



# RISK BASED AUDIT SELECTION (RBAS) SYSTEM

IT SOLUTION FOR TAXPAYERS' RISK ASSESSMENT

FINAL

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IT SOLUTION FOR TAXPAYERS' RISK ASSESSMENT

FINAL

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# ABSTRACT

This report outlines the activities and results of a two-week assignment aimed at reviewing and assessing the readiness of the Georgia Revenue Service's Risk-Based Audit Selection (RBAS) system and recommending improvements to the risk assessment model and the RBAS system.

# ACRONYMS

RA – Risk Assessment

RBAS – Risk-Based Audit Selection

RAU – Risk Analysis Unit

CPT – Corporate Profit Tax

PIT – Personal Income Tax

VAT – Value Added Tax

RS – Georgia Revenue Service

IOTA – Intra European Organization of Tax Administration

GUI – Graphical User Interface

IT – Information Technology

TP – Tax Payer

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# I. EXECUTIVE SUMMARY

Revenue Service (RS), as any tax administration in the world, works extensively to increase the voluntary compliance of taxpayers in all compliance areas and to collect the correct revenues, while decreasing the administrative burden on taxpayers.

Tax audit is an instrument to measure taxpayer's compliance in regards of accuracy in keeping financial records and accuracy in reporting taxes. A tax audit can discover unintentional mistakes or tax frauds. Discovering inaccuracy in tax reporting leads directly to collection of additional revenue and, indirectly, to education of taxpayers, which will tend to increase voluntary compliance going forward.

No tax administration in the world has the capacity to tax audit all taxpayers. A tax audit is a costly activity, and cost-effectiveness of a tax audit is a factor that is considered when tax audits are planned and executed.

The main question is how to select a taxpayer for tax audit to be sure that:

- The taxpayer is selected for tax audit on objective criteria not on a subjective opinion
- The taxpayers are treated equally
- The tax audit will be cost-effective

One of the techniques widely used in tax administrations to ensure those objectives is a Risk Assessment of taxpayers. The Risk Assessment technique calculates a taxpayer's risk score based on risk criteria using the taxpayer's data from tax returns and others sources. The taxpayer's risk score is used to identify taxpayers for tax audit. A high-risk score means a high probability this taxpayer has misreported its taxes (unintentionally or intentionally). Conducting a Tax Audit for this taxpayer is reasonable. Expectation is to collect additional revenue and impact taxpayer's voluntary compliance.

The RS has been trying to implement a Risk-Based Audit Selection (RBAS) system during the last few years unsuccessfully. The system that was developed in 2009 used 16 risk criteria, hard-coded into the software (12 for business entities and 4 for individuals) and all criteria were applied to all taxpayers with the same weight. The system was not used as main instrument for identifying taxpayers for tax audit, nor for tax audit planning. Its credibility among tax auditors was very low.

Almost a year ago, the RS initiated development of new model for taxpayers' risk assessment and development and implementation of new RBAS computer system, which generates results to be used for Tax Audit annual planning.

The RS's RAU has been working to develop new risk criteria, but it did not have a vision how to change the existing model. In April 2011, when EPI Consultant was reviewing and discussing with RAU the existing system, it became clear for all stakeholders that a new model for risk assessment needs to be adopted and new software solution to be developed. High-level requirements for risk assessment model and to the RBAS system functionalities and architecture were provided in May 2011(Attachment to N.Baeva previous report, dated April-May, 2011).

Since then, the RAU and IT team have been working to develop a new risk-scoring model and new software solution for executing taxpayers risk scoring. The EPI project also provided technical support in transferring knowledge about approaches for risk-scoring models development in June and September 2011 (Norman Fox).

The goal of this two-week assignment is to:

- Review the requirements specifications for completeness
- Assess the software functionality and capabilities
- Make recommendations for improvements

During the assignment, the EPI consultant worked in close cooperation with RAU and IT Department staff involved in developing the RBAS system. Multiple working meetings were held including presentation of the risk assessment model, presentation of software for risk scoring, review of the database objects, and discussions on different scenarios that can occur during the execution of the risk scoring.

