Statistical Office of the Republic of Serbia

IST

WHERE INTEGRATION MEETS INFORMATION

IST User Guide

Authors:	Dušica Zečević Ivana Trajković
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Table of Contents

1. IST

1.1. What is IST?

IST is a statistical information system, completely developed in the Statistical Office of the Republic of Serbia (SORS). This software tool is used for managing statistical production, covering everything from survey management to report generation. It is designed to fully support and align with the Generic Statistical Business Process Model (GSBPM). The main purpose of IST is to simplify data management and enhance the value of statistical data through a unified, metadata-driven system.

IST's architecture is designed to be modular, flexible, and scalable, making it suitable for various applications. The system is written for the **Windows OS,** and it consists of two equally important components:

1. **centralized metadata database**
2. **.NET**-based **interpreter** which consists of multiple modules that handle specific tasks within the data processing workflow.

The interpreter reads metadata from the central repository and dynamically, in real time, generates applications for data processing (data entry, validation, and reporting). IST uses **MS SQL Server** databases as the central repository for all data and metadata. Because the database stores both raw data and metadata, it enables IST to manage the entire data lifecycle from collection to dissemination.

The IST interpreter entirely relies on **SQL Server authentication and authorization** to access data, as well as database objects on the corresponding SQL server. There is no need for authentication at application level. The IST solution respects all SQL Server roles, user accounts and their authorizations to work with the data and database objects of a corresponding SQL server database.

IT employees who are working on the development of applications in IST are expected to be completely data oriented. Each IST application developed for processing data from statistical surveys is only as effective as its database, as well as its queries and procedures. In other words, the quality of the application depends on the quality of its database, queries and procedures.

1.2. .NET program

The IST .NET program is written on the .NET platform. It runs on Windows OS and requires Framework 4.7.2 to run properly. The program is hosted on a server, accessible locally or remotely. The servers also host backup databases and SQL queries used for automatic correction and the creation of reports.

IST does not need to be installed, but rather, it is enough to create a shortcut of the IST program from the server.

IST is developed in such a way that it is possible to run multiple different IST applications simultaneously on the same computer. Additionally, it is also possible to run the same IST application on multiple computers. What this means is that every instance of IST is independent and separate from other instances, and each instance uses computer memory to create its own connection to the database. IST automatically opens and closes the connections to the database, every record is accessed separately, every rule of logical control and automatic correction is created separately, and every request made for data processing opens and closes the connection by itself. This is what enables IST to have multiple simultaneous and independent instances active.

IST .NET program uses Windows authentication to access the SQL server database. Therefore, it is not necessary to create rules for database access through different applications. IST handles roles, user accounts and their permissions, as well as their access to appropriate SQL server databases.

IST .NET program is developed so that any one record is always active (this speeds up the work process significantly) and ready for data entry or editing. On the other hand, in the cases of logical control and automatic correction, a set of syllables is selected from the database.

2. Why IST?

IST supports the entire statistical production process. Unlike traditional data processing tools that treat each survey separately, IST provides a unified platform where applications are generated dynamically from metadata, ensuring consistency, flexibility, and efficiency across all surveys and domains.

- Application-Based Data Management
  - In IST, users select an *application* rather than a survey. This is important because one survey may have multiple applications.
  - Each application is generated in real time from metadata, so users always work with the most up-to-date rules, forms, and classifications.
  - Changes to metadata (new questions, rules, or classifications) are instantly reflected across all applications.
- Data Entry
  - IST works with one record at a time, making data entry and editing efficient and preventing performance bottlenecks.
  - It supports CATI, CAPI, and CAWI, ensuring that the same metadata can drive data entry regardless of mode.
  - It entails advanced questionnaire logic; it can group questions, have conditional flows and skip patterns, mandatory fields and data validity checks, and in real time highlight errors.
  - Tables and subtables are displayed with collapsible grids, supporting hierarchical data structures without restrictions on depth.
  - Address books, codebooks, and other auxiliary tables are integrated directly into applications for consistency in coding and classification.
- Data Validation and Quality Control:
  - All rules of logical control are defined in the metadata database and executed automatically during entry or editing. Users can run validation on selected tables, selected errors, or the entire dataset. Results of logical control can be exported to Excel or displayed on screen for detailed quality checks.
  - IST can automatically correct common errors by applying predefined correction rules linked to validation rules.
  - Dedicated views enable statisticians to track errors, corrections, and record statuses, ensuring that the quality of survey data can be monitored continuously.
- Data Editing
  - Users can filter records by key, validity, errors, or field values. Both *entry fields* and *fictitious fields* (derived or external values) can be used for filtering.
  - Records can be displayed in their original entry form, in tabular grids, or using IST's built-in grid systems.
  - Statisticians can view and use data not only from the current application, but also from other survey datasets or administrative registers.

    - All changes are logged, ensuring transparency in editing and enabling rollback or investigation if needed.
- Data Export
    - Data can be exported into Excel, XML, CSV, or JSON formats.
    - Leading zeroes and codes are preserved when exporting to Excel, ensuring data integrity.
    - Exports can be used for further statistical analysis in external packages (SPSS, SAS, R) or for dissemination.
- Procedures and Reporting
    - Reports are generated from metadata descriptions using SQL queries and formatting instructions. They can be exported in multiple formats (Excel, Word, XML, JSON, HTML, TXT).
    - Beyond reporting, procedures can execute database actions such as creating new tables, updating records, or preparing dissemination datasets.
    - Reports can be run with parameters, enabling flexible analysis.
- Advanced Search and Sampling
    - Users can build complex filtering conditions using a graphical interface or directly editing the generated SQL.
    - Search conditions can be saved and reused across applications.
    - Advanced search can be used to select records for sample frames that are later processed in statistical packages.
- Record Locking and Security
    - Records can be locked at the table or survey level, preventing editing or deletion. Only authorized users can unlock data. The system records the user and time for every lock/unlock action.
    - IST integrates with Active Directory, ensuring that user rights and permissions are consistent with organizational policies.
    - Users in regional offices access IST with their domain accounts, ensuring secure and controlled access across locations.
- Background Logging and Audit
    - Every deletion is recorded in a specific database (ISTLogBrisanja table), with details of the user, time, survey, and record key.
    - Updates and saves are confirmed explicitly and logged to ensure data traceability.
    - Changes are first stored in working memory before being written to the database, allowing users to confirm edits before committing.
- Multi-Language Support:
    - IST can operate in multiple languages, selectable from the settings menu.
    - Questions, labels, and modules can be defined in different languages, allowing statisticians and interviewers to work in their preferred language.

3. Main window

Clicking on the shortcut for CAPI IST on the desktop, the main menu window will open.

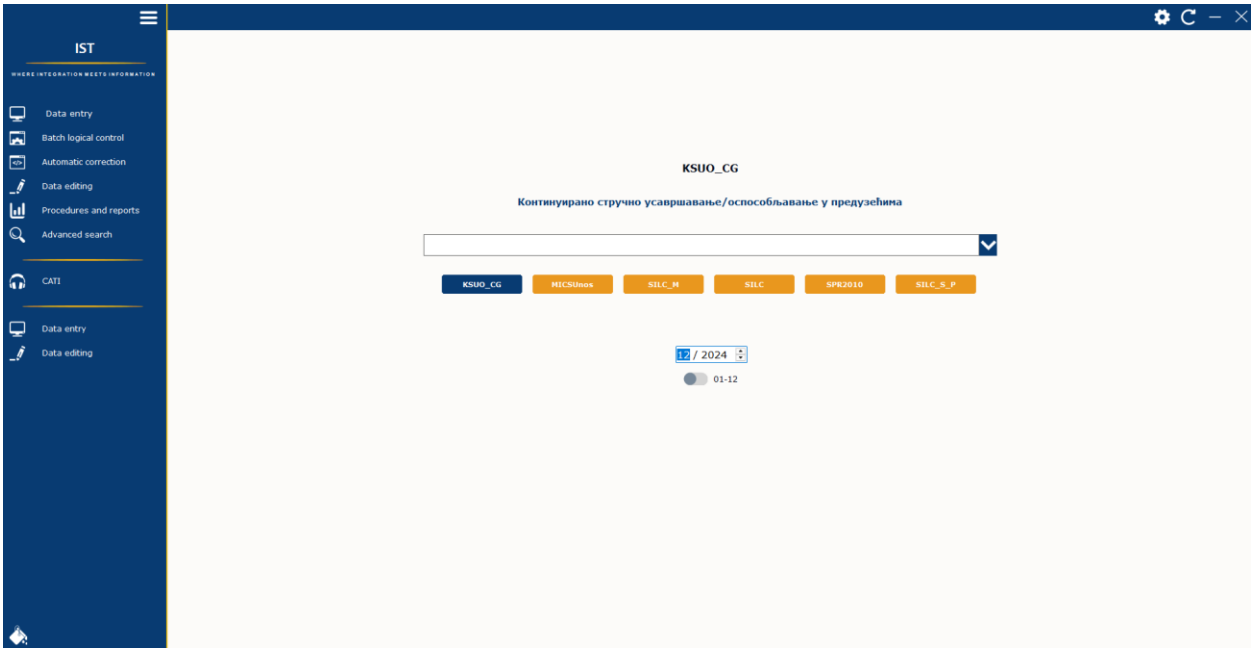


Image 1: IST Main Menu

On the left side of the window, there is a main IST menu:

- Data entry
- Batch logical control
- Automatic correction
- Data editing
- Procedures and reports
- CATI version of IST (which will be more explained in the IST CATI guide)
- Reference tables (Data entry and Data editing).

In the center of the window there is the code and the name of the chosen application. Underneath it is the time point that can be chosen (MM/YYYY).

3.1. Selecting the application:

As mentioned, one survey may have multiple applications. Every application has a specific code and name. To choose an application, start writing the code for it in the field below. You can also choose it from the drop-down menu by clicking the arrow on the right side of the entry field.

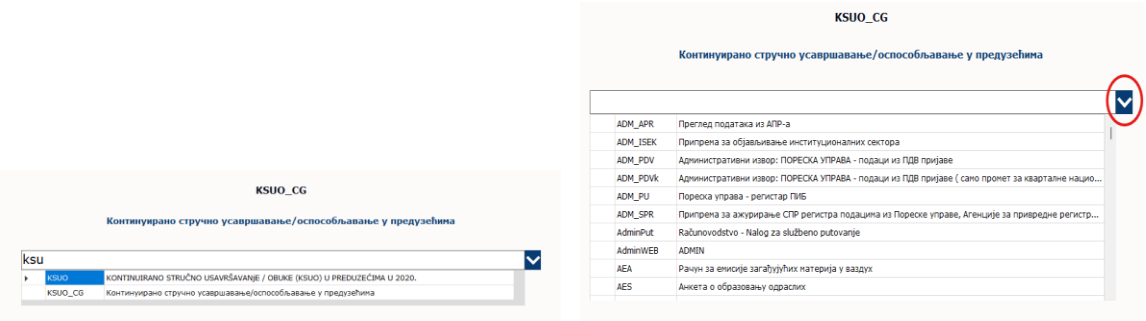


Image 2: IST choosing the app

Beneath the application name entry field, there are also buttons that the user can click on and quickly open the most recently opened and used applications.

3.2. Selecting the time point:

One of the first and most important steps when working in IST is selecting the time point. It controls which metadata and data the system uses and ensures that every application reflects the correct version of survey instruments, classifications, and rules.

By storing multiple time points, IST makes it possible to compare data across months or years while keeping track of how the instrument or rules may have changed. This is especially important for long-running surveys (e.g., price statistics, labour force surveys).
When it comes to logical rules, they often change over time. When you select a time point, IST only executes the rules that are valid for that reference period, ensuring the validation process is correct. Likewise, corrections linked to validation rules are executed only if they are valid for the chosen time point.
Reports are generated using queries that incorporate the time point. For example, exporting labor market data for "March 2025" will automatically include only records valid for that time point.
Codebooks (e.g., NACE, NUTS, ISCED) are often updated. The time point ensures that the correct version of classifications is in use.

As a part of some methodologies (e.g. prices), some applications require the 13th month to be selectable. Therefore, the selectable range for months is 00-59, not the 01-12 range, which is set initially. If the user wants to chose from a range between 00 and 59, the user should click on the toggle button under the date field and pick.

Image 3: Choosing the time point, two different ways

After choosing the application and time point, IST generates in real-time (by reading what is written in the metadata database in real time) for that specific time point data entry form, data validation rules, automatic correction rules, reports, procedures, etc.

3.3. Logging in and permissions:

Permissions in IST are defined in the SQL Server environment. They determine:

- Which applications a user can access.
- Which actions they can perform (view, enter, edit, delete, export).
- Whether they can lock/unlock records or run reports.

Database roles and grants are configured by IT staff (for example, a statistician working on Labour Force Survey is granted read/write access to LFS application tables but only read access to other survey reference tables.). If a user does not have permission for a certain table or action, that option will simply not work, or be read-only (for example, a user without DELETE rights cannot remove records).

This sort of logging and permission system gives a great audit and logging overview: every save, update, or delete action is logged with the user account and timestamp. This makes it possible to trace who did what and when.

Regional Offices login:
When the user from the regional office clicks on the IST icon, the window for entering their user account and password will be opened:

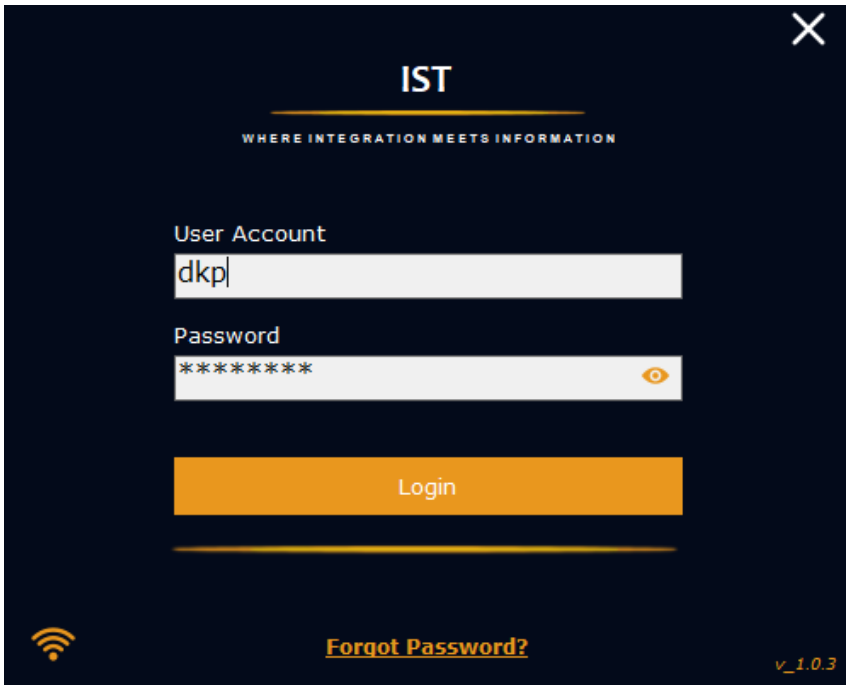


Image 4. Entering user account and password

The user account and password is stored in the SQL Server environment. When the user enters their information, the server will read who is entering the IST and read what permissions and roles they have. IST will show only the applications that the user has permissions on. If the user cannot remember their password, they can click Forgot_Password at the bottom of the window and new window will open.

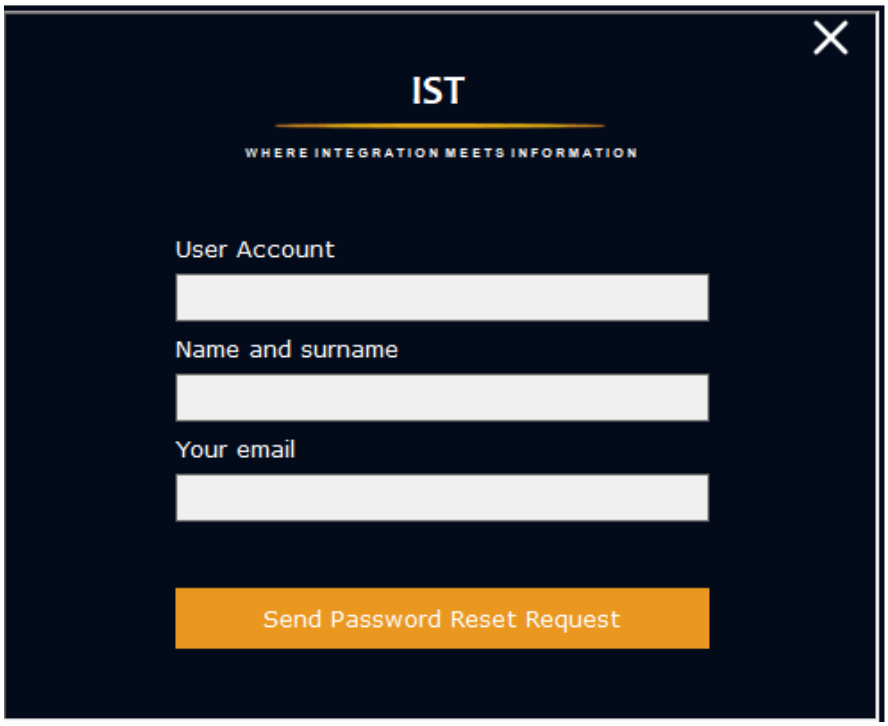


Image 5. Password Reset Request

The user can enter their user account, name and surname and their email and send the password reset request. Depending on the configuration for specific users, the user can either receive the initial password (which they can enter again when logging in and then afterwards setting up a new password) or they can receive their own, already made, password.

4. Data Entry

The Data Entry program is one of the most important components of IST. It is not a fixed application but is generated dynamically from metadata stored in the central repository. This ensures that every survey application is always up to date with the correct fields, rules, and structure.

From the main IST menu, selecting Data Entry launches the generated entry application for the chosen time point and application. If in the metadata database multiple tables are defined as the main/master tables, then first the list of those tables will appear, and the user will click on one to open data entry form for that table (more about this in Master-Detail Data Entry section).

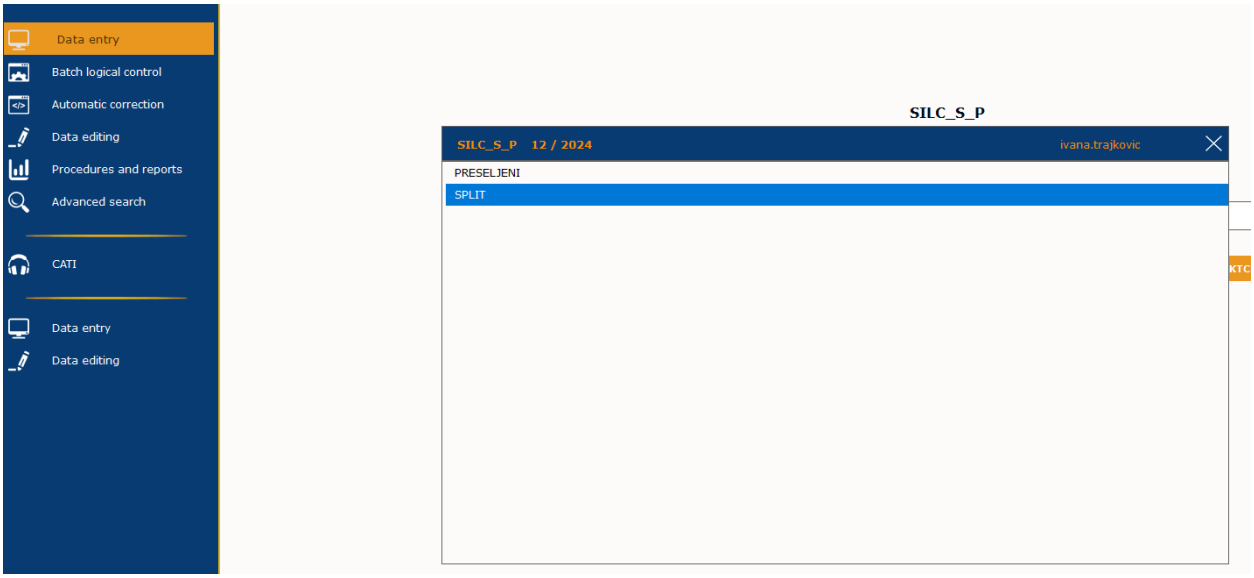


Image 6: Selection of the tables

The user can choose the desired table, and the data entry form will open. The layout of the entry screens, the order of fields, the skips, and the rules of logical control are not hardcoded but generated in real time from metadata database for the selected time point.

The program is generated and stored in the working memory of the computer. Rules of logical control are created in the working memory, except for the rules that interact with other records from the database.

Here are the examples of a few different data entry screens generated from the data of the description from the IST metadata database:

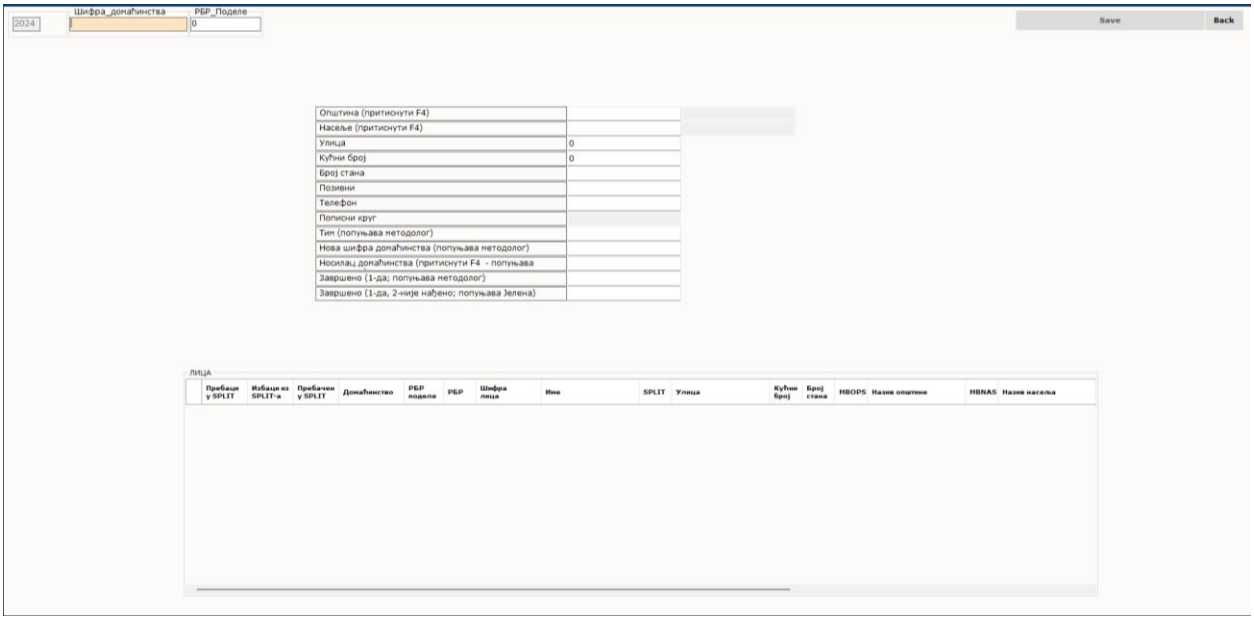


Image 7: Generated screen for data entry for SILC

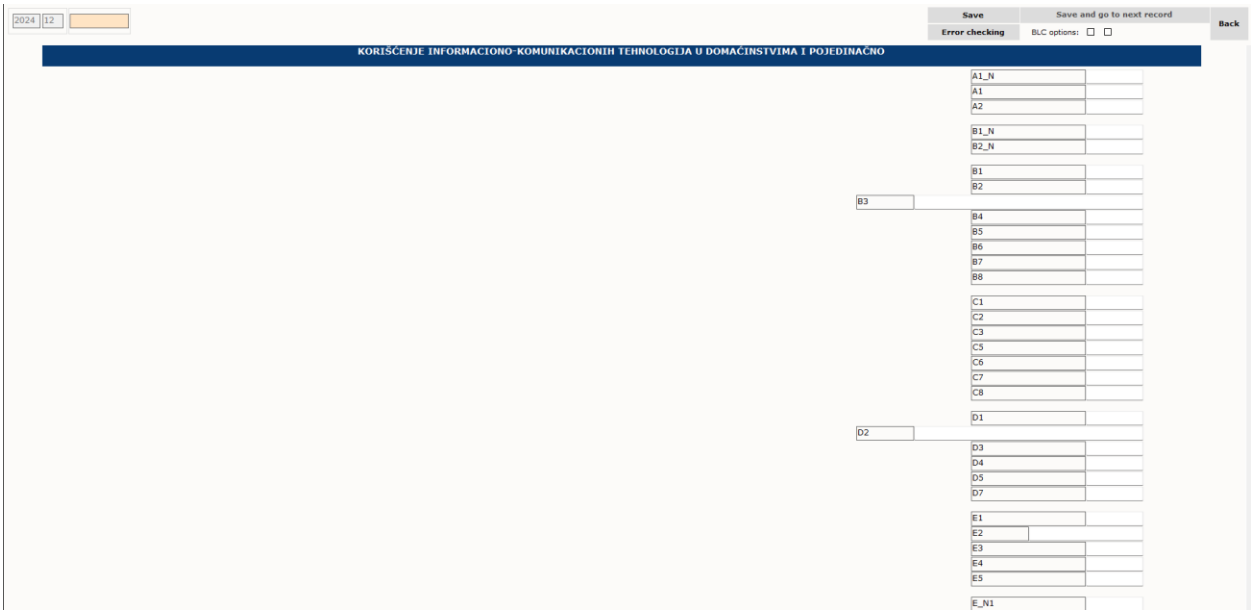


Image 8: Generated screen for data entry for ICT

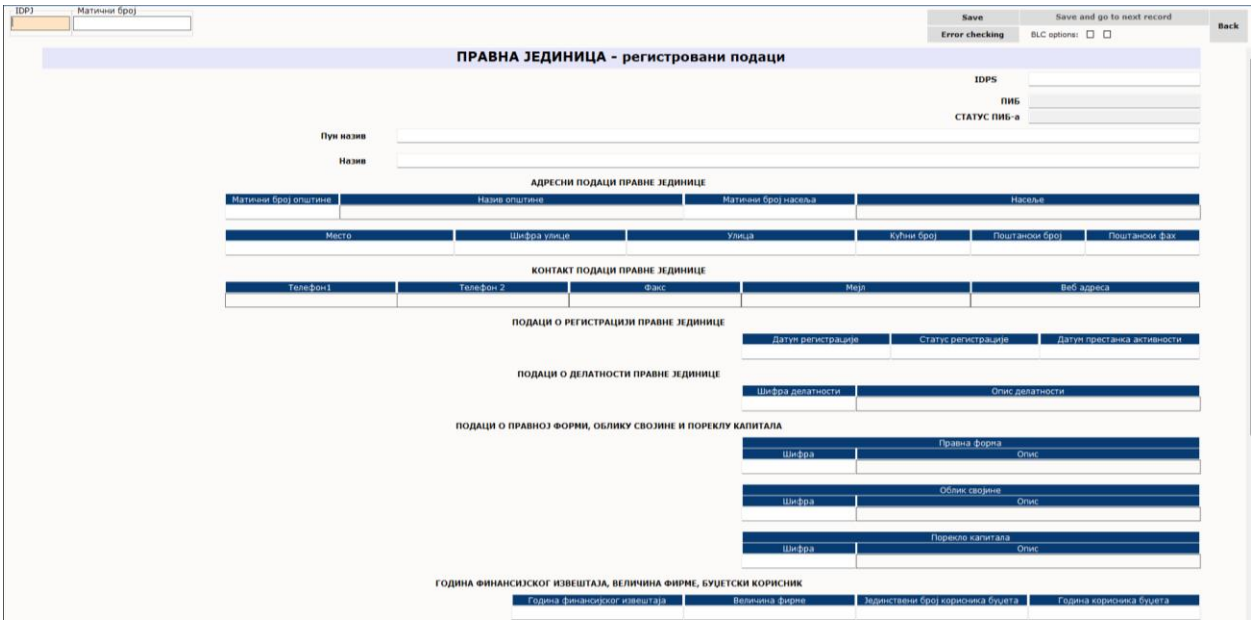


Image 9: Generated screen for data entry for SBR

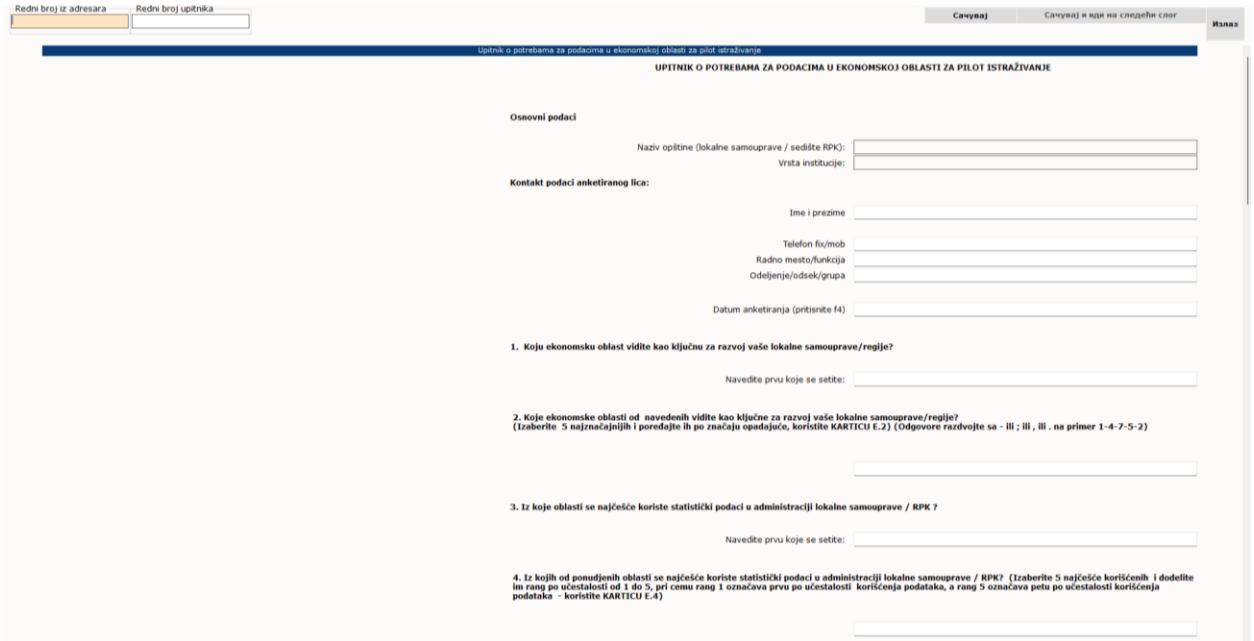


Image 10: Generated screen for data entry for DMSS

Main functionalities of Data Entry:

- Record Management

Users begin by entering the key fields that identify a record (primary keys, defined in the metadata database; for example, for the application that deals with Statistical Business Survey, that can be registration number of legal entity). The key fields are always positioned at the top left corner of the Data Entry screen.

