EUROSAI
INNOVATIONS

BUDGET MONITOR
Analytical portal of State
Audit Office

BUDGETMONITOR.GE

NKÚ | Czech Republic Supreme Audit Office

MODERN VISUALISATION OF THE REGISTER OF AUDITED BODIES

Public administration collects a large amount of data, which contains a great fortune. However, only a small part of these data is available in the form of open data and therefore cannot fully serve the public. The SAO together with colleagues from other public institutions organised the first hackathon of public administration in September 2017. The aim of the event was to show what kind of applications and other products can be created from public administration data. Teams of programmers disposed of 60 data sets and were given 24 hours for work. In total, 15 applications were created by these teams of programmers and experts from various professions. The SAO was also represented there, namely by Mr Baxa, who created an application called RegisKO at the event.

The application is an alternative form of the register of audited bodies. The purpose of the application is to dispose of relevant information on audited bodies, related audits and further details. All of this is well arranged on a user-friendly map. The addresses saved in the internal Audit Information System "KIS" are transformed into GPS positions on Openstreet map by an opensource software known as QGIS. Such added data from our open data are connected to open data from the Czech Statistical Office and the Czech Cadastre Office. In the first print screen you can see audited bodies represented in different colourful points and the number shows audit volume in the surrounding territory. In the left part of the application you can search by company registration number (IČO).

