PS IMAGO PRO

User Guide

Predictive Solutions Sp. z o.o.

(formerly known as SPSS Polska)

ul. Retoryka 1, 31-108 Kraków, Poland

Tel./fax (12) 6369680, 6364535

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1. PS IMAGO PRO

1.1. Introduction

PS IMAGO PRO is a comprehensive analysis and reporting solution that provides analysts with an integrated data analysis environment. This analytical environment facilitates not only data exploration and preparation but also multidimensional analysis and construction of predictive models.

This solution is the foundation of a system for providing information on Legend operations of the organisation. Items resulting from analyzes are put in a personalised report and then published on a corporate portal. Authorised recipients have access to the information via a browser or as a document. PS IMAGO PRO is a flexible tool for creating ad hoc reports and making analysis and reporting automatic for repetitive operations.

PS IMAGO PRO is a comprehensive solution that combines the following components:

- analytical – offering a broad array of procedures available both from the interface and the programming language level. It provides access to various types of data, data preparation, processing, and analysis. The core of the analytical component is the engine of the IBM SPSS Statistics suite and a set of proprietary procedures that expands the functionalities of the tool;
- report designing – it is used to prepare Dashboard reports (available online) or Document reports (available as hard copy) based on results from the analytical component;
- automating – helps plan periodic reporting: from data retrieval, data analysis, report creation, to publication on the website;
- distribution – used for publishing and sharing analytical reports with recipients. From saving reports into a popular format (PDF, PPT, HTML, DOCX) to publishing them on a dedicated web server.

1.2. What's new?

The latest version of PS IMAGO PRO 9 offers new procedures in the Predictive Solutions menu:

- Multiply cases – allows you to multiply the cases on the basis of the weight variable and save them to the desired location as a new data set;
- Reverse coding – allows you to reverse the coding direction of categorical variables;
- Data audit – allows you to obtain selected statistics and presents the results in the form of tables for analyzed categorical and scale variables;
- Dashboard Matrix – allows you to present the degree of completion of a target in the designated groups on the dashboard. The visualisation compares the actual values of the task implementation with the target values and presents the results in the form of a table.

2. PS IMAGO PRO architecture

PS IMAGO PRO may take various forms to flexibly adapt to your business and technical needs. Its architecture is scalable, which facilitates the precise adaptation of functionalities and efficiency of the solution to your current expectations. At the smallest scale, it is an independent analytical workstation for a single analyst, at the largest, a corporate solution for a large organisation. Components of the solution have different uses that together make up a comprehensive analytical and reporting platform.

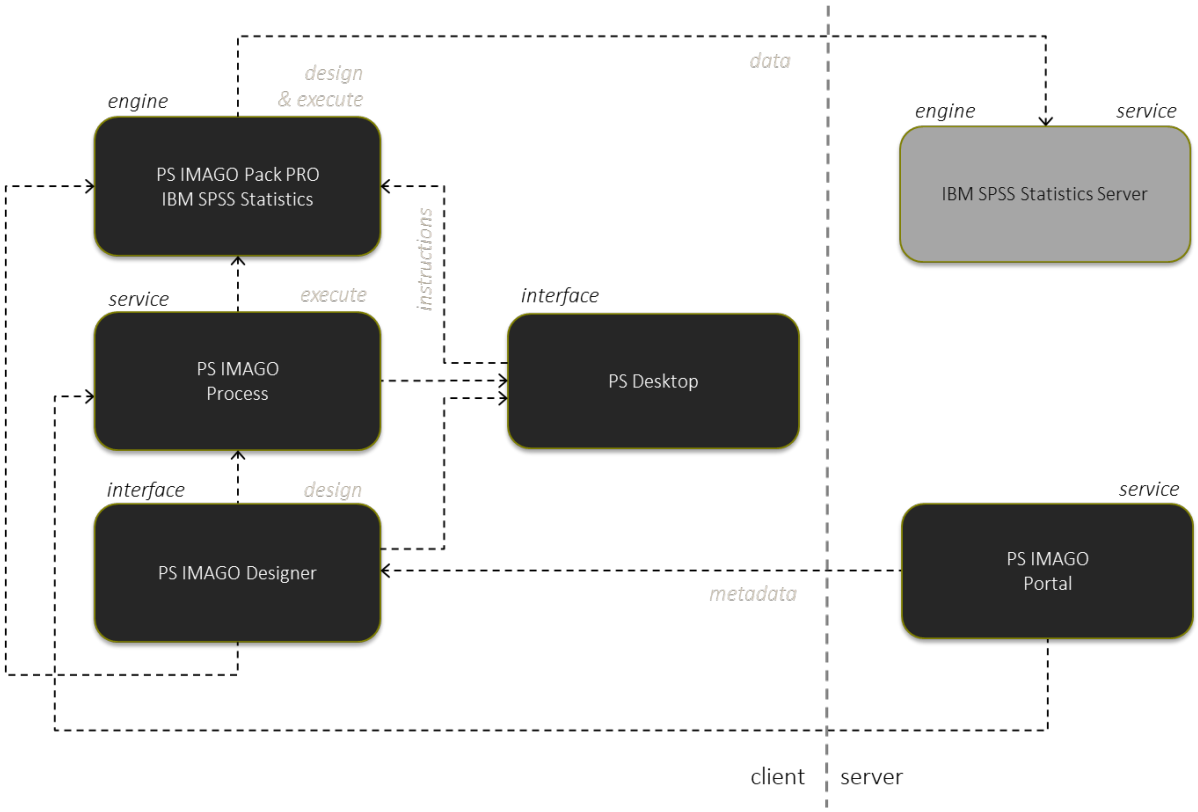


Figure 1. A general diagram of PS IMAGO PRO's architecture

2.1. Types of installation

Depending on the purchased licence, PS IMAGO PRO may be installed as one of the two installations: *Client* and *Server*.

2.1.1. Client – local processing

The Client installation has two standard licence versions, single workstation and network. With the former, you can install the number of solution components equal to the number of licences you hold. In the network variant, it is the number of simultaneously run applications that is taken into consideration; the number of installations does not matter. For the network version to work, you need to install a licence server.

Figure 2. Installation of a specific Client solution

2.1.2. Server – processing on a server

With the Server licence, you can use the additional computing power of an analytical server. This licensing approach is based on PVU, which is a server performance equivalent.

In the case of PS IMAGO Portal, a single product installation is licensed. You may use an additional instance of PS IMAGO Portal Cloud under the same licence. Both applications have similar functionalities.

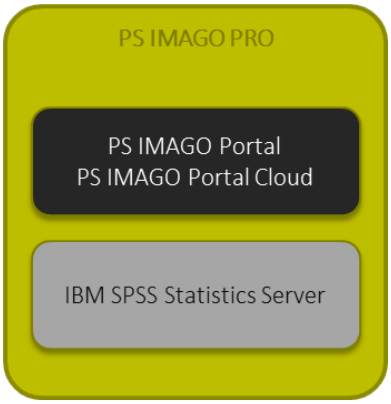


Figure 3. A diagram of server component installation

2.2. Components

PS IMAGO PRO consists of the following components:

- PS IMAGO Designer
- PS IMAGO Portal and Portal Cloud
- PS IMAGO Process
- PS IMAGO Pack PRO
- IBM SPSS Statistics (with any optional additional modules).

The suite has a companion application, PS Desktop, which provides centralised access to your PS solutions, including components of PS IMAGO PRO.

2.2.1. PS Desktop

It is the managing application that supports organisation of data collection, analysis, and reporting. It is intended both for analysts who handle analyzes and build processes and for business users who do not have the analytical engine on their machine but activate analytical processes. PS Desktop allows you to move between systems or groups of programs listed as tabs in the left-hand part of the window.

Features:

- Configuration and setting of PS IMAGO PRO (such as interface language);
- Starting components of the solution;
- Logging in to the report distribution environment.

2.2.2. IBM SPSS Statistics Client / IBM SPSS Statistics Server

IBM SPSS Statistics, a recognised standard used by analysts all over the world for over fifty years, is the analytical engine of PS IMAGO PRO.

It offers:

- a native data storage format in a single file together with all important information (data, values, labels, measurement levels, missing data, etc.);
- access to data in formats other than the native format, including ODBC databases, MS Excel, SAS, Stata files, or text data;
- data processing procedures for preparing them for analysis, including selection, aggregation, restructuring, transposition, random sampling, and: creation, transformation, categorisation, and recording of variables, variable and value labelling, and dataset merging; all this can be selected from the interface or the programming language level;
- a set of data analysis techniques such as frequency, descriptive statistics, crosstabs, mean comparison, correlation verification, and Bayesian statistics;

- an array of multi-dimensional data analysis techniques that facilitate prediction, classification, segmentation, scaling, and reduction, including regression, time series forecasting, optimal scaling, cluster analysis, decision trees, and neural networks;
- procedures for presenting analysis results using a wide variety of tables, charts, and maps.

2.2.3. PS IMAGO Pack PRO

We have integrated 57 additional proprietary procedures with the analytical engine. They provide functions that speed up data preparation, analytical functions and several out-of-the-box result visualizations. The procedures are allocated to the following groups:

- **data** – dataset management, including Delete Constants, Delete Variable Duplicates, Create Calendar, Data Description, Balance Distribution, Join Files, Copy Value Labels, Create Global Labels, Data Inventory, Multiply Cases;
- **transformations** – variable transformation, including Recode Infrequent Categories, Normalization of Variables, Coding Multiple Response Sets, Dichotomous Coding, Recode Monotonic Categories, Compute Global Values, Clear Text, Reverse Coding;
- **analysis** – investigation of variable relationships, including Cramer's V Correlated Variables, Significant Variables CHAID, Significant Variables Chi-square, Inequality Measures, Cluster Evaluation, Compare Text, Data Audit;
- **charts** – analysis result visualization, including Contingency Map and Heatmatrix map, Table Charts, Waterfall Graph, Ring Chart, Series Graph, Scatterplot with Distribution Graphs, Nightingale Rose, Violin Plot, Radar Chart, Multidimensional Scatterplot, Treemap, Hierarchical Chart, Marimekko Graph, Layered Bar Chart, Word Cloud, Sankey Diagram;
- **dashboard** – visualizations for dashboard building, including Thermometers, Measures, Dartboard, Arrows & Lights, Matrix;
- **report** – operations on result items, including Table Coloring, Insert Image, Output Actions, Footnotes Statistics.

2.2.4. PS IMAGO Designer

PS IMAGO PRO helps create professional analytical reports that may be both presented as documents and shared online. The environment is integrated with an analytical engine, so reports are built from result items of IBM SPSS Statistics.

Basic functions are available from the menu. Even a beginner can design the layout and content of a whole report without any problems.

Unassisted design in PS IMAGO PRO means:

- creating multipage reports and defining report navigation;
- customisation of report appearance to requirements of your institution using own or predefined templates;
- arranging analytical items using a layout selected by the designer;
- adding comments and descriptions to items used;

- dynamic editing of items in the analytical engine;
- updating a finished report to reflect source data;
- exporting of hard copy reports to DOCX and PDF;
- exporting to PDF with layout and navigation unaffected;
- publishing reports on a distribution platform as HTML pages.

Using a single source, with result items in PS IMAGO PRO, you can at the same time create reports as:

- Dashboards – reports to be shared online;
- Documents – traditional, hard copy reports;

Any update of source result items automatically updates items in reports regardless of the operating mode. Both types of reports can be generated simultaneously in the same project.

Designing a dashboard report involves adding items to consecutive pages with specific layout and defining navigation between them. After formatting and populating a report with analytical items, it can be shared on a dedicated portal or saved to a popular file format (such as PDF, HTML).

Work with a document report resembles work with popular editors. A great advantage is that when building a report in PS IMAGO PRO, the user has access to all result items from the application. The user may edit the result item at every stage of work with the report. Complete reports can be exported to third-party applications such as DOCX or PDF files, or they can be printed immediately.

2.2.5. PS IMAGO Portal and Portal Cloud

The distribution component in PS IMAGO PRO is an environment for publishing and presenting analytical reports. It is a solution for storing analytical information relevant to the company or organisation operation in one place.

Reports are published in a portal database repository (compatible with MySQL and MS SQL) and shared with authorised persons as HTML pages. Website users browse through analytical reports using their web browsers in line with security and confidentiality standards.

During publishing, reports are stored in a tree structure of folders that helps keep repository content in order. The hierarchical folder tree may reflect the organisational structure of a company or its business goals. The portal has an administrator panel for managing privileges of individual users and access to resources.

Users may view historical versions of reports or other documents published on the portal. Reports may have an expiry date, after which they are no longer available to users without administrator privileges.

2.2.6. PS IMAGO Process

PS IMAGO PRO offers the function of regular updates of a published report. The automated update procedure consists of up to six steps for the following individual stages:

- data preparation;
- analysis plan preparation;
- result item preparation;
- report composition;

- report export;
- report publication online.

You decide at which step the automation takes over and indicate the last automated step. The process can be fully (from the preparation of result items from data to the publication on the portal) or partially automated. Automation tasks can be triggered regularly with a schedule (for example, every day, every week, every month, on a specific date).

This way, recipients have uninterrupted access to up-to-date information, which can be used for business decision-making. Manual work of an analyst can be streamlined and automated, especially for recurring activities related to the preparation of periodic reports. A set of various parameters describing the process of preparation and distribution of a report may be saved and batch processed by PS IMAGO PRO without involving the user.

3. PS Desktop. Managing PS IMAGO PRO

You need analytical tools to start working with data, identify any patterns, and use them to make effective business decisions. The first step to start working with Predictive Solutions software is to open the PS Desktop window. It is an application for analysts.
It lets you move between programs listed in the left-hand part of the panel.