Generally, the software is ready and has all main functionalities and features. It:

- Adds a new risk criterion with its characteristics
- Defines set of criteria to be applied to a group of taxpayers for calculating taxpayer risk scores
- Defines a homogeneous group of taxpayers through set of parameters
- Defines the tax period for which the risk scoring will be executed
- Retrieves relevant taxpayer data and completes the scoring as well as presents the results in two views: 1) ranking by total risk score value; and 2) scores by criteria for each taxpayer

The accuracy of risk calculation for each criterion is confirmed through using an Excel model by the RAU. The same Excel model is used for the criterion “invention” process and testing. Sets of criteria are also run-on groups of taxpayers with this Excel model and results are compared with the results produced by the RBAS system.

The experts from RAU created a Taxpayer’s Risk Assessment Model employing the knowledge they have gained from the EPI advisors; IOTA conference in Serbia in 2011, where two RBAS systems were demonstrated: Serbian and UK; research and accumulated through practice and experiments.

Thirty-nine (39) criteria along with their characteristics are defined and thirty (30) of them are already loaded into knowledge database and used by the RBAS system. Criteria are classified into five categories of importance/significance, based on which a max score is assigned to each criterion. Each criterion has a formula for calculating the criterion value as well as rules for score allocation based on criterion value.

To mitigate the risk of inconsistency use of criteria and also applying inappropriate criteria to a selected group of taxpayers the following main recommendation to the risk assessment model is provided:

Identify correlations among: 1) period for risk scoring; 2) criteria characteristics, such as “min period to be applied to” and “principle of calculation”; 3) criterion classification by tax types; and 4) taxpayer’s registration and VAT registration dates. Based on



those correlations, define controls to be implemented in the software or in the process for defining and approving risk score parameters.

Specific examples of controls are provided in the Attachment A — Recommendations.

Regarding software: It is well designed and allows flexibility in defining scoring session parameters and easy to use GUI. The recommendations provided relate to adding features ensuring traceability for criteria and set of criteria maintenance and for scoring sessions execution. Those features will ensure an audit trail of the system usage. The necessity of such features is based on the importance of the results produced by the RBAS system for the Tax Audit Department and the RS.

Attachment A to this report provides more details about specific recommendations. Some of the proposed improvements can be made in the future when the preconditions for them exist, especially those related to the interfaces with other computer systems.

Two procedures along with required organizational structures are proposed and aimed at mitigating the risk of misusing the RBAS system:

- Establish a committee and process for determining and approving the parameters for a risk-scoring session
- Establish a cycle of the risk-scoring practice, ensuring risk assessment model monitoring, measuring, and improving

More details are provided in the attached document.

Some concerns, for which broader discussion is needed, are:

- Executing the RBAS system on more recent taxpayers data (current tax year)
- Rules for ranking taxpayers and including taxpayers in the tax audit plan

Those concerns were shared with the RAU in the hope that they will be addressed in appropriate way.

The RBAS system can be used in practice after a process for determining and approving parameters for a scoring session is established as well as rules for using the RBAS results for preparing tax audit annual plan.

Models for Risk Assessment and software systems implementing such models are living and dynamic objects that are elaborated and improved only through the usage.

So, EPI consultant encourages the usage of the system and the engagement of formal scientific approaches for improving the risk assessment model.

Other recommendations:

- A methodology for business requirements to software to be developed and adopted at the RS. A relevant follow-up training on usage of the methodology for requirements definition to be provided to business experts from all business departments/units. Business experts should understand their role and responsibilities regarding software development at any of the following stages: requirements definition (functional and nonfunctional), testing, implementation, and operation as well as when request for changes are prepared and submitted to the IT Department.
- The RS to adopt an annual program for IT staff training, bearing in mind the dynamics in technology development. EPI probably can support some of the formal training needs, identified in April–May 2011, which will ensure capabilities at the IT department for

developing IT solutions that will improve taxpayers' services as integral part of improving the business environment in Georgia.

