



Big Data Analytics for Improved Governance and Public Procurement in Georgia

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SUMMARY

Despite high levels of transparency in Georgian public procurement, governance remains a challenge. In response, the State Audit Office of Georgia (SAOG) and the World Bank launched a project to increase SAOG's capacity for detailed analysis of procurement data. This would enable it to identify inefficiencies, corruption and critical risk areas in tender processes, and issue recommendations to improve value for money and integrity in public procurement. The team is creating a consolidated database of procurement data from several different sources, and is developing tools for analysis designed to uncover patterns and correlations indicative of risk, such as failed e-tenders, multiple contracts with one supplier or contract costs exceeding market prices. To enable ongoing analysis, the project is upgrading the technical and analytical capacity of SAOG staff and investing in tools and applications for advanced data analysis. The resulting analyses will be available not only to government officials, but also to the public through a user-friendly interface, building on the success of [Budget Monitor](#), a public web-platform which allows citizens to easily access analytical information about Georgian state and municipal budgets and audit findings. With dashboards enabling the visual analysis of procurement data, the web portal will increase citizen participation and oversight, enhancing public control over taxpayers' money and resulting in better service delivery.

CHALLENGE

The general cutoff date for countries to report data for this publication was end-August 2018. The economic aggregates presented in the tables are prepared for the convenience of users. Although debt ratios can give useful information about developments in a debt-servicing capacity, conclusions drawn from them will not be valid unless accompanied by careful economic evaluation.

As in many countries, governance issues present a challenge in Georgia. This undermines informed decision making by the authorities and allows sub-optimal contracts to be awarded, preventing value for money in public projects. In response, the State Audit Office of Georgia (SAOG) – the country’s supreme audit institution – sought to increase transparency in public procurement and identify specific areas of risk, through advanced data analytics. This would enable it to issue informed recommendations to decisions makers and increase levels of integrity in tender processes.

Georgia has recently made considerable progress in disclosure of public procurement data in machine-readable format. However, in order to analyze the volume of data needed to improve the procurement process, SAOG needed to enhance human and technical analytical capacity, and to acquire specialized software tools and applications which it could tailor to the Georgian context. To improve transparency, SAOG also sought to make procurement information publicly available in an easily understood way, enabling citizen oversight and improving the contract award process.

This thorough scrutiny of public procurement data would establish a solid foundation for evidence-based decision making by

policymakers and other stakeholders, achieving value for money in public procurement and raising integrity in the public sector. The initiative would deliver ongoing benefit to the Georgian state and its people, offering enhanced oversight by SAOG of how public money is spent, including in projects financed by the World Bank, and improving the quality of SAOG’s post-project reviews.

CHALLENGE

In partnership with the World Bank, SAOG launched a project aimed at improving capacity to analyze big data related to public procurement. Making Big Data Work for Governance aims to uncover and minimize corruption in tender processes, including collusion between suppliers or between a supplier and officials awarding a contract. The need to build political will and facilitate cooperation among different stakeholders – from procurement officials to audit staff – were woven into the project framework from the start as key drivers of change.

To address gaps in SAOG’s capacity for analysis of big data related to public procurement, the project aimed to develop algorithms for statistical analysis to derive insights from different databases. A consolidated dataset for analysis would be created by merging data from sources including public procurement information (spa.gov.ge), Georgia’s open contracting data portal (opendata.spa.ge), the companies register (napr.gov.ge), the suppliers’ price list (emarket.spa.ge) and information on political party financing. As well as new tender processes, the data analysis included past projects financed by the World Bank, which pioneered the use of e-procurement systems in Georgia.

Information derived from these past data provides valuable context for analysis and assists the Bank's fiduciary oversight, especially in post-procurement reviews.

Building analytical capacity

To enable ongoing analysis of such a large volume of data, the technical and analytical capacity of SAOG staff needed enhancing and auditors needed to be equipped with advanced tools and applications. The analysis would be designed to uncover hidden patterns and unknown correlations indicative of inefficiency or corruption, such as goods or services purchased from connected parties – suggesting conflict of interest – or large numbers of contracts with the same supplier. Other key indicators of risk would include low levels of competition between bidders, failed e-tenders, contracts completed late and over-budget, a large number of small contracts, and contract prices exceeding market prices. This analysis will enable SAOG staff to identify critical risky areas and issue recommendations to improve value for money and integrity in public procurement.