AUDIT RESULTS DISPLAYED ON A MAP

The Supreme Audit Office of the Czech Republic offers an additional search of audit results for the public use which are displayed on a map. The application of "RegisKO", designed for the Internet Explorer browser and developed in the course of the public competition "Hackathon" in 2017, provides visualisation of the SAO's open data sets through a free software called "QGIS". For more information see https://www.nku.cz/cz/otevreny-urad/regisko/#7/49.820/15.475.
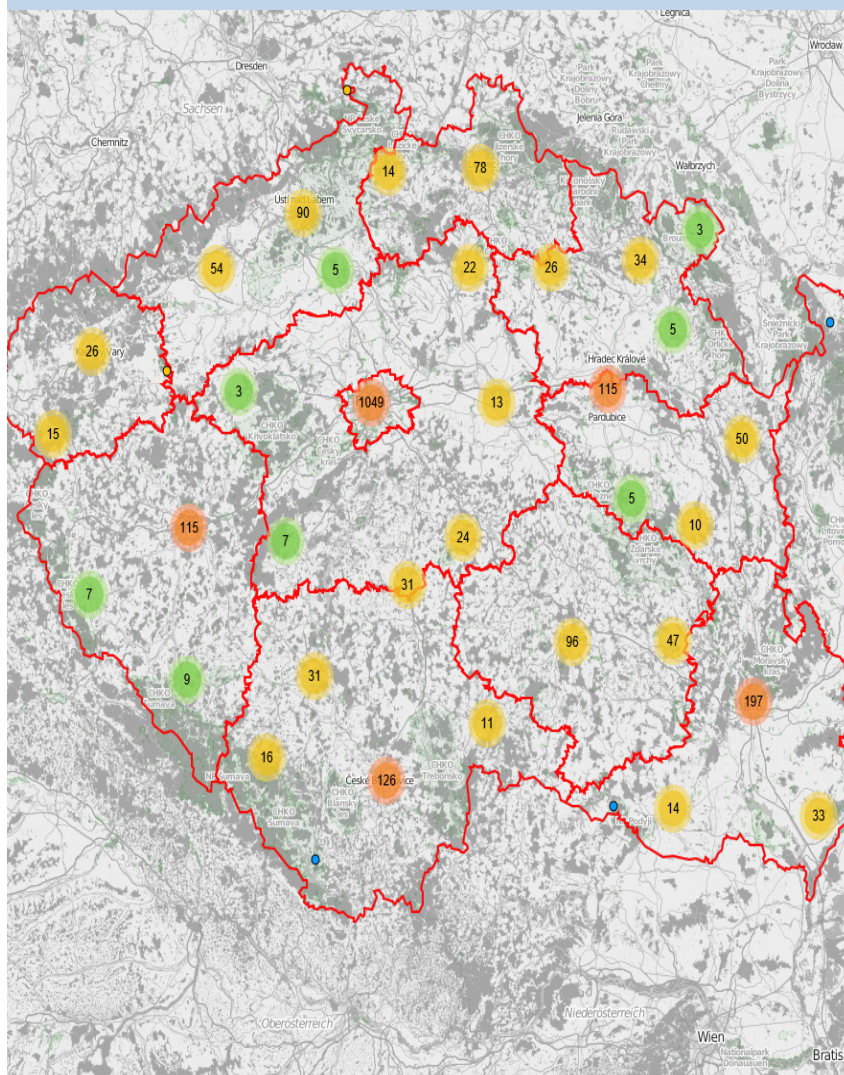
By zooming in, you can see many details on the map. Colourful points divide themselves into smaller points, each representing an individual body that was audited. The number in any point represents repeated audits of an audit body. If you click on the number, it gets divided into individual colourful points representing individual audits. They are represented in a spiral web and the most recent audit is the furthest away. The points are divided into three different colours according to the audited body ownership; red = state, orange = communal/regional; blue = private. The pink (or light red) colour represents a specific case where the SAO focused on a branch of any state office; this point does not represent an independent audited subject.
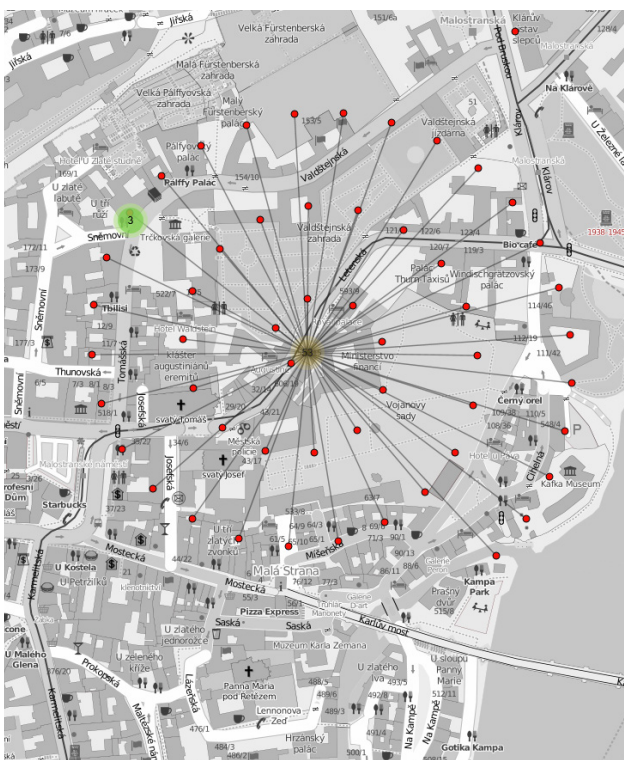
The application includes reports from audits and basic information about audited bodies in the map labels. In the label, users can see the audit code, the title of the audit, audited body's official statistical number and its name, character of residence (branch/HQ), and the audited body´s ownership. Last but not least, the link to the audit review and the press release on this audit are included. Press releases are also published in English.
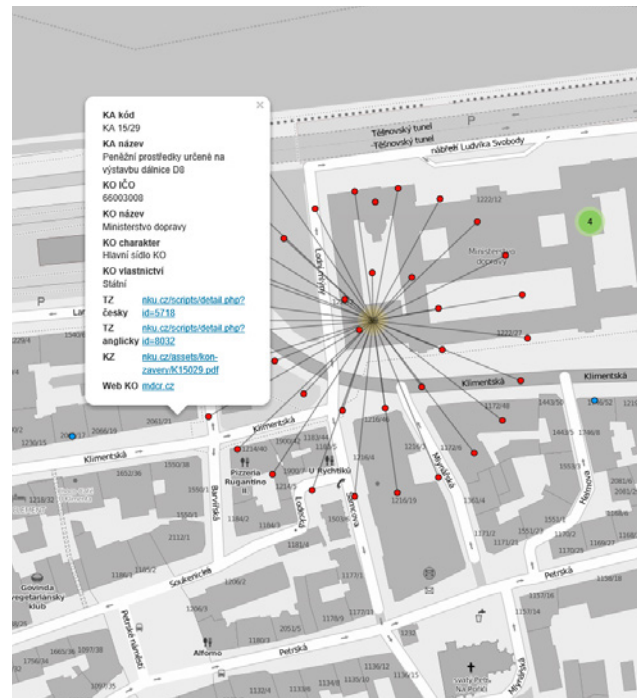
The application is user-friendly and intuitive. It is necessary to mention that RegisKO is still being developed and its layout and functions can be changed. We believe that this application brings added value for "KIS" and modern and trendy tools for analyses which are appreciated more by citizens than charts or Excel tables used in everyday life.