Upon entering the last field that belongs to that key, IST either offers an existing record for selection (found in the database using the specified key) or allows entry of a new record.

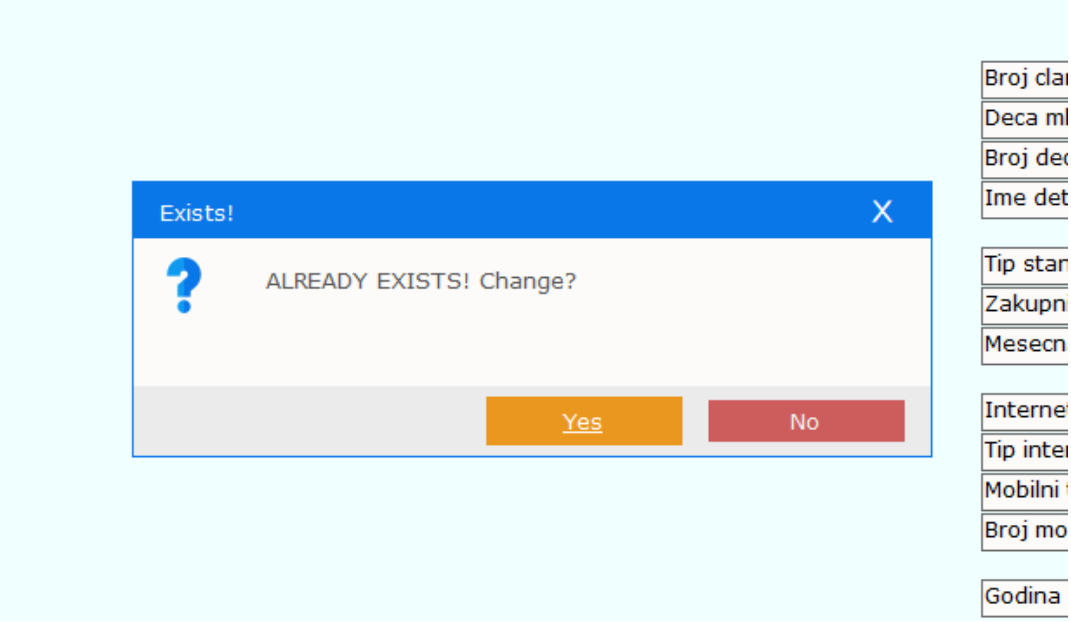


Image 11. Notification for the record that already exists

If the record already exists, it can be opened for editing purposes (by the user who has the right permissions).

Image 12. Record with existing data taken from the database

- Saving Records

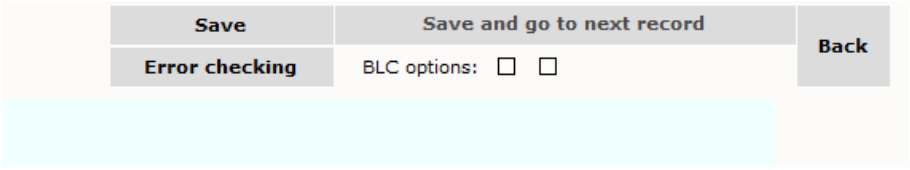


Image 13. Save and Save and go to next record

Clicking the Save button saves the record to the database without moving on to the next record. On the other hand, clicking the Save and continue button saves the record to the database and the screen changes to the next record (if accessed from Data Editing) or to a new record. It is also possible to only have one Save button on the data entry screen. This button will actually behave as if it is Save and go to next record button. The data entry tables have specific columns that save and keep the data regarding saving and updating records. The columns user_START, user_INSERT, date_START, date_INSERT and sourceof_INSERT have data about who, when and from where inserted the record. Columns user_UPDATE and date_UPDATE keep the data about who and when updated an existing record. IST_duration field has the information about how long the data entry for that record took.
Locked records can only be viewed but not modified, guaranteeing data protection.

- Real-Time Validation and Logical Control

Every field in the Data Entry form can be connected to validation rules defined in metadata. When generating data entry form, IST also reads from the metadata rules of logical control for that application and immediately shows errors found by reading the rules. However, there

is also an option for errors not to be immediately shown, and that only by clicking the button Error checking (Image 11) can that appearance be activated. Even if the user does not click the said button, by clicking the Save button IST will do logical control on the table.
It is possible to define and create errors of different severity in the metadata database. Depending on the severity of the error, the field which contains the error will immediately be highlighted in the designated color (red for critical errors that must be corrected, yellow for warnings that can be reviewed later).

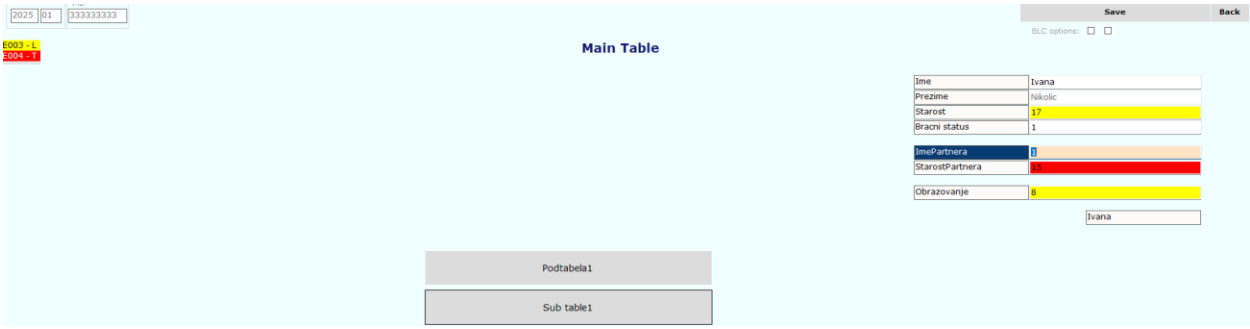


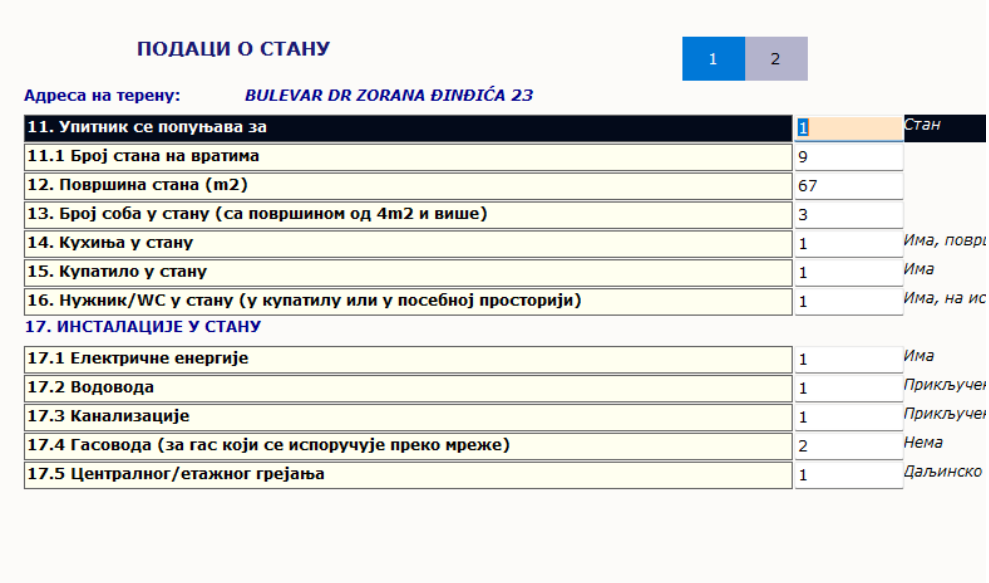
Image 14. Record with errors on screen (yellow and red)

Hovering over an error displays a descriptive message, ensuring users understand what needs to be corrected. Additionally, a list of all errors in the record is displayed in the top-left corner (underneath the key fields) for quality control.

- Questionnaire logic

One of the biggest advantages of IST is that questionnaires are not “hard-coded forms.” Instead, they are driven entirely by metadata, which allows IST to behave like a smart questionnaire engine. This ensures that data entry reflects the real survey design and that statisticians can trust the system to enforce rules consistently.

- **Groups of questions**: Questions that belong together conceptually (e.g. *Household characteristics*, *Employment details*) can be grouped into blocks. Groups make entry clearer for interviewers and statisticians, and they improve the readability of long forms.



ПОДАЦИ О СТАНУ

1 2

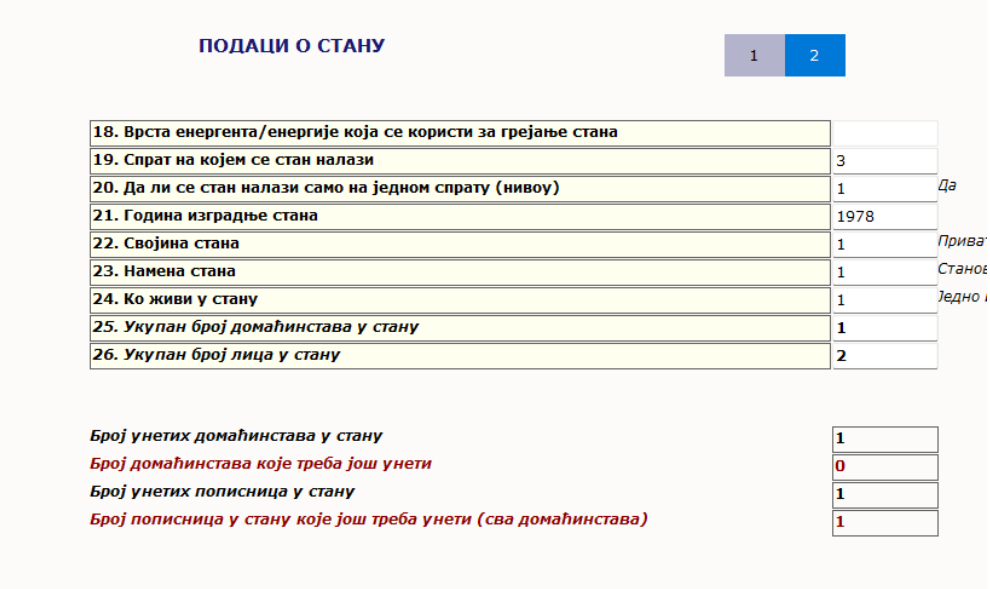
Адреса на терену: *BULEVAR DR ZORANA ĐINĐIĆA 23*

11. Упитник се попуњава за	1	*Стан*
11.1 Број стана на вратима	9	
12. Површина стана (m2)	67	
13. Број соба у стану (са површином од 4m2 и више)	3	
14. Кухиња у стану	1	*Има, повр*
15. Купатило у стану	1	*Има*
16. Нужник/WC у стану (у купатилу или у посебној просторији)	1	*Има, на ис*

17. ИНСТАЛАЦИЈЕ У СТАНУ

17.1 Електричне енергије	1	*Има*
17.2 Водовода	1	*Прикључе*
17.3 Канализације	1	*Прикључе*
17.4 Гасовода (за гас који се испоручује преко мреже)	2	*Нема*
17.5 Централног/етажног грејања	1	*Даљинско*

Image 15. Question Group 1



ПОДАЦИ О СТАНУ

1 2

18. Врста енергента/енергије која се користи за грејање стана		
19. Спрат на којем се стан налази	3	
20. Да ли се стан налази само на једном спрату (нивоу)	1	*Да*
21. Година изградње стана	1978	
22. Својина стана	1	*Прива*
23. Намена стана	1	*Станов*
24. Ко живи у стану	1	*Једно*
25. Укупан број домаћинстава у стану	**1**	
26. Укупан број лица у стану	**2**	

Број унетих домаћинстава у стану	**1**
Број домаћинстава које треба још унети	**0**
Број унетих пописница у стану	**1**
Број пописница у стану које још треба унети (сва домаћинства)	**1**

Image 16. Question Group 2

If certain fields in question group 1 cannot be skipped (are mandatory and have to be filled), the user will not be able to click on the next question group button (top right corner). Button 1 represents question group 1, button 2 represents question group two, etc.

- **Skip patterns**: Skip rules automatically hide or disable questions that do not apply based on earlier responses. This prevents unnecessary data entry and eliminates a common source of error.
- **Validity checks**: IST runs field-level and cross-field validity checks in real time: range check (e.g. *Age must be between 15 and 99*), consistency checks (e.g. *If*

"Marital status = married", then "Number of spouses" ≥ *1*), reference checks (e.g. codes must exist in the classification tables).

- **Conditional fields**: Some fields only become active if a condition is met (e.g. If *Type of contract* = *"Temporary"*, then *End date of contract* becomes mandatory and editable.) This makes the questionnaire more dynamic and user-friendly.
- **Mandatory fields**: Certain fields can be marked as mandatory in metadata. The record cannot be saved unless those fields are completed. This ensures that critical information is never left blank.
- **Fictitious Fields**: In addition to real fields directly entered by the user, IST also supports fictitious/fictional fields. These are not stored in the main data tables but are calculated or imported dynamically to help with editing, validation, or cross-checking. They are metadata-defined fields that can display:
    - Derived values calculated from other fields (e.g. *Total income = sum of salary + benefits*).
    - Data imported from another survey or register (e.g. population register, business register).
    - Historical values from previous reference periods (e.g. *Last year's revenue*).

  They allow statisticians to compare current entry with past or external data without leaving IST. They make logical controls richer (e.g. *If reported number of employees > register value × 2, flag an error)*. They answer a frequent user question: *"Can I see data from another database or another time period while entering this record?"*

All of these features mean statisticians can trust IST to faithfully enforce the survey design, rather than relying on manual checking or external tools.

- Mater-Detail Structure

For surveys with hierarchical data (e.g. households → persons, enterprises → local units), IST generates Master–Detail entry forms. The main entity is shown at the top of the screen, while sub-entities are displayed in expandable grids. This allows complex structures to be entered intuitively.

The Data Entry is a practical interface through which data is collected, checked, and managed. For statisticians, this means:

- **Confidence** that all rules, skips, and checks are applied correctly.
- **Consistency** across surveys and time periods.
- **Efficiency** in handling large volumes of records without sacrificing quality.

By supporting groups of questions, skips, validity checks, and detailed logical control, IST's Data Entry ensures that quality is built in at the moment of entry, reducing the burden of later editing and validation.

5. Master Detail Data Entry

Many statistical surveys deal with hierarchical data structures, where one main unit (the *master*) has several related sub-units (the *details*). For example:

- A household (master) and its members (details).
- An enterprise (master) and its local units (details).
- A farm holding (master) and its plots, animals, or machinery (details).

In IST, these structures are supported through Master–Detail Data Entry, which is generated dynamically from metadata. This feature allows statisticians to enter complex, nested data efficiently while preserving consistency across all levels.
These master-detail data structures can also be referred to as main table-subtable structures.

When a record is opened in Data Entry, the master entity (main table) is displayed at the top of the screen. This includes key identifiers (e.g. household ID, enterprise ID) and main characteristics. Related sub-entities or subtables are displayed beneath the master in the form of expandable grids. Each grid corresponds to one subtable. There are no limitations to the number of subtables that a single main table can have. The size and appearance of the grid are defined in the metadata database.

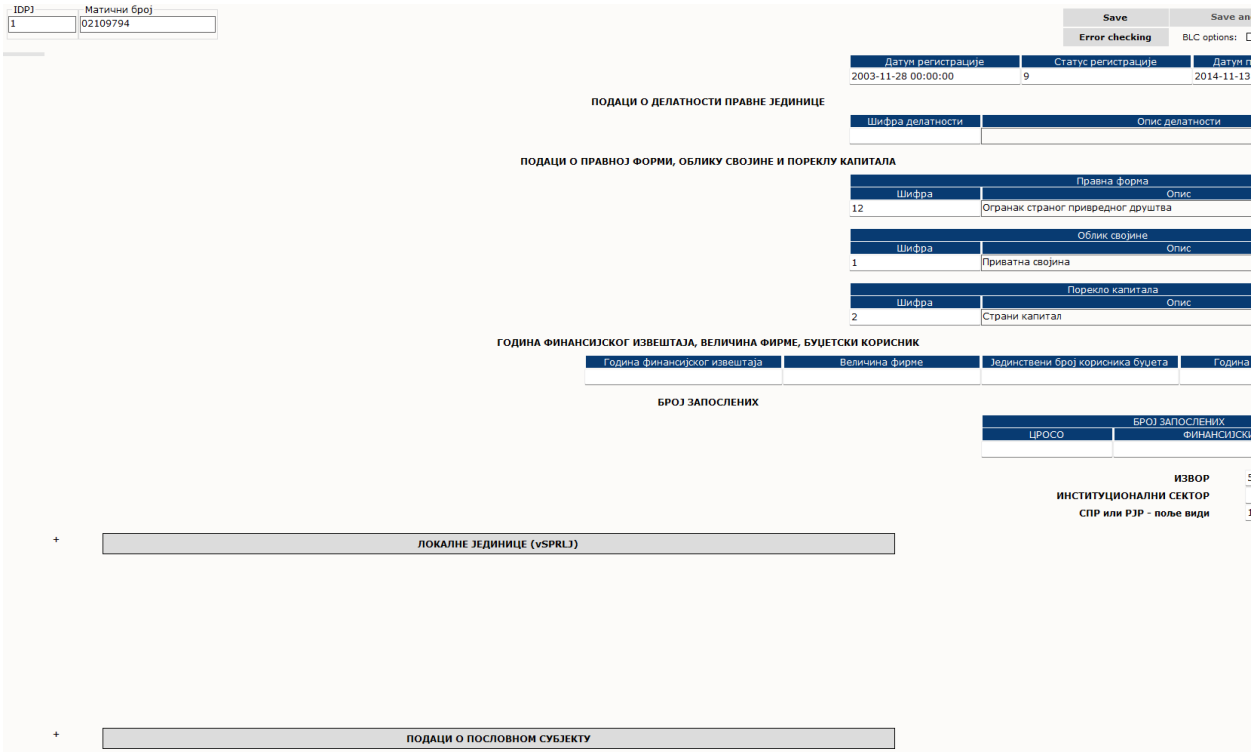


Image 17. Collapsed grids

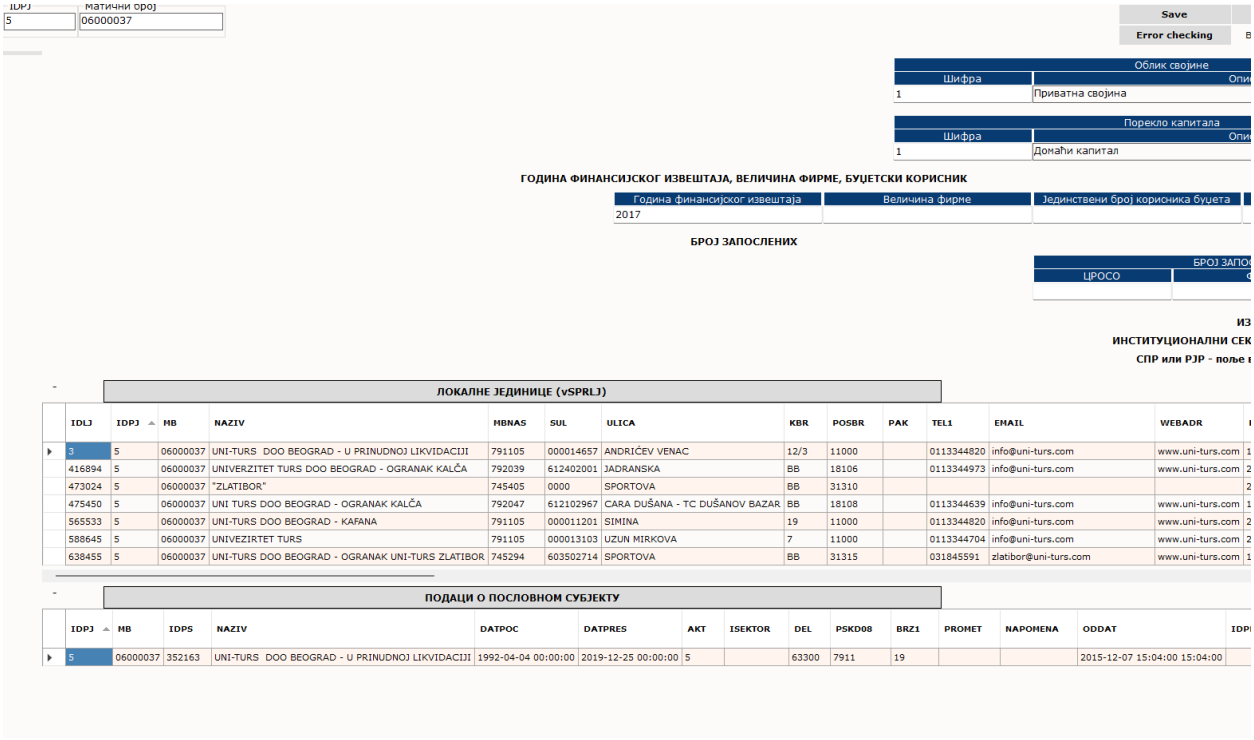


Image 18. Expanded grids

Users can view a summary of all detail records in the grid and expand individual records into full entry forms. Also, within the grid, detail records can be sorted or filtered for easier navigation.

ЛОКАЛНЕ ЈЕДИНИЦЕ (vSPRLJ)

IDLJ	IDPJ	MB	NAZIV	MBNAS	SUL	ULICA	KBR
638455	5	06000037	UNI-TURS DOO BEOGRAD - OGRANAK UNI-TURS ZLATIBOR	745294	603502714	SPORTOVA	BB
473024	5	06000037	"ZLATIBOR"	745405	0000	SPORTOVA	BB
3	5	06000037	UNI-TURS DOO BEOGRAD - U PRINUDNOJ LIKVIDACIJI	791105	000014657	ANDRIĆEV VENAC	12/3
565533	5	06000037	UNI-TURS DOO BEOGRAD - KAFANA	791105	000011201	SIMINA	19
588645	5	06000037	UNIVEZIRTET TURS	791105	000013103	UZUN MIRKOVA	7
416894	5	06000037	UNIVERZITET TURS DOO BEOGRAD - OGRANAK KALČA	792039	612402001	JADRANSKA	BB
475450	5	06000037	UNI TURS DOO BEOGRAD - OGRANAK KALČA	792047	612102967	CARA DUŠANA - TC DUŠANOV BAZAR	BB

Image 19. Sorting grid rows by clicking on the header of the column
the sorting should be done by (in this example it is the column MBNAS, ascending sort)

Clicking on the appropriate row generates a standard input screen for the subtable record in real time, populated with data from the metadata database. Clicking on the subtable header (the button) opens a screen for entering a new record. If the data is locked, the input screen for a new record will not open.

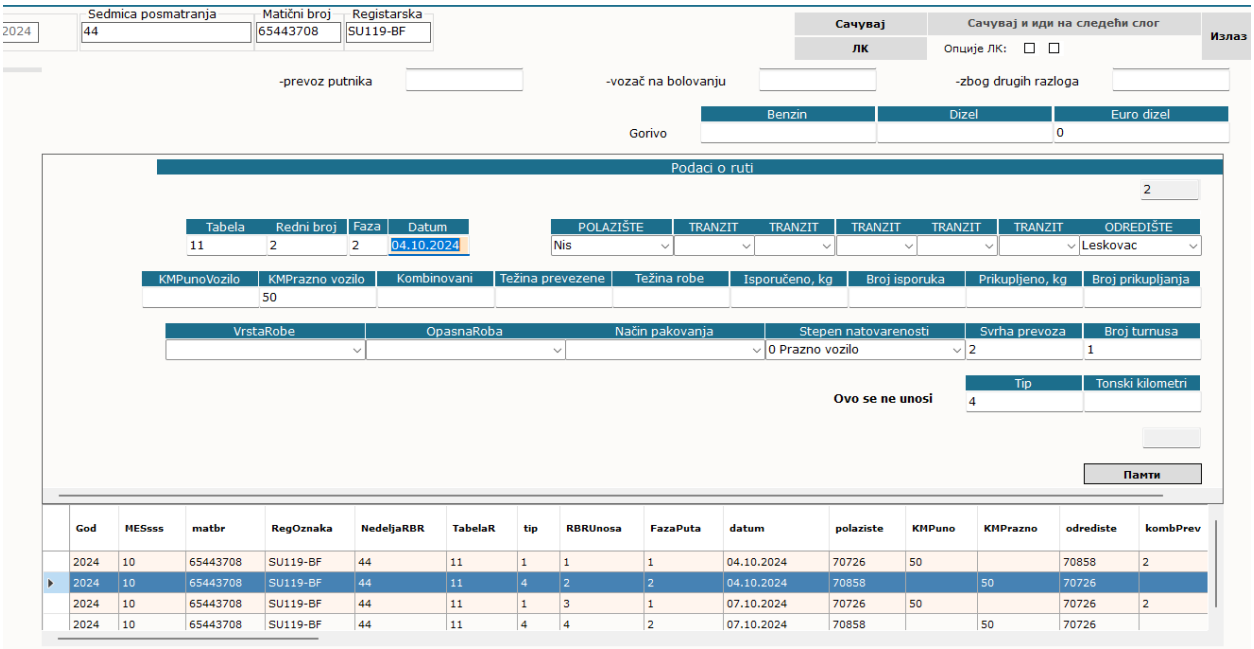


Image 20: By clicking on a row in the grid, editing of the record in subtable is enabled

Validation rules apply not only within each detail record but also across levels. Example: *The number of persons in Household Members table must equal the reported household size in the Household table.*

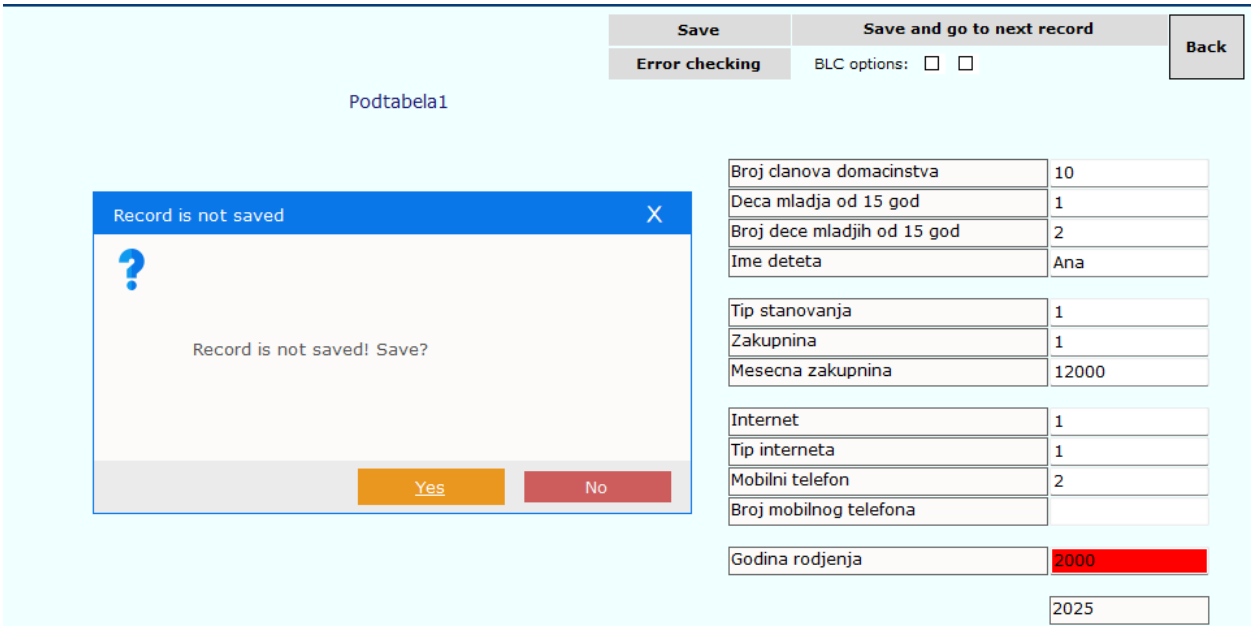


Image 21. The notification for an unsaved record

In addition to the default grid that represents a subtable and contains all its columns, IST allows us to create a custom grid with only the columns that the user wants to display on the

screen. This grid can also include modified subtable data, showing only the selected columns instead of all available ones.