RBAS system is just an example of the advanced thinking at the RS and also demonstrates the determination of the RS leadership and experts to improve the tax administration in Georgia.

With the technical assistance provided by EPI, the RS will be able to make the reforms faster and in the right way and increase the maturity of the RS.

# **II. APPENDICES**

## **A. RECOMMENDATIONS**

# A. RECOMMENDATIONS

## RECOMMENDATIONS TO THE RISK SCORING MODEL

In order to ensure consistency the following business rules are suggested to be adopted, based on some findings:

- Execute risk scoring only when selected period of tax years for scoring matches the criteria requirements for “min period of calculation” for all criteria included in the set of criteria for this scoring session.

Elaboration:

Currently, when all parameters for a scoring session are set up, the system applies a control and issues a warning message that in the selected set of criteria for this scoring session there is at least one criterion for which characteristic “min years for calculation” is bigger than the period selected for risk scoring.

Still the calculations are completed.

This raises a question regarding meaningfulness of results : If the characteristic “min years for calculation” of criterion X within the set of criteria for risk scoring is less than the period set up for scoring, how would the score results of this criterion impact the meaning of the final scores?

There are two ways for adjusting the scoring session parameters before executing the scoring and being sure that allocated scores are meaningful:

- Adjust the set of criteria – based on selected set (group) generate a new set (group) removing those criteria for which the “min period for calculation” is bigger than the period for scoring. OR
- Change the period for scoring, so no criteria within the selected set of criteria with “min period for calculation” bigger than the selected scoring period.

In order to enable any of the above options the software should offer functionalities for:

- Returning the user to the scoring session parameters setting when the control message is issued, so the user can re-set the parameters
- Completing the adjustments automatically: adjusting the set of criteria (removing the risk criteria, for which the min period is not consistent with scoring session period) or adjusting the scoring period

Scoring should not be executed as it is now. Experts from IT department and Risk Analysis unit, engaged in the RBAS system development, agreed during a working meeting dated December 15, 2011, that returning the user to the scoring sessions parameters will be implemented.

- Do not apply “zero” score to a taxpayer on a criterion for which the taxpayer doesn’t have data to complete the calculation. Mark this taxpayer as exception and do not use this taxpayer in final risk ranking.

Elaboration:

Currently if a taxpayer from a selected group of taxpayers doesn't have data for calculating the score on a criterion within the scoring session criteria set (group) the score is set to "zero."

This brings a distortion of the final ranking results. Below example is demonstrating it:

	TP1	TP2	TP3
Cr1	27	0-no data	35
Cr2	20	27	25
Cr3	13	30	14
Cr4	15	10	26
<b>SUM()</b>	<b>75</b>	<b>67</b>	<b>100</b>

It looks like TP2 is with lowest risk, but if we eliminate Cr1 then the total score for each TP is:

<b>SUM()</b>	<b>48</b>	<b>67</b>	<b>65</b>
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Then TP2 is the highest risk score.

Recommendation:

Mark this taxpayer as exception and do not use its score in the final ranking of taxpayers from this scoring session, but pay specific attention to it - analyze additionally to identify whether it should be proposed for tax audit and with what risk level: very high, high, medium, low, or very low.

**Obviously, to ensure consistent results, the existing correlations between:**

- a) the period selected for risk score calculation
- b) the rules for criteria such as: "min year" and "principle for calculation" (annual, whole period, from TP registration, etc.)
- c) the criterion classification by tax types
- d) the Taxpayer's date of registration and / or VAT registration

must be used to define controls, which will not allow inappropriate criteria to be applied to an inappropriate group of taxpayers.

Since the number of criteria is expected to increase, this implies the need to define and implement such controls.