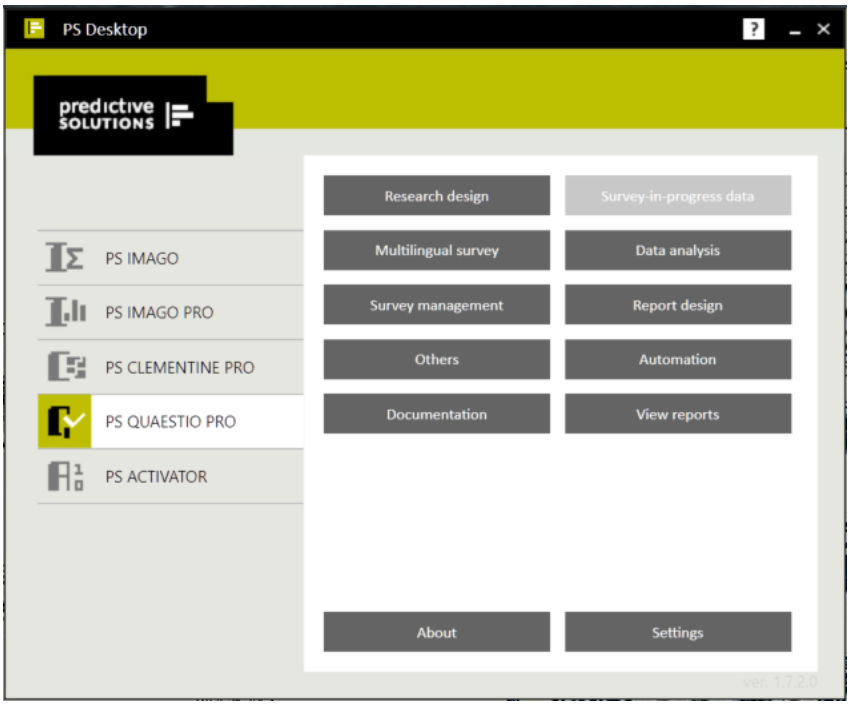


Figure 4. PS Desktop window

The first tab is PS IMAGO, a comprehensive analytical environment based on IBM SPSS Statistics, which facilitates analysis, creation, and visualization of data and their periodical updates.

The PS IMAGO PRO tab contains all elements that make up PS IMAGO with additional components for analysis, impressive visualization, creating analytical reports, and instantaneous publication online.

PS QUAESTIO PRO is an integrated environment for survey projects. It supports all stages: from the construction of surveys, to data collection, to data analysis, and distribution of reports.

A data mining and big data analysis environment, which offers process automation and networking, can be found in the PS CLEMENTINE PRO tab.

PS ACTIVATOR is a window for activating software license and previewing it.

If this solution is installed, its tab shows buttons that can be used to start individual components, check and change the configuration, and gain access to the help system. When this solution is not installed, you can see basic information about it.

The start-up window of PS IMAGO PRO contains a set of buttons that facilitate commencing work at any stage.

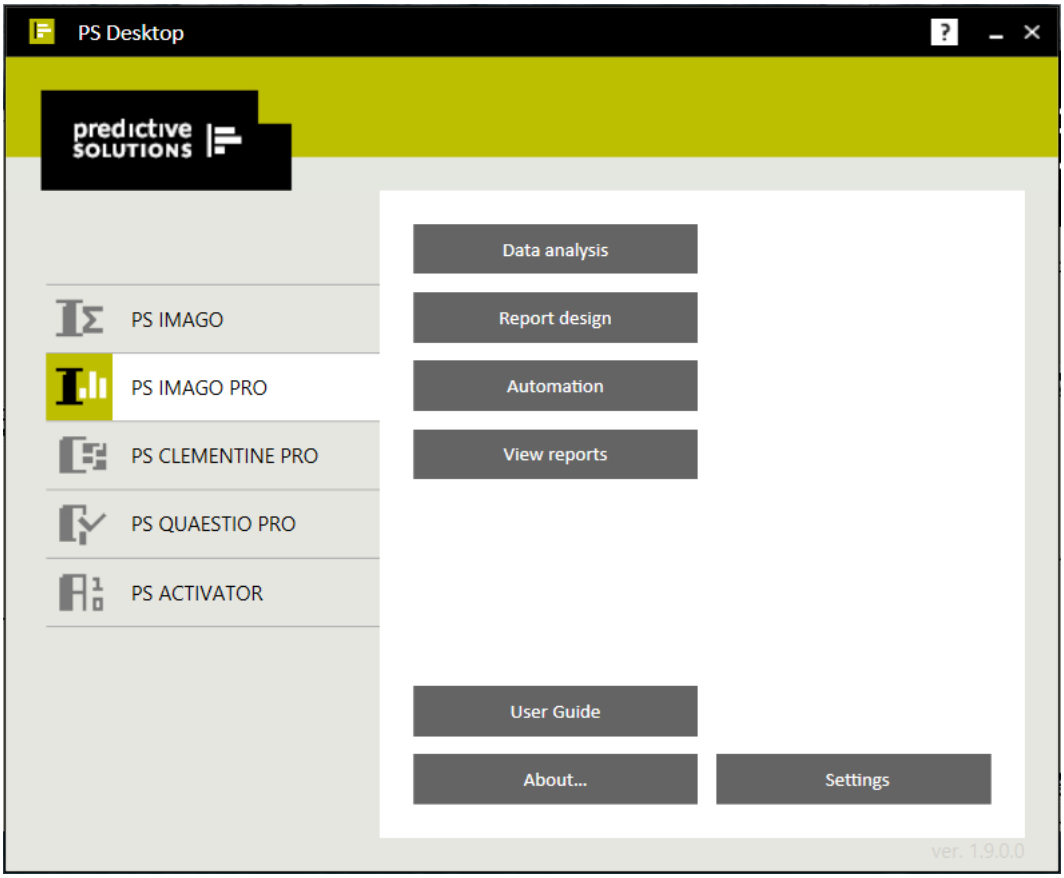


Figure 5. PS Desktop main window for PS IMAGO PRO

You can open the PS IMAGO PRO help window by clicking the question mark button in the top right-hand part of its windows. Content is displayed relevant to the window where the help was activated.

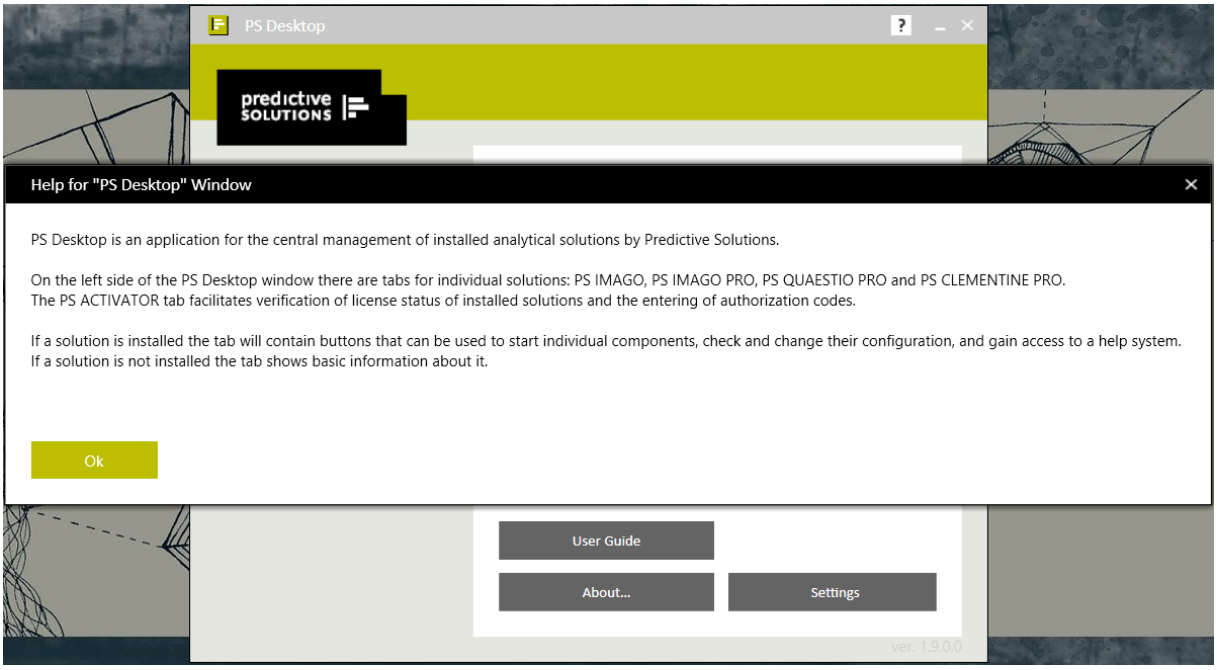


Figure 6. Help for a PS Desktop window

[ABOUT...] displays a message with the version of installed PS IMAGO PRO and its components.

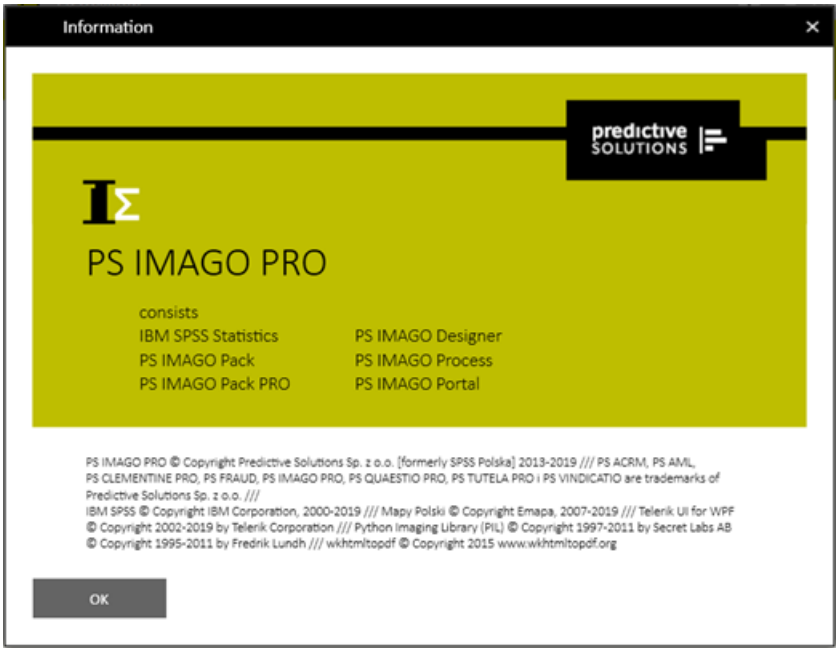


Figure 7. PS IMAGO PRO About window

[SETTINGS] opens a window where you can change application settings and configure the default connection to the PS IMAGO Portal or Portal Cloud report distribution platform.

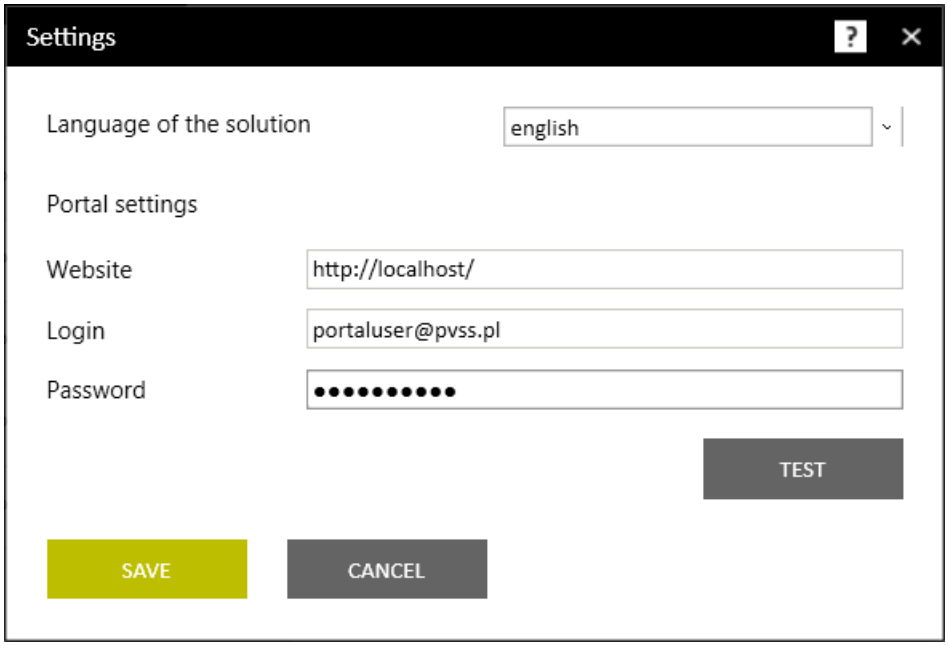


Figure 8. PS IMAGO PRO Settings window

In *Language of the solution*, you can select the language for all component applications of PS IMAGO PRO. To set a language, select it and confirm with [Save].

The *Portal settings* option requires three parameters:

- Website – the URL or local host name of the existing PS IMAGO Portal or PS IMAGO Portal Cloud instance,
- Login – PS IMAGO Portal or PS IMAGO Portal Cloud login,
- Password – the current password.

Click [TEST] to verify that the values you entered are correct.

[SAVE] confirms changed settings and [CANCEL] closes the window and discards the changes.

[DATA ANALYSIS] opens IBM SPSS Statistics in the standard data processing mode.

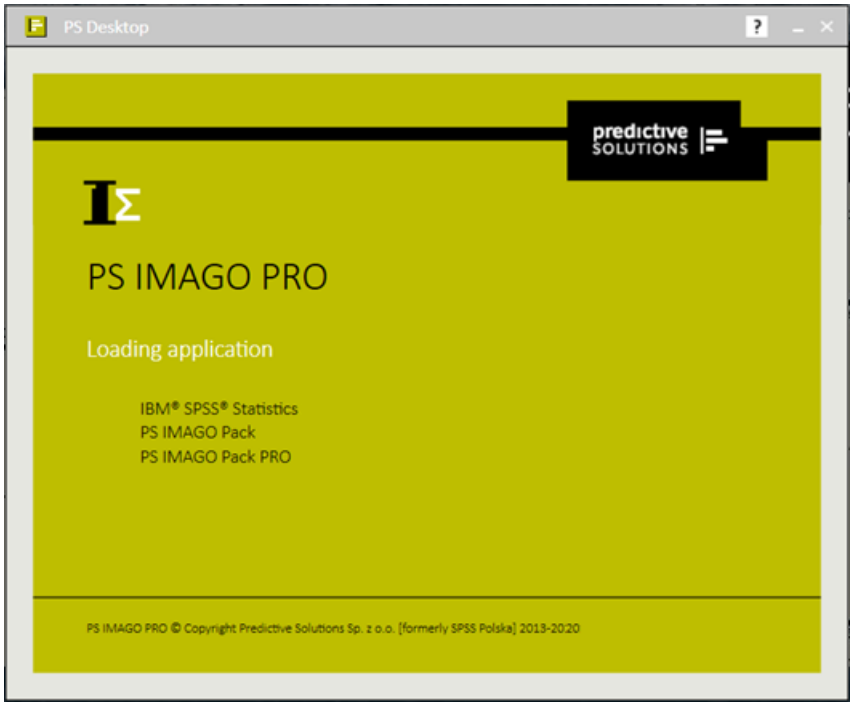


Figure 9. Starting IBM SPSS Statistics from PS Desktop

The menu bar has an additional section [Predictive Solutions] with almost 60 custom analytical procedures in groups:

- Data
- Transform
- Analyze
- Graphs
- Dashboard
- Report

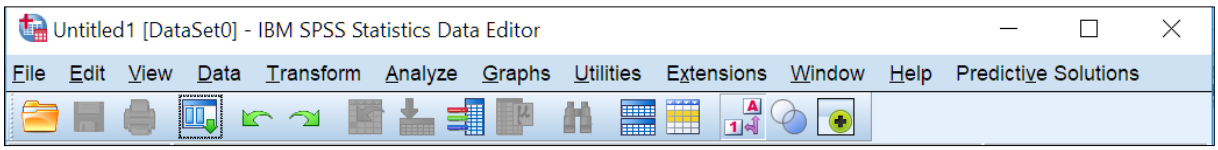


Figure 10. The IBM SPSS Statistics menu bar with the Predictive Solutions section

You can find out more about using the software in section 5 PS IMAGO Designer.