The first step was to procure data analysis and visualization software and train staff to use them for advanced analytical techniques. SAOG organized several-capacity building courses and certifications through international and local experts in big data analysis, to equip staff with technical skills to derive insights from the dataset. The courses enable staff to collect data from different file formats and analyze them using in-built features for specialized audit work, such as gap detection, stratification, visual connectors, predictions about digit distribution in a dataset (Benford's Law), duplicate exclusion and summarization.

In parallel to capacity building, SAOG staff started to apply knowledge and software tools in their everyday work. Analysts began by gathering, joining and analyzing data related to public procurement produced by different public bodies. The data amalgamation process is challenging, both in terms of obtaining the data itself and of inconsistencies and different structures across databases. This often entails a lack of matching criteria or missing values, which SAOG staff try to address using different data-wrangling approaches and tools, such as CaseWare IDEA and R. Besides quantitative and inferential analysis of the amalgamated procurement database, the analysis will also include data science approaches (such as Network Analysis) to measure correlations such as degree distribution, density and clustering coefficient, and modularity.

Making findings publicly accessible

The resulting analytics will be available not only to government officials, but to the public through a user-friendly interface, with dashboards enabling the visual analysis of procurement data. The project aims to replicate the success of SAOG's award-winning budget monitoring platform, launched in partnership with the World Bank in 2017. Budget Monitor is a publicly accessible web platform which allows citizens to easily access analytical information about state and municipal budgets, audit findings and recommendations. With awards including a [World Summit Award 2017](#) and a [Georgia IT Innovation award for best online information resource](#), the platform displays information in easily understood ways using dynamic data visualization tools and clear text, giving citizens deeper insight into public finance data and budgetary information. A similar platform for procurement information

would enable citizen monitoring and improve the contract award process.

RESULTS

SAOG has started to train auditors from different departments in data analysis, with a very positive response from staff. Although the analysis is at the initial stage, with confirmed findings not yet available, SAOG has already transformed its approach to auditing public procurement, away from individual ministry-level auditing to a horizontal audit of public procurement across government entities. This gives a more holistic picture of how public money is spent. The project will not only highlight deficiencies in a specific year's procurement patterns, but aims to become a useful planning tool, identifying high-risk areas in public procurement and addressing them across government, with audit topics identified accordingly. Based on the results of the pilot phase, beginning in 2019, SAOG will issue recommendations to mitigate risk and monitor their implementation.

In 2018, with support from the UK government and the World Bank, the Georgian State Procurement Agency launched the new [e-procurement data portal](#), as well as a [reimplemented version of the existing e-procurement data portal](#), which now generates machine-readable tender information for all public procurement contracts for 2011-2018. Although still in its early phase, the portal has already reduced the time required for analytical work – which had previously taken weeks – through downloadable excel files and other formats. The next phase of the data portal will include the transformation of raw data into user-friendly charts and graphs. The portal and data

are open to anyone interested in public contracting in Georgia, including officials and government agencies, private-sector representatives, CSOs, donors and citizens.

LESSONS LEARNED

Although major results and lessons learned are yet to come, the initiative confirmed that gaining support across the stakeholder spectrum is as key to project success as the data analysis itself.