The SAO's goal is to further monitor trends that will bring new solutions and procedures to its work so that it can stay a strong player representing citizens. At the same time, we want to share experience and information with other SAIs in order to move our audit activity further on. That is also a reason why we want to introduce the topic of the visualisation at XI. EUROSAI Congress held in Prague in 2020.

Cour des comptes

USING THE DATABOX

Over the past years, the French Cour des comptes has introduced innovations regarding both control methods and external communication. Among other initiatives, it has fully engaged in the open data process, as part of its commitments to the open government partnership initiative...

Regarding the specific topic of data, the release of a data box might be of interest for other SAIs. During our audits, we frequently face irritants regarding the collection and use of data: requesting the same information several times from the same organizations; being unable to know which specific sets of data are available; delays as the administration refuses or takes a lot of time to share information...

This is all the more problematic than auditors obviously rely more and more on large sets of data provided by the public organizations. Therefore, better ways to collect data, to store and to analyze it have become crucial, as well as the ability to link data provided with publically available data to add greater contextual value.

Within our IT system, the data box is an open internal platform for accessing and sharing publically available data sets and data collected throughout audits and other.

It comes with many benefits:
- Data sets are available and ready to use.
- Auditees are not repeatedly asked to provide the same data sets.
- On screen data visualization enables to drill down directly into the data sets.
- It fosters collaborative work since auditors can easily share data of interest and publish their re-use and so-called "data stories".

Among next steps, we are aiming at a seamless process to connect our data box to data.gouv.fr, the official open government data platform, as both apps share the same (free and open) source code.

Another ongoing challenge has to do with General Data Protection Regulation (GDPR) compliance. Earlier this year, the Cour des comptes ran a full audit on the use of personal data by its services. Since then, we have started implementing an action plan based on its conclusions.

All these initiatives are monitored by a soon-to-be-appointed SAI Chief Information Officer and an already-appointed Data Protection Officer (Mrs Lucie Roesch, lucie.roesch@ccomptes.fr). They are driven by the necessity to help our SAI being fully aware that efficient audits are data-driven audits.

**State Audit Office
of Georgia**

BUDGET MONITOR - INNOVATIVE ANALYTICAL WEB-PLATFORM

Budget Monitor represents an innovative ICT tool, developed by State Audit Office of Georgia (SAOG), that enables stakeholders to participate in the monitoring process of public finances; it answers questions how taxes are spent; it satisfies curiosity how successfully the government achieves its goals and how efficiently it uses budget resources.

Government agencies publish basic budgetary information, in order to meet transparency and accountability criteria. However, non-specialist stakeholders face difficulties in understanding this information. Aggregating various data sources to have ample understanding about the ongoing processes is quite complicated and disincentives citizens to be actively involved in the budget oversight.

This status quo was clearly articulated in Open Budget Index (OBI) 2017, where Georgia received 82 points out of 100 and ranked 5th in the world. Albeit this success, in the Public Participation component a score amounted to 22 that stresses out the existing challenges in citizens' engagement, that are mainly stemming from insufficient mechanisms for taxpayers to participate in Public Finance Management (PFM) issues.

Being aware of the flaws related to citizens' participation and striving to improve transparency and accountability, SAOG came up with the innovative idea to elaborate an innovative web-platform to increase taxpayers' role in the decision-making and monitoring processes of public finances and to hold government accountable. Thus, SAOG developed Budget Monitor - an analytical web-platform.