[REPORT DESIGN] runs a report design tool, PS IMAGO Designer. It offers two modes: Dashboard and Document.

Figure 11. Starting PS IMAGO PRO Designer from PS Desktop

With result items of analyzes, the creator of the report can prepare information adapted to the needs of the recipient with ease. They can arrange items in line with corporate identity principles and publish a finished report or share it directly with decision-makers.

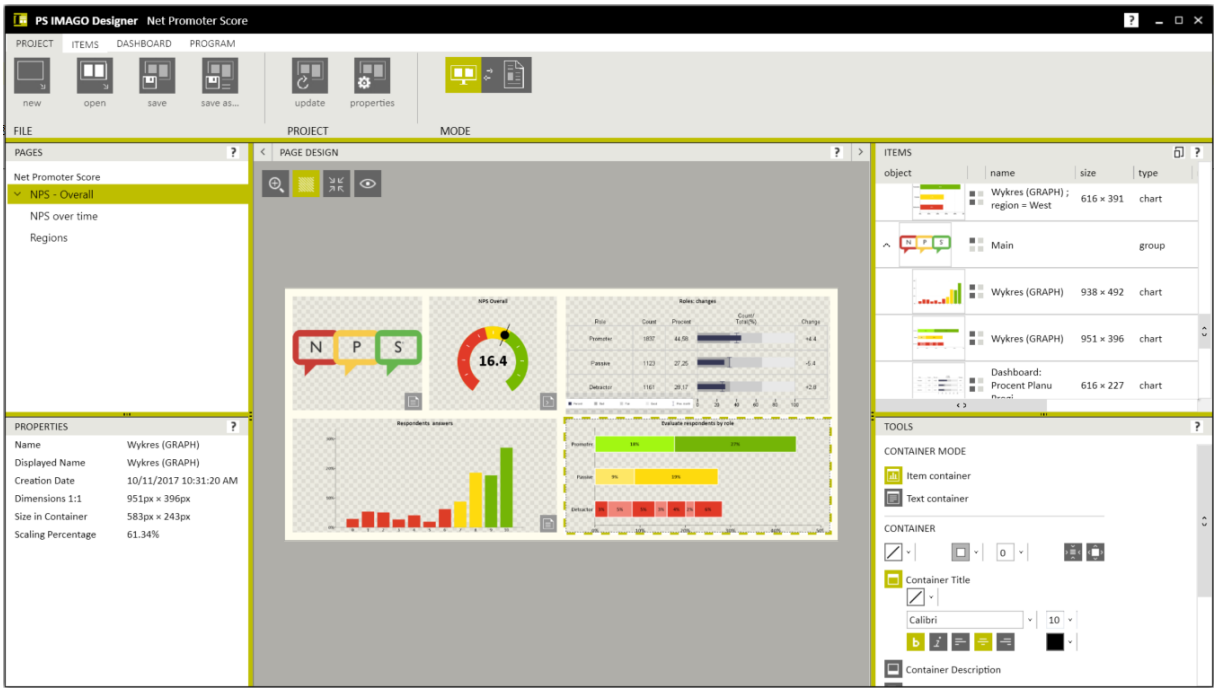


Figure 12. The PS Designer window, the Dashboard mode

You can find out more about using the software in section 5 PS IMAGO Designer.

[AUTOMATION] runs PS IMAGO Process for scheduling recurring tasks.

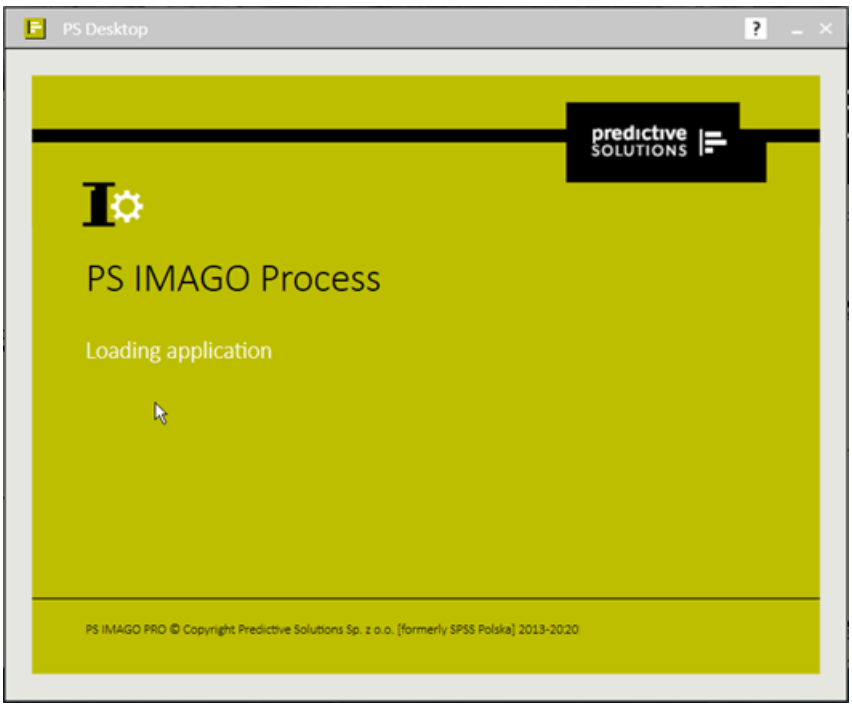


Figure 13. Starting PS IMAGO Process from PS Desktop

This tool allows you to make recurring asks automatic using a dynamic range of updatable elements. Beginning with the indication of a file with a set of syntax commands to the publication of a report in PS IMAGO Portal or PS IMAGO Portal Cloud.

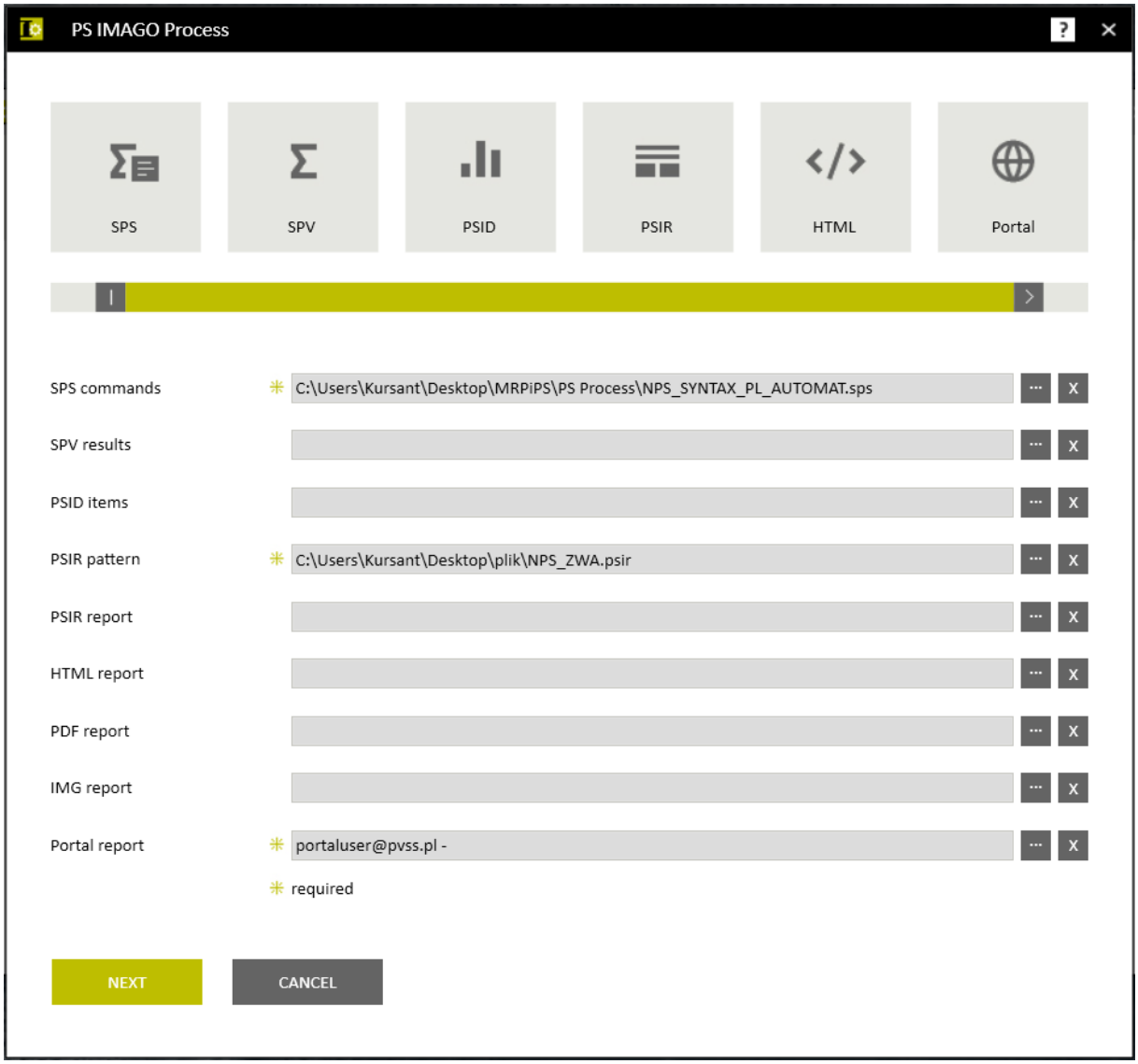


Figure 14. The window for defining a recurrent task in PS IMAGO Process

You can find out more about using the software in section 7 PS IMAGO Process.

[VIEW REPORTS] opens the default web browser and goes to the address of PS IMAGO Portal or PS IMAGO Portal Cloud specified in [SETTINGS].

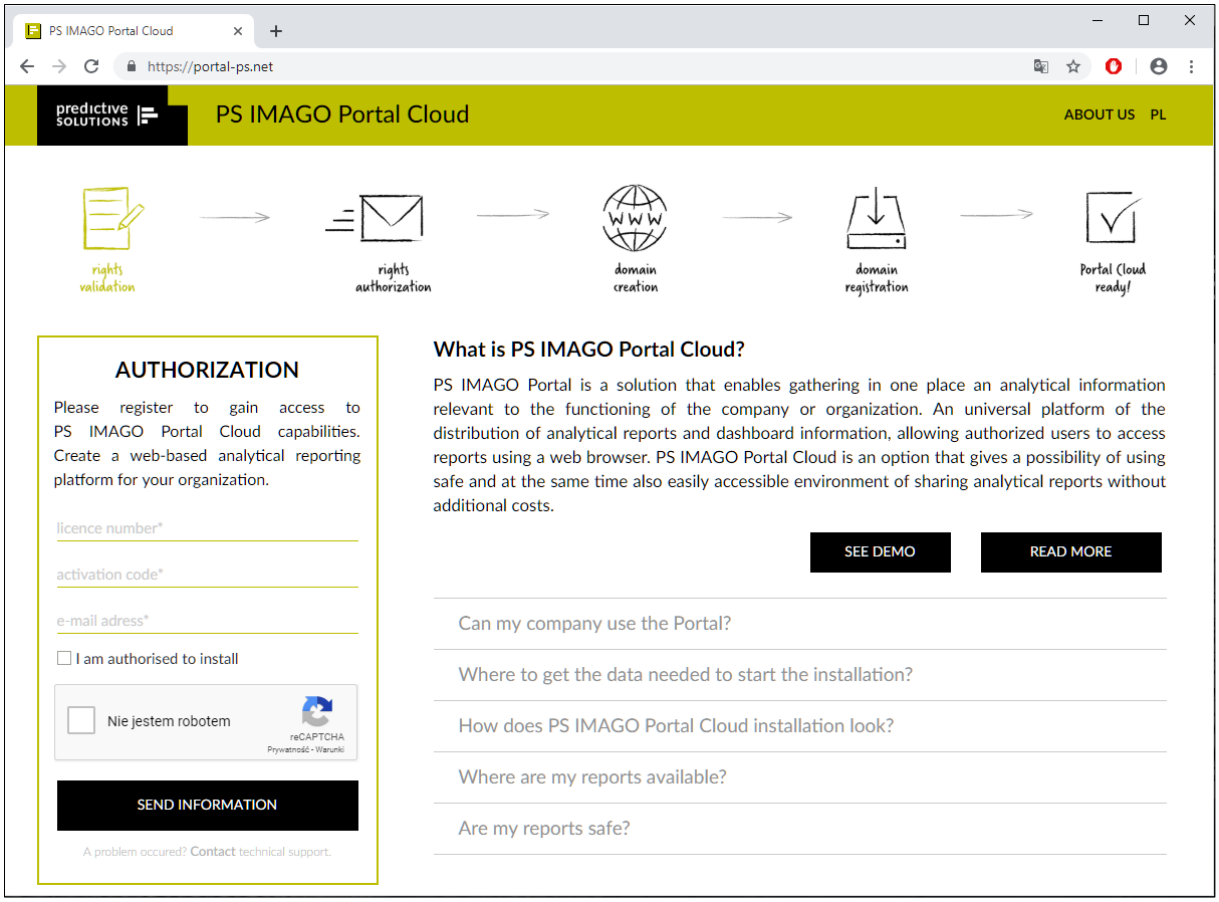


Figure 15. The window for registering a new instance of PS IMAGO Portal Cloud

PS IMAGO Portal or PS IMAGO Portal Cloud are a universal platform for distributing analysis results and dashboards among authorised recipients via a web browser.

You can find out more about using the software in section 6PS IMAGO Portal and Portal Cloud.