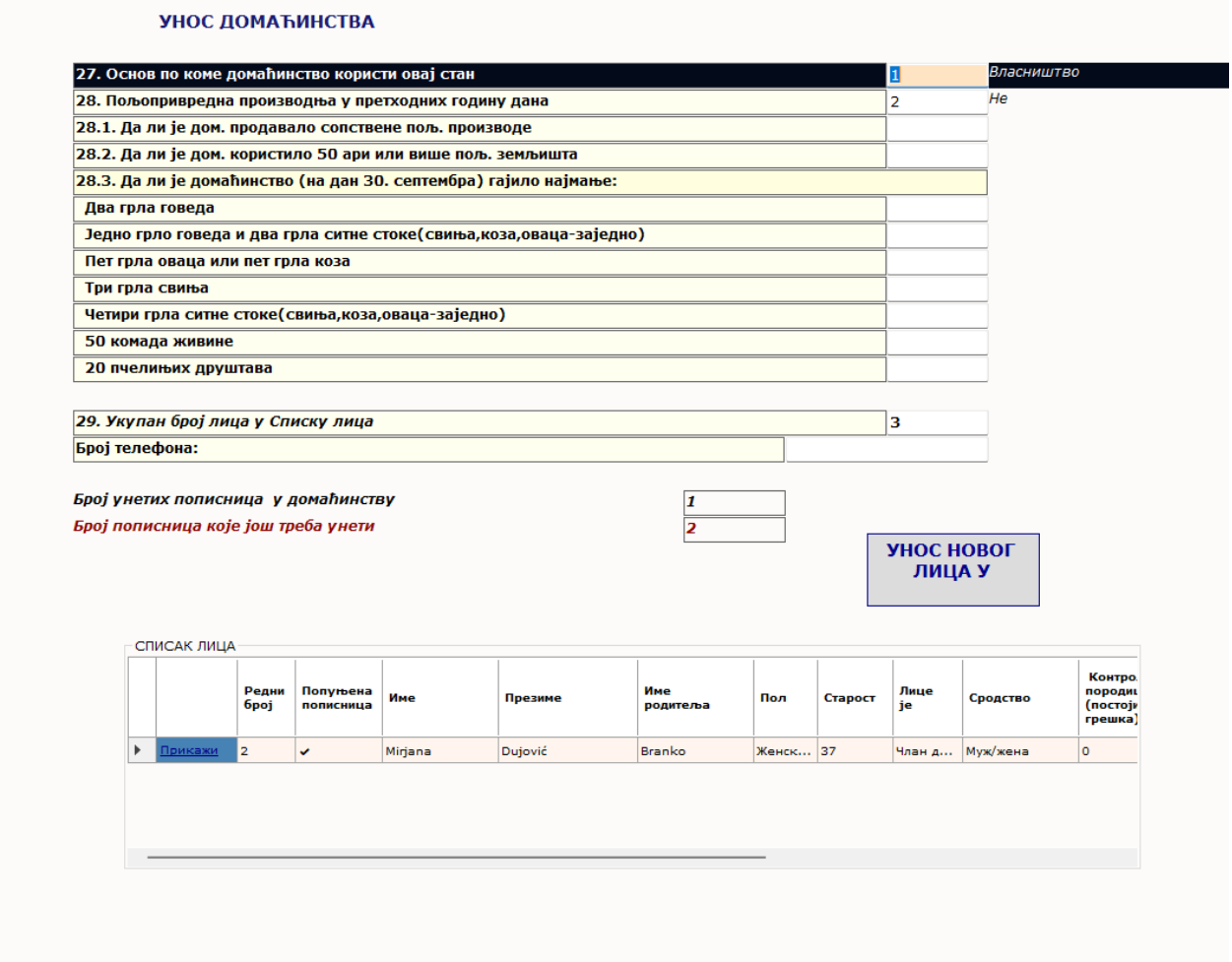


Image 22. Example of a grid

The image shows an example from the census, where a modified grid of the "Household Members" subtable is displayed, containing only the columns the user wants to show on the screen. By clicking the "Prikaži" (Edit) link in the grid, the subtable opens, allowing us to edit only the existing data from the grid. Once the subtable is saved, the subtable window closes and the view returns to the grid page with the updated data.
If the user want to add a new household member, they use the silver button “Unos novog lica” (Adding new member), which opens the same subtable, but with a new member number ready to be entered. After saving, the newly added person will appear in the grid.

A list of basic information related to the survey can be displayed in a grid and used within the application. Users can add new records or modify existing data as needed.

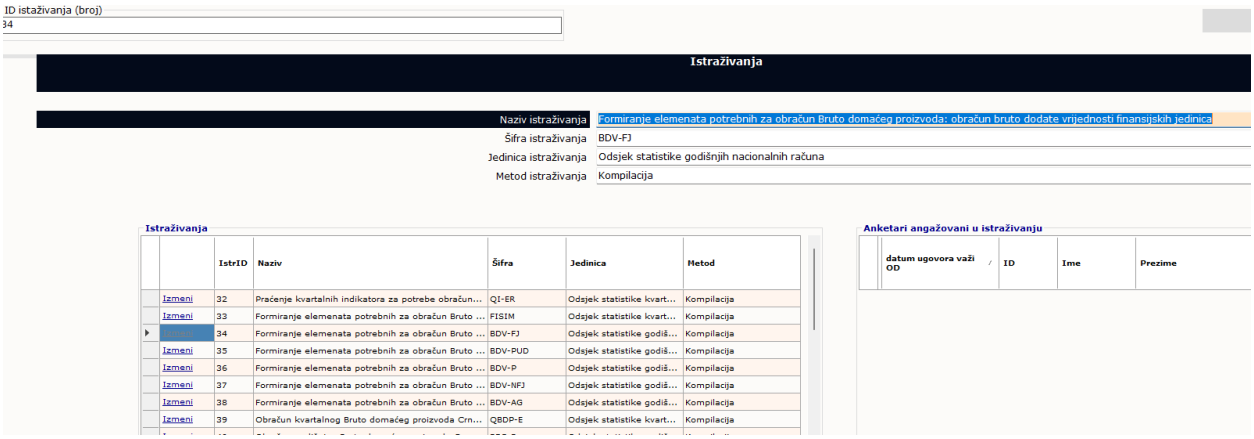


Image 23. Example of a grid

In the Image shown above, there is an open table and the grid on it contains the data from the opened table, and also data from other sources that are needed to be shown for better and easer data management. If the user changes the data in the opened table, in specific columns that are also used in the grid, the value in the column in the grid will also be changed as soon as the user saves the change in the table.

Master–Detail Data Entry allows IST to handle even the most complex survey structures — from simple one-to-many relationships to deep hierarchies with multiple levels. By integrating grids, entry forms, and logical controls into one workflow, statisticians can be confident that all units and sub-units are correctly linked, validated, and stored.

6. Batch Logical Control

While IST performs real-time validation during Data Entry, many surveys require more comprehensive checks across the entire dataset. This is where Batch Logical Control (BLC) comes in.
BLC is a tool that allows statisticians to run all relevant validation rules at once on a chosen set of records, rather than checking them one by one during entry. It ensures that inconsistencies, errors, and missing data are systematically identified and documented.

Batch Logical Control is a process in which all logical control rules defined in metadata are executed on a dataset, for chosen time point. It produces a comprehensive error report that can be reviewed and acted upon later. It is especially important for quality control and editing after data collection is complete.

To execute batch logical control, the user first must click Batch logical control button on the main menu. The new window will open for more options.

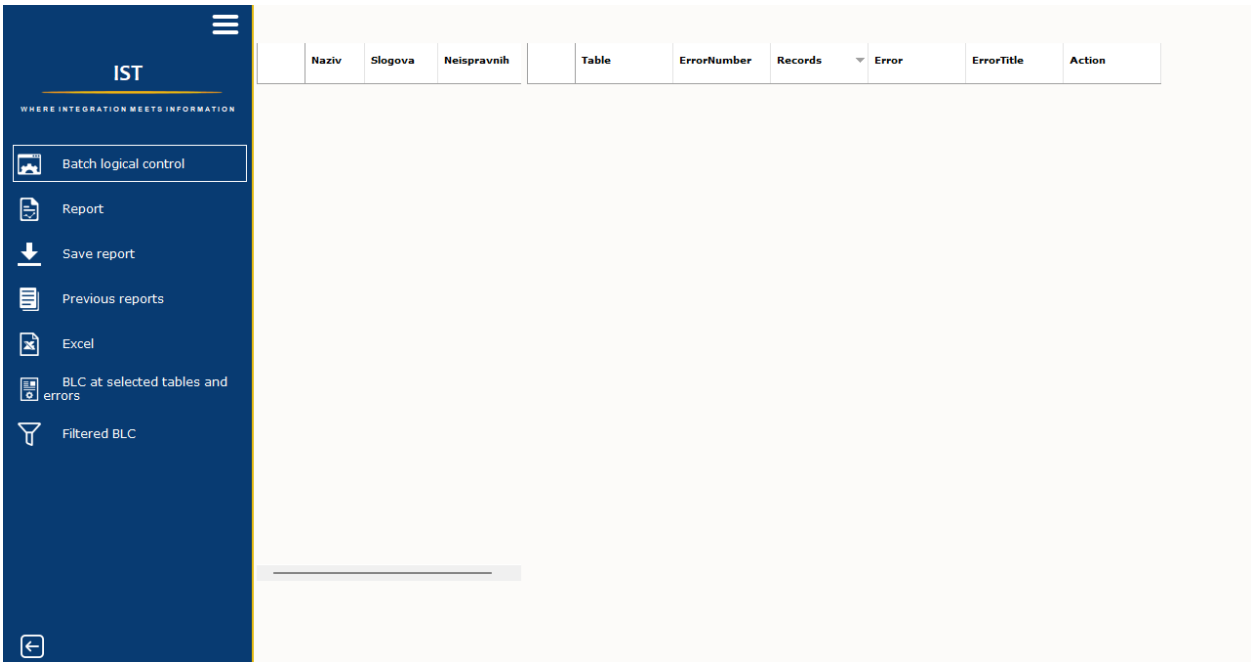


Image 24. Batch logical control window

Logical control of data can be done in a variety of ways in IST:

1. On the whole material – all errors and individual errors
2. On the selected tables – all errors and individual errors
3. On the selected rows – all errors and individual errors

To do logical control on the whole material, the user must click the Batch logical control button on the left side of the screen. If the user wants to do logical control on selected tables or errors, the user must click the BLC at selected tables and errors, and the new window will open.

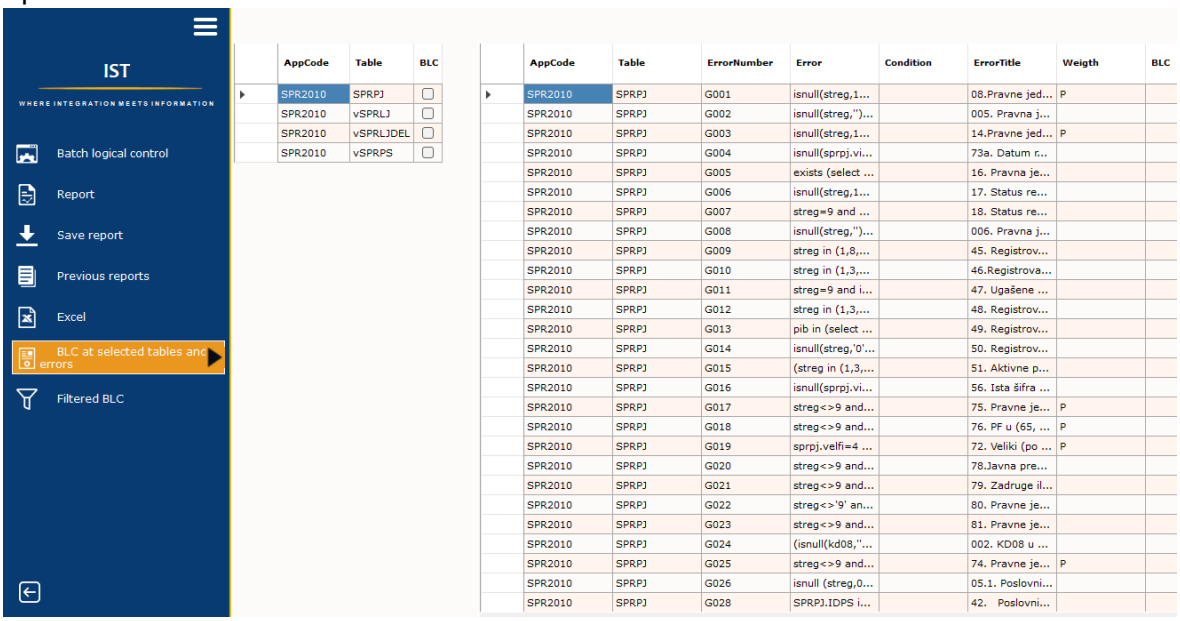
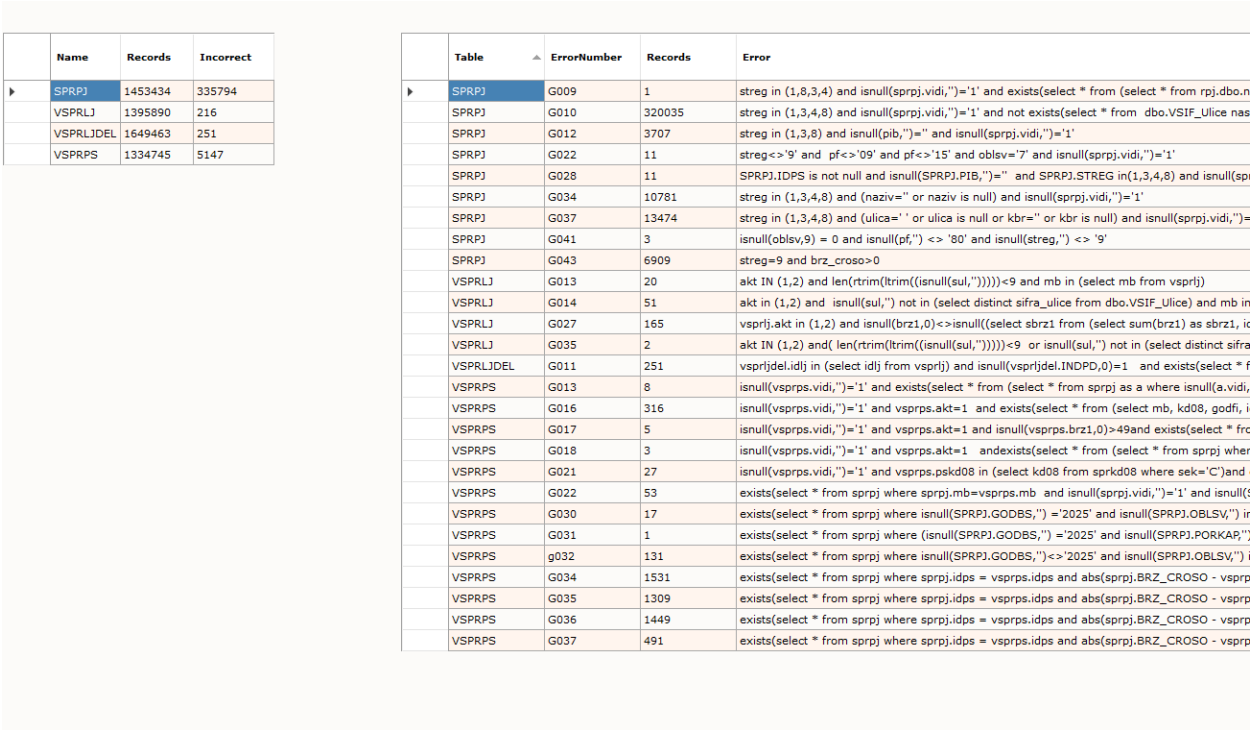


Image 25. BLC at selected tables and errors

The window shows all the tables and errors that are defined in the IST metadata database for specific application, for the specific time chosen. The tabular view of all errors can also be sorted by any column in the table; by clicking on the header of the column they wish to do sorting by.

The user can choose the exact table, or errors, they wish to do the logical control on, by ticking the box in the column BLC. Afterwards, the black arrow on the right of the BLC at selected tables and errors has to be clicked on. Then, the batch logical control will be executed. When it is done, IST will open a new window.

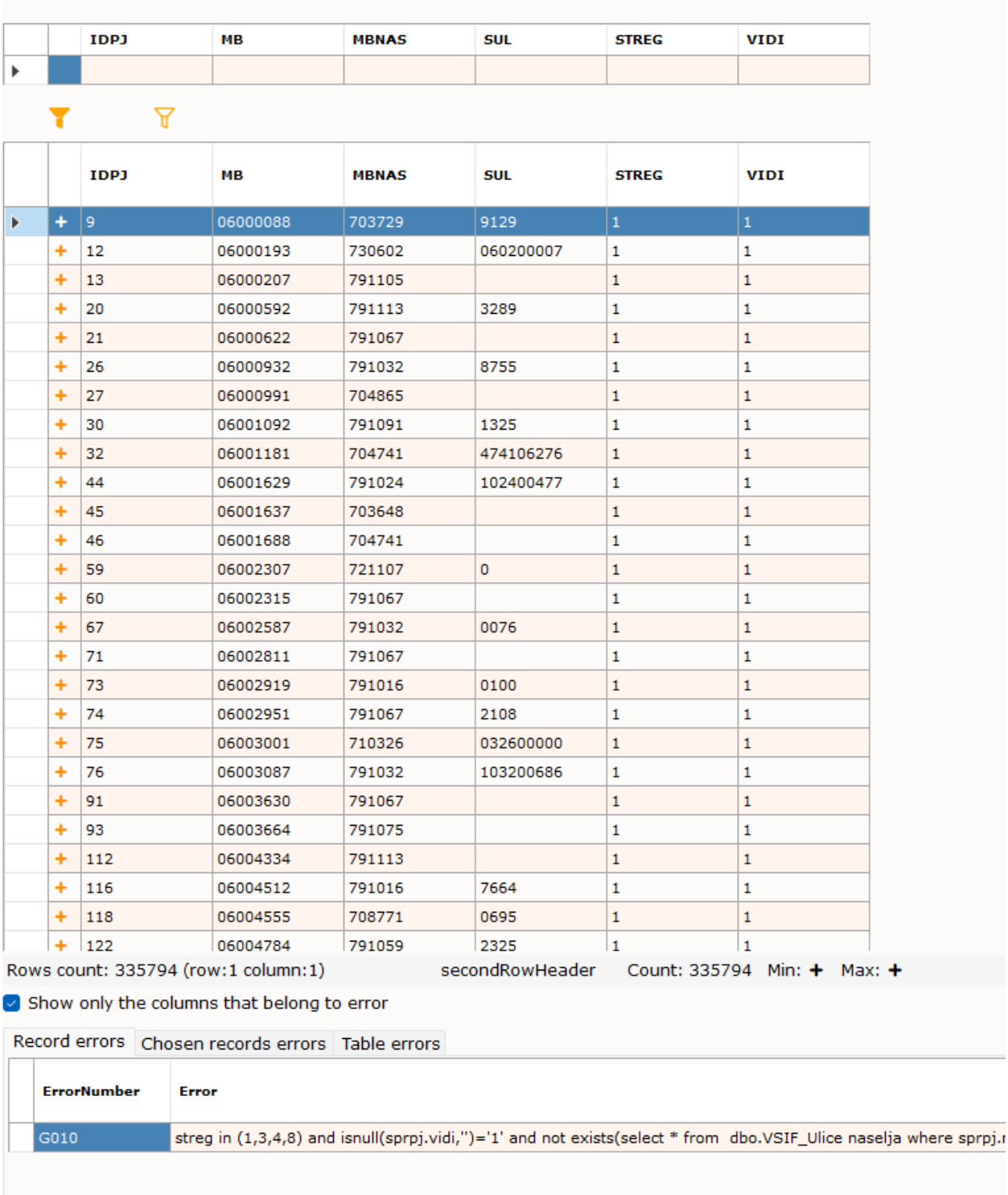


Name	Records	Incorrect
SPRPJ	1453434	335794
VSPRLJ	1395890	216
VSPRLJDEL	1649463	251
VSPRPS	1334745	5147

Table	ErrorNumber	Records	Error
SPRPJ	G009	1	streg in (1,8,3,4) and isnull(sprpj.vidi,'')='1' and exists(select * from (select * from rpj.dbo.n
SPRPJ	G010	320035	streg in (1,3,4,8) and isnull(sprpj.vidi,'')='1' and not exists(select * from dbo.VSIF_Ulice nas
SPRPJ	G012	3707	streg in (1,3,8) and isnull(pib,'')='' and isnull(sprpj.vidi,'')='1'
SPRPJ	G022	11	streg<>'9' and pf<>'09' and pf<>'15' and oblsv='7' and isnull(sprpj.vidi,'')='1'
SPRPJ	G028	11	SPRPJ.IDPS is not null and isnull(SPRPJ.PIB,'')='' and SPRPJ.STREG in(1,3,4,8) and isnull(sp
SPRPJ	G034	10781	streg in (1,3,4,8) and (naziv='' or naziv is null) and isnull(sprpj.vidi,'')='1'
SPRPJ	G037	13474	streg in (1,3,4,8) and (ulica=' ' or ulica is null or kbr='' or kbr is null) and isnull(sprpj.vidi,'')=
SPRPJ	G041	3	isnull(oblsv,9) = 0 and isnull(pf,'') <> '80' and isnull(streg,'') <> '9'
SPRPJ	G043	6909	streg=9 and brz_croso>0
VSPRLJ	G013	20	akt IN (1,2) and len(rtrim(ltrim((isnull(sul,'')))))<9 and mb in (select mb from vsprlj)
VSPRLJ	G014	51	akt in (1,2) and isnull(sul,'') not in (select distinct sifra_ulice from dbo.VSIF_Ulice) and mb in
VSPRLJ	G027	165	vsprlj.akt in (1,2) and isnull(brz1,0)<>isnull((select sbrz1 from (select sum(brz1) as sbrz1, ic
VSPRLJ	G035	2	akt IN (1,2) and(len(rtrim(ltrim((isnull(sul,'')))))<9 or isnull(sul,'') not in (select distinct sifra
VSPRLJDEL	G011	251	vsprljdel.idlj in (select idlj from vsprlj) and isnull(vsprljdel.INDPD,0)=1 and exists(select * f
VSPRPS	G013	8	isnull(vsprps.vidi,'')='1' and exists(select * from (select * from sprpj as a where isnull(a.vidi,
VSPRPS	G016	316	isnull(vsprps.vidi,'')='1' and vsprps.akt=1 and exists(select * from (select mb, kd08, godfi, i
VSPRPS	G017	5	isnull(vsprps.vidi,'')='1' and vsprps.akt=1 and isnull(vsprps.brz1,0)>49and exists(select * fro
VSPRPS	G018	3	isnull(vsprps.vidi,'')='1' and vsprps.akt=1 andexists(select * from (select * from sprpj wher
VSPRPS	G021	27	isnull(vsprps.vidi,'')='1' and vsprps.pskd08 in (select kd08 from sprkd08 where sek='C')and
VSPRPS	G022	53	exists(select * from sprpj where sprpj.mb=vsprps.mb and isnull(sprpj.vidi,'')='1' and isnull(s
VSPRPS	G030	17	exists(select * from sprpj where isnull(SPRPJ.GODBS,'') ='2025' and isnull(SPRPJ.OBLSV,'') ir
VSPRPS	G031	1	exists(select * from sprpj where (isnull(SPRPJ.GODBS,'') ='2025' and isnull(SPRPJ.PORKAP,'')
VSPRPS	g032	131	exists(select * from sprpj where isnull(SPRPJ.GODBS,'')<>'2025' and isnull(SPRPJ.OBLSV,'') i
VSPRPS	G034	1531	exists(select * from sprpj where sprpj.idps = vsprps.idps and abs(sprpj.BRZ_CROSO - vsprp
VSPRPS	G035	1309	exists(select * from sprpj where sprpj.idps = vsprps.idps and abs(sprpj.BRZ_CROSO - vsprp
VSPRPS	G036	1449	exists(select * from sprpj where sprpj.idps = vsprps.idps and abs(sprpj.BRZ_CROSO - vsprp
VSPRPS	G037	491	exists(select * from sprpj where sprpj.idps = vsprps.idps and abs(sprpj.BRZ_CROSO - vsprp

Image. 26 Result of batch logical control

The user will see all the tables that have defined errors for the specific time point (on the left), and also all the errors (on the right) in tabular form. Besides the table, error number and error itself, the column Records inform the user how many records have the specific error. When clicking on the specific error (row), the new window will appear.



IDPJ	MB	MBNAS	SUL	STREG	VIDI
9	06000088	703729	9129	1	1
12	06000193	730602	060200007	1	1
13	06000207	791105		1	1
20	06000592	791113	3289	1	1
21	06000622	791067		1	1
26	06000932	791032	8755	1	1
27	06000991	704865		1	1
30	06001092	791091	1325	1	1
32	06001181	704741	474106276	1	1
44	06001629	791024	102400477	1	1
45	06001637	703648		1	1
46	06001688	704741		1	1
59	06002307	721107	0	1	1
60	06002315	791067		1	1
67	06002587	791032	0076	1	1
71	06002811	791067		1	1
73	06002919	791016	0100	1	1
74	06002951	791067	2108	1	1
75	06003001	710326	032600000	1	1
76	06003087	791032	103200686	1	1
91	06003630	791067		1	1
93	06003664	791075		1	1
112	06004334	791113		1	1
116	06004512	791016	7664	1	1
118	06004555	708771	0695	1	1
122	06004784	791059	2325	1	1

Image 27. The list of all records (columns are record keys) that contain the error described below (description includes the error number, the error itself (in a .sql query) and the error title)

With this tabular display, the user can easily see all records that have a specific rule validated. They can then quickly, simply by clicking on the row of the desired record, to open entry form and immediately correct the data if they wish so.