Budget Monitor, through incorporating data visualizations, infographics and diagrams, presents comprehensive budgetary data in easy-to-interpret manner. These visualization tools allow the information to be much more interactive, so regular users can drill down to examine the data in greater detail. Moreover, citizens can choose, filter, sort, compare and export any information they are interested in. Presenting information in this manner increases taxpayers awareness about PFM issues and fosters their interest and drive to participate in decision making processes.

Portal provides comprehensive budgetary information, designed from auditor's perspective, so that no issue is left out of citizens' notice:

- A hundred audit reports per year;
- Expenditures of more than sixty public agencies;
- Budgets of seventy-six municipalities;
- Around four-hundred programs and subprograms.

Moreover, to deliver audit findings and recommendations in one space via easily understandable manner, Budget Monitor utilizes dynamic visual filters. These filters enable stakeholders to get comprehensive information about existing deficiencies per public agency or to identify systemic problems on the country level.

To improve transparency and accountability, increasing citizens awareness about PFM issues should be twinned with their engagement in decision making processes. Hence, another distinct feature of the web platform is that it forms a channel for two-way communication between the State Audit Office and citizens. On one hand, Budget Monitor equips citizens with key budgetary information and, on the other hand, offers an opportunity to engage in the audit process. By sending audit requests and proposals through the citizen's page, stakeholders (a) can express their interests in auditing particular fields and/or (b) report and inform SAOG about existing deficiencies and potential corruption risks in public spending. SAOG applies predefined methodology to analyze and shortlist the requests considering their importance/materiality and based on the results includes them in the annual audit plan.

It is worth mentioning, that Budget Monitor was launched only a year and half ago, yet it has already achieved multiple tangible results. In terms of its users, during this period budget monitor had more than 20,000 active users. This

engagement has been of particular importance, since the SAOG conducted 10% of its audits upon citizens' requests in 2018.

In 2017, Budget Monitor was awarded with several outstanding awards, most notable of these:

– Public Participation in Fiscal Policy and Budget Making Award by Global Initiative for Fiscal Transparency (GIFT);

– United Nations World Summit Award of digital innovations in the category of the Government & Citizen Engagement;

– Georgia's IT Innovation (GITI) award in the category of the Best Online Information Resource.

Budget Monitor stands for a workable digital solution to engage citizens in PFM of Georgia. Thus, SAOG plans to further improve the platform and incentivize citizens to be engaged and enjoy even more comprehensive and far-reaching supervision of the government spending that ultimately results in improved public service delivery and consequently - in good governance.
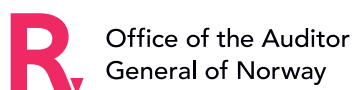
R. Office of the Auditor
General of Norway

THE OAGN DATA
SCIENCE PROJECT

GitHub

Introduction

Private audit companies are implementing automated audit at full speed. How can Supreme Audit Institutions make use of new audit technology? At OAG Norway, we have established a small experimental development outfit, working almost as a tech start up, to solve challenges posed by the rest of the organisation. A small team of data scientists with a lot of administrative freedom has already yielded a number of solutions and effective approaches to audit automation.

The OAGN Data Science Project

Data retrieval, data preparation and analysis are key and often time-consuming activities in any audit assignment. In recent years, developments in this area have accelerated, not least thanks to a sharp increase in the amount of data available, developments in terms of computer power, and development of systems and applications to handle large amounts of data. This provides completely new possibilities for data analysis and provide great opportunities for streamlining the audit.

The OAGN Data Science Project provide data services for both financial audit and performance audit. For example, we build on existing data capture solutions to obtain more data on enterprise internal control and data across transaction populations, to more effectively verify the accounts.

With regard to storage, structuring and customization, we are looking for a modern data warehouse/data lake solution, where both qualitative and quantitative data from highly different sources can be stored, easily accessible, and structured in a way that makes use easy.