4. PS IMAGO Pack PRO

PS IMAGO Pack PRO is a set of almost 60 procedures, transformations, charts, and visualizations available in the [Predictive Solutions] menu. They are a useful tool for streamlining arduous and time-consuming data transformation procedures. They also make work easier to less proficient users. On the other hand, PS IMAGO Pack PRO is an extensive set of graphic procedures for reporting and preparing dashboards using PS IMAGO Designer.

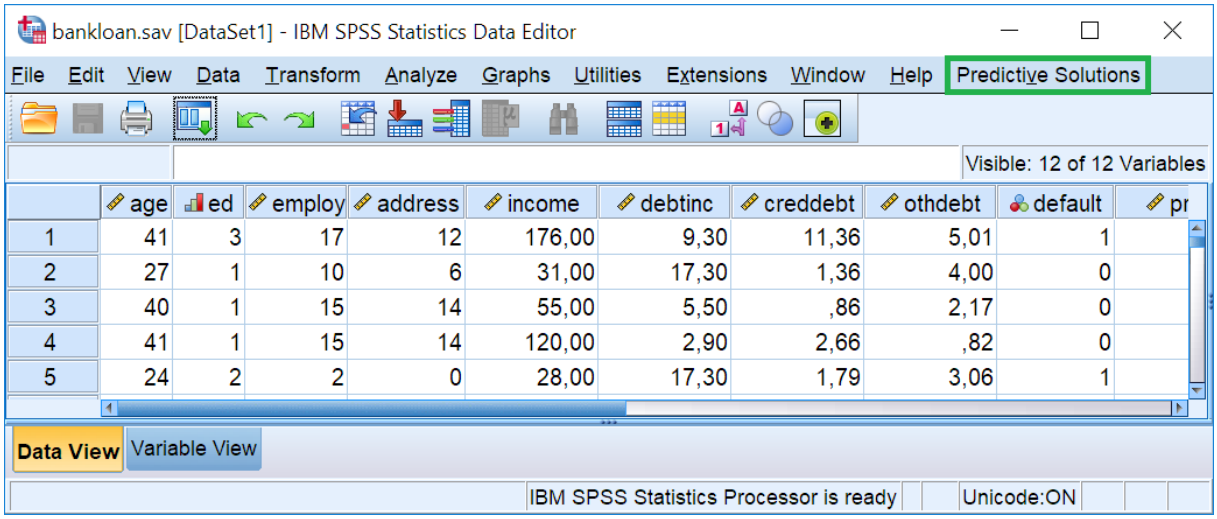


Figure 16. The main window of the program with the Predictive Solutions menu

PS IMAGO Pack PRO procedures in the [Predictive Solutions] menu are divided into the following groups:

- *Data* – dataset management operations;
- *Transform* – conversions for computing new variables;
- *Analyze* – automated search for predictors, computation of measures of statistical dispersion;
- *Graphs* – generation of specific types of charts;
- *Dashboard* – generation of dashboard visualizations;
- *Report* – modification of results in the reports window.

4.1. Data

This section contains procedures that facilitate the management of PS IMAGO PRO files and help order and prepare the active data set for analysis. It contains the following procedures:

- *Data Description* – procedure for describing variables;
- *Join files* – procedure joins all of the SAV file located in the chosen directory;
- *Multiply cases* – multiply cases based on the weight variable;
- *Create Global Labels* – retrieves text labels from the dataset;
- *Copy Value Labels* – copies value labels among variables;
- *Data Inventory* – prepares a list of PS IMAGO PRO files in the location;
- *Delete Variable Duplicates* – detects and removes duplicate variables;
- *Delete Constant Variables* – detects and removes constants;
- *Create calendar* – creates a new dataset with observations based on the given start and end dates.
- *Balance Distribution* – balances the dataset based on a selected variable.

4.1.1. Data Description

[Data Description] allows you to prepare a description of variables in the active dataset. The dictionary can be used to move properties of variables onto another set or onto selected variables through a set of IBM SPSS Statistics commands to define such properties as value labels or level of measurement. Another potential application of the procedure is to save a text description of variables that is later used in a user report.

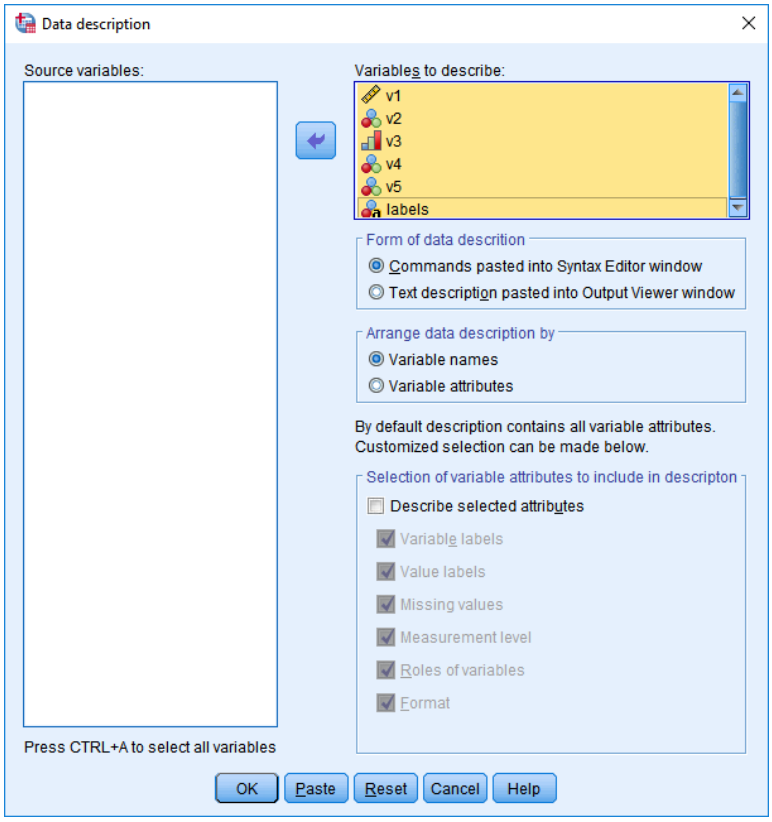


Figure 17. The window for defining the procedure Data Description

Procedure [Data Description] can be used to create a dictionary description of either all or some variables in the active dataset. Move the selected variables from section *Source variables* to field *Variables to describe* to process them.

Section *Form of data description* allows you to define the form of the description to be created with the procedure. Two options are available:

- *Commands pasted into Syntax Editor window* – the procedure prepares a set of commands using the command language to define the description of variables. The commands are ready for implementation with the PS IMAGO PRO command editor (SPS file).
- *Text description pasted into Output Viewer window* – the procedure prepares a text description of variables in the report editor window of PS IMAGO PRO.

Section *Arrange data description* gives a choice of how elements of the description or command code are grouped:

- *Variable names* – selected attributes are ordered by variable names in the report of command language code. As a result, the selected elements of the description of a specific variable are in the same section.
- *Variable attributes* – selected attributes are ordered by commands defining variable attributes in the report or command language code. As a result, all commands defining a specific attribute are grouped in one section.

Section *Selection of variable attributes to include in description* allows you to include all or selected elements of data description in the report or command code. If you do not tick [Describe selected attributes], PS IMAGO PRO includes all elements of the description. It is the default setting. When this option is ticked, you can select the elements of the description yourself:

- *Variable labels*,
- *Value labels*,
- *Missing values*,
- *Measurement level*,
- *Role of variables*,
- *Format*.

4.1.2. Join files

Procedure to merge multiple SAV files (according to the add cases method). The procedure joins all of the SAV files located in the chosen directory. It also allows to designate one file which includes the variable dictionary. New cases will be added to the pattern file basing on the variable names to preserve the proper order of data.

The procedure PS JOIN FILES requires the directory in which files are stored to be indicated. Each of the joined files have to include at least one case. If the user decides to join files without the pattern file then the object file will include all variables from all of the added files. The choice of method which designates file with a variable dictionary will result in a final file that contains only variables from the pattern file. If the procedure encounters two string variables with the same name but different length it will extend the shorter variable to the longer size.

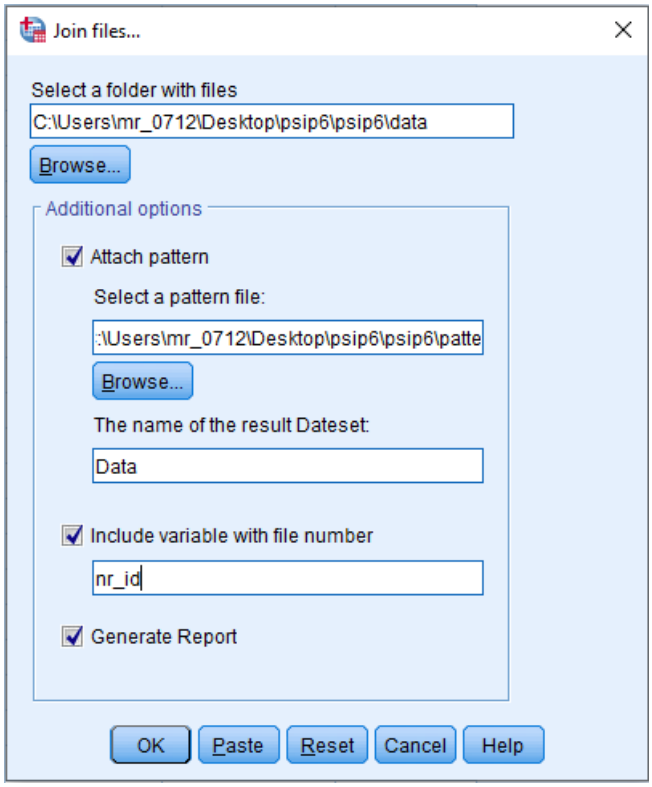


Figure 18. The window for defining procedure Join files

The procedure allows the user to choose some additional options for joining data sets:

- [Attach pattern] designates a file with a variable dictionary. It will be the first file to be opened and then new cases will be added to this file. Although the pattern file doesn't need to contain cases it has to contain variables with their description (labels, formats, etc.). To use a dictionary file one has to click the Browse button and select an appropriate file. Optionally, the name of the dataset with the dictionary can be defined in the field below.
- [Include variable with file number] adds an index variable which includes information about the source file for cases that have been joined. The name of the index variable has to be defined in the text field below. The name has to be unique and it can't exist in any of the merged files.
- [Display report] prepares and displays a report which includes a summary of the procedure: the name of the directory and the list of joined files, variables in the object file and the number of cases are displayed.

4.1.3. Multiply cases

The procedure allows you to multiply the cases on the basis of the weight variable used and save them to the indicated location as a new data set. Each case will be represented in the new dataset as many times as its weighted frequency in the original dataset. The non-integer weights are rounded according to the mode specified by the user. Cases with negative weights will be omitted.

The procedure requires indicating a quantitative weighting variable that should be transferred to the *Weight variable* field. In the *File path* field, specify the directory where the file with multiple observations will be saved. Selecting the *Open file after saving* option will open a file with multiplied

observations in a new dataset. Selecting the *Remove weight variables* option will remove the original and rounded weight variables from the new data set. To keep the weight variables, leave this option unchecked (the default option).

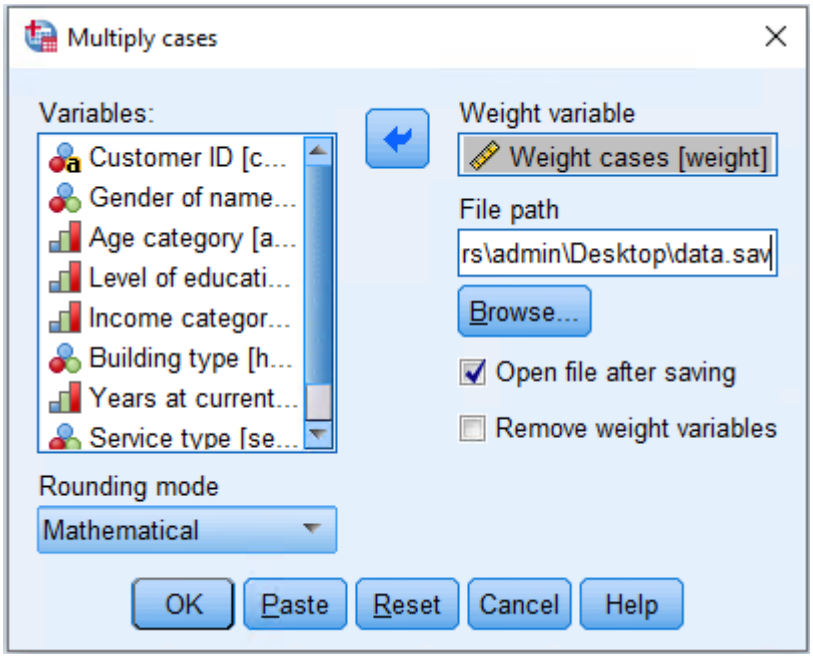


Figure 19. The window for defining procedure Multiply cases

In the *Rounding mode* field, you should define the way of handling non-integer weights. The mode will determine the number of cases in the new dataset in the case of non-integer weights. The procedure of rounding is performed before multiplication.

The procedure has three modes of rounding weights:

- *Mathematical* - weights with non-integer values bigger or equal to 0.5 are assigned to a greater integer.
- *Up* - weights are rounded to the nearest integer greater than the weight value.
- *Down* - weights are rounded to the nearest integer smaller than the weight value.

4.1.4. Create global labels

With procedure [Create Global Labels] you can create a label based on a selected variable. It is stored as a macro during this session of PS IMAGO PRO. You can use existing variables or create an auxiliary variable in the dataset with the label. The global label can then be used in other procedures as a [Custom Tables] table or [Legacy dialogs] chart title, for example

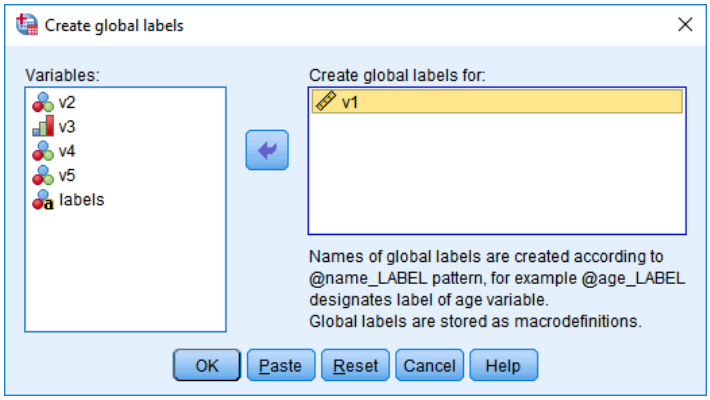


Figure 20. The window for defining procedure Create Global Labels

You may use more than one variable from which the label is created. To choose the variables, move them from *Variables* to *Create global labels for*. If you use several variables, the procedure generates a set of global labels. Each variable will have one label in the format *@name_LABEL*. You can add a global variable to a table or chart by modifying the code in the command language in the command editor of PS IMAGO PRO.