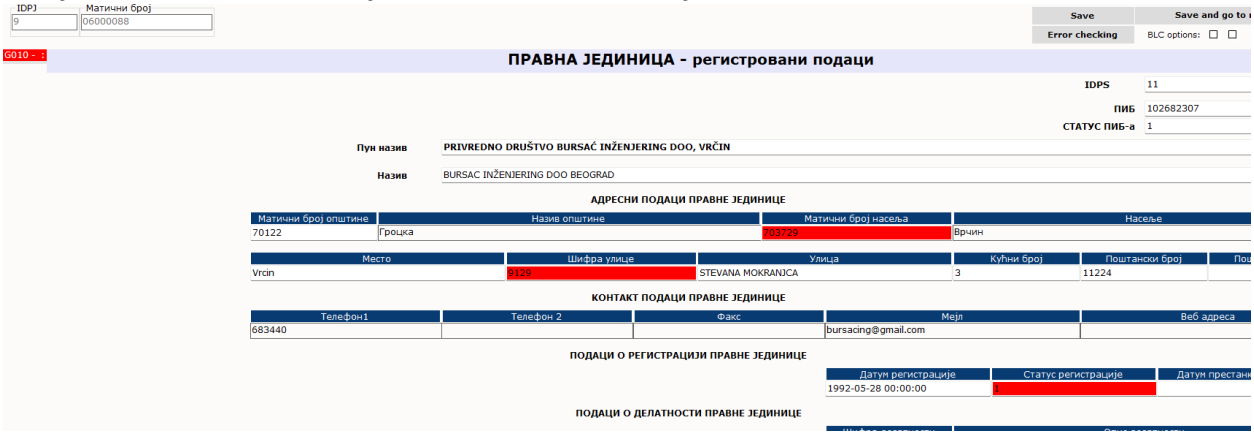
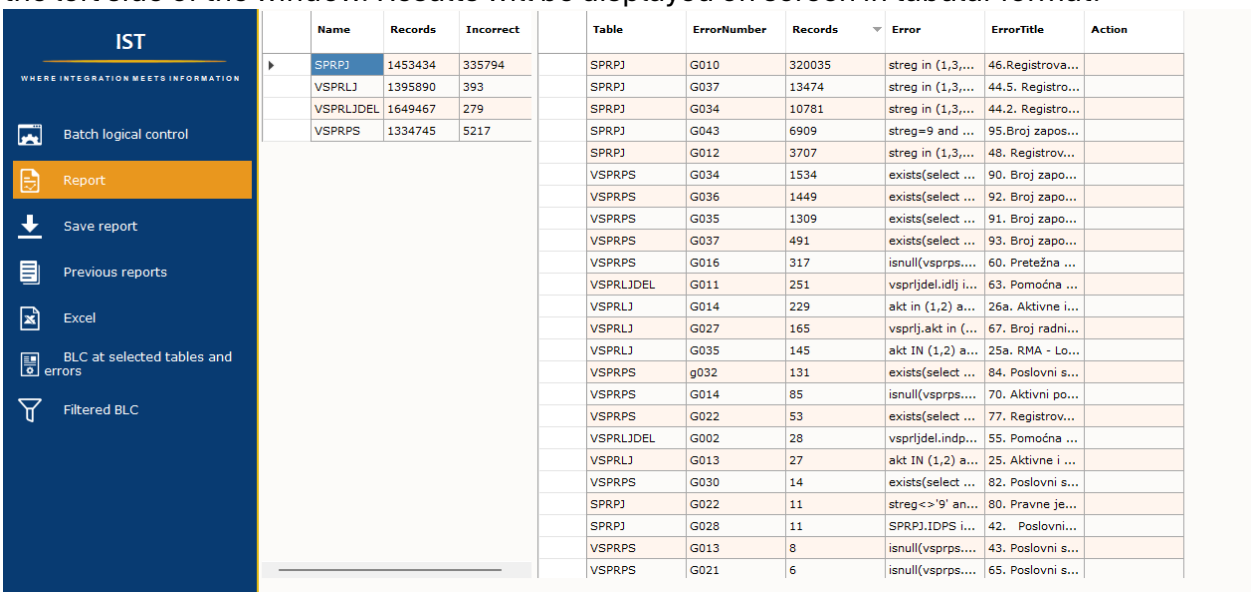


Image 28. The entry form of a records containing the error

Errors are classified as critical (coloured in red and must be corrected) and as warnings (coloured in yellow, should be reviewed).

Every rule of logical control in the metadata database has fields that specify the period during which the rule is valid. Also, rules can compare values across fields, across tables, or even across surveys (if fictitious fields are defined).

It is possible to generate a report about logical control by clicking on the Report button on the left side of the window. Results will be displayed on screen in tabular format.



Name	Records	Incorrect
SPRPJ	1453434	335794
VSPRLJ	1395890	393
VSPRLJDEL	1649467	279
VSPRPS	1334745	5217

Table	ErrorNumber	Records	Error	ErrorTitle	Action
SPRPJ	G010	320035	streg in (1,3,...	46.Registrova...	
SPRPJ	G037	13474	streg in (1,3,...	44.5. Registro...	
SPRPJ	G034	10781	streg in (1,3,...	44.2. Registro...	
SPRPJ	G043	6909	streg=9 and ...	95.Broj zapos...	
SPRPJ	G012	3707	streg in (1,3,...	48. Registrov...	
VSPRPS	G034	1534	exists(select ...	90. Broj zapo...	
VSPRPS	G036	1449	exists(select ...	92. Broj zapo...	
VSPRPS	G035	1309	exists(select ...	91. Broj zapo...	
VSPRPS	G037	491	exists(select ...	93. Broj zapo...	
VSPRPS	G016	317	isnull(vsprps....	60. Pretežna ...	
VSPRLJDEL	G011	251	vsprljdel.idlj i...	63. Pomoćna ...	
VSPRLJ	G014	229	akt in (1,2) a...	26a. Aktivne i...	
VSPRLJ	G027	165	vsprlj.akt in (...	67. Broj radni...	
VSPRLJ	G035	145	akt IN (1,2) a...	25a. RMA - Lo...	
VSPRPS	g032	131	exists(select ...	84. Poslovni s...	
VSPRPS	G014	85	isnull(vsprps....	70. Aktivni po...	
VSPRPS	G022	53	exists(select ...	77. Registrov...	
VSPRLJDEL	G002	28	vsprljdel.indp...	55. Pomoćna ...	
VSPRLJ	G013	27	akt IN (1,2) a...	25. Aktivne i ...	
VSPRPS	G030	14	exists(select ...	82. Poslovni s...	
SPRPJ	G022	11	streg<>'9' an...	80. Pravne je...	
SPRPJ	G028	11	SPRPJ.IDPS i...	42. Poslovni...	
VSPRPS	G013	8	isnull(vsprps....	43. Poslovni s...	
VSPRPS	G021	6	isnull(vsprps....	65. Poslovni s...	

Image 29. Report generation

It is also possible to generate an Excel report at any given moment, by clicking on the Excel button on the left side of the window. It can also automatically be saved by clicking the Save report button.

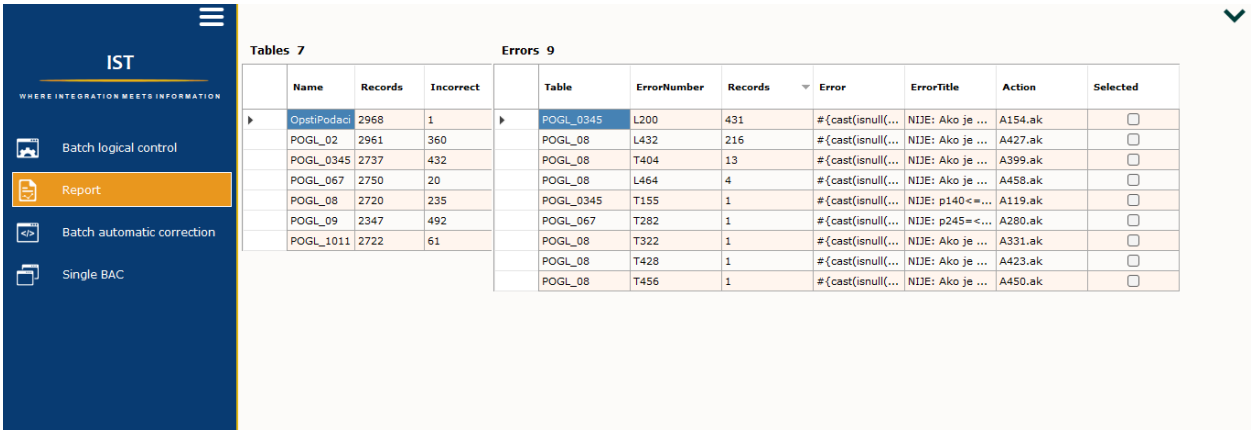
7. Automatic Correction

In addition to detecting errors through real-time validation and Batch Logical Control (BLC), IST also supports Automatic Correction. This functionality applies predefined correction rules to data when certain types of errors are found. Instead of only flagging issues, IST can *fix them automatically* based on methodological rules provided by statisticians.

The need for this module became most apparent when working with survey materials containing a large number of records and a methodologically extensive set of logical control errors. If it is anticipated that a large dataset may contain errors that need to be corrected universally, automatic correction becomes the only viable solution for rapid data processing.

Automated correction rules in the metadata database are linked to rules of logical control. After executing logical control, if an error linked to an automated correction rule is detected, IST will apply the correction to the set of records containing this error. This reduces repetitive editing work and ensures consistency in how corrections are applied.

By clicking on the Automatic Correction button on the main window menu, new window opens. The user can see for selected application all of the errors that can be automatically corrected in the data by clicking on the Report section (the user can first click on the Batch logical control, so that they have the most recent state)



Name	Records	Incorrect
OpstiPodaci	2968	1
POGL_02	2961	360
POGL_0345	2737	432
POGL_067	2750	20
POGL_08	2720	235
POGL_09	2347	492
POGL_1011	2722	61

Table	ErrorNumber	Records	Error	ErrorTitle	Action	Selected
POGL_0345	L200	431	#{cast(isnull(...	NIJE: Ako je ...	A154.ak	☐
POGL_08	L432	216	#{cast(isnull(...	NIJE: Ako je ...	A427.ak	☐
POGL_08	T404	13	#{cast(isnull(...	NIJE: Ako je ...	A399.ak	☐
POGL_08	L464	4	#{cast(isnull(...	NIJE: Ako je ...	A458.ak	☐
POGL_0345	T155	1	#{cast(isnull(...	NIJE: p140<=...	A119.ak	☐
POGL_067	T282	1	#{cast(isnull(...	NIJE: p245=<...	A280.ak	☐
POGL_08	T322	1	#{cast(isnull(...	NIJE: Ako je ...	A331.ak	☐
POGL_08	T428	1	#{cast(isnull(...	NIJE: Ako je ...	A423.ak	☐
POGL_08	T456	1	#{cast(isnull(...	NIJE: Ako je ...	A450.ak	☐

Image 30. Report on automatic correction

On the table on the left there are names of tables, how many records there are in the dataset and how many of them are incorrect. On the table on the right, there is detailed information about tables and their errors that can be automatically corrected, by doing the defined action in the Action column.

All of the rules can be corrected by choosing the Batch automatic correction section. If the user wishes to automatically correct the specific error, they can choose the desired error by ticking the Selected field for the error they want to automatically correct, and then click the Single BAC option on the left side of the window, and click the black arrow that will appear next to it.

Automatic correction ensures corrections are applied uniformly across all records and users. It improves final dataset quality without relying entirely on human intervention.
In this section the user can also do BLC (the first option on the left side of the screen), so they can quickly check the material before and after automatic correction.

8. Data Editing

The Data Editing button opens a new window where users can select records they wish to review and edit if necessary.

Image 31. Data Editing screen

Here it is possible to directly proceed to data entry or perform logical control at any time. Record editing can be done either in tabular view or from a menu displaying the record in its original form layout.

The data editing option is one of the most useful features. After selecting the "Record Selection" button, a window opens with a list of tables.

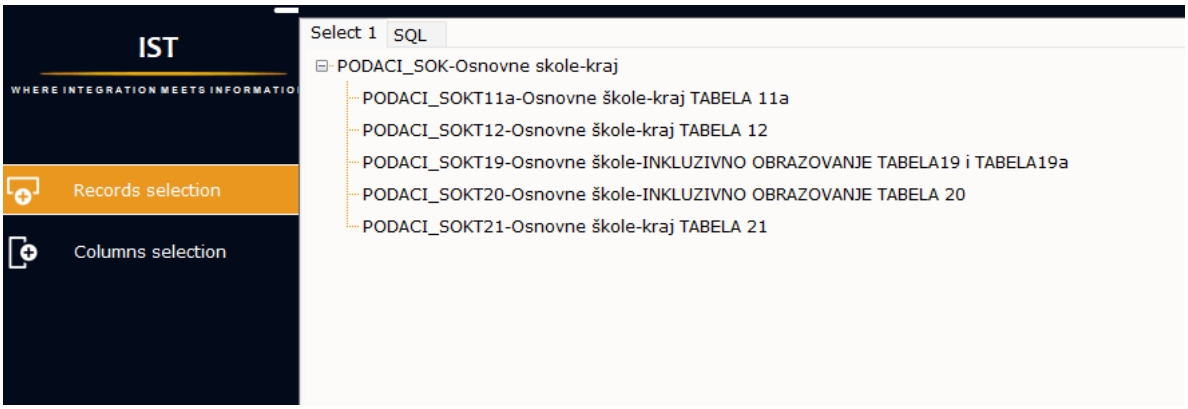


Image 32. Selection of tables

When user select one of the tables, the columns contained in that table are added, along with some additional options.

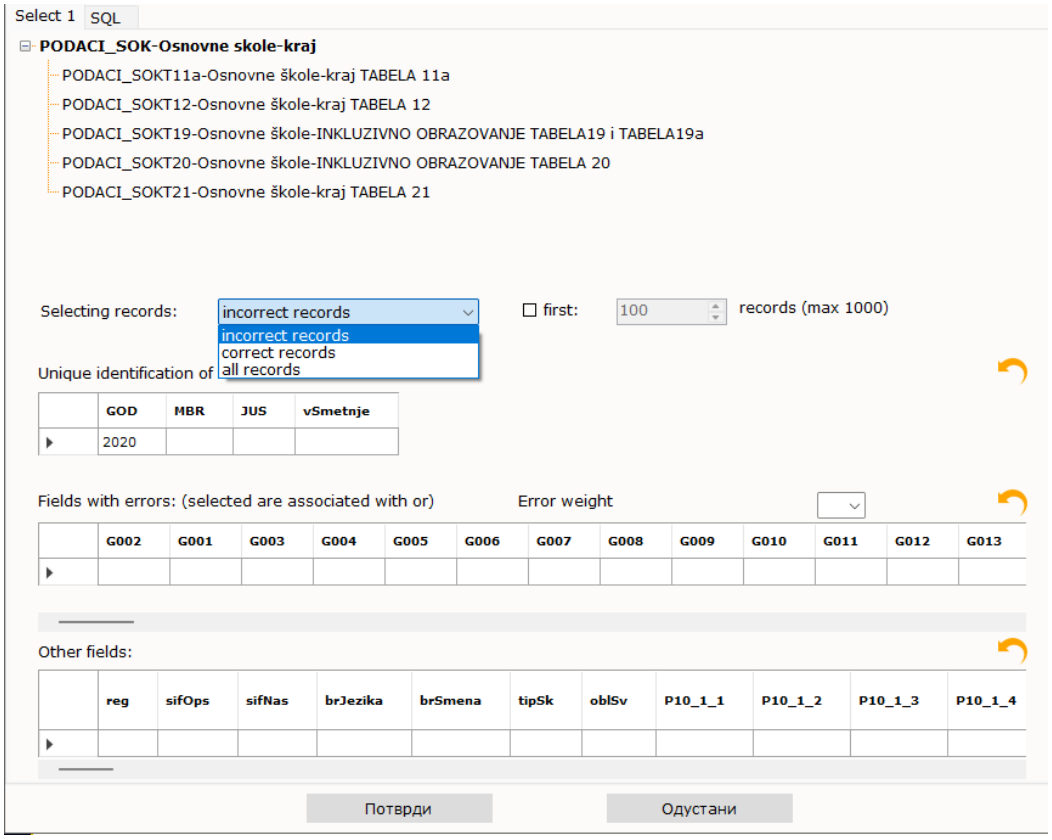


Image 33. Advanced search

In the additional options, user can use the dropdown list to choose whether they want to review records with errors (incorrect records), valid records (correct records) or all records.

Additionally, for any of these options, user can check the box next to it to review only the first 100 records by default, but they can change this number to whichever they want.

It is possible to review records in the following ways:

1. By key (the year and month fields are automatically populated based on the selected time point, if they exist in the table, while the other fields can be manually filled for review data for a specific key in the part unique identification record)
2. By selected errors
3. By specific field values

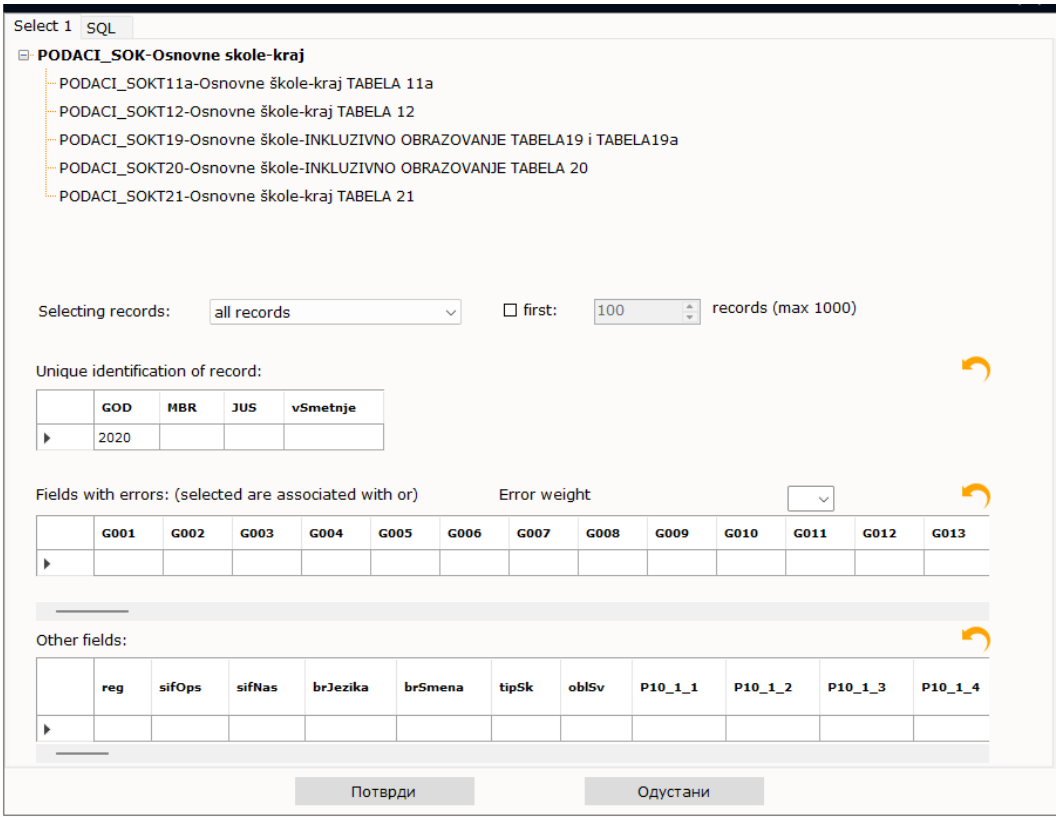


Image 34: Record selection screen (example of selecting all records containing a key where GOD (year) is 2020)

<u>Reviewing records by specific field values for entry fields:</u>

On the record selection screen, it is possible to search and filter by entry fields (those that can hold data in the database). If the entry field is textual, simpler conditions can be used, and entering text in such a field will display all records containing that text in the specified field. If the entry field is numeric or Boolean, conditions cannot be applied. Instead, all records containing specific value in the field will be listed.

Reviewing records by specific field values for fictitious fields:

On the record selection screen, it is also possible to search and filter by fictitious textual fields (e.g. entering “Belgrade” in the city name field will display all records containing “Belgrade” in that field). Additionally, simple conditions can be entered into fictitious fields. For instance, entering a condition like >5 and <=10 in a field (typically the third grid) will list records meeting that condition for the specific field. Supported operators include and, or, (,), >=, >, <=, <, <>, =.

If it is required to search records using conditions on an entry field, the simplest solution would be to turn that entry field into a fictitious field.

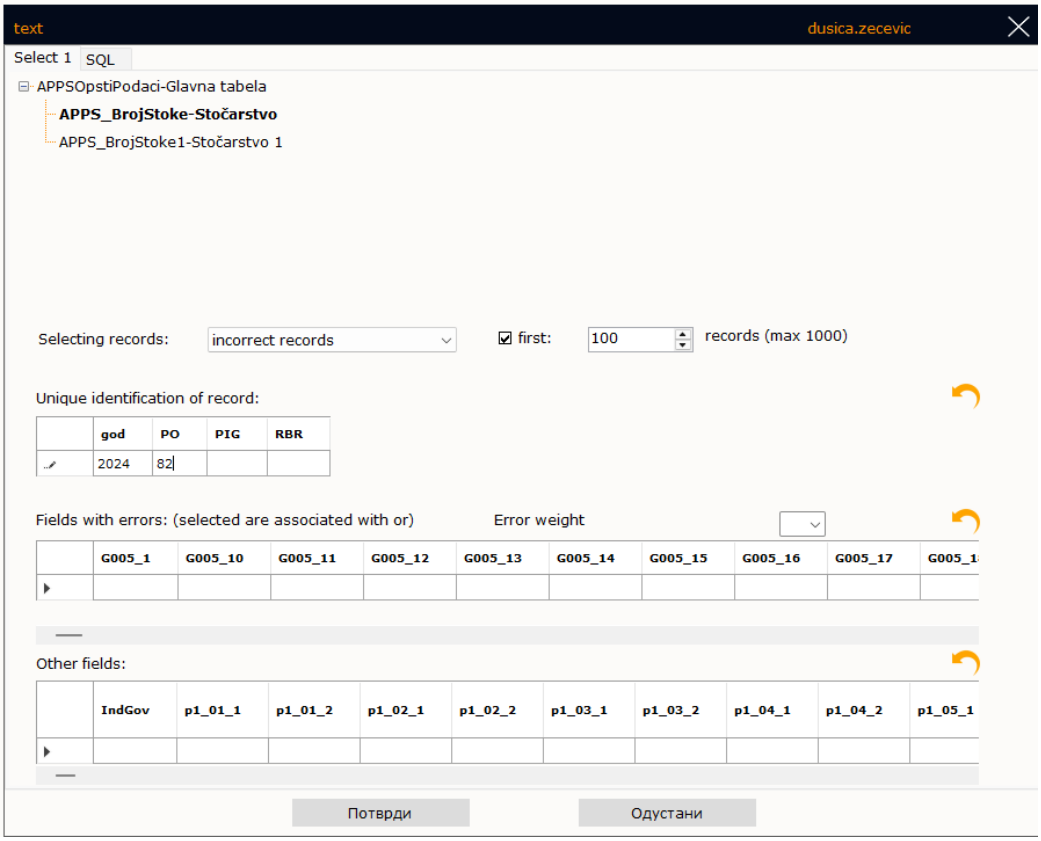


Image 35: Record selection screen (example of selecting first 100 incorrect records which have key where god (year) is 2024 and PO is 82)

The selected records are displayed tabularly after click on button Potvrdi (Confirm).

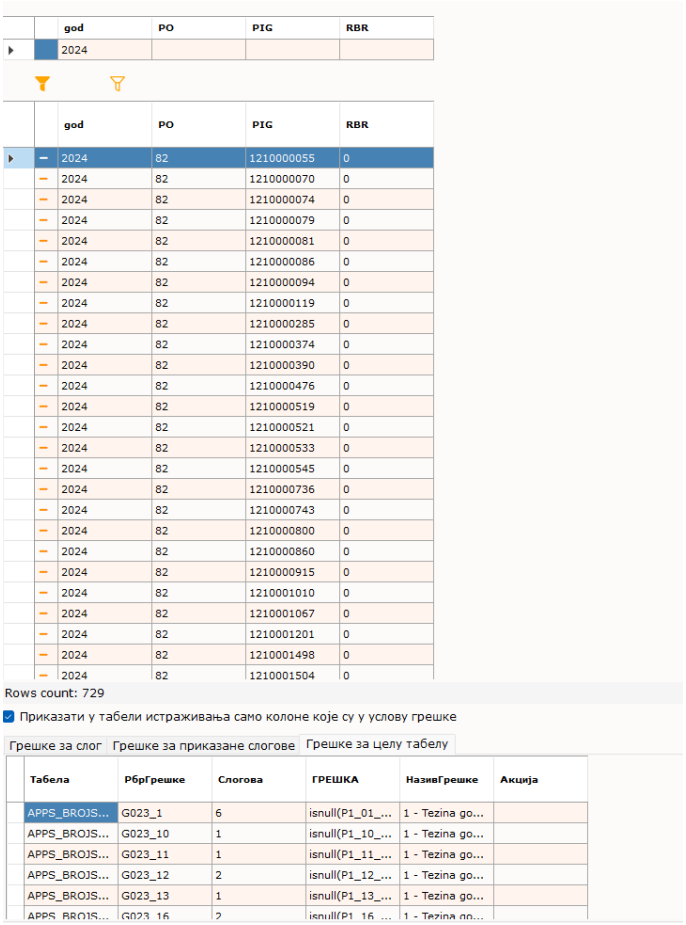


Image 36: Default view of the selected records

For each record, any associated errors are also shown (bottom of the screen). The columns displayed in the table include columns that are part of the key (mandatory). However, the user can choose more columns to add to the selection view.

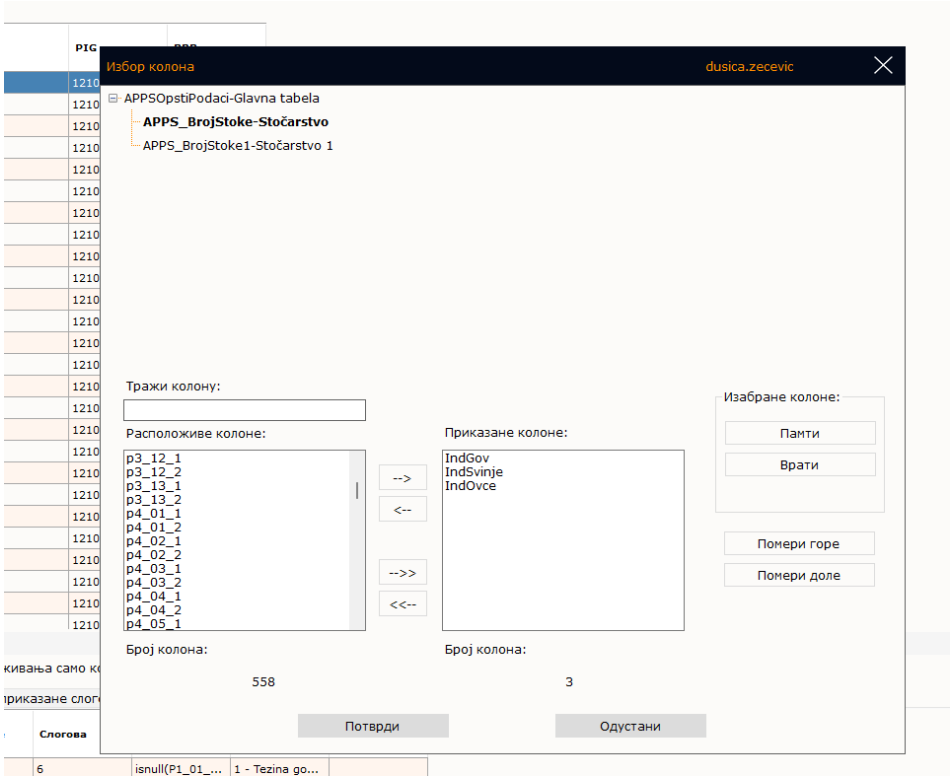


Image 37: Selection screen for choosing additional columns to display

Selected records can be exported to Excel in the XML format, and the export process retains leading zeroes.