## **RECOMMENDATIONS TO THE SOFTWARE (RBAS SYSTEM) FUNCTIONALITIES AND FEATURES**

The system should have additional functionalities and features as listed below to ensure audit trails and accountability that are important for this kind of system:

- Criteria and set of criteria maintenance functionalities and features:
  - If a criterion needs to be changed, it is actually a new criterion. The old one should be deactivated and a new criterion to be created, valid from a specified date. Also those sets (groups) of criteria that contain the deactivated criterion should be: (1) deactivated and replaced with new; or (2) modified to include the new criterion instead of deactivated, but some track of the change should be maintained. (*Generally each criterion should have start date of validity and end date of validity.*)
  - The system should keep a track of who created a set (group) of criteria and when, along with a description of the set of criteria and to which group of taxpayers this set of criteria should be applied.
  - When creating a set (group) of criteria, controls for mutually exclusive criteria must be imposed. (*This means that the characteristics of a criterion should be enhanced to contain information about criteria with which this criterion should not be in one set (group) of criteria.*)

- Scoring sessions execution maintenance features:

The RBAS system is flexible in creating sets (groups) of criteria and groups of taxpayers to which the set of criteria should be applied for a selected period of tax years. This flexibility is good, but it also creates a risk of misusing it and applying a wrong set of criteria to a wrong or nonhomogeneous group of taxpayers, which will lead to wrong ranking of taxpayers by risk score, so wrong taxpayers will be selected for tax audit.

This is why I am proposing additional features to be developed allowing recording and tracking who (from Risk Analysis Unit – RA Unit) has executed the scoring. The records also should contain details about scoring session, *i.e.*, set of criteria used, what were the characteristics of the taxpayers to which those criteria were applied, when it was executed, *etc.* This will increase the accountability of the people authorized to run the system for taxpayers scoring. Also those records will be used for follow up analysis of the criteria after the tax audits are completed.

In addition to this feature, the RAU should establish a procedure for defining the parameters of a scoring session and approving those parameters for execution. Increasing the number of criteria will increase the complexity, and only a team of experts will be able to make the right decision. This process also can be computerized in a later stage. The process could include multiple levels of reviews and approvals before finalization of the scoring session parameters (set of criteria, group of taxpayers, and tax period).

- Output

The scoring result needs to be sorted by risk score (ranking taxpayers by risk score) and, when the result is exported to Excel, a title should be included containing information about which set of criteria was applied to which group of taxpayers (taxpayers' characteristics) for which period of tax years and when – a date it was executed, as well as the max score for this set of criteria (to be used for classifying TPs as per this set of criteria).

This information could be included in the header/footer of the Excel file. Maybe in the future the result should also be saved as part of the scoring session information and used for post-tax audit analysis.

- Drill down option

At that stage the RAU considers this option redundant and claims that they can use it from another application, but if it is already developed, it should not be a problem including it in this application also. This option should allow the analyst to see the raw data (from tax return or other source) used in calculating taxpayer's score on a specific criterion.

It remains optional improvement.

- Interfaces with other applications

It was discussed with the RAU that in the future interfaces between RBAS system and other business applications facilitating the Tax audit department will be necessary, but because those applications are not yet defined, designed, and developed it is premature to try to define those interfaces.

It is included in this report as identified amendment and future work on RBAS application.

- Performance monitoring and measuring

Include progress bar when scoring is executed and other mechanisms for measuring time for executing a specific step/operation, for example: 1) time for retrieving TPs' TINs matching the entered characteristics; 2) time for executing each criterion within the set, *etc.* This will help to identify which operations take too long and allow for improvement in the performance.