4.1.5. Copy Value Labels

With procedure [Copy Value Labels], you can quickly copy labels or values from a selected source variable into another variable. You can copy using both text and numeric variables. The procedure is very useful for recoding, ordering imported flat files, and converting text variables into numeric variables. It can also be used to assign labels and values using a specific scheme (such as hierarchical scheme) to the new variable.

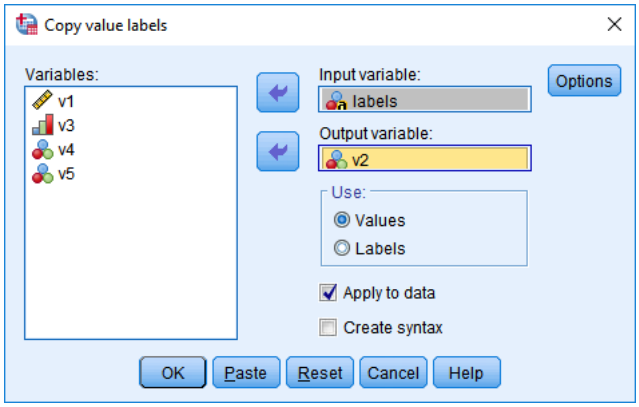


Figure 21. The window for defining procedure Copy Value Labels

Specify the variable that is the source of the labels (field *Input variable*) and the variable to receive the copied labels (field *Output variable*) in the dialogue box of the procedure. The procedure copies the labels based on the data arrangement in the active set.

Section *Use* allows you to specify the basis for the creation of the labels:

- *Values* – PS IMAGO PRO uses values (numeric codes of a numeric variable or text for a text variable) of the source variable to create labels;

- *Labels* – PS IMAGO PRO uses labels of the source numeric or text variable to create new labels.

In this window, you can also execute the procedure on the data (if you tick *Apply to data*) or generate a code and paste it to the command language editor (tick *Create syntax*).

The procedure for automated label copying has several safeguards that give you a choice when there is a conflict between new labels and the labels of the target variable. You can define them by clicking [Options].

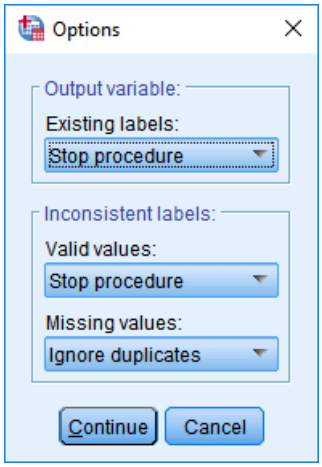


Figure 22. Safeguards of procedure Copy Value Labels

In the *Output variable* section, you can define the protocol for when the procedure encounters labels in the target variable. For *Existing labels*, you have four options:

- *Stop procedure* – the procedure stops and a warning is displayed in the report editor window (the default option);
- *Overwrite old with new* – the procedure deletes the existing labels and puts the new ones in their places;
- *Add new but leave old* – with this option, the procedure adds new labels only to those values of the target variable that do not have a label already. The existing labels remain unchanged;
- *Merge old and new* – the new labels are appended to the existing ones. The labels are separated by an en dash. The procedure does not append labels that are the same as for the existing labels of values of the target variable. Note that if the resulting label is too long, it is cropped.

Section *Inconsistent labels* allows you to define the protocol for when inconsistent labels are detected. It is the case when a single value of the target variable can be assigned several possible labels from the source variable. This can be approached in two ways:

- *Stop procedure* – the procedure stops and a warning is displayed in the report editor window (the default value);
- *Merge labels* – all relevant labels are assigned to the conflicting value of the target variable separated with a semicolon.

Further, in the section, you can define the protocol for when the source variable has more than one label for the same value of the target variable, and one of the labels is missing data. Option *Missing*

data works only if you select *Merge labels* in the inconsistent variables field. Two approaches are possible:

- *Ignore duplicates* – the procedure assigns labels using only valid values (the default value);
- *Stop procedure* – the procedure is halted if missing data are found that are duplicates of a label in the source variable.

4.1.6. Data Inventory

Procedure [Data Inventory] creates a report with a list of PS IMAGO PRO data files (SAV and ZSAV) in the selected directory, descriptions of the files, and lists of variables in files in the searched directories as an option. The report is copied into the report editor window.

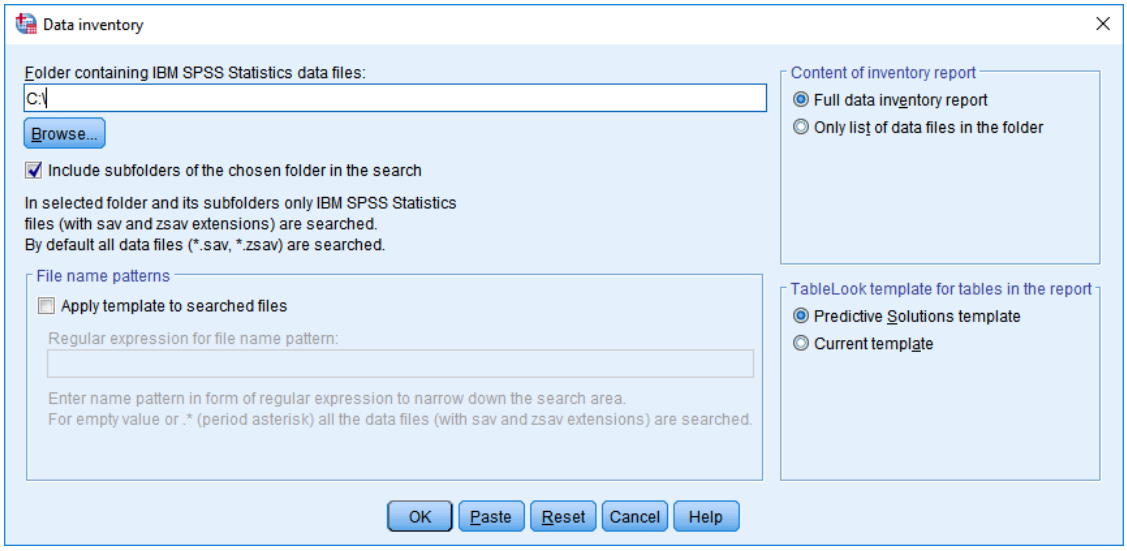


Figure 23. The window of procedure Data Inventory

Using the [Browse] button, select the directory to be searched. You can tick *Include subfolders of the chosen folder in the search* to search files not only in the main directory you select but also in its subfolders.

By default, the procedure searches all data files linked to PS IMAGO PRO in the directory. In section *File name patterns*, you can select a filter, a regular expression that can be used to search files the name of which contains the specified character string. When you tick *Apply template to searched files*, field *Regular expression for file name patterns* is activated where you can enter the expression.

In section *Content of inventory report*, you can choose whether the report should contain only a list of files with full access paths or a list of files with a full description and a table for each file with the list of basic properties:

- *Full data inventory report* – (the default option) the procedure generates information about files in the searched directory (as a list) and tables describing properties of files and variables;
- *Only list of data files in the folder* – the report is restricted to a list of data on PS IMAGO PRO files.

The full [Data Inventory] report shows the following file properties:

- directory access path and file name;
- file type;
- date of creation;
- label;
- coding;
- file content (such as data types, used sets of variables);
- data information: number of observations, number of elements of the variable, number of variables, presence of a weigh variable, compression.

The full [Data Inventory] report shows the following variable properties:

- variable name;
- position in data file;
- variable label and labels of values;
- level of measurement;
- format;
- column width;
- alignment.

The [Data Inventory] procedure produces a table with values and labels of variables if they had been defined in the dataset.

You may also select the following in the *TableLook template for tables in the report*:

- *Predictive Solutions template* – this template was designed by Predictive Solutions for procedure [Data Inventory];
- *Current template* – the default user template for PS IMAGO PRO.

4.1.7. Delete Variable Duplicates

Procedure [Delete Variable Duplicates] compares two sets of variables and identifies duplicates. The comparison focuses on values in the data file. Two variables that have the same values (codes) for all cases (records) are considered a duplicate. Variables with the same distributions but different values in the dataset are not considered duplicates. Labels of variable values do not affect the results of the comparison.

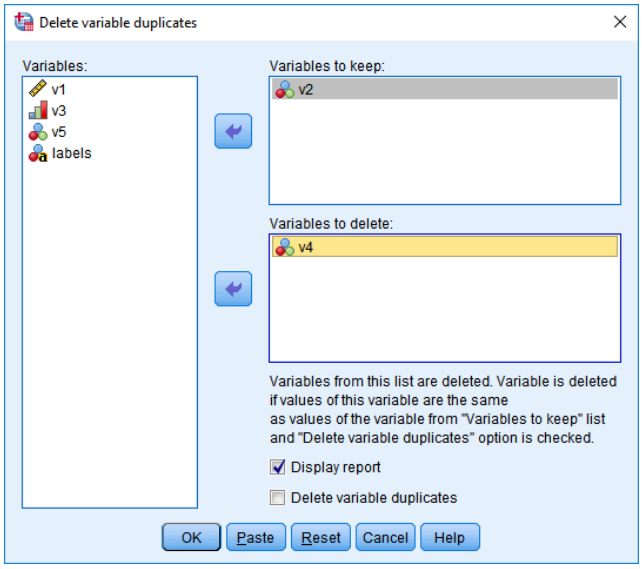


Figure 24. The window of procedure Delete Variable Duplicates

You need to select the variables to be retained for the analysis by moving them to *Variables to keep*. Variables to be deleted have to be moved to *Variables to delete*. Procedure [Delete Variable Duplicates] compares the variables moved to these fields only. Every variable in field *Variables to keep* is on its own compared with every variable in field *Variables to delete*.

There are two options for duplicate handling:

- *Display report* – the procedure notifies you which variable in *Variables to delete* is a duplicate of a variable in *Variables to keep*;
- *Delete duplicate variables* – a variable in *Variables to delete* is deleted from the dataset if it is a duplicate of a variable in *Variables to keep*.

The procedure removes all identified duplicates of variables in *Variables to delete*. If you do not want to remove a variable, take it out from the field.

Note that the removal of variables from a dataset is irreversible and permanent.

4.1.8. Delete Constant Variables

Procedure [Delete Constants] checks distributions of selected variables. It then reports and deletes those that take only one value in the dataset.

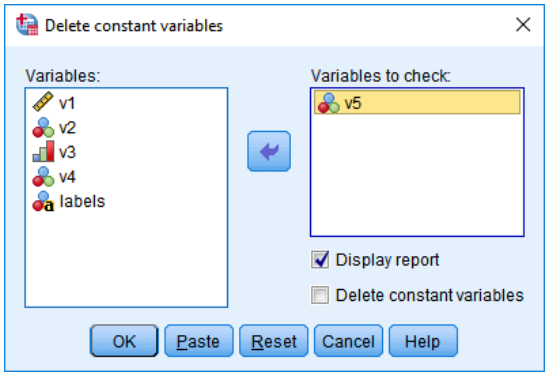


Figure 25. The window of procedure Delete Constant Variables

You may check all or some of the variables in a dataset. Variables to be verified have to be moved from *Variables* to *Variables to check*.

If the procedure finds constants, you may:

- *Display report* – the procedure notifies you about the existence of constants;
- *Delete constant variables* – the procedure automatically removes the identified constants from the dataset.

Note that the removal of variables from a dataset is irreversible and permanent.

4.1.9. Create calendar

The procedure to create a new dataset and in the next step to create new cases in it. The procedure adds the following daily date to each case, starting from initial to final date, both of which have been previously defined. The number of cases equals the number of days between the dates mentioned before.

The procedure is useful at the stage of data preparation. One can frequently find missing values, breaks or gaps in processes observed during a long period of time. As a result of that proper analysis and visualization can be difficult. The procedure creates a dataset with continuous dating series thereby filling in any gaps in the time series. After that the new data can be added from the other file after proper transformation (for example aggregation).

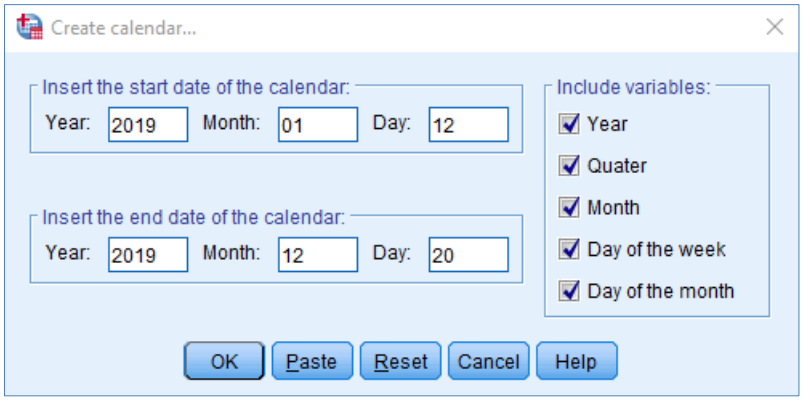


Figure 26. The window of procedure Create calendar

The procedure requires the proper definition of the initial and final date:

- Numbers specifying a year, a month and a day have to be an integer number higher than 0;
- Dates have to adhere to general date rules according to the number of days in the chosen month and the number of months in a year;
- An initial date must be earlier than final date;
- According to IBM SPSS requirements the 15.10.1582 is the earliest daily date that can be entered.

4.1.10. Balance Distribution

With [Balance Distribution] you can equalise the size of a dataset using the size of categories of a selected variable. The procedure samples observations from excess categories and creates a filtering variable in the dataset. After the filter is enabled, categories of the variable are equinumerous. The sizes are equalised based on the smallest category of the variable used for the balancing.

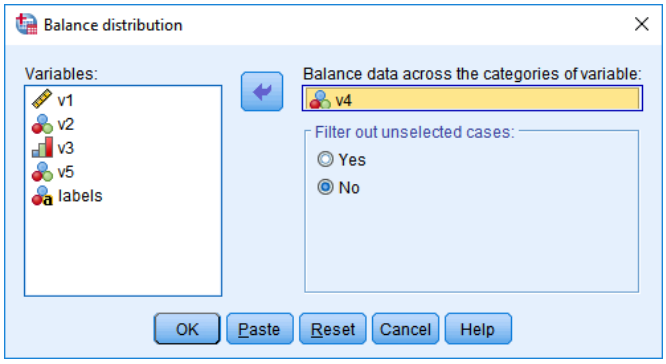


Figure 27. The window of procedure Balance Distribution

You select the variable used for the balancing by moving it from *Variables* to *Balance data across the categories of variable*. You can filter out observations in *Filter out unselected cases* (option *Yes*) or just create a filter variable (option *No*).