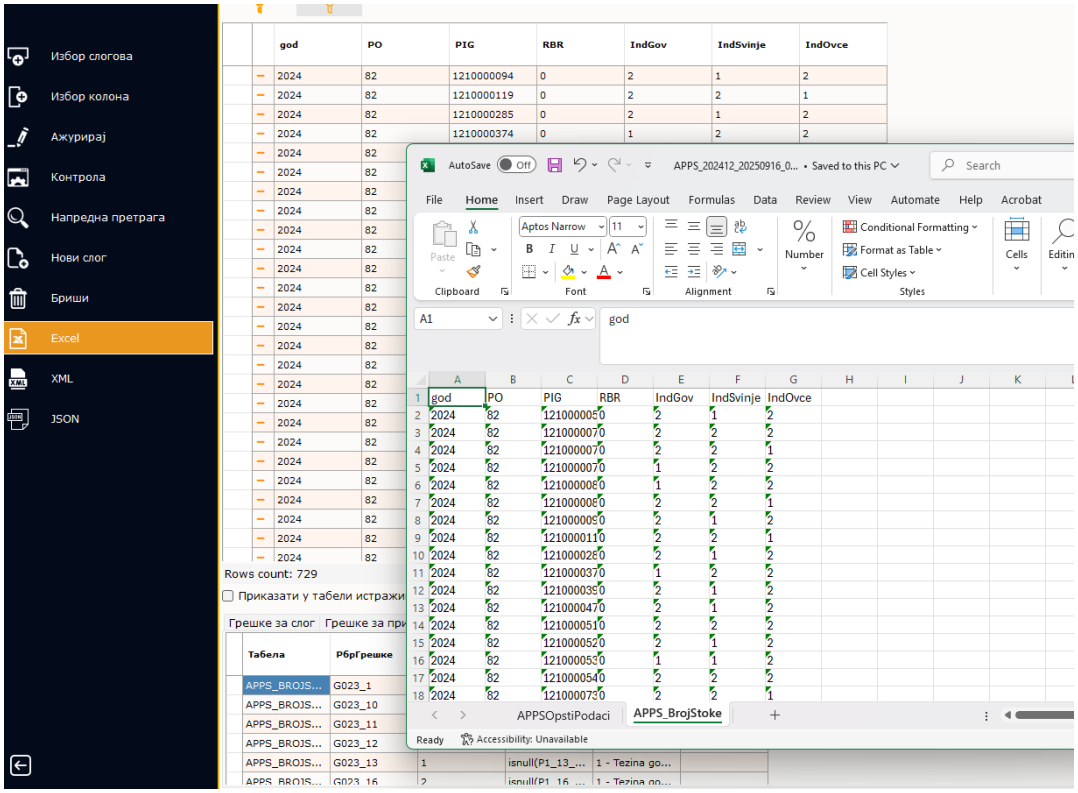


Image 38: Exporting selected sets of records to Excel

The user also has additional options such as filtering data by text or numeric values, sorting in ascending or descending order, multi-column sorting, selecting values equal or not to a specific value, text filtering and unfiltering all, freezing and unfreezing, autofitting to context, to window, and to column header.

These options become available when the user right-clicks on a field within the grid.

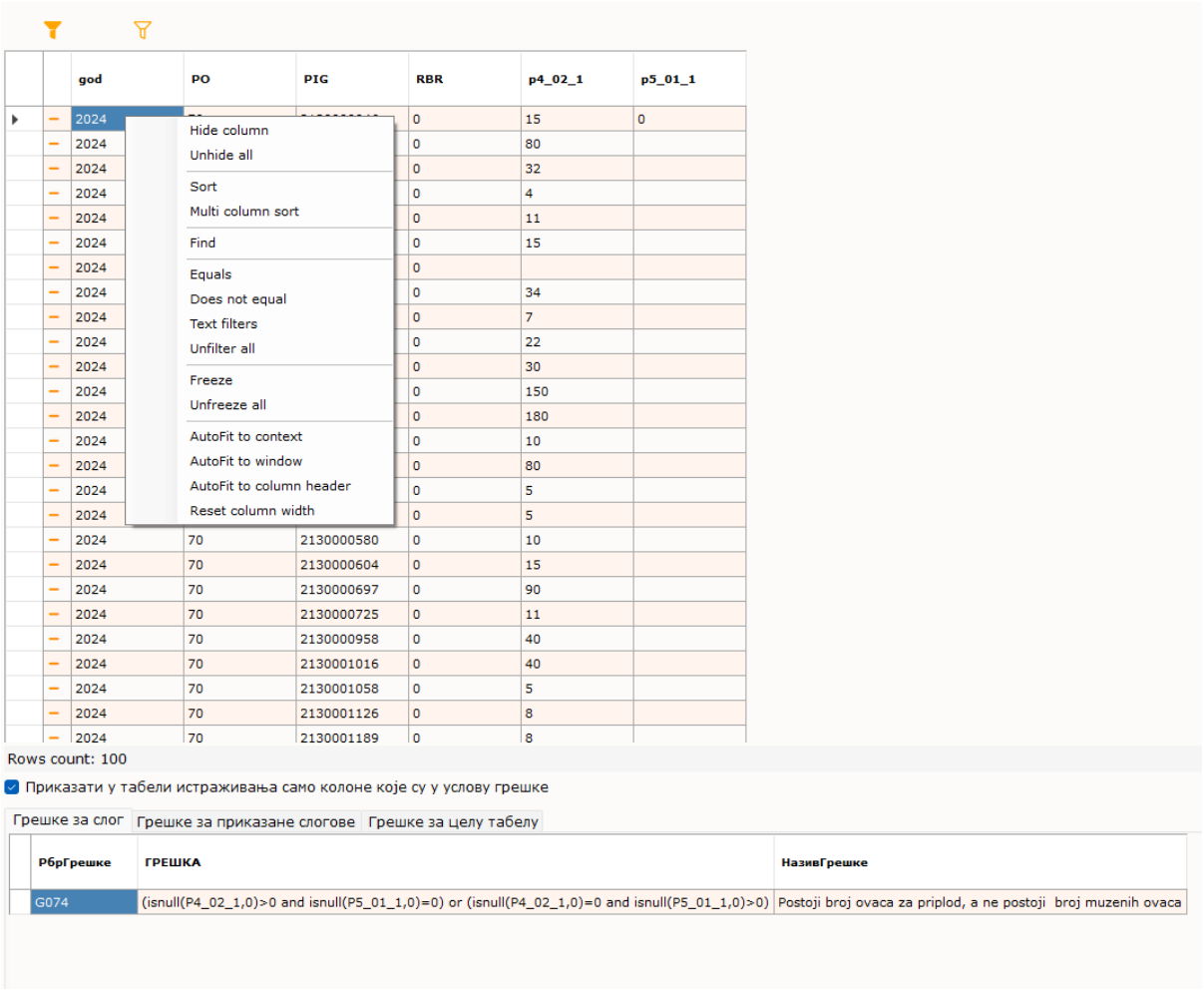


Image 39: Adding additional search parameters in the grid

The following section contains a more detailed explanation of these options:

When user select the first option, **Hide Column**, the entire column that contains the selected field will disappear from the grid.

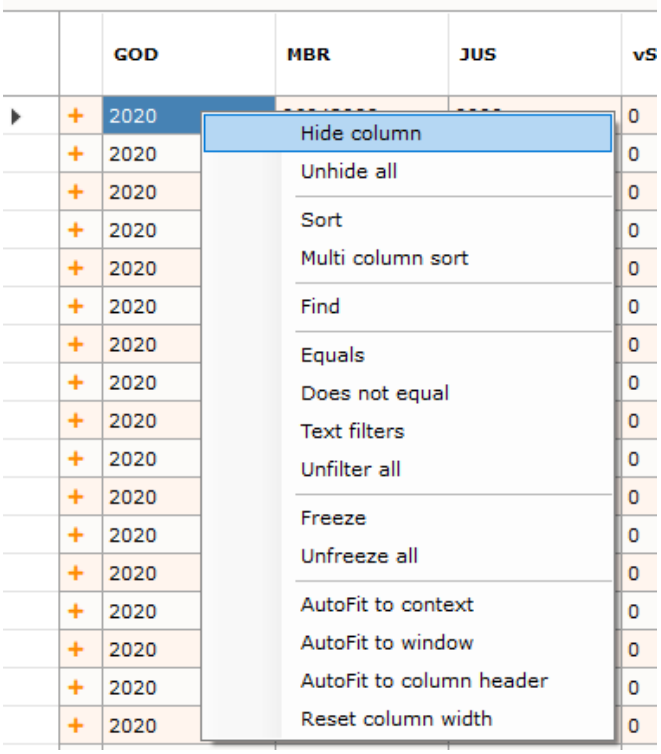


Image 40.

User can see that the "GOD" column is not visible on the screen.

	MBR	JUS	vSmetnje	reg
+	06042988	0000	0	71
+	06128254	0000	0	72
+	06128254	0001	0	72
+	06128254	0002	0	72
+	06128254	0003	0	72
+	06193021	0000	0	71
+	06950841	0000	0	72
+	06950841	0004	0	72
+	06950841	0006	0	72
+	06950841	0008	0	72
+	06950841	0011	0	72
+	07001185	0000	0	71
+	07001185	0001	0	71
+	07001185	0002	0	71
+	07001193	0000	0	71
+	07001193	0001	0	71
+	07001193	0002	0	71
+	07001193	0003	0	71

Image 41.

At any moment, the user can click on the second option **Unhide All**, which will restore all hidden columns back to the screen.

The next two options are used for sorting. The **Sort** option sorts the values in the selected column from the smallest to the largest.

By clicking on the **Multi column sort** option, the following window opens.

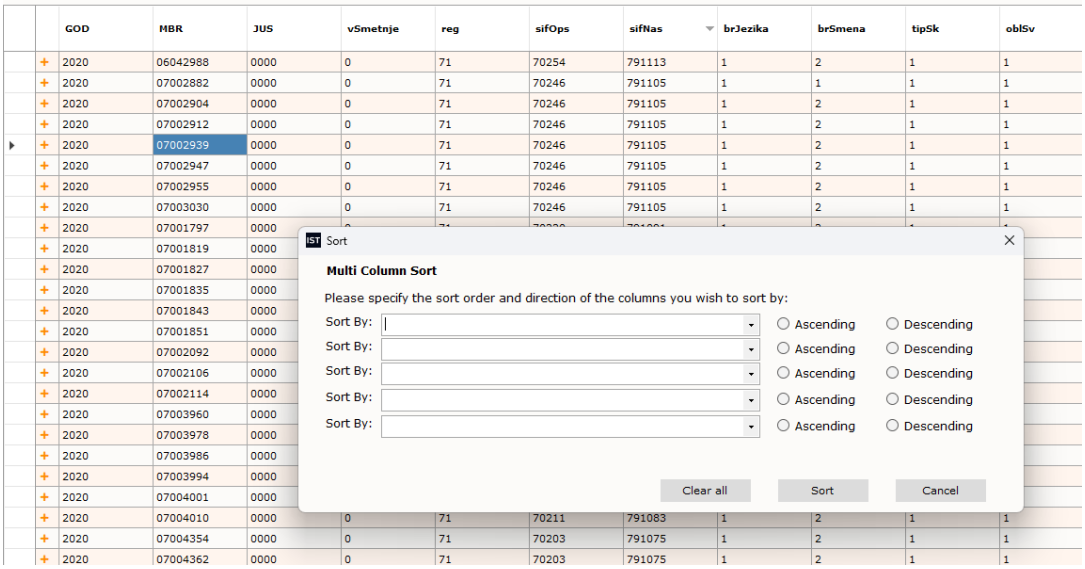


Image 42. Sorting options

Here, the user can sort up to five columns at once by selecting the column name from the dropdown list and choose whether they want the values in that column to be sorted in ascending or descending order.

At any time, user can press the **Clear All** button to start over. And if they are sure about the columns they chose and how they want to sort their values, they can press the **Sort** button, and the sorting will be performed.

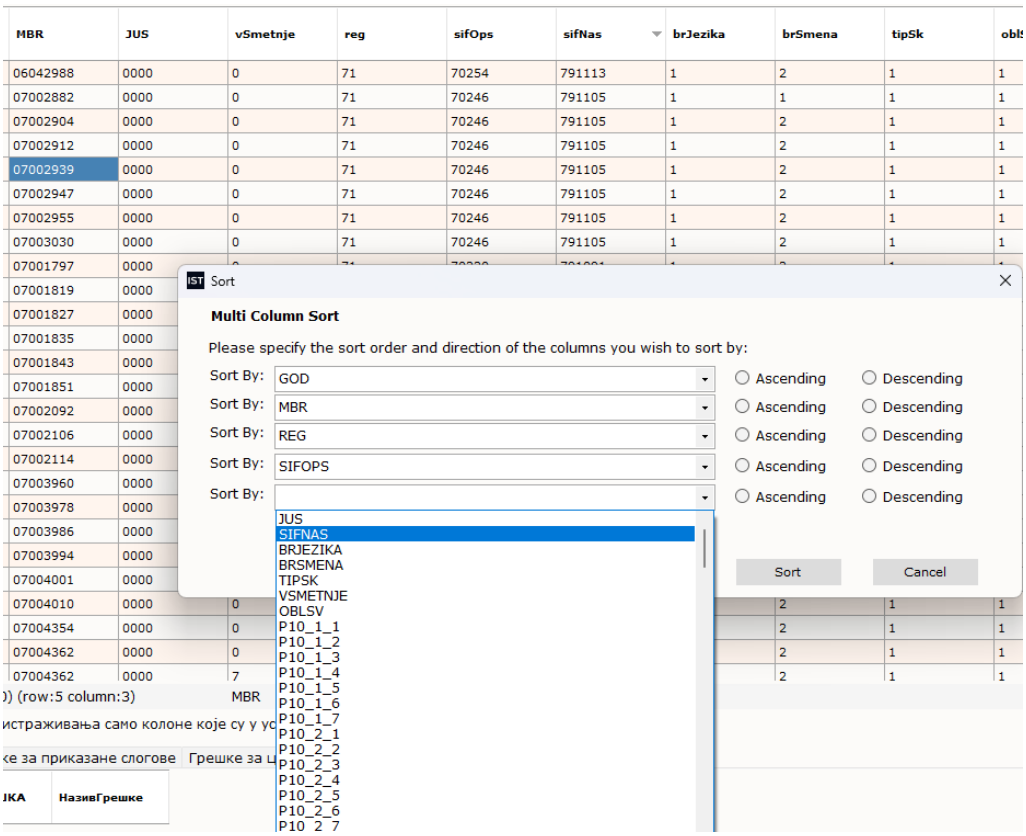


Image 43. Sorting options

When the user right-clicks on a value in a field within the grid, that value gets selected. If they then choose the **Find** option to search for that value, a window opens where user can choose whether they want to search across the entire table and all columns, or only within the selected column. Within the **Find** option, besides the content of the clicked cell, users can enter custom text to search for. Additionally, there is a checkbox to specify whether the text should exactly match the entered value or simply contain it.

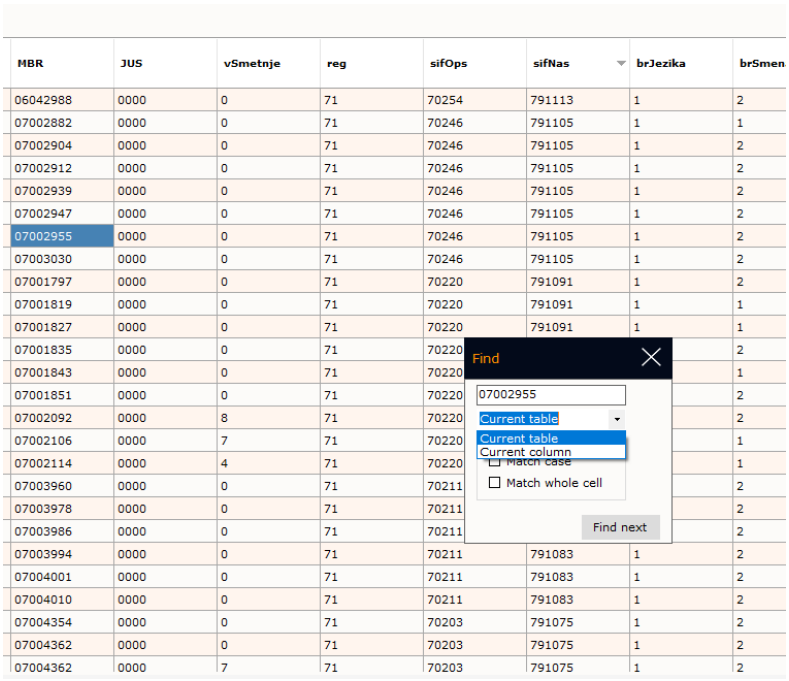
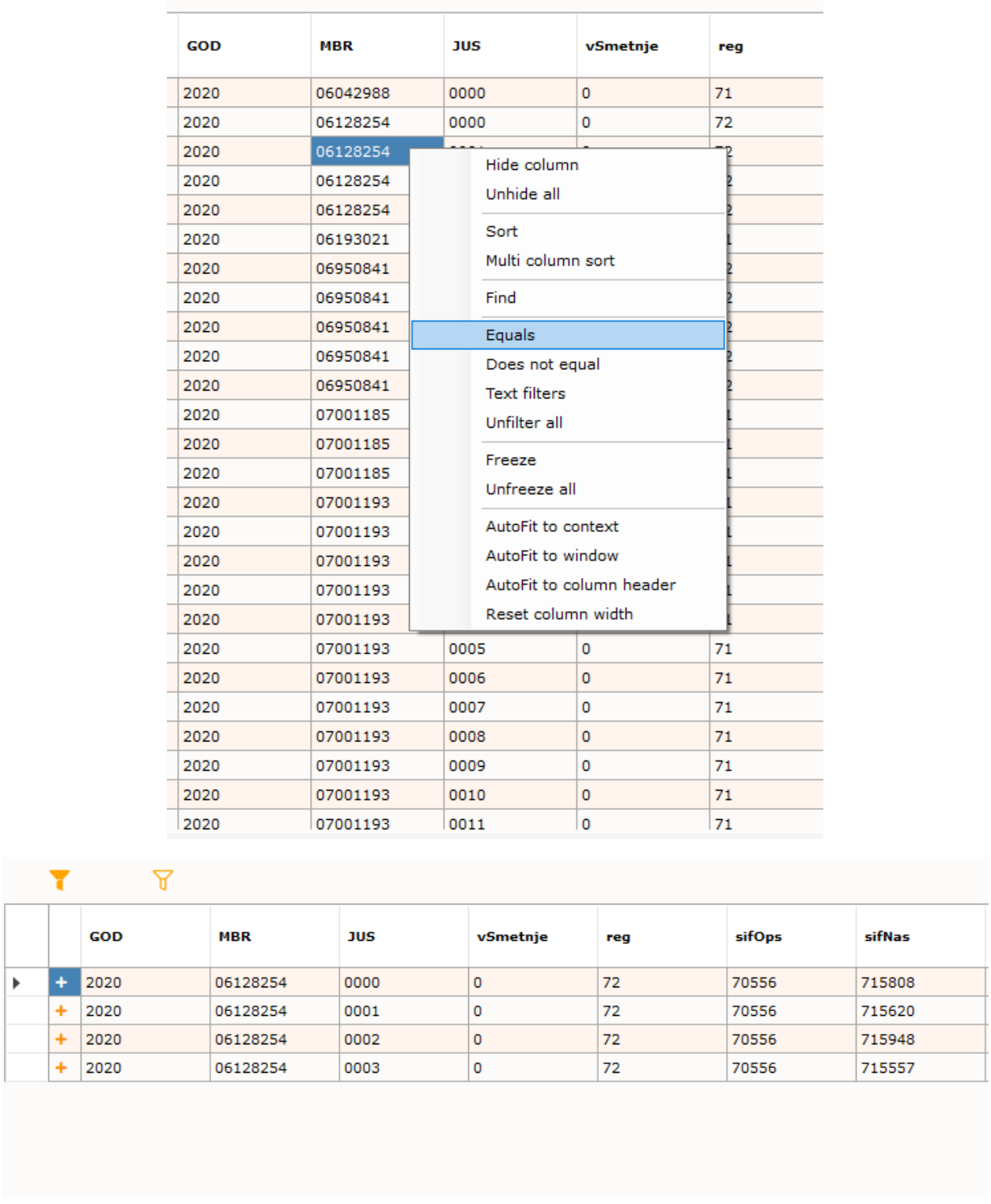


Image 44. Find

The next option is **Equals**, where the values from the selected column are filtered based on the content of the field that was selected and clicked on.



Images 45 and 46. Equals

Does not equal option do the opposite—it filters the data by values that are different from the selected value, just as its name suggests.

The **"Text Filter"** option opens the following window.

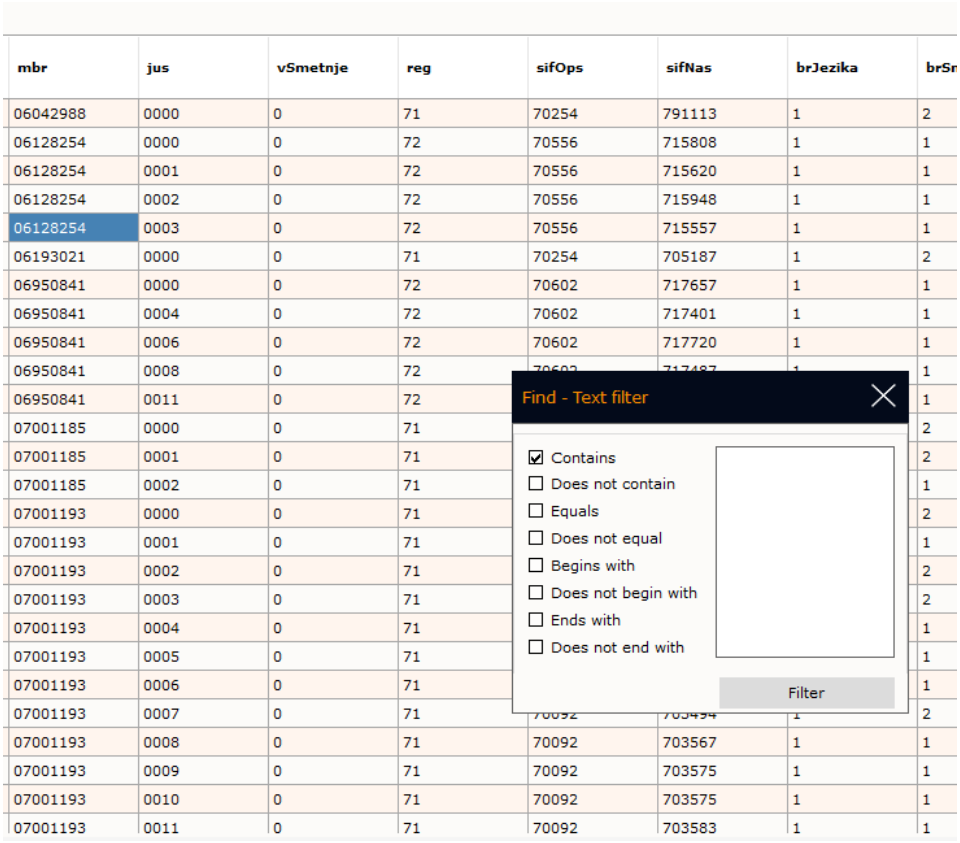
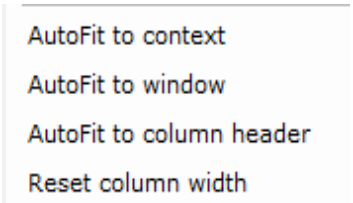


Image 47. Text filter

Select one of the following options: contains, does not contain, equals, does not equal, begins with, does not begin with, ends with, does not end with. Then, enter the desired condition for the selected option in the accompanying text field. Then, click the Filter button to apply the filter based on the specified condition.

The **Unfilter All** option serves to remove all applied filters.

An alternative, simpler method to clear all filters and reset to the initial state is by clicking the icon above the table. 



The following options relate to the table layout, specifically the columns. If the user wants to expand a column to see the content in the field, user right-clicks on the field and select the **AutoFit to context** option. **AutoFit to Window** expands all columns so that the table layout covers the entire screen. **AutoFit to Column Header** expands the columns to match the width of the text in the column header. And the last option, reset column width, restores the column width to the default view.

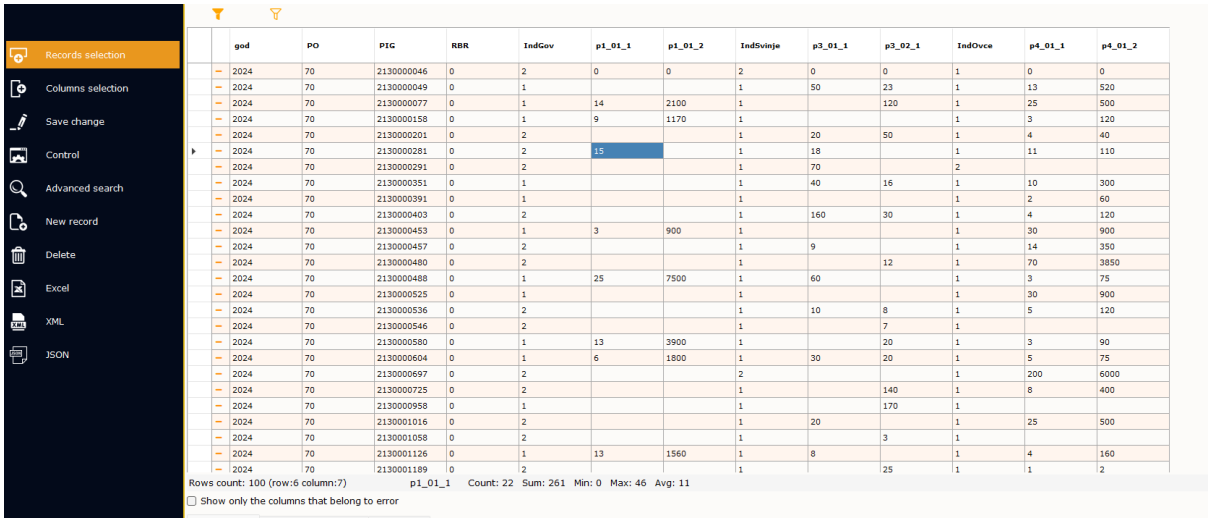


Image 48. Data editing – tabular view

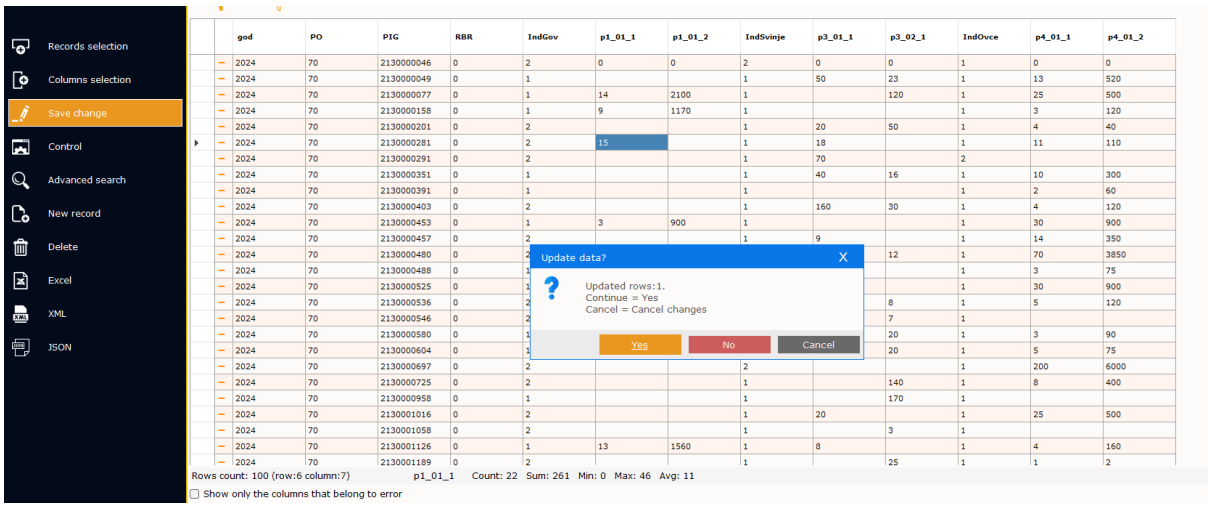


Image 49. Data editing – tabular view notification

All the changes are made in the working memory of the computer. Only by confirming the Update notification are the records actually updated in the database. As with any data modification done through IST .NET program, the update process requires additional confirmation.

The data from records can be displayed in its original form, not just tabularly. By clicking on a specific record (selecting the row of the record), its original form (as it appears during entry) is opened.

