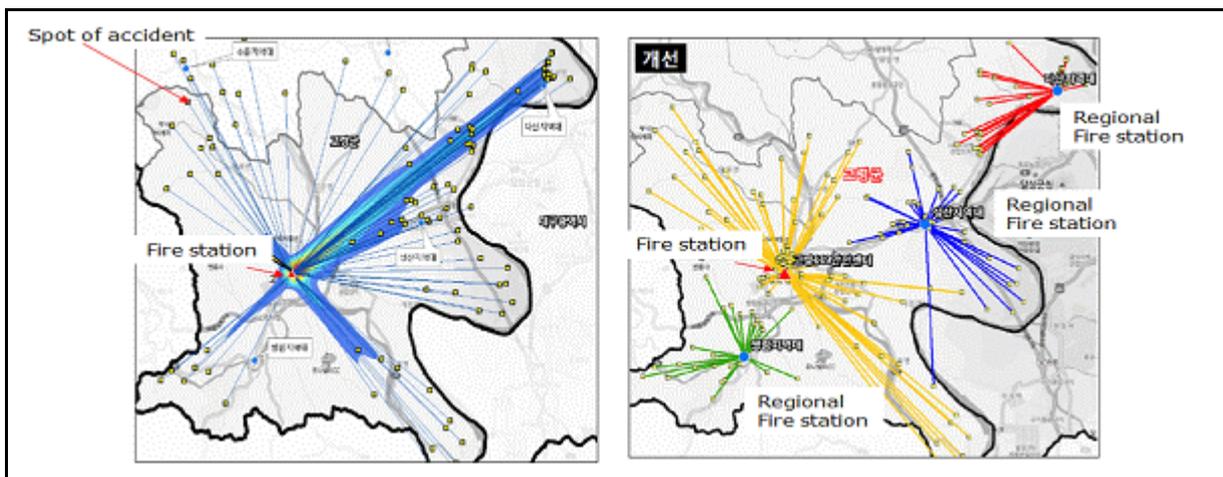
- Extraction of records of drunk driving accidents, registered in the computerized transportation system of the police department (e.g. identity information)
- Compare the data from the labor insurance system with the records of drunk drivers to check if drunk drivers had received workers' compensation
- Detect cases of people receiving unjust insurance benefits and recover the distributed benefits

. **Data Mining:** It is the computational process of discovering hidden patterns and relations, which can be found in large databases. By modeling the patterns and relations, it transforms them into useful information for future use. The examples of data mining are as follows:

- . When public institutions(including the central government) use credit cards owned by the institutions or the government, information, such as date, time, the amount of purchase, the vendors, along with the type of business should be recorded into the Digital Budget and Accounting System (dBrain)
- Collect suspicious transaction records taking place during weekends, late nights or at inappropriate places; detect unjust uses and request budget redemption

. **Geospatial Information System:** It computes audit results by figuring out the geospatial distribution of the data. The data is then used to identify the concentrated locations of the emergency rescue requests, and using the geospatial information system, as shown in [Picture 2], the requests are then distributed to the closest regional rescue center to be dispatched more efficiently.

[Picture 2] Case of Application and Analysis of the Geospatial Information System