The power of sharing code

Computer code is universal and as such easy to share. Thus, we at the OAGN Data Science team want to share code and stuff we make with the world. Our first offer is a fully functional webapplication for Data Envelopment Analysis (DEA) called pioneeR. Free for all to download, easy to use and financed by taxpayers money. You find it on Github, which is the largest internet site for sharing code.

Audit Automation and Analysis in Financial Audit

In the near future, it will be possible to automate much of standard financial audit. How so? It is about numbers, it is highly standardized, and auditors basically do the same from cycle to cycle. This is really a recipe for machines to take over. SAIs have to realise this. If we do not take advantage of the opportunities that technology has to offer, we will eventually lose in the competition with the private audit companies.

The Data Science Project has admittedly contributed mostly with semi-automation so far - with a focus on curating accounting data, meaning much less time spent on searching for and cleaning of data for the auditors. This means a lot less manual extraction and merging of datasets.

The next step for the OAGN data science team regarding financial audit is using machine-learning algorithms to automate audit procedures. For example, why not set up machines to automatically pinpoint dubious transactions? If you have properly curated data on every single transaction and you have the computing power to analyse every transaction, why wouldn't you? Thus, we believe that in the near future sample based financial auditing will be outdated. Computer power and machine learning algorithms will make automated control of entire transaction populations possible. We are not there yet, but we will and sooner rather than later.

Audit Automation and Analysis in Performance Audit

Webscraping and Text Analytics

Performance auditors find that a lot of information is available for harvest on the internet, but that it is often in PDF-format. Downloading hundreds of PDF documents is a very tedious task if done manually. In addition, it is very difficult to search across a large number of PDFs. PDF is really "where information goes to die". So how have we handled this?

First, we automate the download process through webscraping. By using a simple and short script written in R or Python you can download all PDFs in one go. No more "click and save as" - just running the script takes care of all the downloads from a website. You want to download 15 000 PDFs? No problem. The next step is to make the 15 000 PDFs searchable in full text. Here we use the search and analytics engine Elasticsearch to parse and index the documents. Finally, we build a simple search user interface for the auditors in R Shiny on top of Elasticsearch. One of the advantages with Elasticsearch is that is really, really fast. Searching through 15 000 documents in full text takes about 0.5 seconds.

Cloud Computing Power

What if you want to do analysis on millions of transactions? And you really need heavy machinery? A physical machine with enough CPU power and memory, which you only will use occasionally, will cost you perhaps $10 000. You cannot possibly spend that kind of money on something you will only use from time to time. Well, enter AWS EC2 Spot. This is a spotmarket for surplus computing power on Amazon Web Services, with normally around 75 % discount. Renting mentioned machine for, let's say, three weeks will set you back perhaps $ 50. Yes 50. And it takes about 15 minutes to set up. Just brilliant. So, like it or not: the future in advanced analytics lies in the cloud.

The way ahead

With reference to the above: The audit future is all about data. There is data everywhere, and data should be available in the form the individual user wants regardless of where the data is stored, regardless of file format or data format, regardless of database structures. We need an approach to data management that allows auditors to retrieve and manipulate data without requiring technical details about the data, such as how it is formatted at source, or where it is physically located. Then we will be able to take public auditing to a whole new level.

TCA'S NEW ASSIGNMENT:
AUDIT OF E-GOVERNMENT PROJECTS

Having conducted IT audits for more than 15 years, Turkish Court of Accounts – TCA has a new assignment in this regard. 2016-2019 National e-Government Strategy and Action Plan issued in July 2016 brought a new duty to the TCA: "Ensuring efficiency of audit for e-Government projects in public sector."

It is stated in the Strategy that; the scope of e-Government concept and implementations is constantly expanding in line with developing technology, social demands and trends, and the expectations from e-Government activities are getting increasingly higher. As a natural result of this situation, the number of e-Government projects is growing from day to day.

On the other hand, the Strategy also sentences that, the success rate of e-Government projects is substantially low due to some reasons such as
- lack of required pre-project (feasibility) analyses,
- decision-making failures,
- unclear definition of project roles and responsibilities,
- lack of qualified staff,
- communication failures among stakeholders,

- insufficient description of project requirements,
- poor change management,
- poor risk management,
- neglecting information security requirements, and etc.