- ***Invest in winning political will***

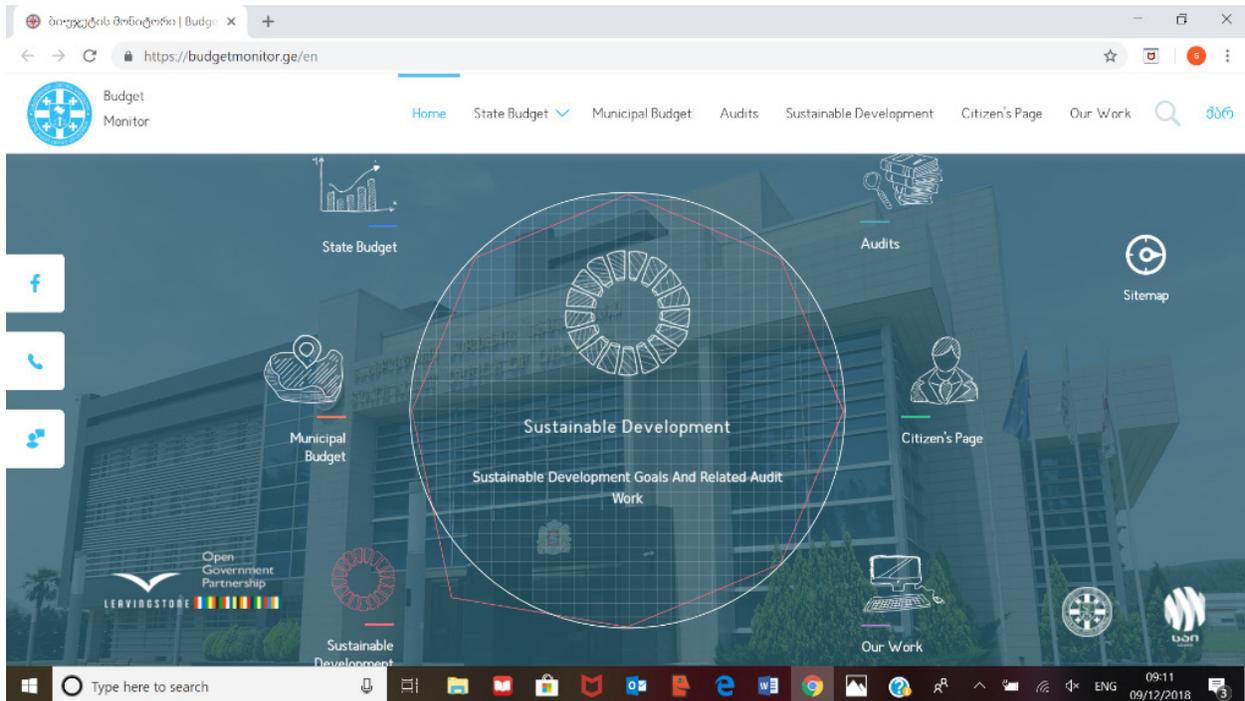
Without clear political will behind the project, this cross-departmental work could not have taken place. Evident top-level support has been a key unifier and driver of success so far.

- ***Make it a multi-stakeholder process***

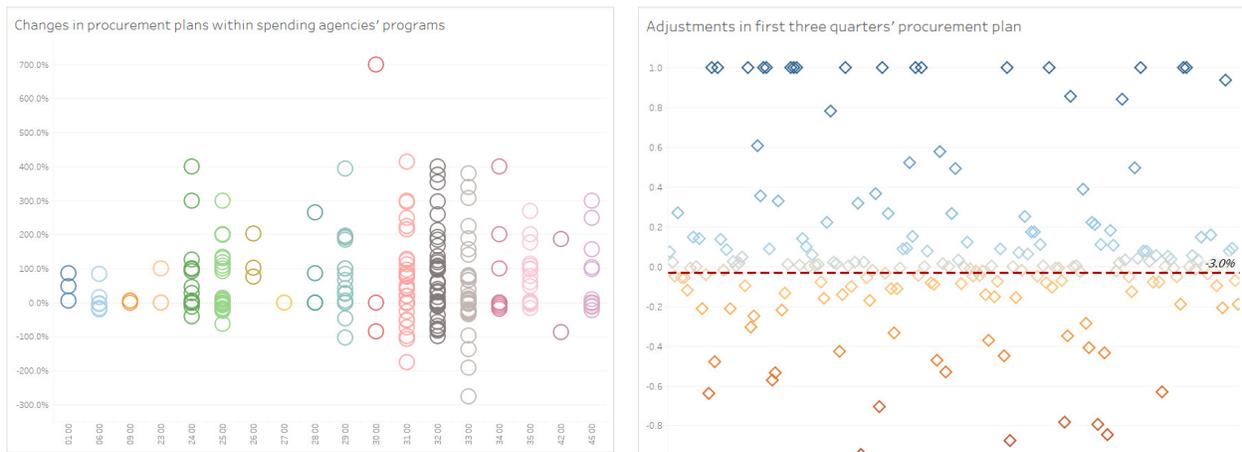
To ensure outputs are fit-for-purpose and widely used, each stage of project development should be a multi-stakeholder process including relevant groups, from senior officials to auditors or the public.

[Making Big Data Work for the Governance - Animated Video](#)

[Sandro's Blog on E-procurement and Data Analytics](#)



The procurement governance project will launch an open web platform to give citizens easy access to analytics about tenders, contracts, audit findings and recommendations – emulating Georgia’s award-winning Budget Monitor platform



Sample visualizations of data analysis that will be publicly available on the procurement monitoring dashboard