## **RECOMMENDATIONS FOR ESTABLISHING ORGANIZATIONAL STRUCTURES AND PROCEDURES**

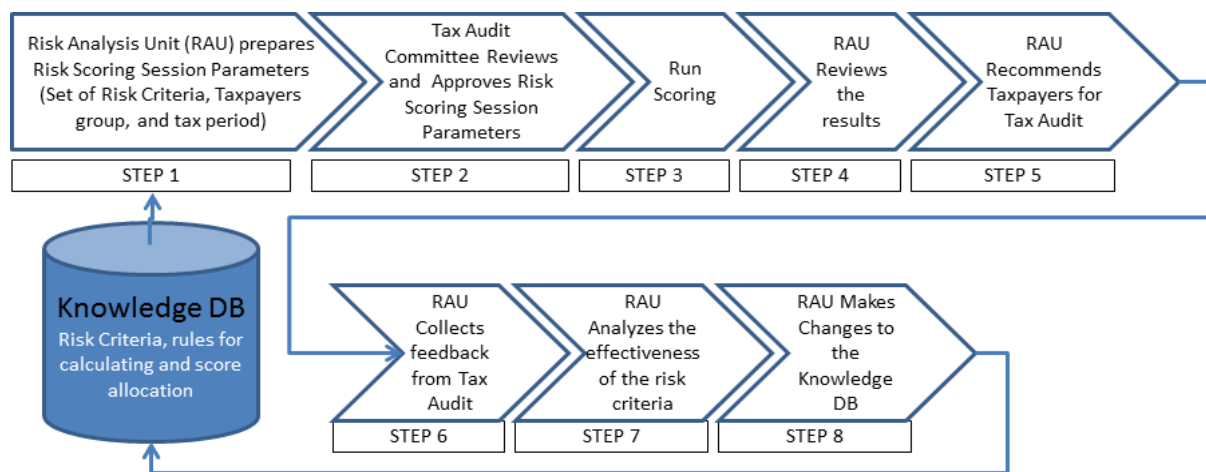
- Procedure for determining and approving the risk scoring session parameters need to be established to avoid the risk of:
  - Inconsistent risk criteria to be included in one group
  - Inappropriate risk set to be applied to inappropriate group of taxpayers

The procedure should involve a committee comprising tax auditors and risk analysis experts.

- Procedure for reviewing the scoring results and agreeing on the final list of taxpayers, ranked by risk score, to be proposed for tax audit
- Procedure for gathering feedback on risk criteria, used for identifying a taxpayer for tax audit, from tax auditors
- Procedure for making decision on invalidating a risk criterion and introducing a new risk criterion

All proposed procedures are part of the operational cycle of the risk assessment model that need to be established.

*Diagram 1: Risk Assessment Model Operational Cycle*



- Establish relevant structures and processes for IT governance, especially steering committee comprising business and IT managers to discuss and decide on IT projects and investments.

## CONCERN

This concern relates to the scoring session parameter “PERIOD,” and it was shared with the RAU experts. It is up to them to decide how it will be addressed.

The period defines one or more tax years. A tax year is equal to a calendar year in Georgia. Annual tax returns on CPT and PIT are due in April/May for the previous tax year, which means that scoring using data for calendar year 2011 can be executed at the end of May 2012, beginning of June 2012 after the tax returns are processed.

That means that scoring for annual tax audit plan 2012 that should be prepared in December 2011 can use results from RBAS system based on data up to 2010.

Example: In December 2011, only scoring for periods up to 2010 can be executed. In this way the most recent data obtained from monthly tax returns during 2011 will not be used.



At the same time, data on monthly tax returns for 2011 can contain information based on which a taxpayer's risk could be significantly higher compared to the risk of the same taxpayer, based on data up to December 2010.

The risk analysis unit should come up with rules for executing risk scoring of taxpayers using more recent data from monthly tax returns – VAT, withholdings, VAT invoices, last year taxpayer's filing and payment compliance, *etc.* Still the calculation can be run on data set going to three years back from the month the calculation is run (*i.e.*, from September 2008 to August 2011, the calculations are executed in the beginning of September 2011).

Usually RBAS systems are run at least once per six-month period, and results of each session are used for updating the annual tax audit plan.

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