4.2. Transform

This section contains procedures for transforming variables for further analyzes. The following transformations are available:

- *Recode infrequent categories* – recoding through the merging of small categories;
- *Normalization of variables* – standardisation or normalisation based on specified parameters;
- *Reverse coding* – reversing coding direction of categorical variables
- *Multiple response sets coding* – the transformation of coding of multiple response sets;
- *Recode categories monotonically* – recoding based on size;
- *Compute Global Values* – record values of a selected descriptive statistic to a macro or an attribute of a variable;

- *Dichotomous Coding* – conversion of a qualitative variable into a set of dichotomous variables;
- *Clear Text* – transformation of text variables.

4.2.1. Recode Infrequent Categories

Procedure [Recode Infrequent Categories] reduces the number of categories of a variable. The procedure merges small categories and labels the new code automatically. The procedure creates a new variable. Its name is the combination of the name of the recoded variable and suffix *_other*. The new variable can be used for analyzes. It is also clearer on charts and tables. The new category is labelled *other*.

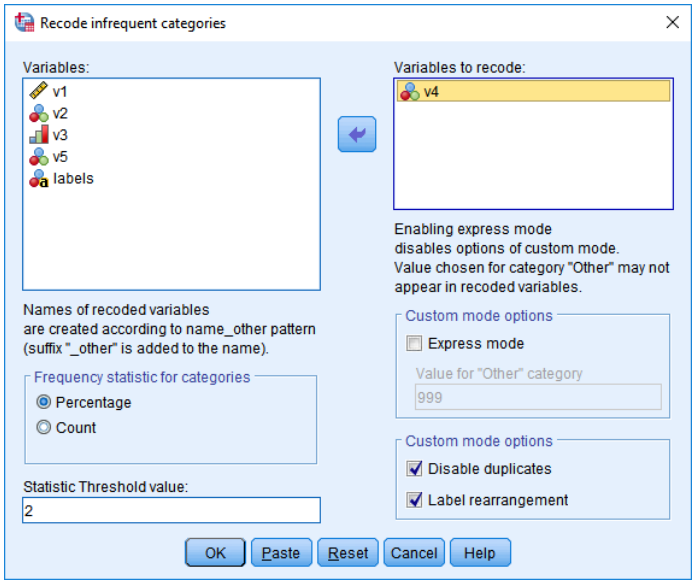


Figure 28. The window of procedure Recode Infrequent Categories

You select the variables to be recoded by moving them from *Variables* to *Variables to recode*.

In *Frequency statistic for categories*, you can define what a small category is: whether the percentage of observations in the category (option *Percentage*) or the size (option *Count*) decides. Enter the threshold number for small categories in *Statistic Threshold value*. The number is interpreted either as the size or percentage of observations depending on the previously selected statistic.

In *Express mode options*, you can perform express recoding. If you select *Express mode*, you can just enter the code (in *Value for 'Other' category*) for category other. Labels are not reorganised, and the new variable is created even if it is a duplicate of the source variable.

In *Custom mode options*, you decide which additional recoding options to use:

- *Disable duplicates* – the procedure checks whether the distribution of the result variable is different than the distribution of the source variable. If no category can be merged at the specified threshold, the procedure stops.

- *Labels rearrangement* – automatically recodes values starting with 1 up to the number equal to the number of categories. The last code is assigned to the new category *other*. Appropriate labels are assigned to new values. After recoding, the values of the new variable are numbered continuously, while the order of codes and labels of source values are retained.

4.2.2. Reverse coding

The procedure allows you to reverse the coding direction of categorical variables.

In order to recode, move selected categorical variables from the *Variables* field to the *Coded variables* field. It is possible to recode multiple variables at once. The procedure requires entering a prefix for new variables, which should be entered in the *Prefix in the names of created variables* field. Proceeding in case of finding variables with names identical to newly-created ones in the data set can be determined by the option *Overwrite existing variables*. Checking it will overwrite the variables, while unchecking it (the default option) will stop the procedure from running before starting the recoding process.

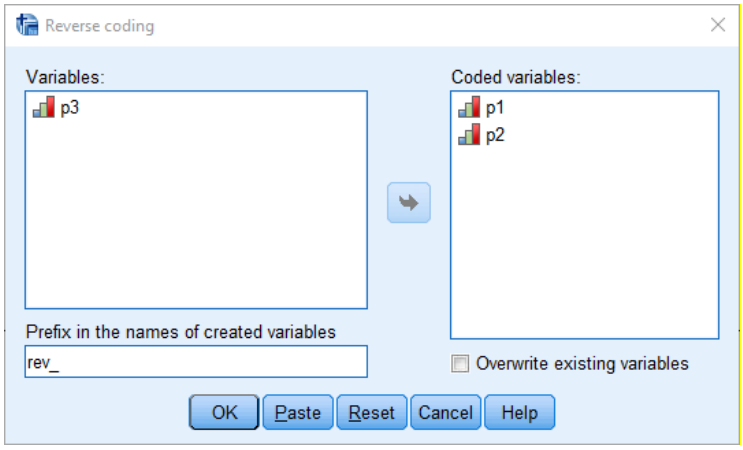


Figure 29. The window of procedure Reverse coding

The procedure is value-driven when recoding. After the coding is reversed, the source variable labels are copied to the new variable. The procedure ignores values for which categories have been defined that do not exist in the dataset. The procedure supports variables measured at the nominal and ordinal levels only. Additionally, the variables must be numeric – *Reverse coding* procedure does not support text variables. User-missing data are coded as the last category.

4.2.3. Normalization of variables

Procedure [Normalization of variables] transforms an empirical distribution of a variable into a distribution with specific parameters. You can transform several variables simultaneously. The transformation is often necessary before multidimensional analysis. It can also compare values of observations between variables that had different units.

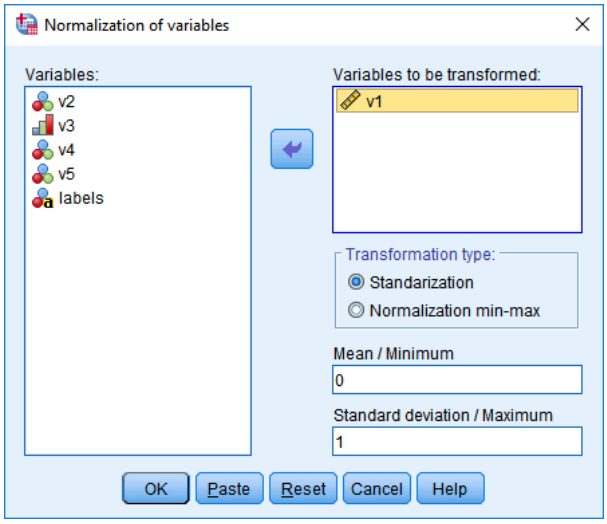


Figure 30. The window of procedure Normalization of variables

Variables are selected by moving them from *Variables* to *Variables to be transformed*.

You can choose the rescaling mode in *Transformation type*:

- *Standardization* – transformation into a variable with user-specified mean and standard deviation;
- *Normalization min-max* – transformation into a variable with user-specified minimum and maximum.

Enter the parameters in *Mean/Minimum* and *Standard deviation/Maximum*. Depending on the transformation you selected, the procedure interprets the values as the mean and standard deviation (for standardisation) or minimum and maximum (for normalisation).

The procedure adds new variables to the dataset with properties as specified. The name of the new variable is the name of the source variable with suffix *_STD* for standardisation or *_NOR* for normalisation.

4.2.4. Multiple response sets coding

Sets of multiple responses are recorded in a dataset in various ways, each with certain advantages and disadvantages. It often happens that the analyst needs to transform the sets because their format hinders or prevents some statistical procedures. Procedure [Multiple response sets coding] automatically changes the coding of multiple response questions thus reducing the time needed to prepare data for analysis.

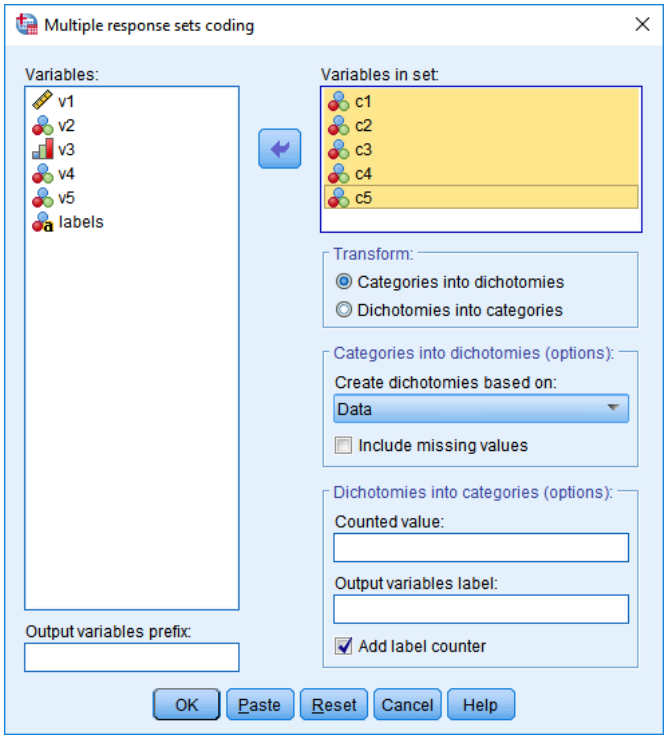


Figure 31. The window for procedure Multiple response sets coding

Move the set of variables from *Variables* to *Variables in set*.

You can define the prefix of the new variables in *Output variables prefix*. The default prefix is *CAT_* for new categories and *FLG_* for a dichotomy. The procedure writes the number of the variable in the set after the prefix.

Next, select the transformation in *Transform*:

- *Categories into dichotomies*;
- *Dichotomies into categories*.

If you select *Categories into dichotomies*, PS IMAGO PRO automatically transforms data coded as categories into a set of dichotomous variables. The procedure generates variables with values 0 or 1 and labels based on value labels of source variables. You can set transformation parameters in *Categories into dichotomies (options).* You can select the basis for the dichotomies; its variants are listed in *Create dichotomies based on*. The following options are available:

- *Data* – dichotomies are created only based on values in data. The procedure disregards labels without values in the dataset;
- *Value labels* – new variables are created based on labels of categories. Values without defined labels are disregarded;
- *Data and value labels* – the procedure considers both codes in the dataset and labels when generating new variables.

By default, the procedure ignores codes that are missing data. If you select *Include missing values*, an additional variable is created for codes marked as missing data.

If you select *Dichotomies into categories*, the procedure checks values of dichotomous variables for each case. The variable the counted value of which appears first is coded to the first categorical

variable under its number in the set. The number of the other dichotomous variable with the counted value is coded to the second categorical variable and so on. The new categories contain information about consecutive counted values in the set of dichotomous variables. For other categorical variables, the case is assigned a system missing data. This transformation requires the following parameters in *Dichotomies into categories (options)*:

- *Counted value* – the value that represents the analyzed phenomenon.
- *Output variables label* – the text that is the label of the new variables.

You can also enable *Add label counter*, which numbers the labels of result variables. The numbering takes place only if a custom label is specified in *Output variables label*.

The transformation generates a set of variables the number of categories of which is equal to the number of dichotomies introduced into the source set. Each result variable has the same set of codes created in the order in which the dichotomous variables were analyzed (not in the order they appear in the dataset).

4.2.5. Recode Categories Monotonically

If you need to rearrange codes of a variable so that they reflect the frequency of individual categories (to perform aggregation of improve work with tables, charts, and visualizations, for example), you can use the [Recode Categories Monotonically] procedure available in PS IMAGO PRO.

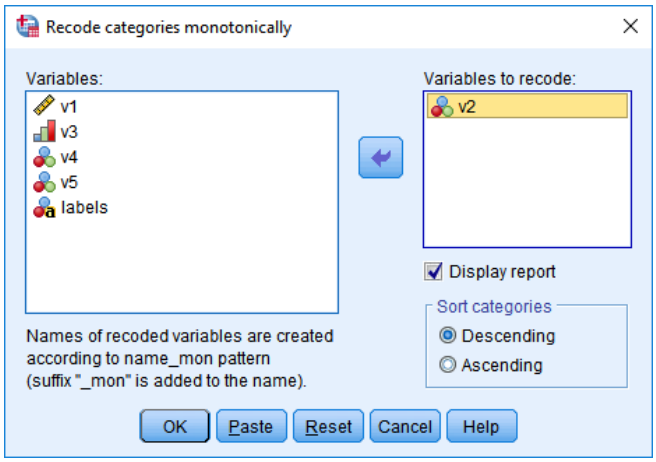


Figure 32. The window of procedure Recode Categories Monotonically

To perform the procedure, move selected variables from *Variables* to *Variables to recode*. You can also enable *Display report* to generate a report on codes of the source variable and the new variable following recoding. Codes of the new variable are in ascending or descending order of frequency depending on the option selected in *Sort categories*. The procedure automatically copies labels of the source variable into the new variable. The new variable gets suffix *_mon*.

4.2.6. Compute Global Values

With [Compute Global Values], you can save values of a descriptive statistic calculated for a selected variable. Such a global value can be used in transformations and other analyzes. The global value of a variable is stored in PS IMAGO PRO as a macro. The global value can be recalled in procedure

windows and command editor. The procedure is an important improvement of data aggregation capabilities.