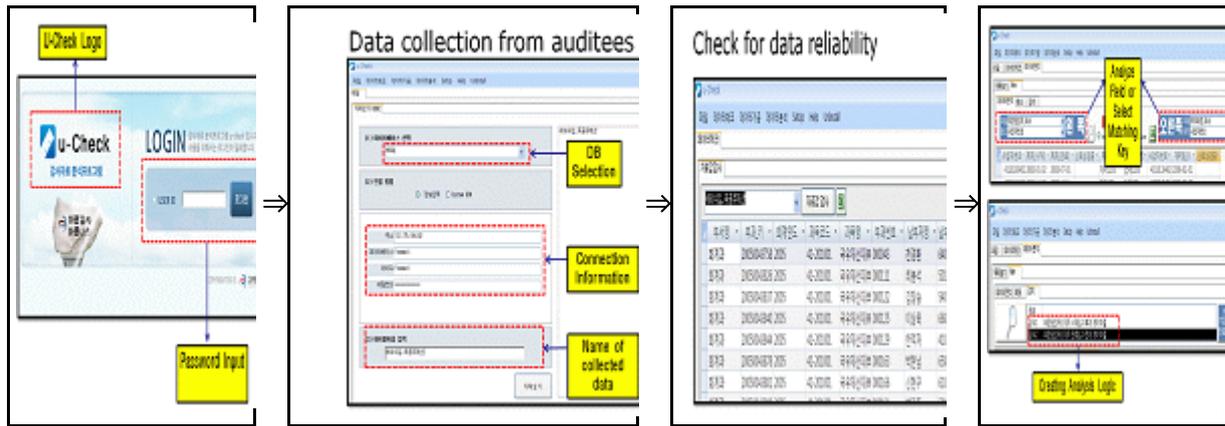
(2) Tool for IT Audit

Since the late 1990s, the BAI of Korea has actively used the data matching method, using common programs, such as the Microsoft Excel and Access, as analytic tools.

It is, however, suggested that the tools should provide easy application of the frequently required functions for IT audit, such as verification of duplicative work. In line with this, the BAI of Korea developed U-Check, a digital information analysis program, in 2013, and has been using it efficiently since then.

The U-Check program extracts necessary materials from the auditees' database and verifies data reliability and data matching. It supports a whole process of analyzing digital information. [Picture 3] illustrates how to use the U-Check program.

[Picture 3] Use of the U-Check Program



5. Main IT Audit Cases (inspection on the delivery system of welfare payments)

(1) Audit Background

The Ministry of Health and Welfare (MHW) established an integrated social welfare management system in 2010 to administer welfare projects more effectively. The system is associated with 452 official documents from 42 entities, along with financial information from 131 financial institutions, including banks. The MHW provides local governments with the collected data to help select recipients for the welfare payments.

However, those who do not qualify are being granted welfare benefits. A leakage in the welfare budget has become one of the factors threatening financial soundness. The BAI conducted an audit on the delivery system of the welfare payments to inspect the cause of the leakage and to enhance the effectiveness of the delivery system.

The audit was conducted in 2013, with 50 auditors targeting the MHW, whom operate the integrated social welfare management system, Korea Health and Welfare Information Service, Ministry of Security and Public Administration (MOSPA) and the local governments.

(2) Main Audit Methodologies and Audit Results.

The BAI compared the resident registration data from the MOSPA with the list of recipients from the integrated social welfare management system to check if the welfare allowances were being paid to those who were deceased.

It was revealed that the welfare allowances were inaccurately delivered to 320,000 deceased persons from 2010, with the amount totaling an estimated KRW 63.9billion.

.The BAI compared the earned income data from the National Tax Services (NTS) with the list of recipients of the basic livelihood security payments, in order to check if the basic livelihood security benefits were being paid out to those who are able to work or have earned income. The basic livelihood security payment should be set for those who do not have income, but it was discovered that financial support was being incorrectly delivered to 4,229 people, who were actually earning an income.

. The BAI compared MHW's data of child care benefits recipients with the resident data from local governments, to inspect whether or not nursery facilities were receiving infant caring subsidies by falsely registering children.

As a result, it was found that 131 nursery facilities had dishonestly registered the number of children and, therefore, been receiving wrongful subsidies.

6. Future Tasks

Firstly, after the development of the IT systems, the BAI has retained its role in carrying out ex post facto measures in the process of realization of e-government. It is important for the BAI to inspect each IT system, to ensure that it is operating effectively. However, it is also vital that the BAI conducts feasibility studies of the e-government projects through a national point of view to prevent the occurrence of duplicate projects and investments before developing the IT systems. The BAI should also reinforce its role as a coordinator or as an advisor before the systems are developed.

Secondly, it is becoming increasingly difficult to collect digital data due to the trend of strengthening the security of personal information. Along with heightened information security, growing concerns for information leaks, the diffusion and the use of information for unwanted purposes, auditees are reluctant to submit requested data. It is required to

systematically organize the data obtained from auditing to preserve them safely. It is strongly recommended that the BAI should prepare legal grounds to gain access to personal information and to seek methods for managing and protecting the collected information.