Considering the above-mentioned reasons that result in failure of e-Government projects, the Strategy consequently stresses the need for "efficient and generalized audit" to avoid loss of functionality, time and funds.

In this context, "ensuring the efficient and generalized audit for e-government projects in public sector" is defined as an action

point in the Action Plan, and the responsibility of the action is given to the TCA.

According to the Plan, the action has four main steps:
- Creation of the Audit Model for e-Government projects,
- Preparation of the Audit Guideline concordant with the Model,
- Testing and finalization of the Model and the Guideline,
- Generalization of audit in all public agencies and institutions.

After the literature review in the subject area and the examination of good practices in the audit
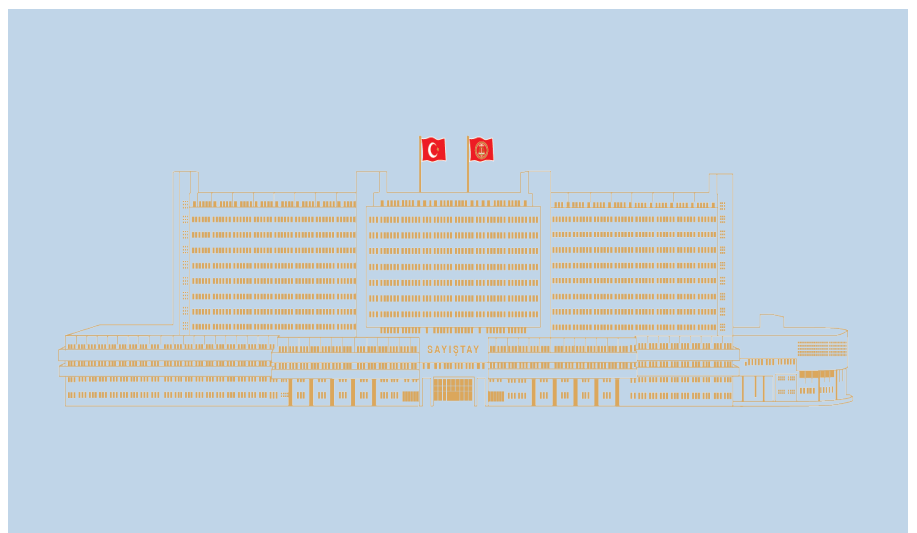
community, the TCA has created the Model, subsequently prepared the Guideline, and in the current situation, is conducting pilot audits.

The Model focuses on project success and brings two main success criteria for e-Government projects.

First is the completion
- within defined scope,
- within given budget and
- at targeted time.

Second criterion is ensuring
- user-satisfaction with appropriate quality,
- information security requirements and
- compliance with national policies, entity strategies and relevant legislation.

Proposing IT audit methodology, the Model defines the audit of e-Government projects as "Examination and evaluation of internal controls which are necessary for successful completion of e-Government projects according to the efficiency, effectiveness, confidentiality, integrity, availability, reliability and compliance criteria."

The Model adopts a risk based audit approach and groups the controls to be examined and evaluated under the following five main areas:
- IT Governance/Management,
- Project Management,
- Information Security,
- Outsourcing,
- Process and Content.

According to the Model, important and/or critical e-Government projects will be audited by the TCA via its IT auditors. With regard to generalization, the TCA will carry out trainings for its regularity auditors and place a compulsory toolkit for the audit of e-Government projects in the Regularity Audit Guideline.

In addition to this, the Guideline will be adapted for the use of internal audit units in the public sector and concurrent trainings for internal auditors on IT audit will be organized.

For further information about the e-Government projects audit model, please contact: Davut Ozkul, at davutozkul@sayistay.gov.tr or Ihsan Culhaci, at iculhaci@sayistay.gov.tr.

Audit of e-Government Projects aims at

- **Contributing to the public institutions by identifying the problems that may prevent the successful completion of the e-government projects and by providing recommendations for taking the necessary precautions in this respect, and**

- **Providing information about e-government projects to their stakeholders through reporting.**