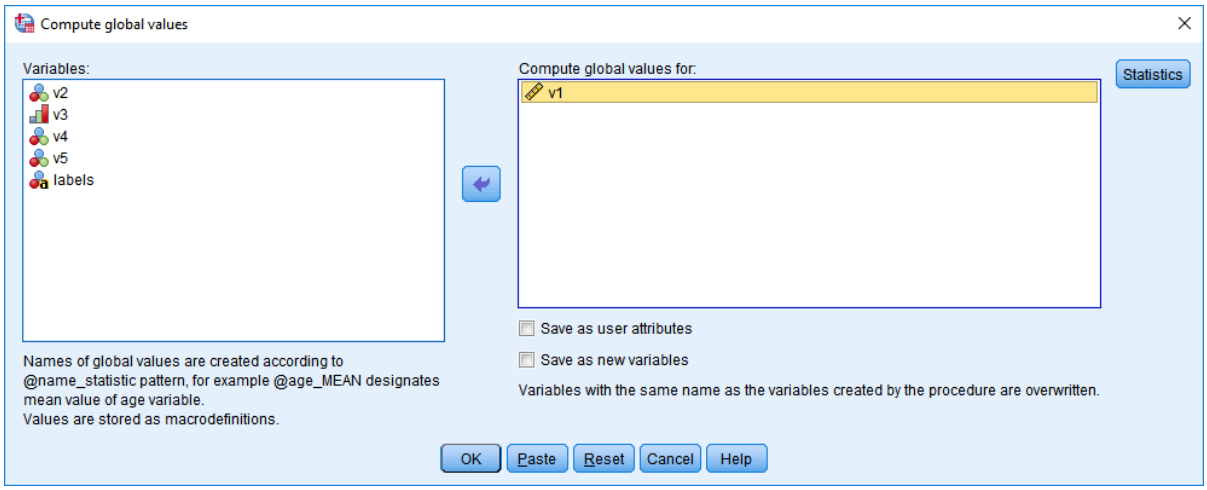


Figure 33. The window of procedure Compute Global Values

The global value is by default stored by PS IMAGO PRO as a macro and available using the command language. Its value can be viewed with command *print* or by saving it to a dataset with command *compute*.

Global values of variables are stored as macros only for the current session of PS IMAGO PRO. After you close all windows of the program, the values are removed and need to be computed again.

After you enable *Save as user attributes*, the values of global variables are added to attributes of the variables for which they were calculated. To display the added values, go to the variables view (tab *Variable View*) and select and activate the visibility of the added attributes by selecting [Customize Variable View] in [View]. You may need to switch to the data view and back to the variables view for the new attributes to appear in the view adjustment options. Global values in the form of user's attributes are stored until you remove them.

To remove a global value, delete its value from the attribute by right-clicking it and selecting [Delete] in [Customize Variable View] in [View]. To remove a cleared column with a name of a statistic, restart PS IMAGO PRO and then in the variables view (tab *Variable View*) select [Customize Variable View] in menu [View] and select [Restore defaults]. The column disappears from the Variables view.

A global value can be assigned to a dataset as a variable just like for the aggregation command (the same global value is assigned to each case of the variable) after selecting *Save as new variables*.

Global values in the form of variables in a dataset are stored as regular variables, but they assume the same value for each record as per a calculated statistic of the global value.

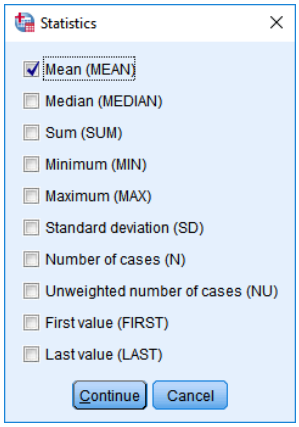


Figure 34. The window of statistics of procedure Compute Global Values

When you click [Statistics], you can define descriptive measures to be calculated for the variable. A separate global value with a unique suffix is created for each statistic:

- *Mean* – suffix *_MEAN*,
- *Median* – suffix *_MEDIAN*,
- *Sum* – suffix *_SUM*,
- *Minimum* – suffix *_MIN*,
- *Maximum* – suffix *_MAX*,
- *Standard deviation* – suffix *_SD*,
- *Number of cases* – suffix *_N*,
- *Unweighted number of cases* – suffix *_NU*,
- *First value* – suffix *_FIRST*,
- *Last value* – suffix *_LAST*.

The name of the global value is built as *@name_statistic* and should be recalled this way in commands.

4.2.7. Dichotomous Coding

Many analyzes require qualitative variables (nominal or ordinal level of measurement) to take the form of dichotomous variables coded as 0 or 1. To avoid arduous conversion of a qualitative variable into a set of dichotomous variables, you can use procedure [Dichotomous Coding] with command language.

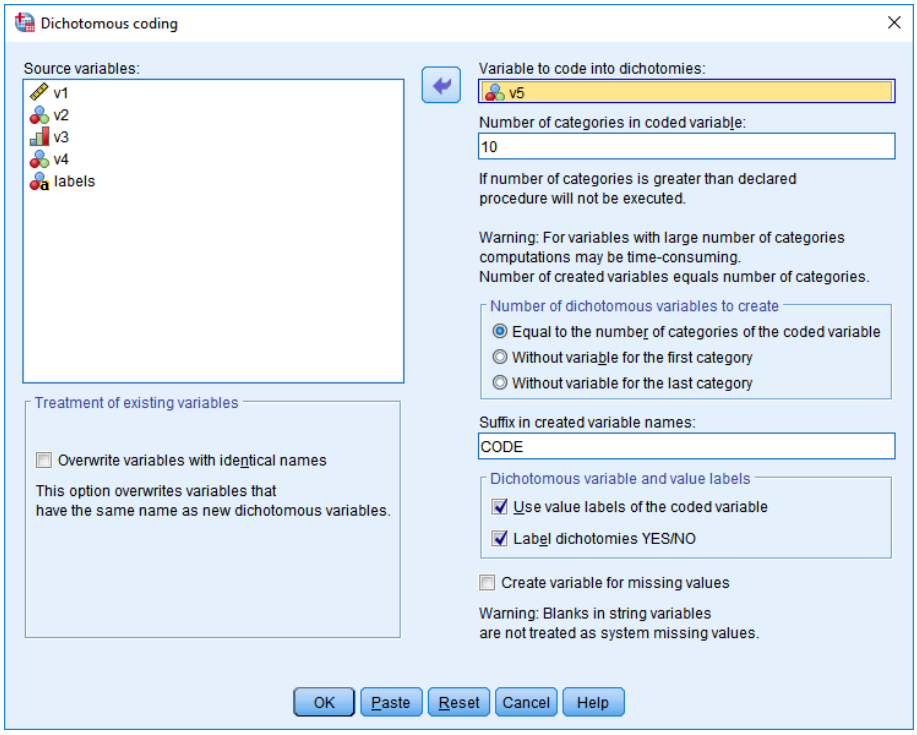


Figure 35. The window of procedure Dichotomous Coding

The variable to be transformed is selected by moving it from *Source variables* to *Variable to code into dichotomies*.

In *Treatment of existing variables*, you can enable *Overwrite variables with identical names*. If a dataset already contains variables with names identical to the names of the new dichotomous variables, the procedure overwrites them. If this option is not selected, the procedure is halted if variables named the same occur.

In *Number of categories in coded variable*, you can define the maximum number of categories the transformed source variable can have. If this number is exceeded, the procedure halts and no new variables are created.

In *Number of dichotomous variables*, you decide whether the number of new variables should be the same as the number of categories or smaller, without the first or last category. The following options are available:

- *Equal to the number of categories of the coded variable*,
- *Without variable for the first category*,
- *Without variable for the last category*.

Names of the dichotomous variables are based on the name of the source variable. By default, new variables are suffixed with *_CODE* and an appropriate value code of the source variable. You may define the suffix in *Suffix in created variable names*.

In *Dichotomous variable and value labels*, there are the following options:

- *Use value labels of the coded variable* – the procedure creates labels for the new dichotomous variables based on labels of values of the source variable as *Source variable label = source value label*. If no labels are defined, the description is created from values.

- *Label dichotomies YES/NO* – the new variables receive value labels: 0 – NO, 1 – YES.

If you enable *Create variable for missing values*, an additional variable is generated for values marked as missing data. If this field is not enabled values defined as missing data are skipped when dichotomous variables are created.

4.2.8. Clear text

The [Clear Text] procedure is used to prepare text data before analysis. It contains functions which transform, clear and adjust variables to guidelines provided by the user. It permits changes to:

- *White marks* (changing whitespace);
- *Diacritic marks* (changing and removing diacritics for the following languages: Polish, German, Hungarian, Italian, Spanish, Slovak, Czech);
- *Letter case* (changing the size of letters);
- *Multiplicated chars* (removing multiple characters);
- *Chars set* (removing or replacing a character set);
- *Between chars* (removing or replacing text between characters);
- *Chars group* (removing or replacing a group of characters (e.g. only numbers, only punctuation marks)).

Significantly, it is possible to perform several data operations at the same time. When all options are selected the operations will be performed in a predetermined order, i.e.: *diacritic marks, letter case, white marks, between chars, chars set, chars groups, multiplicated chars*.

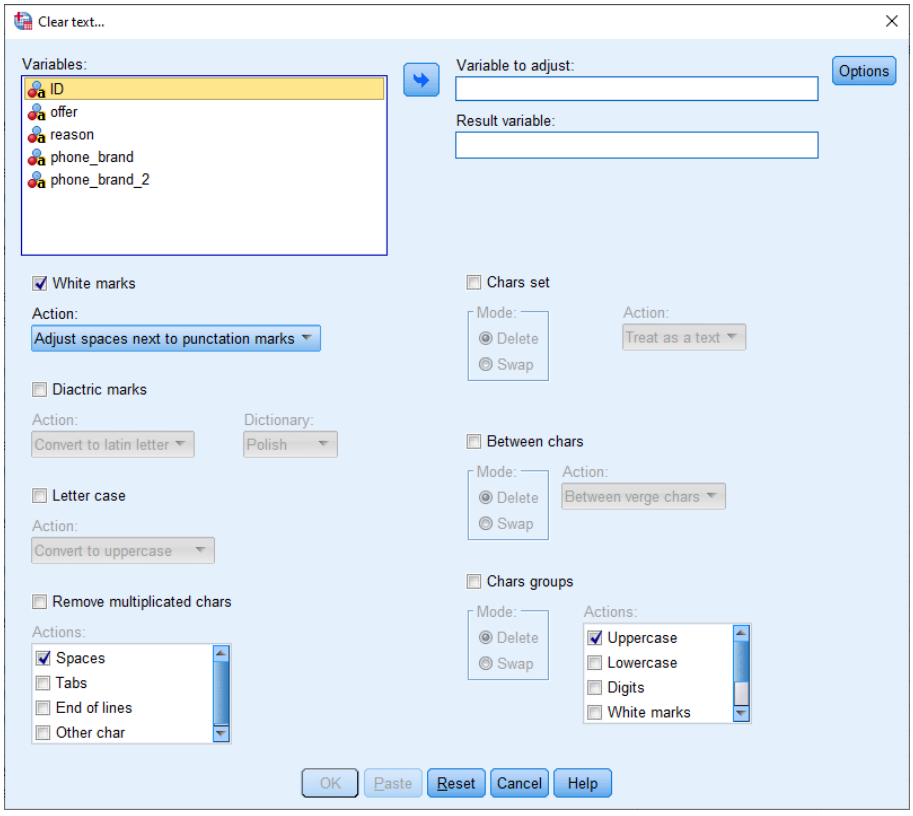


Figure 36 The window of procedure Clear text

To run the procedure, move the variable which needs to be transformed from the *Variables* list to the *Variable to adjust* field, then enter the *Result variable name.* The name of this new variable has to be unique and comply with standards adopted by IBM SPSS Statistics.

The default operation for the [Clear Text] procedure is whitespace conversion. The [White marks] section has three modification options:

- *Adjust spaces next to punctuation marks* – it removes or inserts spaces before or after specified characters: the procedure will remove spaces before (and insert a space after) the characters: .,!?:;)]} ... "' and also remove spaces after (and insert before) the characters: ([{¿i"'. Additionally, the function will remove multiplied spaces (if there are any) before the characters.,!?:;)]} ... "' and after the characters ([{¿i"';
- *Convert spaces into tabs* – it converts all spaces into tabs;
- *Convert tabs into spaces* – it converts all tabs into spaces.

The [Diacritic marks] section converts, removes or swaps the diacritical marks from a selected dictionary. The user can modify the diacritical characters from one of the seven implemented languages: Polish, German, Hungarian, Italian, Spanish, Czech and Slovak. The dictionary language needs to be chosen in the drop-down menu of the [Dictionary language] field, while the type of modification is available in [Action] field. There are 3 modifications available:

- *Convert to a Latin letter* – it converts diacritical marks from the selected language into a Latin letter;
- *Remove* – it removes diacritical marks from text variables;
- *Swap for a char* – it converts a diacritical mark to a specified symbol. The default symbol is #, while selecting a different character is possible in the [Options] menu in the [Diacritical marks] section.

Another section available in this procedure is [Letter case] where the size of a letter in a text variable may be modified. The following modifications are accessible in the [Action] drop-down list:

- *Convert to lowercase*: converts the whole text to lowercase;
- *Convert to uppercase*: converts text to uppercase;
- *Inverse case*: reverses case;
- *Uppercase after spaces*: changes the first letter after a space to a capital;
- *Uppercase after '.?!'*: changes the letter after listed characters to a capital.

A common problem with text variables is the occurrence of unwanted multiple characters. This procedure removes them by selecting the [Remove multiplicated chars] option. The user can choose a specific character from the list (*spaces, tabs, line break*) or define another character (by selecting the *other char* option). The *other* character has to be defined in the section [Remove multiplicated chars] in [Options] menu. It is possible to choose more than one char whereby each of them will be used by the procedure.

In the section [Chars set], it is possible to remove or replace strings or single chars according to the chosen option in the section [Mode]. If the [Chars set] option is selected, the user has to define a character (or text) which will be searched for. This is done in the [Options] menu in the section [Chars set] in the field [Char of text]. It is important that characters in the text box (e.g. letters) cannot be separated with any separators (e.g. spaces or commas). Thus, if user wants to search for letters a, b,

c, the *abc* string has to be inserted. Moreover, if the *Replace* option has been selected, the character (in the [Insert a char] field in [Chars Set] section) has to be specified (by default it is #). What's more, in the main menu, one has to define whether the set of defined characters should be treated as a text or as a list. The first option (*Treat as a text*) will search the exact string that has been entered in the [Insert a char] field (e.g. when user would find "OK", the procedure will find all strings for which these two characters are inseparable), while in the second case (*Treat as a list*) all "O" and "K" will be found, even if those marks are not directly next to each other in the modified text.

The [Between Chars] option will remove (or change) the text between specified characters (e.g. brackets). For the [Between chars] option, the user has to specify in the [Options] menu the characters between which the text has to be removed or replaced. The user should choose the character from which the procedure starts modifying a text (field [Left]) and the end character (field [Right]). By default the brackets are set, however any character can be entered there.