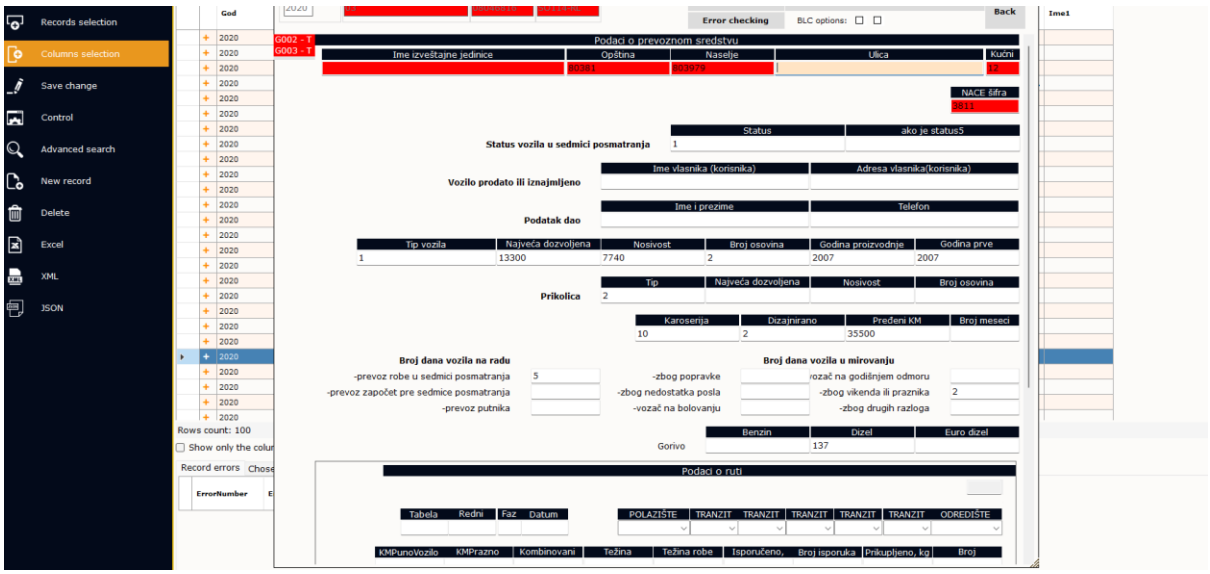


Image 50. Data editing – an individual record selected from tabular display

Clicking Save and continue will update the record in the database (if any changes are made), as well as open the same view for the next record listed in the table through the Data Editing option.

Since IST works directly with databases, the results of logical control will be visible immediately.

IST operates in a similar way with records presented in the Master Detail form (tables, subtables, etc.) under the Data Editing option. When selecting records, the table is chosen first, and the filtering is done afterwards. If the selected table is a parent table, the tabular display will immediately show the associated records from the database.

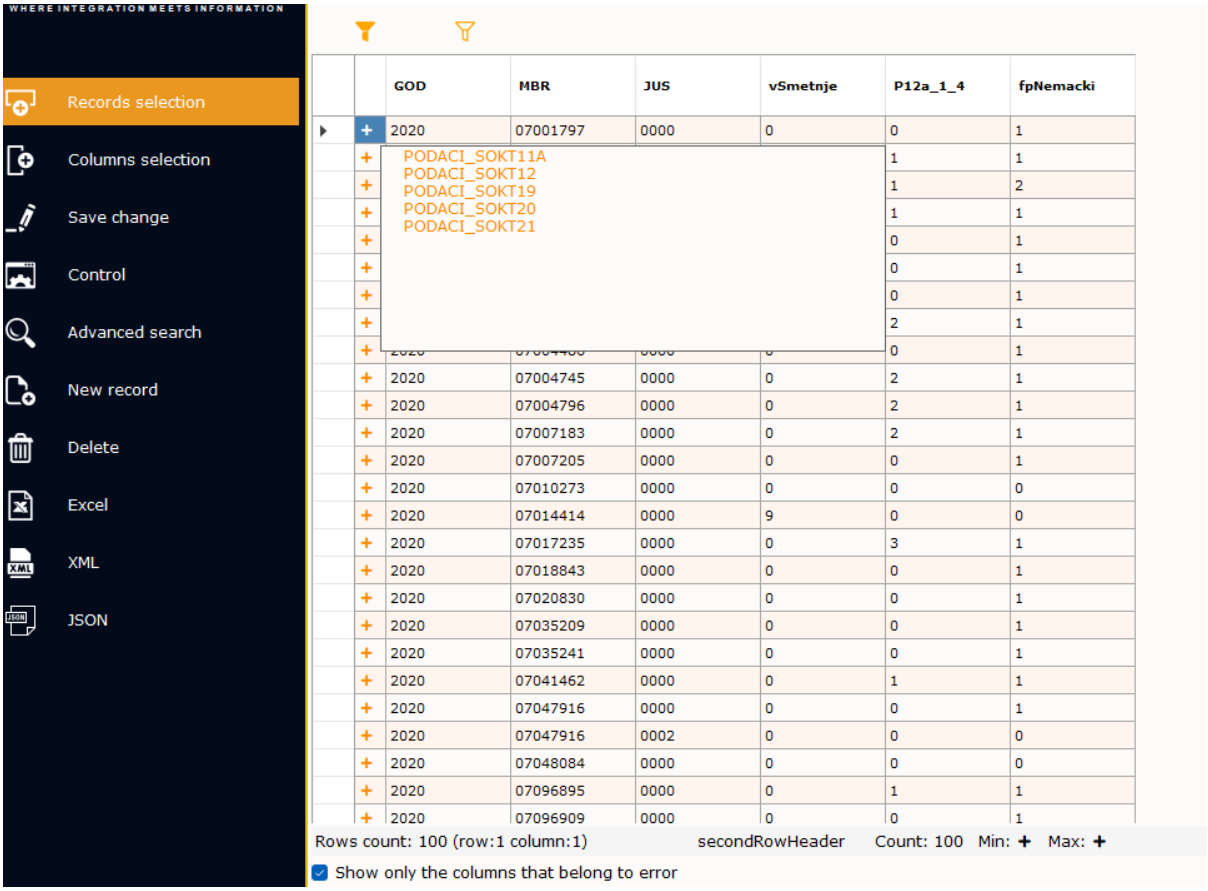


Image 51. Data editing – Master Detail display

When the user clicks on the plus sign in the row of a desired record, the list of subtables will be displayed. The user can click on the name of the desired subtable, and the new tabular display will open showing the data from the chosen subtable for that specific record (image 32).

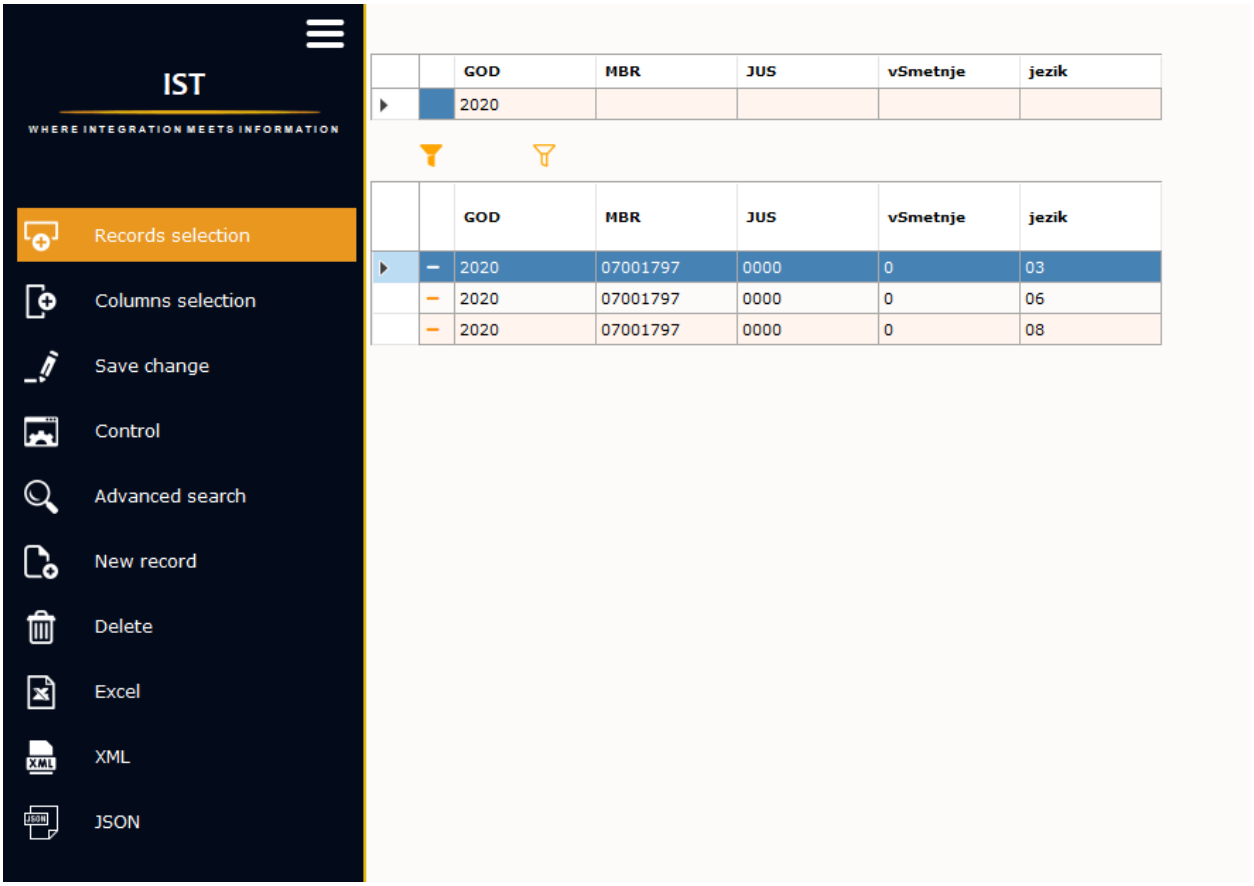


Image 52. Tabular display of subtable data of a record

There is also another option to show data from the subtable. The user has to click on the button Records selection, and to choose the desired subtable in the displayed menu.

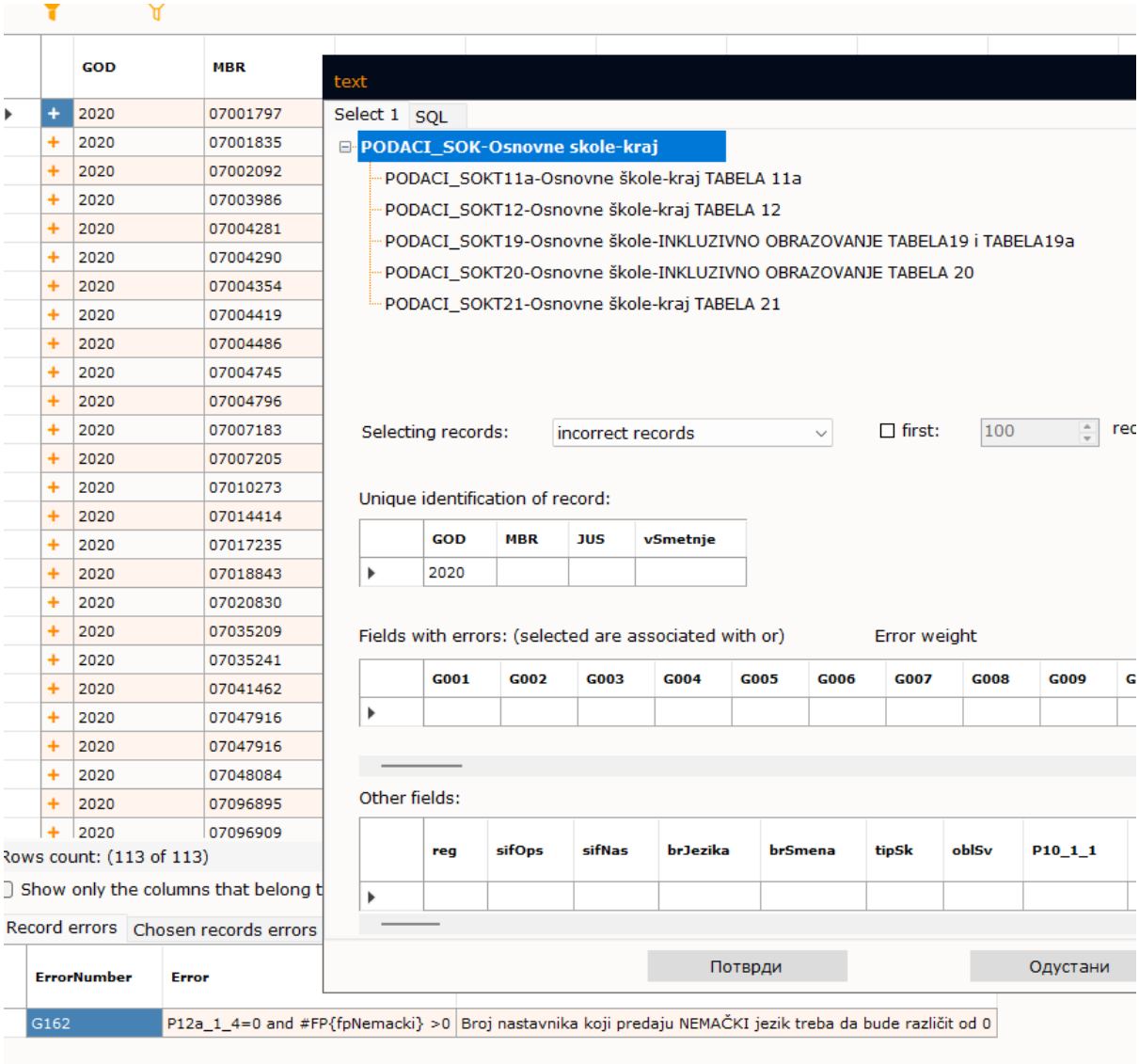


Image 53. Master Detail – the selection of a table/subtable

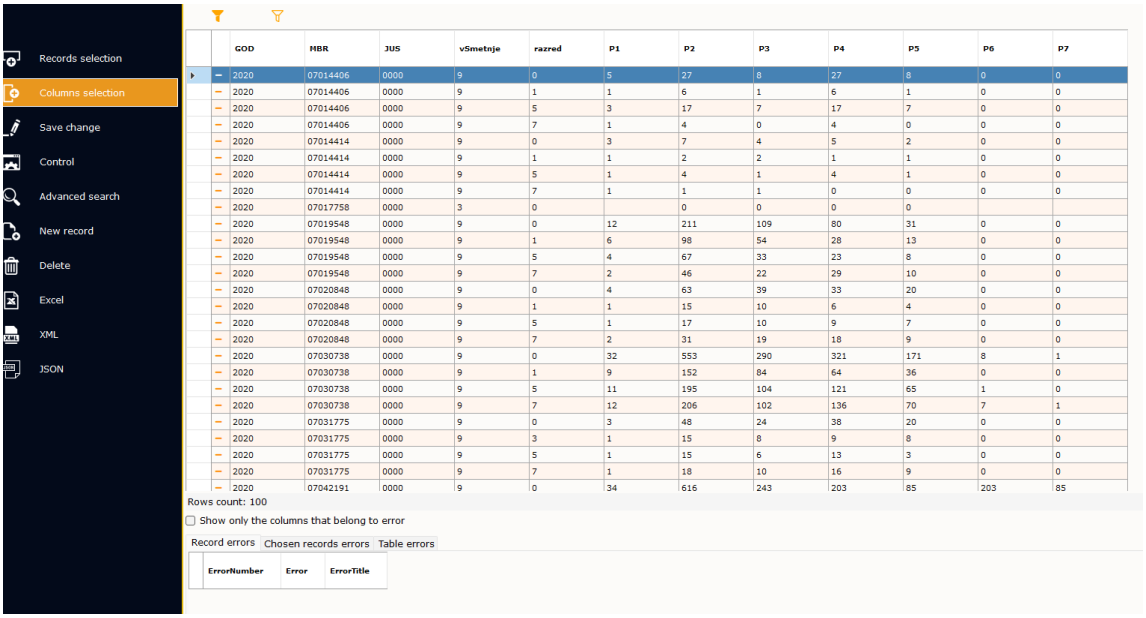


Image 54. Master Detail – records of a subtable

Clicking on any record from a table or a subtable will open the generated entry screen for the main table, with details displayed in the grid format.

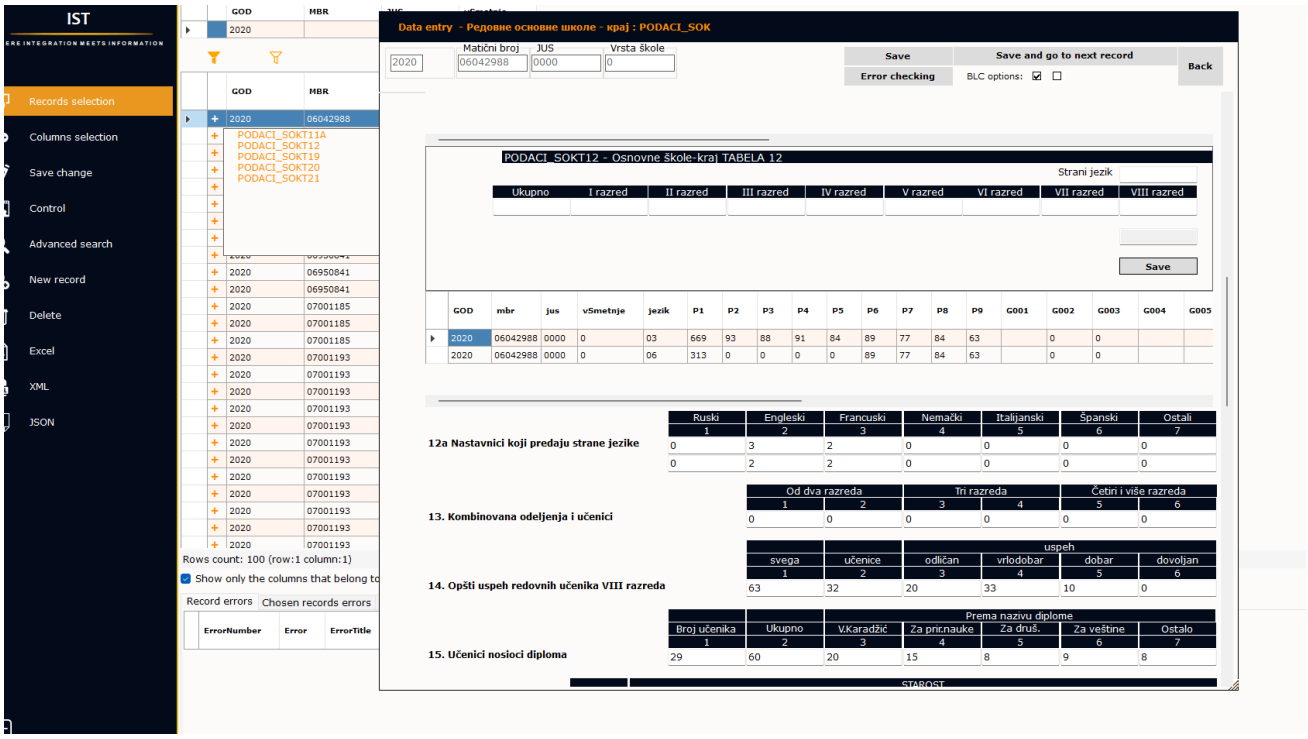


Image 55. Master Detail display reached from the data editing option through filtered records of the main table – the main table with details (subtables) displayed in grid format

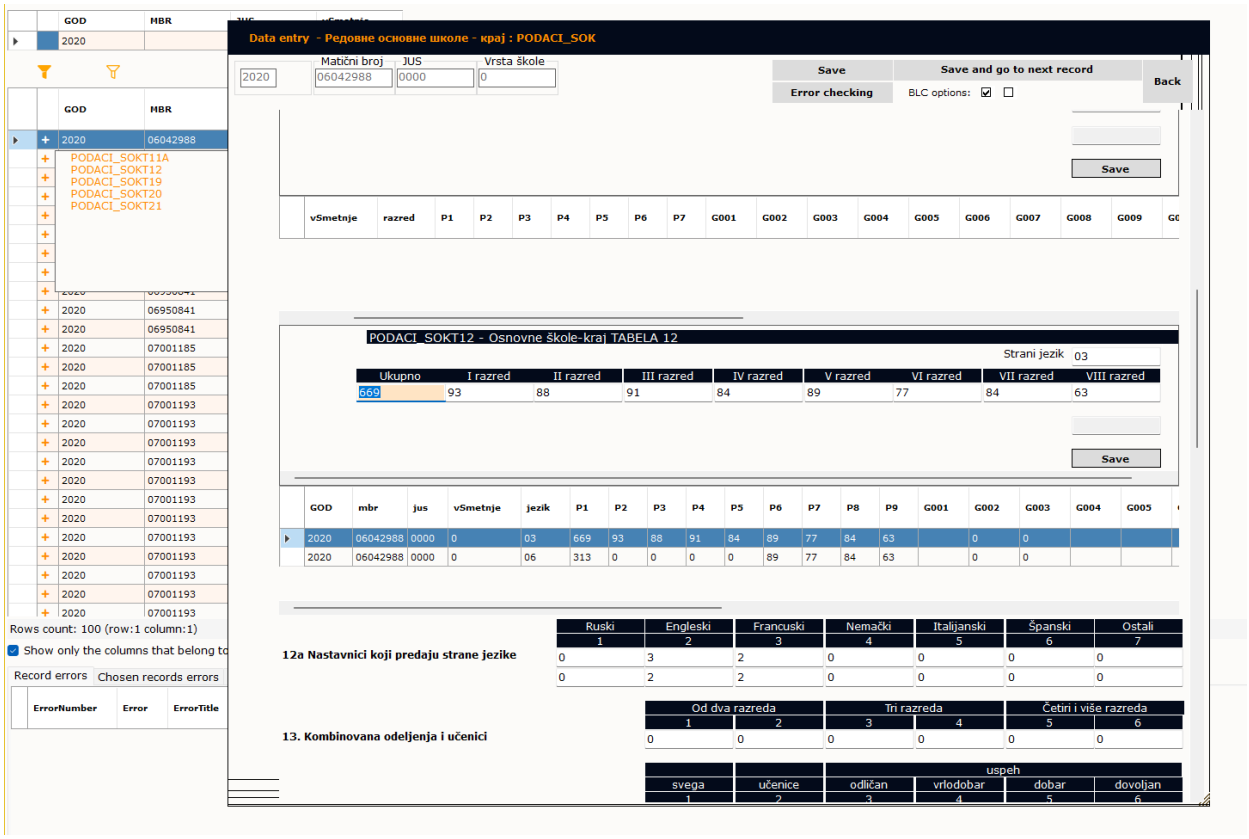


Image 56. Master Detail from the data editing option through filtered records of the subtable – IST generates an identical screen as when accessing the record through the main table

Further work is identical to working through the Data Entry option.

If the record from the subtable was accessed through the grid, clicking the Save and continue button in IST will open the next record in the grid, i.e. the rows will be listed sequentially in the same manner as for the main table selected through the Data Editing option.

9. Deletion of Records

Deleting records is a sensitive operation in any statistical system. In IST, deletion is designed to be controlled and logged, to protect the integrity of official statistics. This means that while statisticians and administrators can remove records when necessary, the system always keeps an audit trail of what was deleted, by whom, and when.

Every action of deleting records from IST automatically triggers the filling of the specific table in the specific database. The table stores information about the survey, table, user account, date, time, and the key of the deleted row. At any time, it is possible to get detailed information on the deleted record, as well as the person who deleted it and the time of deletion.

In order to delete a record, a user should first click on the Data Editing option on the left side of the main window. The new window will open with options to select Records or Columns. By selecting either one of those options, a new window will appear:

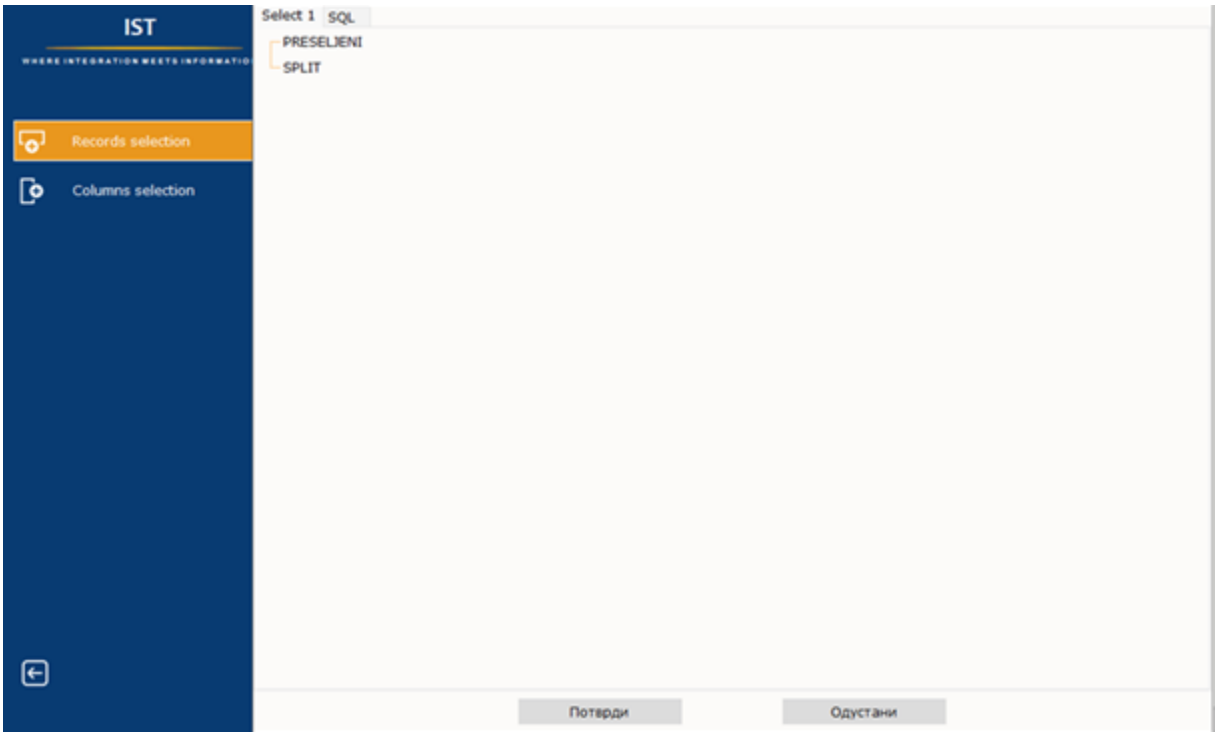


Image 57. Table selection for record deleting

It will show all the tables that are included in the data entry of the survey, therefore all the tables whose records can be deleted. When clicking on one of the tables, there will be further options to narrow down the selection of desired records. The user can filter the records by their key, the value in certain fields and errors.

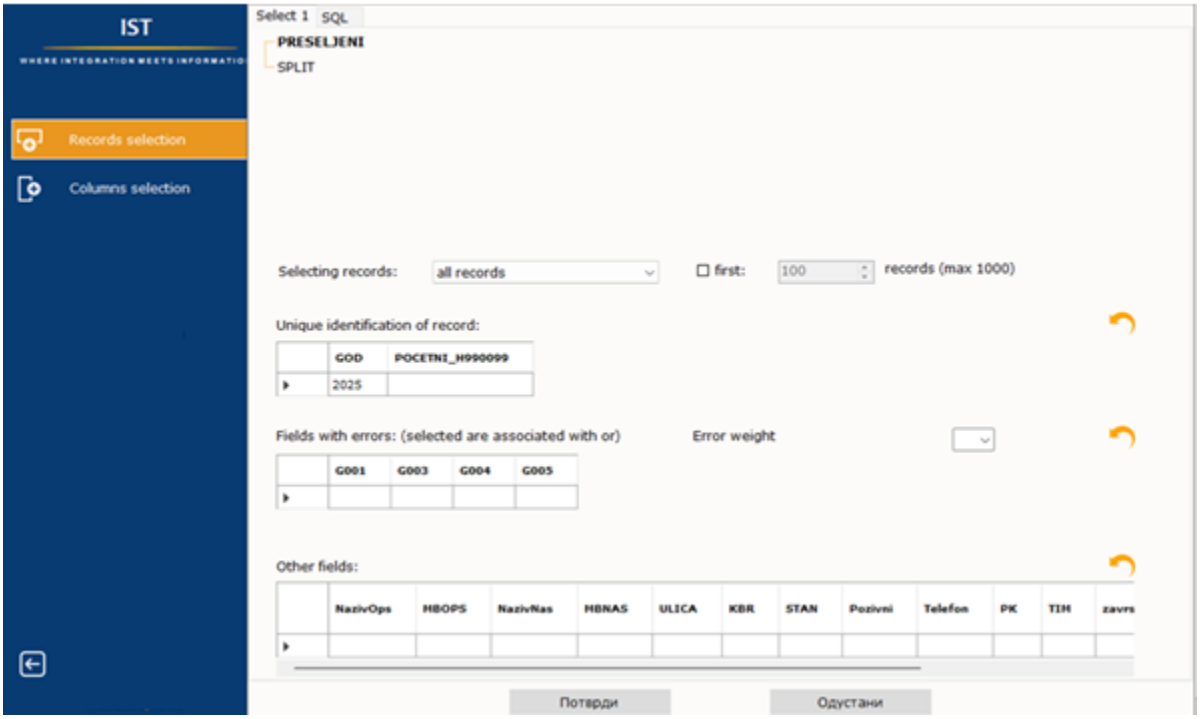


Image 58. Detailed records selection

The desired records will be shown in a tabular form. The user can add columns they wish to see in this tabular form.

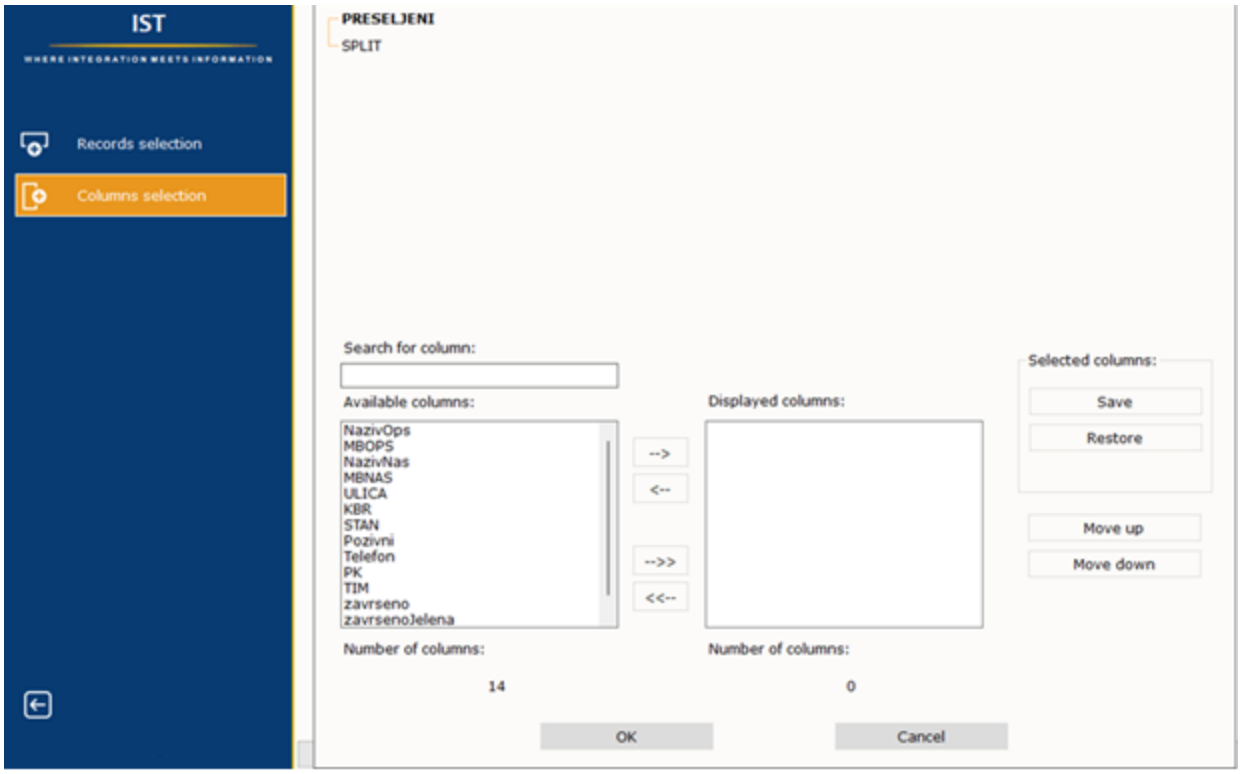


Image 59. Detailed columns selection

Once the records or columns are selected, and it is confirmed, the new window will open, with the list of desired records in a tabular form:

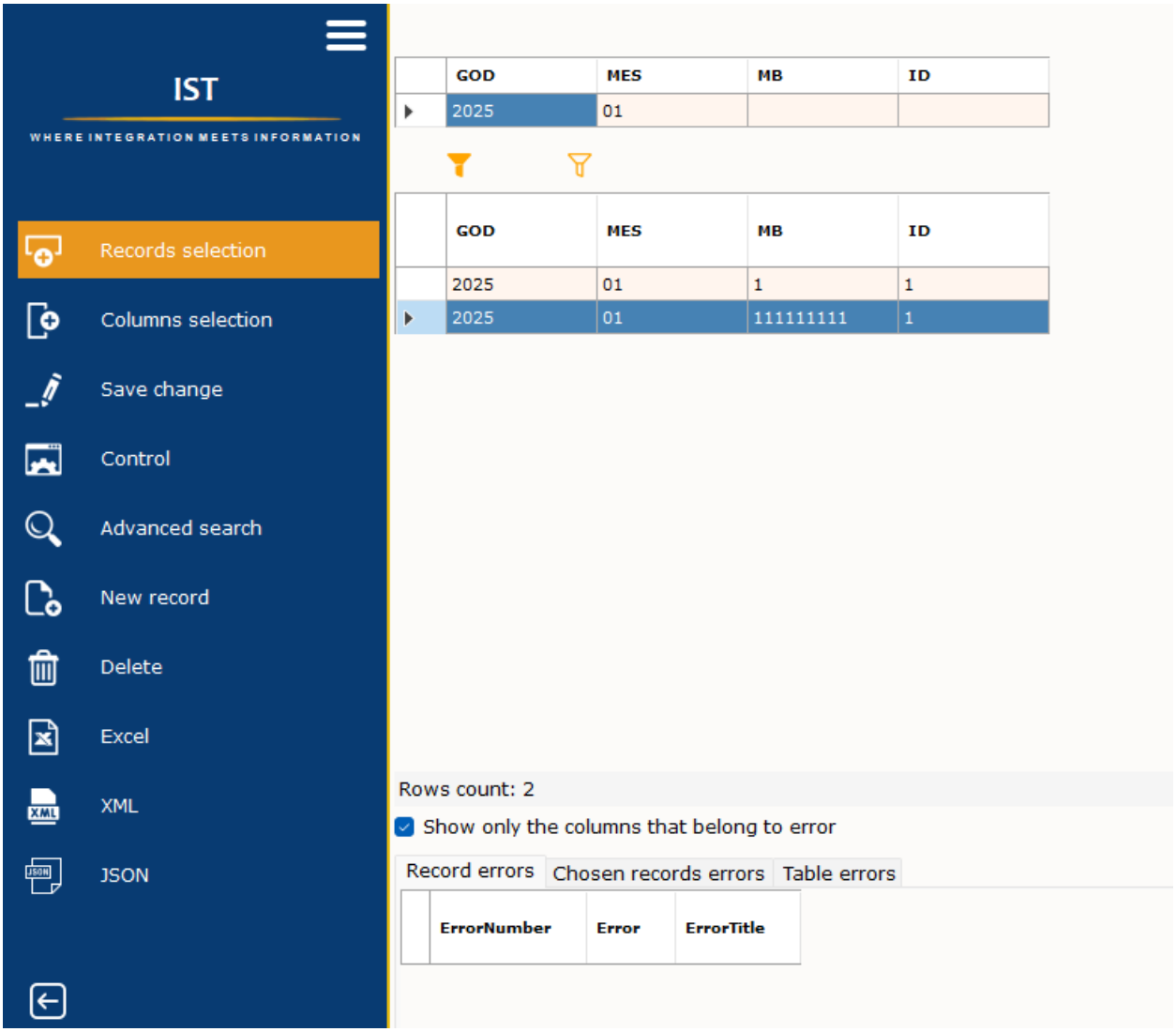


Image 60. Selected records (columns)

By choosing the specific row (record) and clicking the Delete button on the left side of the window, the user will be asked to confirm the deletion of the selected row. This prevents accidental removal of important data. If the user confirms, the selected row will be deleted, and the deleted action will be logged in database.
Locked records cannot be deleted, protecting sensitive or finalized data.

10. Procedures and Reports

IST is not only a platform for data entry and editing — it also provides a flexible framework for generating reports and executing procedures. These tools allow statisticians to run predefined SQL queries, produce formatted outputs, and even perform database actions such as creating new tables or transforming data.

For each application in IST, there can be multiple reports and procedures defined. Based on .sql queries/programs and headers provided in .xml or .xls format, IST generates reports set in the metadata database. There is no limit to the number of reports/actions that can be generated. Fine formatting of .xml reports is also enabled. Users can provide parameters (e.g. *time point, region, enterprise ID*) to customize the report output.

Each report can be saved in Excel, Word, or XML format. .sql queries/programs can perform any action on the database, so through this part of IST, it is possible to execute actions such as modifying records in the database, creating new tables, and most importantly, directly transferring processed data into a web dissemination database. Only users with the right database permissions can execute procedures that modify data.

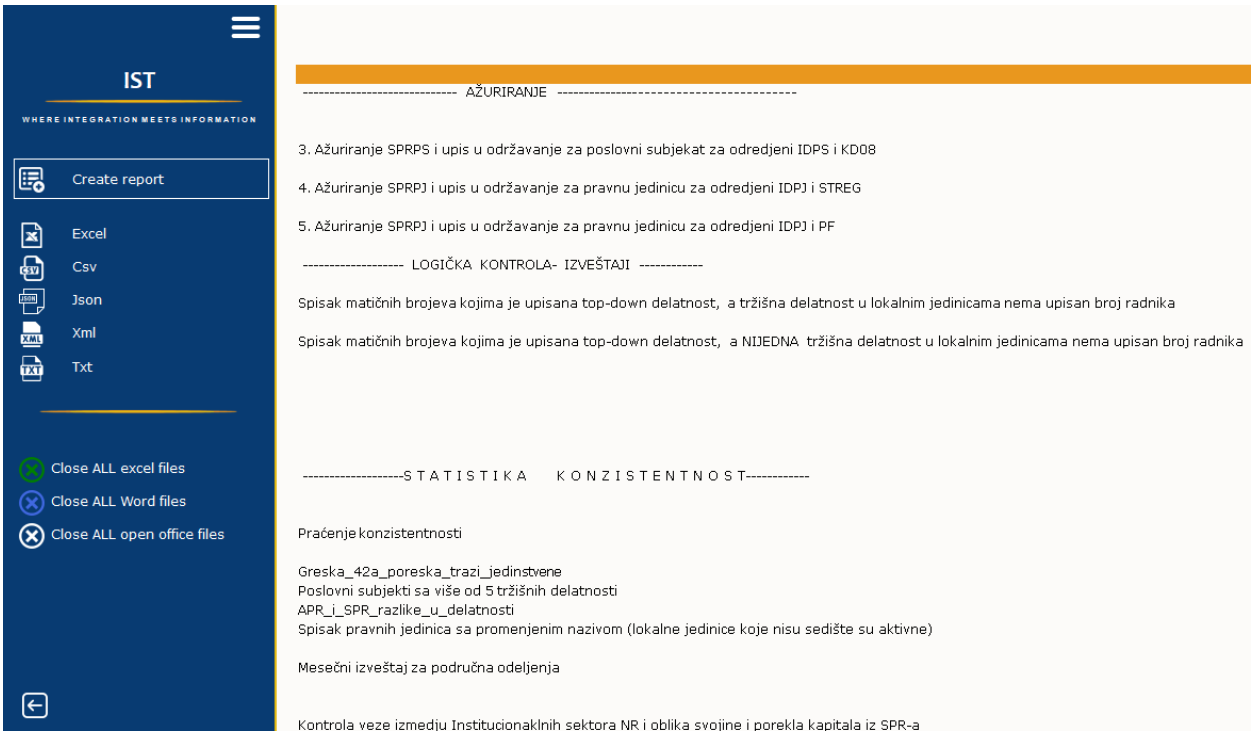
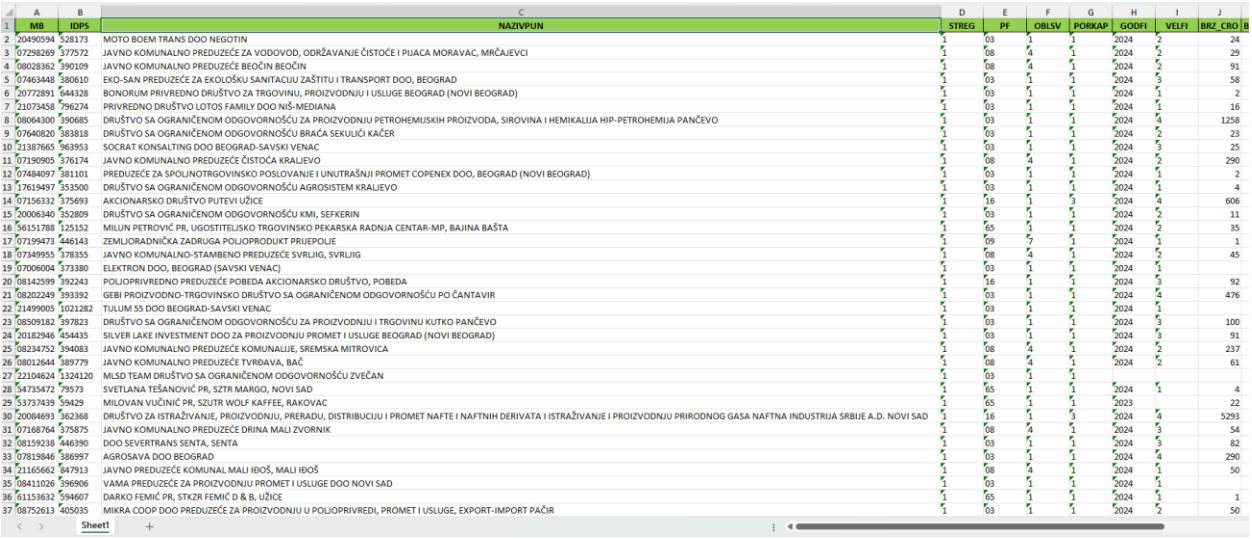


Image 61. List of reports/actions for the selected application and time point that IST generates, based on the description in the database (ISTTABS table)

Selecting the specific procedure or report and then clicking the Create report option on the left side of the screen, the application will open the selected item. The user can also left-click two times on the title of the report/procedure for it to open. If the report is written to be opened in specific file type, the user can choose to open it in its type (excel, csv, json, html or txt file) by clicking the type on the left side of the screen. There are also options to close all excel, word and all open office files.



	A	B	C	D	E	F	G	H	I	J
1	MB	IDPS	NAZIVPUN	STREG	PF	OBLSV	PORKAP	GODFI	VELFI	BRZ_CRO
2	20490594	528173	MOTO BOEM TRANS DOO NEGOTIN	1	03	1	1	2024	2	24
3	07298269	377572	JAVNO KOMUNALNO PREDUZEĆE ZA VODOVOD, ODRŽAVANJE ČISTOĆE I PIJACA MORAVAC, MRČAJEVCI	1	08	4	1	2024	2	29
4	08028362	390109	JAVNO KOMUNALNO PREDUZEĆE BEOČIN BEOČIN	1	08	4	1	2024	2	91
5	07463448	380610	EKO-SAN PREDUZEĆE ZA EKOLOŠKU SANITACIJU ZAŠTITU I TRANSPORT DOO, BEOGRAD	1	03	1	1	2024	3	58
6	20772891	644328	BONORUM PRIVREDNO DRUŠTVO ZA TRGOVINU, PROIZVODNJU I USLUGE BEOGRAD (NOVI BEOGRAD)	1	03	1	1	2024	1	2
7	21073458	796274	PRIVREDNO DRUŠTVO LOTOS FAMILY DOO NIŠ-MEDIANA	1	03	1	1	2024	1	16
8	08064300	390685	DRUŠTVO SA OGRANIČENOM ODGOVORNOŠĆU ZA PROIZVODNJU PETROHEMIJSKIH PROIZVODA, SIROVINA I HEMIKALIJA HIP-PETROHEMIJA PANČEVO	1	03	1	1	2024	4	1258
9	07640820	383818	DRUŠTVO SA OGRANIČENOM ODGOVORNOŠĆU BRAĆA SEKULIĆI KAČER	1	03	1	1	2024	2	23
10	21387665	963953	SOCRAT KONSALTING DOO BEOGRAD-SAVSKI VENAC	1	03	1	1	2024	3	25
11	07190905	376174	JAVNO KOMUNALNO PREDUZEĆE ČISTOĆA KRALJEVO	1	08	4	1	2024	2	290
12	07484097	381101	PREDUZEĆE ZA SPOLJNOTRGOVINSKO POSLOVANJE I UNUTRAŠNJI PROMET COPENEX DOO, BEOGRAD (NOVI BEOGRAD)	1	03	1	1	2024	1	2
13	17619497	553500	DRUŠTVO SA OGRANIČENOM ODGOVORNOŠĆU AGROSISTEM KRALJEVO	1	03	1	1	2024	1	4
14	07156332	375693	AKCIONARSKO DRUŠTVO PUTEVI UŽICE	1	16	1	1	2024	4	606
15	20006340	552809	DRUŠTVO SA OGRANIČENOM ODGOVORNOŠĆU KMI, SEFKERIN	1	03	1	1	2024	2	11
16	56151788	125152	MILUN PETROVIĆ PR, UGOSTITELJSKO TRGOVINSKO PEKARSKA RADNJA CENTAR-MP, BAJINA BAŠTA	1	65	1	1	2024	2	35
17	07199473	446143	ZEMLJORADNIČKA ZADRUGA POLJOPRODUKT PRIJEPOLJE	1	09	7	1	2024	1	1
18	07349955	378355	JAVNO KOMUNALNO-STAMBENO PREDUZEĆE SVRLJIG, SVRLJIG	1	08	4	1	2024	2	45
19	07006004	373380	ELEKTRON DOO, BEOGRAD (SAVSKI VENAC)	1	03	1	1	2024	1	
20	08142599	392243	POLJOPRIVREDNO PREDUZEĆE POBEDA AKCIONARSKO DRUŠTVO, POBEDA	1	16	1	1	2024	3	92
21	08202249	393392	GEBI PROIZVODNO-TRGOVINSKO DRUŠTVO SA OGRANIČENOM ODGOVORNOŠĆU PO ČANTAVIR	1	03	1	1	2024	4	476
22	21499005	1021282	TULUM 55 DOO BEOGRAD-SAVSKI VENAC	1	03	1	1	2024	1	
23	08509182	397823	DRUŠTVO SA OGRANIČENOM ODGOVORNOŠĆU ZA PROIZVODNJU I TRGOVINU KUTKO PANČEVO	1	03	1	1	2024	3	100
24	20182946	454435	SILVER LAKE INVESTMENT DOO ZA PROIZVODNJU PROMET I USLUGE BEOGRAD (NOVI BEOGRAD)	1	03	1	1	2024	3	91
25	08234752	394083	JAVNO KOMUNALNO PREDUZEĆE KOMUNALIJE, SREMSKA MITROVICA	1	08	4	1	2024	2	237
26	08012644	389779	JAVNO KOMUNALNO PREDUZEĆE TVRĐAVA, BAČ	1	08	4	1	2024	2	61
27	22104624	1324120	MLSD TEAM DRUŠTVO SA OGRANIČENOM ODGOVORNOŠĆU ZVEČAN	1	03	1	1			
28	54735472	79573	SVETLANA TEŠANOVIĆ PR, SZTR MARGO, NOVI SAD	1	65	1	1	2024	1	4
29	53737439	59429	MILOVAN VUČINIĆ PR, SZUTR WOLF KAFFEE, RAKOVAC	1	65	1	1	2023		22
30	20084693	362368	DRUŠTVO ZA ISTRAŽIVANJE, PROIZVODNJU, PRERADU, DISTRIBUCIJU I PROMET NAFTE I NAFTNIH DERIVATA I ISTRAŽIVANJE I PROIZVODNJU PRIRODNOG GASA NAFTNA INDUSTRIJA SRBIJE A.D. NOVI SAD	1	16	1	3	2024	4	5293
31	07168764	375875	JAVNO KOMUNALNO PREDUZEĆE DRINA MALI ZVORNIK	1	08	4	1	2024	3	54
32	08159238	446390	DOO SEVERTRANS SENTA, SENTA	1	03	1	1	2024	3	82
33	07819846	386997	AGROSAVA DOO BEOGRAD	1	03	1	1	2024	4	290
34	21165662	847913	JAVNO PREDUZEĆE KOMUNAL MALI IĐOŠ, MALI IĐOŠ	1	08	4	1	2024	1	50
35	08411026	396906	VAMA PREDUZEĆE ZA PROIZVODNJU PROMET I USLUGE DOO NOVI SAD	1	03	1	1	2024	1	
36	61153632	594607	DARKO FEMIĆ PR, STKZR FEMIĆ D & B, UŽICE	1	65	1	1	2024	1	1
37	08752613	405035	MIKRA COOP DOO PREDUZEĆE ZA PROIZVODNJU U POLJOPRIVREDI, PROMET I USLUGE, EXPORT-IMPORT PAČIR	1	03	1	1	2024	2	50

Sheet1

Image 62. Example of a report in Excel

After launching a report/action, it is possible to set parameters which IST directly passes to the .sql query/program. This can further customize the report/action. There is no limit to the number of parameters that can be passed to the .sql query/program.

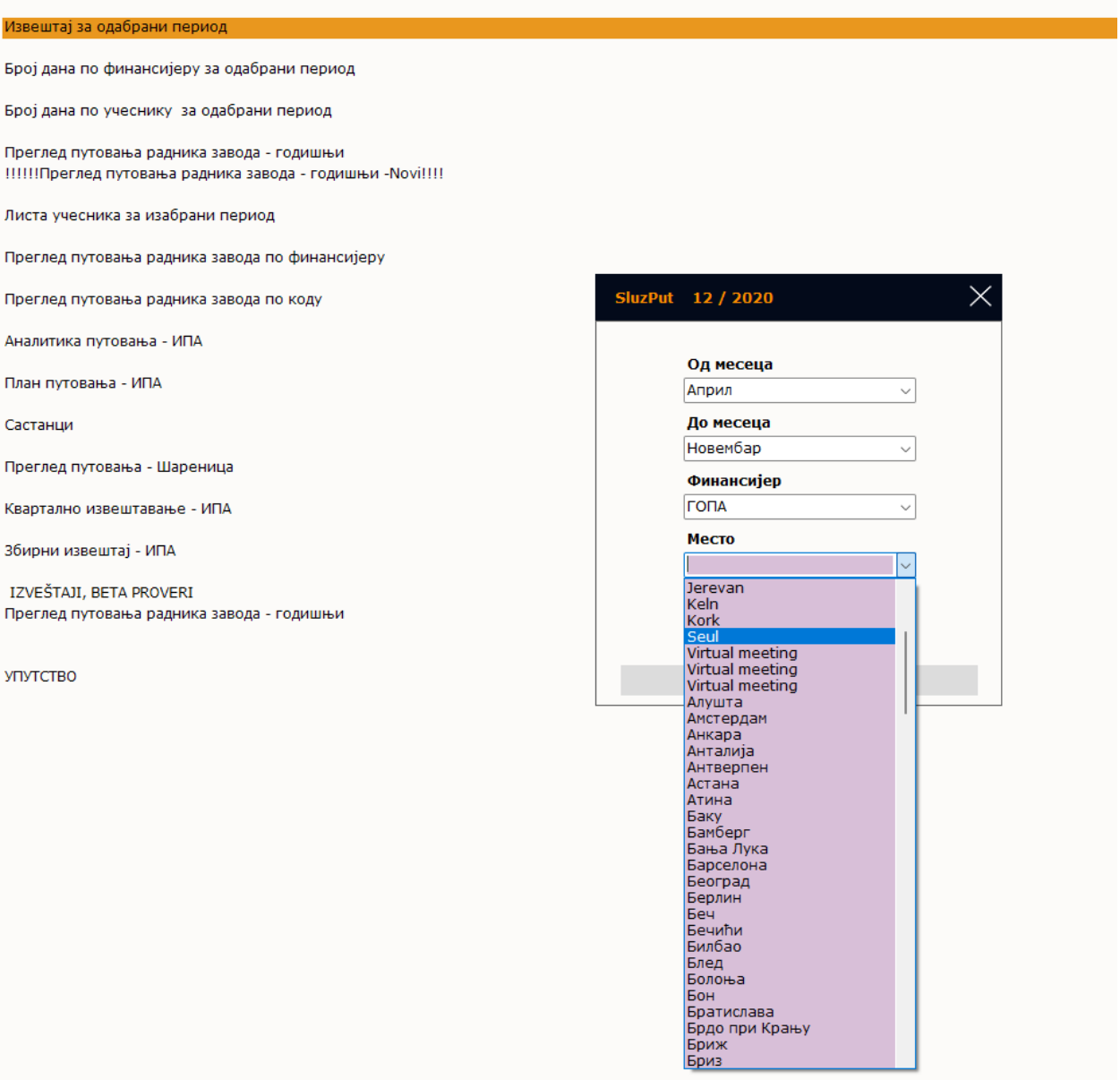


Image 63. List of reports/actions with parameters

11. Advanced Search

The Advanced Search function allows statisticians to create complex queries and filters directly within IST. Instead of manually scanning records or writing SQL, users can define conditions through an intuitive interface, and IST will automatically generate and execute the underlying query. This tool is especially important for data editing, quality control, and sampling.

On the main window menu, by clicking the Advanced Search option, a new window will appear.

Image 64. Advanced Search window

In this section of IST, a menu is generated for each application, based on the data from the metadata database. This feature can also be used for selecting records for a sample frame (which will later be processed in statistical packages like SAS, spss, etc.).

By clicking on the downturned arrow, the list of defined applications will be shown to the user, from which they can pick the desired survey. The user can also type in the name of the application.

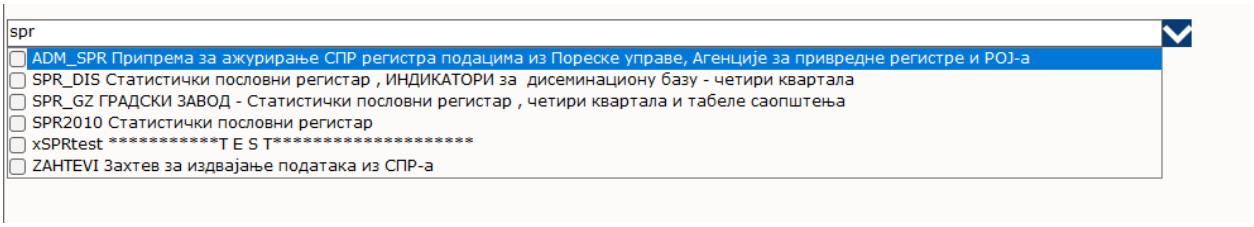


Image 65. Choosing the desired survey

Once the application is selected, a list of defined tables will be shown. All tables and fields described in the metadata database are available in the advanced search. Through advanced search, users can define conditions for filtering records at the field level. This generates an .sql query that is displayed to the user, and direct modification of this generated .sql query is allowed.

Image 66. Choosing the tables and fields

By ticking the desired fields, the user will select the fields that will be shown once the desired records are listed. By clicking and dragging the field from the list to the right side of the screen, the user can use that field for defining the filtering conditions. Conditions can be combined with AND / OR logic, and nested conditions are supported for more complex queries. Advanced Search can use both real entry fields and fictitious (derived or external) fields.

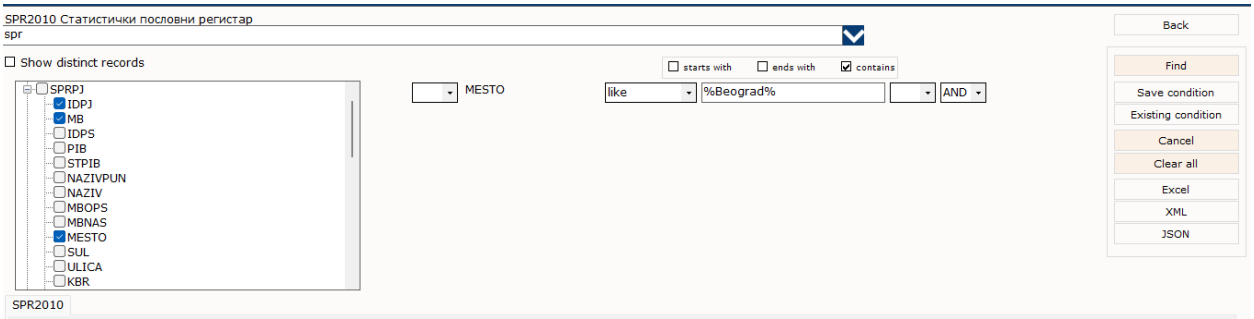


Image 67. Choosing the field and defining the condition for filtering records

Once the user finishes defining the condition, by clicking the button Find on the right side of the screen, the application will find all the records that contain that condition and ask the user if they wish to see the records. By clicking Yes, the list of desired records will appear.

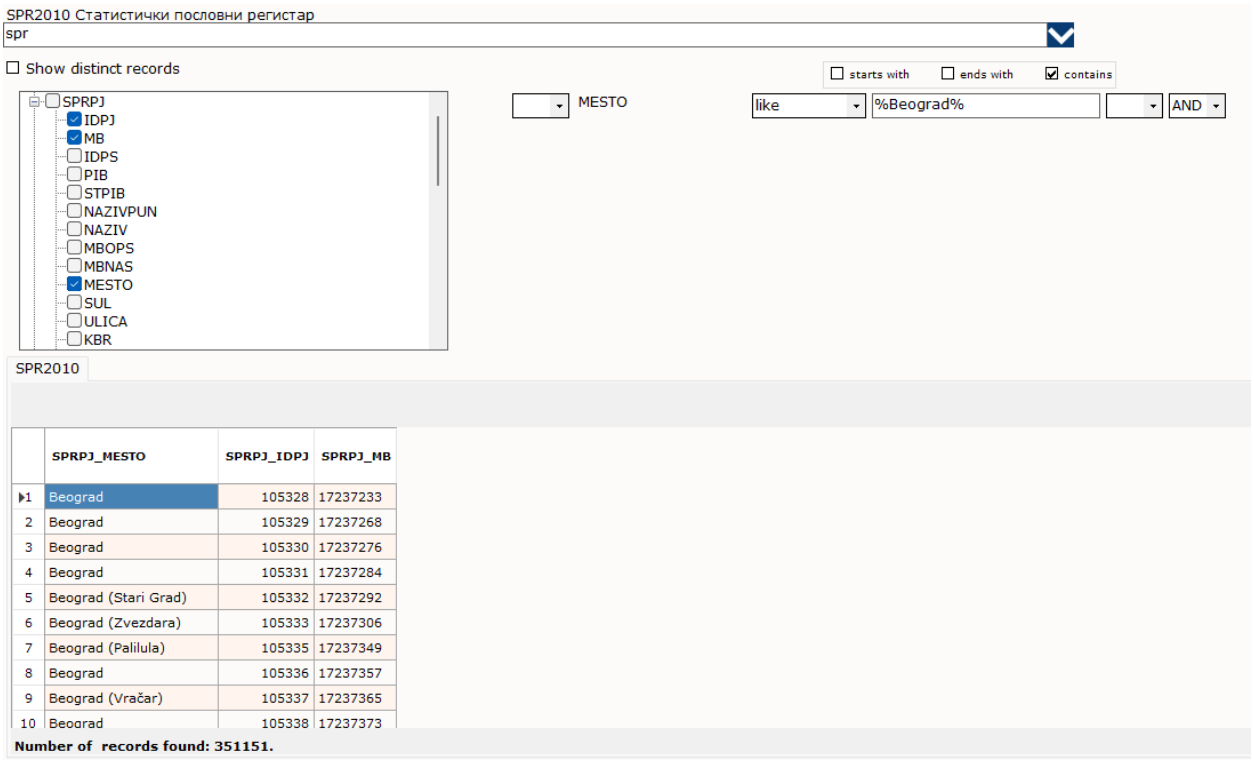
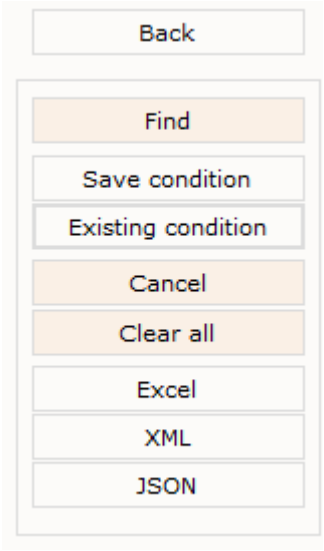


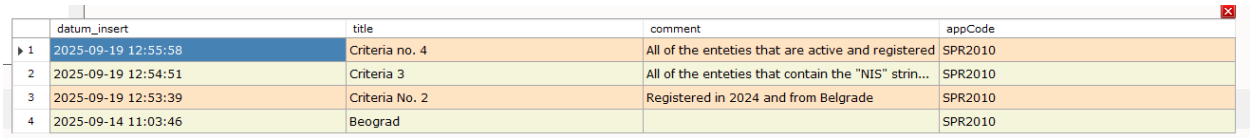
Image 68. List of filtered records

Users can navigate through results, open records directly, or export them for further analysis.



On the right side of the screen, there are also other options the user can choose. The user can save the condition so they could use it again in the future (across all applications they have access to), by clicking the Save condition button. They can also hoose the condition from the already existing conditions, by clicking on the Existing condition button and choosing the specific one from the list of conditions.

Image 69.

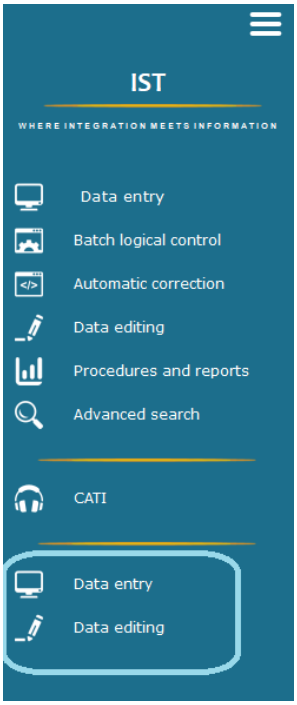


	datum_insert	title	comment	appCode
1	2025-09-19 12:55:58	Criteria no. 4	All of the enteties that are active and registered	SPR2010
2	2025-09-19 12:54:51	Criteria 3	All of the enteties that contain the "NIS" strin...	SPR2010
3	2025-09-19 12:53:39	Criteria No. 2	Registered in 2024 and from Belgrade	SPR2010
4	2025-09-14 11:03:46	Beograd		SPR2010

Image 70. The list of existing conditions that can be used

The resulting records can be exported to Excel, html and json (Image). Additionally, there is no limit to the number of records that can be displayed, nor is there a limit to the number of columns.

12. Reference tables



In the main menu, the last two buttons (Data entry and Data editing) are related to the reference tables.

Reference tables are tables used within a chosen application as auxiliary tables (most often as Address books or Codebooks), and which users need to modify.

Users can add new data to the tables (by clicking the Data entry button) or modify existing data (by clicking the Data editing button).

After updating the reference table, the new data is used within the application.

Image 71. Example of adding address data to the address book used in road traffic application (SAM_21).

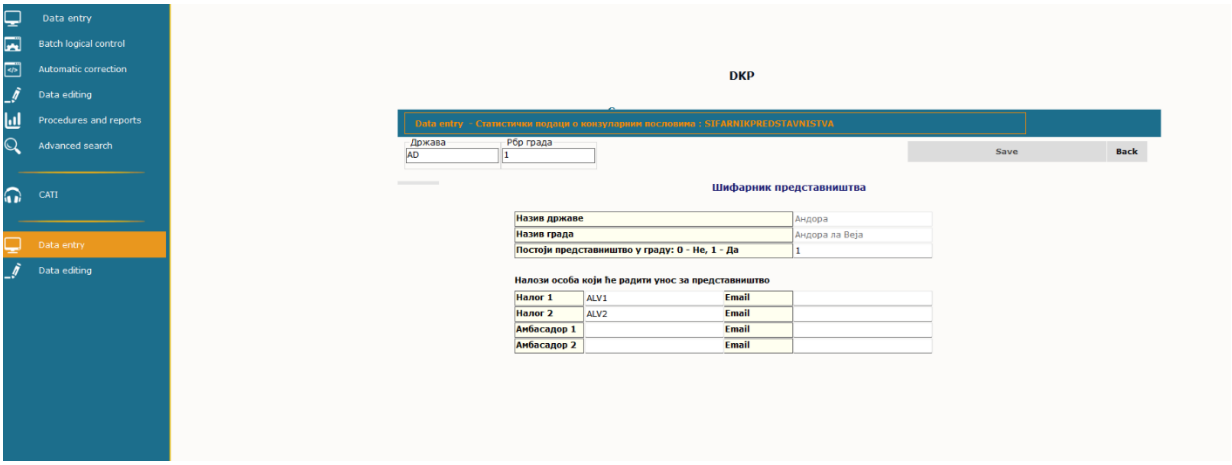


Image 72. Example of adding new accounts to the codebook, which are allowed to access the selected application.

13. Locking/Unlocking Records from the Database

In IST, locking is a mechanism that prevents further editing or deletion of a record (or an entire dataset) once it reaches a certain stage in the survey workflow. This ensures that finalized or sensitive data cannot be accidentally or intentionally altered. At the same time, authorized users can unlock records when changes are necessary, with all actions fully logged for transparency.

There are three locking levels:

1. Record-level lock: Individual records are locked.
2. Table-level lock: All records in a table are locked.
3. Application-level lock: The entire dataset for a survey application is locked.

In the database one of the optional fields that can be set in the tables related to applications is the LK (lock) field (for web application it is LKweb). If the value of this field is set to 1 in the database, the record is locked. In that case, it is only possible to view the locked record, it is not possible to edit or delete it. It is possible to lock all tables related to a survey, or individual tables that have this field.

Anyone with the necessary permission for a given application can lock the data associated with that application. A locked record can be opened in Data Entry or Editing, but fields are read-only. Only employees registered in the metadata database can unlock the application in question.

In order to lock and unlock tables related to a particular application, the user should click the settings button on the top right corner of the main window and select the Application option.

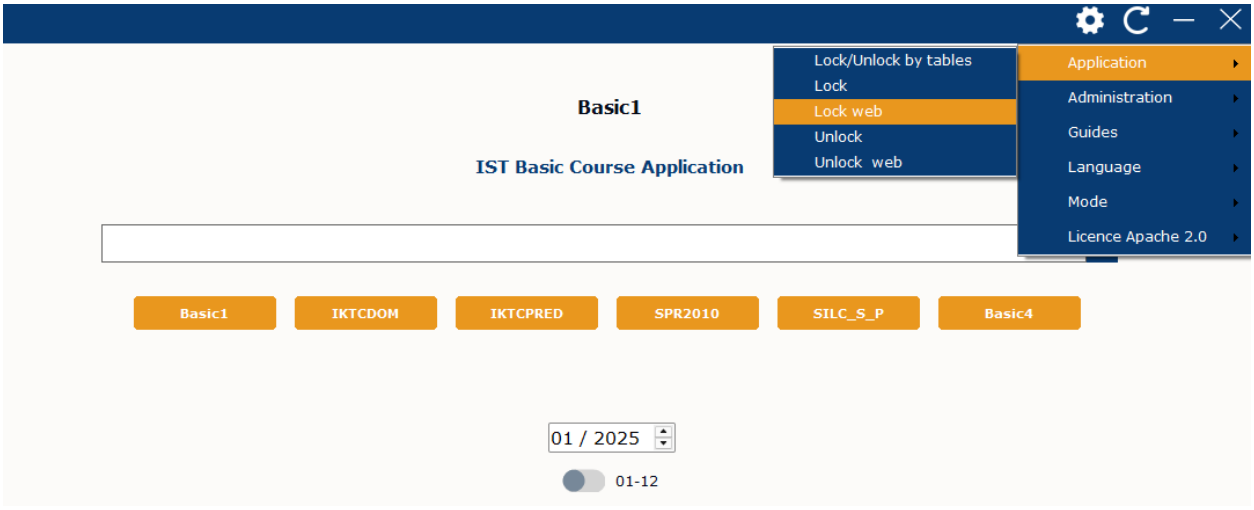


Image 73. Locking/unlocking the survey

The user can choose to lock and unlock the entire application, or to do it on individual tables (option Lock/Unlock by tables). It is also possible to lock and unlock web IST applications.

SifIst	Tabela	DG	NadTabela	Opis	Vod	Zakljucaj	Otkljucaj
Basic1	Address	A		Address	2025-01-01 00:00:00	☐	☑
Basic1	MainTable	G		$FONTBOLD$LCENTERA$foreColorMidnightBlue$backColorAzure$Main Table$fontSize14$lHeight3$	2025-01-01 00:00:00	☐	☑
Basic1	SubTable	D	MainTable	$LCENTERA$foreColorMidnightBlue$Podtabela1$backColorAzure$fontSize10$lHeight3$	2025-01-01 00:00:00	☐	☑
Basic1	SubTable1	D	MainTable	$LCENTERA$foreColorMidnightBlue$backColorAzure$Sub table1$fontSize10$lHeight3$	2025-01-01 00:00:00	☐	☑

Image 74. Locking/unlocking specific tables

The user can define who locks and who can unlock the tables, and by ticking the Lock (Zaključaj) column, user locks the specific table. By ticking the Unlock (Otkljucaj) column, user unlocks the specific table. When the user wants to enter a locked table, the message will appear.

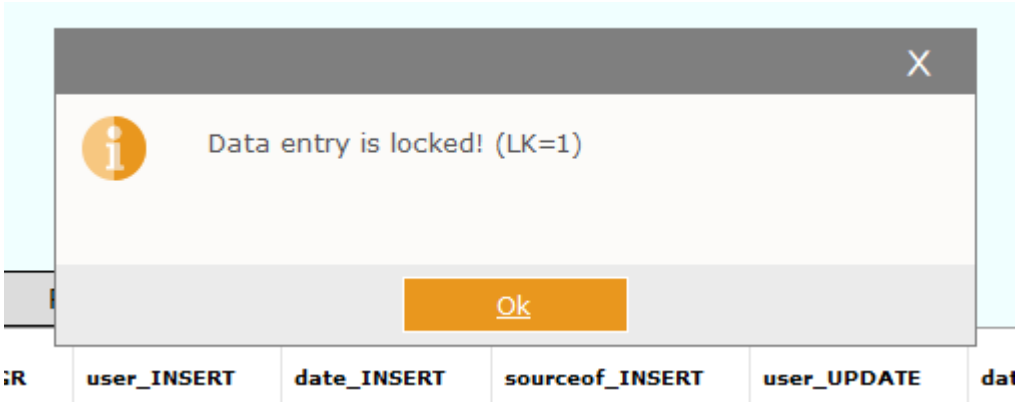


Image 75. Message for locked table

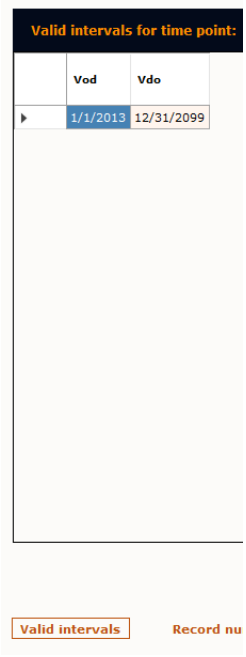
Every lock/unlock is recorded with user, time, and application. The tables have the fields date_LKO, user_LKO, date_LKZ, and user_LKZ, so it is possible to track the time and the user who locked or unlocked the records. For IST web application these are date_LKOweb, user_LKOweb, date_LKZweb and user_LKZweb.

14. Additional options for quality control

Image 76. Bottom of the main window

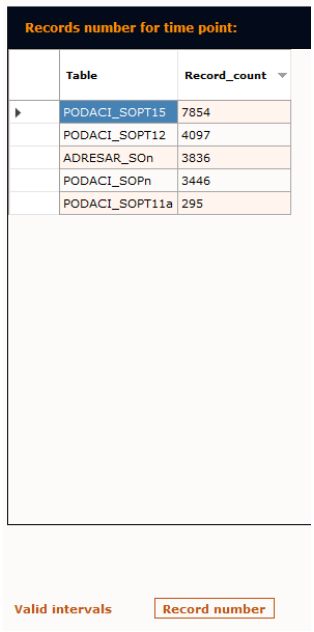
At the bottom of the main window of IST, the following options are available:

- Valid interval
- Record number
- The last date of records
- Number of imputations and edits of variables
- Overview of batch logical control



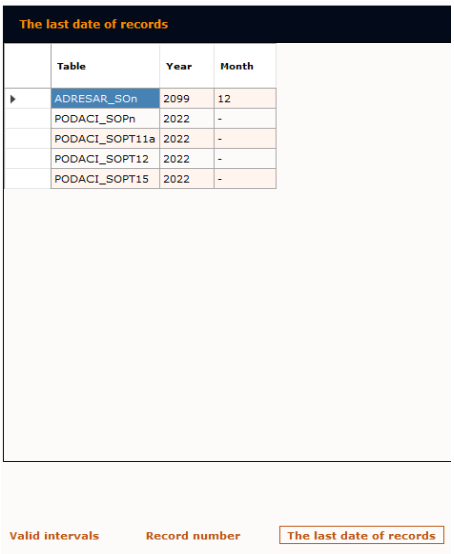
By clicking on the **"Valid Intervals"** option, a window opens where the user can see the time point for which the application is defined, as well as the range of time points that can be selected for the chosen application.

In this example, the application is valid from January 1, 2013, to December 31, 2099.



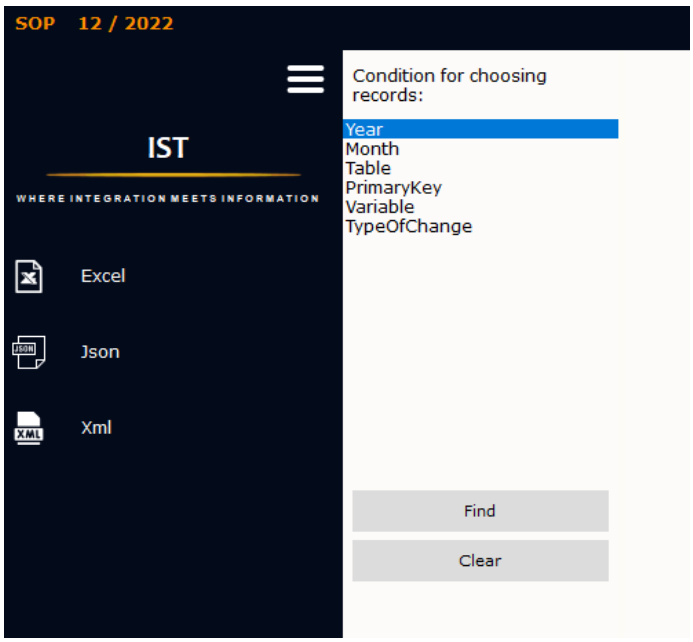
The next option, "**Record Number**", shows the number of records entered for the selected time point and for each table that is active at the selected time point in the selected application.

In the selected example, the user can see that there are five active tables for this application, and can view the number of records for each table in the table displayed on the left side.



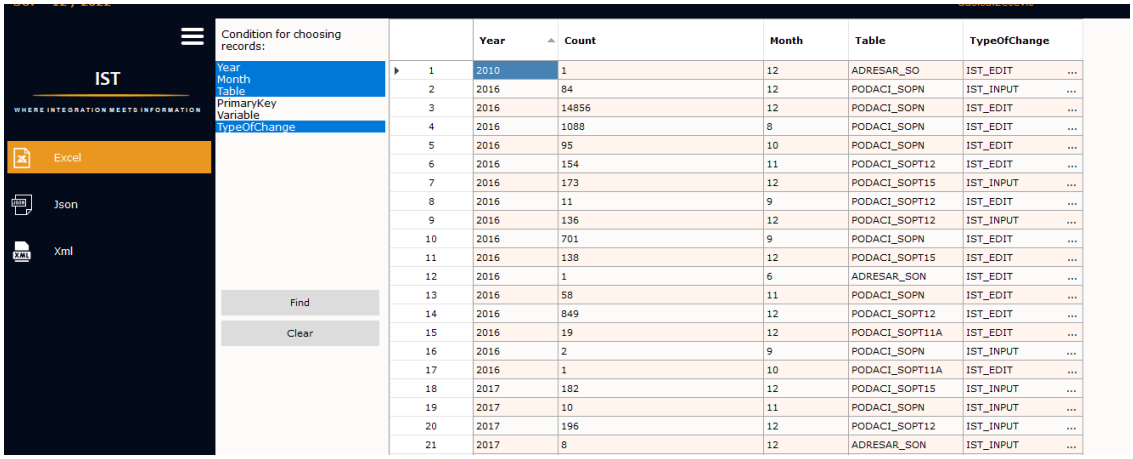
The **"Last Date of Records"** option provides an overview for each table that is active at the selected time point within the chosen application, showing the latest date for which record is available in the table in database.

In the example shown in the picture on the left, the user can see that there are five active tables for the selected time point in this application. The last date of record for the Address Book table is 12/2099, because in this address book we have records that are available until 12/2099, while for the other tables it is the year 2022 because they are data entry tables and the latest record entered was in 2022. The month is not shown because the column month does not exist in data entry tables.



When the user selects the option "**Number of Imputations and Edits of Variables**," the following window opens.

This section allows tracking the number of imputations and variable changes by year, month, table, primary key, variable, or type of change (input or edit), depending on the specific monitoring needs. Multiple criteria can also be combined by selecting them and clicking the "Find" button.



	Year	Count	Month	Table	TypeOfChange
1	2010	1	12	ADRESAR_SO	IST_EDIT
2	2016	84	12	PODACI_SOPN	IST_INPUT
3	2016	14856	12	PODACI_SOPN	IST_EDIT
4	2016	1088	8	PODACI_SOPN	IST_EDIT
5	2016	95	10	PODACI_SOPN	IST_EDIT
6	2016	154	11	PODACI_SOPT12	IST_EDIT
7	2016	173	12	PODACI_SOPT15	IST_INPUT
8	2016	11	9	PODACI_SOPT12	IST_EDIT
9	2016	136	12	PODACI_SOPT12	IST_INPUT
10	2016	701	9	PODACI_SOPN	IST_EDIT
11	2016	138	12	PODACI_SOPT15	IST_EDIT
12	2016	1	6	ADRESAR_SON	IST_EDIT
13	2016	58	11	PODACI_SOPN	IST_EDIT
14	2016	849	12	PODACI_SOPT12	IST_EDIT
15	2016	19	12	PODACI_SOPT11A	IST_EDIT
16	2016	2	9	PODACI_SOPN	IST_INPUT
17	2016	1	10	PODACI_SOPT11A	IST_EDIT
18	2017	182	12	PODACI_SOPT15	IST_INPUT
19	2017	10	11	PODACI_SOPN	IST_INPUT
20	2017	196	12	PODACI_SOPT12	IST_INPUT
21	2017	8	12	ADRESAR_SON	IST_INPUT

Image 77.

In this example of tracking imputations and edits of variables by year, month, table, and type of change. For better overview and visibility, the grid can be sorted by clicking on the column header you want to sort by (for ascending order), or by double-clicking the column header to sort in descending order.

Also, since the number of changes can be large — especially when multiple options are selected at once — for better tracking and visibility, the data can always be exported to Excel, JSON, or XML format by clicking the desired option on the left side.

By clicking the "Clear" button, the table on the right disappears and the selected criteria are reset.

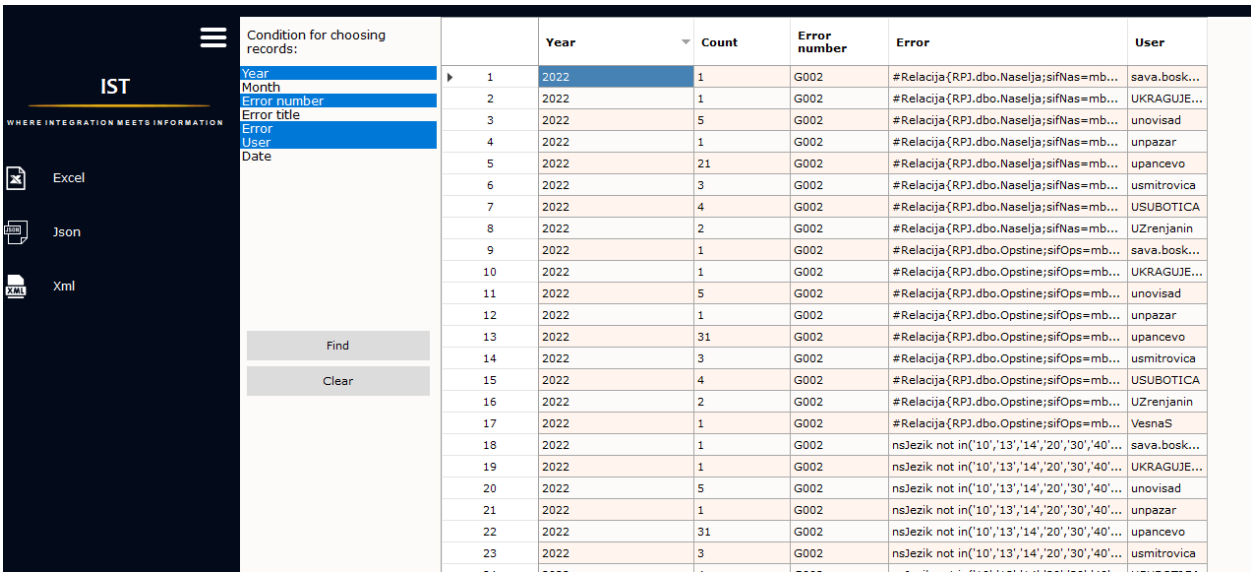
Overviews of batch logical control

Similarly to the previous option, the user can track when the batch logical control was performed, including the year, month, error number, error name, error condition, the user who triggered the logical control, and the date it was executed.

As with the previous option, multiple criteria can be combined simultaneously to allow for a more detailed review.

The image below displays an overview of the executed batch logical controls categorized by year, error number, error condition, and the user responsible for the control.

Also, for better overview, the table can be exported to Excel, JSON, or XML format by clicking one of the options on the left side.



	Year	Count	Error number	Error	User
1	2022	1	G002	#Relacija{RPJ.dbo.Naselja;sifNas=mb...	sava.bosk...
2	2022	1	G002	#Relacija{RPJ.dbo.Naselja;sifNas=mb...	UKRAGUJE...
3	2022	5	G002	#Relacija{RPJ.dbo.Naselja;sifNas=mb...	unovisad
4	2022	1	G002	#Relacija{RPJ.dbo.Naselja;sifNas=mb...	unpazar
5	2022	21	G002	#Relacija{RPJ.dbo.Naselja;sifNas=mb...	upancevo
6	2022	3	G002	#Relacija{RPJ.dbo.Naselja;sifNas=mb...	usmitrovica
7	2022	4	G002	#Relacija{RPJ.dbo.Naselja;sifNas=mb...	USUBOTICA
8	2022	2	G002	#Relacija{RPJ.dbo.Naselja;sifNas=mb...	UZrenjanin
9	2022	1	G002	#Relacija{RPJ.dbo.Opstine;sifOps=mb...	sava.bosk...
10	2022	1	G002	#Relacija{RPJ.dbo.Opstine;sifOps=mb...	UKRAGUJE...
11	2022	5	G002	#Relacija{RPJ.dbo.Opstine;sifOps=mb...	unovisad
12	2022	1	G002	#Relacija{RPJ.dbo.Opstine;sifOps=mb...	unpazar
13	2022	31	G002	#Relacija{RPJ.dbo.Opstine;sifOps=mb...	upancevo
14	2022	3	G002	#Relacija{RPJ.dbo.Opstine;sifOps=mb...	usmitrovica
15	2022	4	G002	#Relacija{RPJ.dbo.Opstine;sifOps=mb...	USUBOTICA
16	2022	2	G002	#Relacija{RPJ.dbo.Opstine;sifOps=mb...	UZrenjanin
17	2022	1	G002	#Relacija{RPJ.dbo.Opstine;sifOps=mb...	VesnaS
18	2022	1	G002	nsJezik not in('10','13','14','20','30','40'...	sava.bosk...
19	2022	1	G002	nsJezik not in('10','13','14','20','30','40'...	UKRAGUJE...
20	2022	5	G002	nsJezik not in('10','13','14','20','30','40'...	unovisad
21	2022	1	G002	nsJezik not in('10','13','14','20','30','40'...	unpazar
22	2022	31	G002	nsJezik not in('10','13','14','20','30','40'...	upancevo
23	2022	3	G002	nsJezik not in('10','13','14','20','30','40'...	usmitrovica

Image 78.

15. Language option

IST can work in several different languages. By clicking the setting button on the top right corner of the main window, and selecting the Language option, the list of languages will appear.

Image 79. Language options

Once the language is picked, the application will be presented in that language, but also all of the survey text, questions and modules that are defined in the metadata database for that language. Developers can also add new languages.