There is also a possibility to define whether certain characters (left and right) should be removed with text or not. If the *Remove with verge chars* option is selected, these verge characters will also be removed (replaced). If this option is unchecked only text between characters will be removed (replaced). In [Options] menu in the [Insert a char] field, user can also specify a character which will be substituted for (by default it is #). After returning to the main menu, it is also possible to choose how this transformation should be performed. If the user selects *Between verge chars*, the text between first specified left character and the last right character in the text will be removed (replaced). The second option (*Between first chars*) will remove (replace) only the text which is limited by the first positions of the defined characters in the text.

The [Chars groups] option allows the user to modify all characters in a given group. There are several possible actions:

- *Uppercase*,
- *Lowercase*,
- *Digits*,
- *White spaces*,
- *Punctuation marks*: *.,¡?¿:;[](){}-–...'"‚„”“* ,
- *Typographic marks*: ~_@#$€¥£%‰&*/+=<>§|^.

If the *Replace* option is selected, in [Options] menu it is necessary to define a character with which characters group will be replaced (the default is #).

4.3. Analyze

The [Analyze] section offers various measures and statistics such as inequality measures and analytical procedures for assessing the quality of segmentation or automatic search for predictors for a selected dependent variable. The following procedures are available:

- *Cramer's V Correlated Variables* – an assessment of predictors based on Cramer's V value;
- *Inequality Measures* – an analysis of differentiation and inequality of distribution;
- *Cluster Evaluation* – an assessment of classification quality;
- *Significant Variables Chi-squared* – a selection of predictors using a Chi-squared test;

- *Significant Variables CHAID* – an assessment and transformation of independent variables using a decision tree algorithm;
- *Compare text* – analysis of text' similarity;
- *Data audit* – a set of statistics for categorical and scale variables.

4.3.1. Cramer's V Correlated Variables

Procedure [Cramer's V Correlated Variables] is used to identify the strength of dependency between a defined dependent variable and a set of independent variables. It may verify hypotheses or help choose variables for further analyzes. It uses the measure of the strength of relationship for qualitative variables based on the value of Chi-squared, or Cramer's V coefficient.

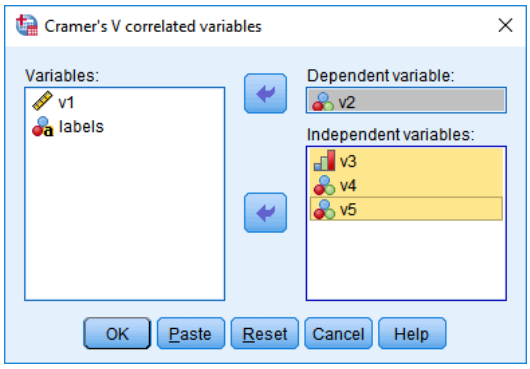


Figure 37. The window of procedure Cramer's V Correlated Variables

The procedure requires specification of one dependent variable by moving it from *Variables* to *Dependent variable*. The dependent variable must be a qualitative variable. Qualitative predictors are selected by moving variables from *Variables* to *Independent variables*. Each independent variable is tested separately.

The procedure yields two items:

- *List of correlated predictors – Cramer's V* is a table with a list of predictors sorted by the strength of the relationship with the dependent variable. It contains information about the name and label of a predictor, Crammer's V value, and the significance level of the statistic.
- *Chart of correlation with predictors* shows the strength of the relationship between a predictor and a dependent variable. Statistically significant correlations (at the default significance level of 0.05) are in blue, statistically insignificant correlations, in red.

4.3.2. Inequality Measures

Procedure [Inequality Measures] presents selected inequality measures. It is used for investigating the differentiation of distribution of a variable. It is usually used to measure income inequalities. The procedure can compare multiple quantitative variables or values of a single quantitative variable divided into categories defined by a qualitative dividing variable.

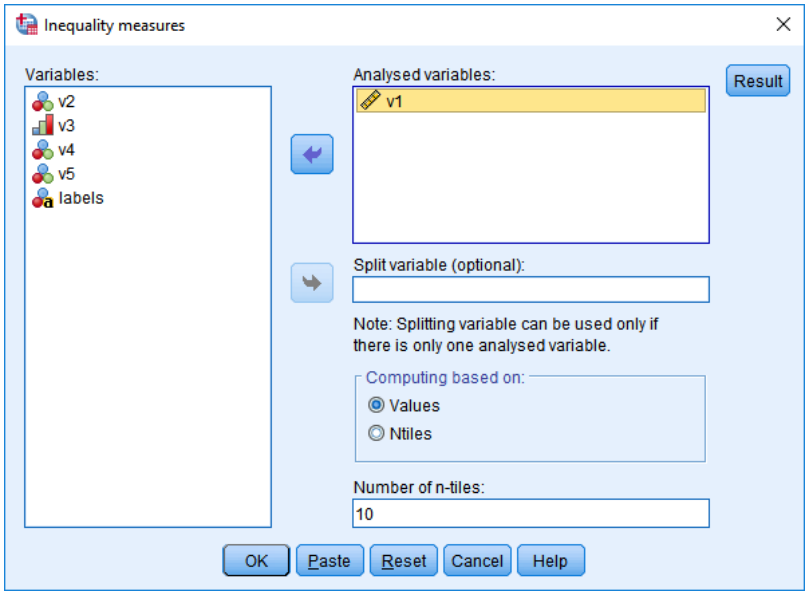


Figure 38. The window of procedure Inequality Measures

To select variables for analysis, move a quantitative variable from *Variables* to *Analyzed variables*. You may also select a qualitative grouping variable by moving it to *Split variable (optional)*. You can analyze several quantitative variables or one quantitative variable in subtotals based on categories of the dividing variable.

You can choose how inequality statistics are calculated in *Computing based on*. Measures can be calculated from *Values* or *N-tiles*. You can define the number of n-tiles by entering a value in *Number of n-tiles*.

You can define options for the report by clicking [Result].

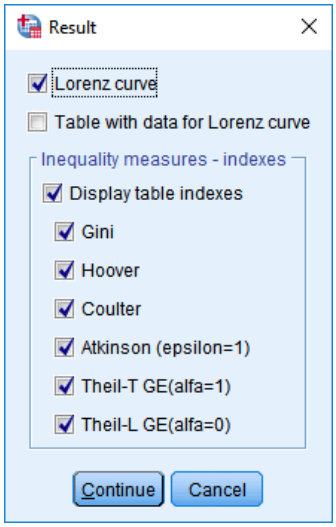


Figure 39. The menu for defining results

The following result items can be displayed:

- *Lorenz curve* – a graph comparing the cumulative proportion of observations (from the number of cases) and the cumulative proportion of values (from the sum of the analyzed variable).

- *Table with data for Lorenz curve* – dataset for the graph.

With procedure [Inequality Measures], you can build a summary of selected inequality measures. If you enable *Display table indexes*, the table is shown in the report. The following inequality measures are available in *Inequality measures - indexes*:

- *Gini*,
- *Hoover*,
- *Coulter*,
- *Atkinson (epsilon=1)*,
- *Theil-T GE (alpha=1)*,
- *Theil-L GE (alpha=0)*.

4.3.3. Cluster evaluation

Procedure [Cluster Evaluation] is used to assess the quality of grouping based on a set of variables during a previous segmentation (such as cluster analysis) or a different set of variables during post-stratification.

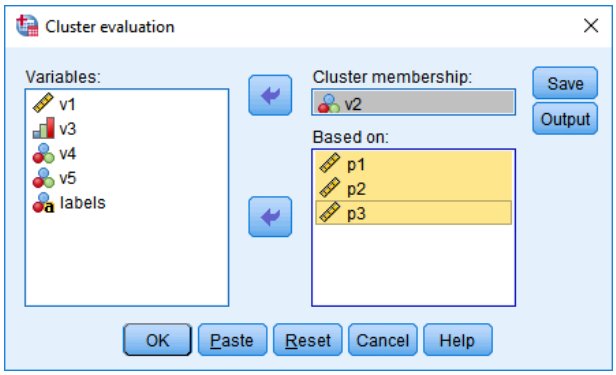


Figure 40. The window of procedure Cluster Evaluation

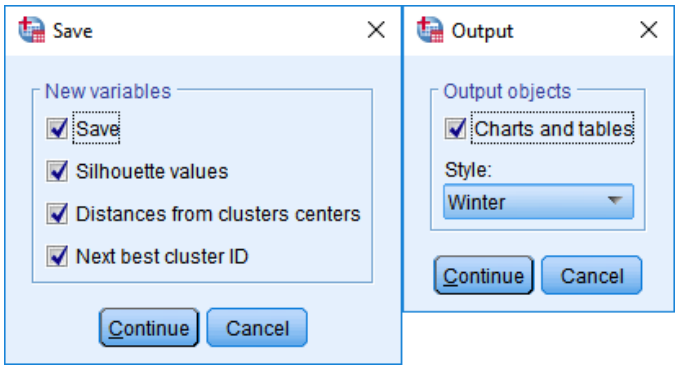


Figure 41. Menu Save and Output of procedure Cluster Evaluation

In the procedure definition window, you select the grouping variable by moving a nominal variable from *Variables* to *Cluster membership*. Move the variable or set of quantitative variables to be used to separate cases into *Based on*.

Click [Save] in *New variables* to save the following variables into the dataset after enabling *Save*:

- *Silhouette values* – values of the Silhouette measure for each case;
- *Distances from clusters centers*: components of the Silhouette measure – distance to cluster the observation belongs to, distance to the nearest cluster the observation does not belong to, and distances between the observation and other clusters (identified using a grouping variable);
- *Next best cluster ID* – the name of the closest cluster the case does not belong to.

To display items of a result report, you may decide in *Output items* whether a report should be displayed by enabling *Charts and tables* after selecting an additional menu with [Output]. You can also select the color theme for the report in *Style*.

The following items are displayed if *Charts and tables* is selected:

- Chart *Silhouette (mean)* yields general conclusions about the quality of grouping.;
- Charts *Descriptives for Silhouette* present the value of the Silhouette statistic for all cases in a cluster;
- Table *Distribution of Silhouette values by cluster* with a set of descriptive statistics facilitate the assessment of the stability of a solution in individual categories of a grouping variable;
- Charts *Distances between clusters centroids* help assess distances between centroids and thus the differentiation between individual groups;
- Charts *The distance between case and cluster centroid* help assess the homogeneity of each cluster.

4.3.4. Significant Variables Chi-squared

Procedure [Significant Variables Chi-squared] is used to explore datasets and search for variables that have low Chi-squared values in relation to an indicated dependent variable. It may be useful for identifying variables related to a dependent variable.

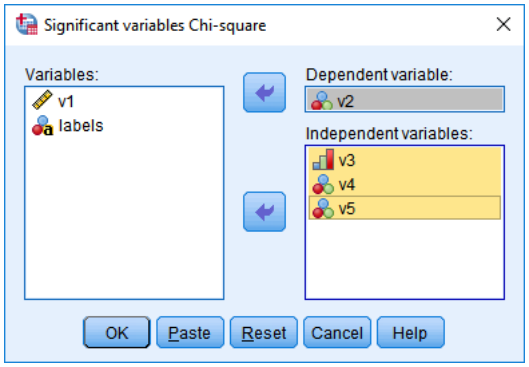


Figure 42. The window of procedure Significant Variables Chi-squared

In the procedure definition window, indicate a dependent variable by moving a selected qualitative variable (nominal or ordinal level of measurement) from *Variables* to *Dependent variable* and select the predictor or set of predictors (nominal or ordinal level of measurement) by moving variables to *Independent variables*.

The procedure reports the significance level of the relationship between a predictor and a dependent variable in the *List of significant predictors – Chi-squared test* table. It shows names and labels of independent variables, significance assessment (column *Asymptotic significance (2-sided))*, the

number of degrees of freedom, and value of Chi-squared. Variables in the table are sorted by the value of Chi-squared taking significance test results into consideration.

4.3.5. Significant Variables CHAID

Procedure [Significant Variables CHAID] is used to explore datasets and identify independent variables correlated with a dependent variable. The procedure is based on decision trees (generated using *exhaustive CHAID*). It may also be used to simplify categorization of independent variables, which results in merging of categories of a predictor that differentiate the distribution of the dependent variable to an insignificant degree. To run the procedure, you need the Decision Trees module.

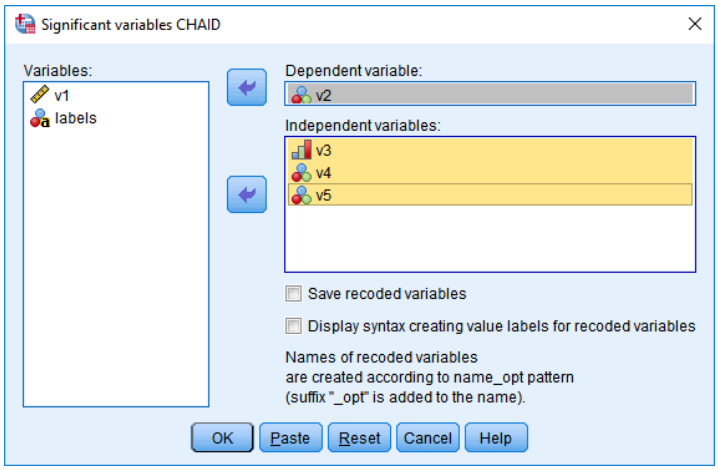


Figure 43. The window of procedure Significant Variables CHAID

The dependent variable is indicated by moving a variable from *Variables* to *Dependent variable*. The predictors have to be moved into *Independent variables*. The dependent variable must be a qualitative variable. The independent variables can have any level of measurement.

With the procedure, you can save categorized variables in the dataset (option *Save recoded variables*) and prepare commands for creating labels for the new variables (option *Display syntax creating value labels for recoded variables*). The command will be displayed in the report (SPV) and can be copy-pasted and run in the SPS command window.

As a result of the procedure, the following items appear in the report:

- table *Predictors binning – CHAID algorithm*;
- table *List of significant predictors – CHAID algorithm*.

They contain a list of independent variables that are significantly related to the dependent variable taking into account the recategorization implemented by the decision tree algorithm.

4.3.6. Data audit

The procedure presents summaries for the analyzed variables. It allows you to obtain selected statistics and presents the results in the form of tables. The summary will be divided into categorical and scale variables.

This procedure is especially useful for creating a quick report or comparing multiple variables with each other within selected values. Its operation is similar to the standard procedure of *Descriptive statistics*, however, it allows to simplify the process both in terms of choosing adequate statistics and presenting the obtained results.

The division of summary into categorical and scale variables allows you to match the statistics to the type of data, in order to avoid obtaining unfit or uninterpretable values.

In addition to a number of available statistics, the PS DATA AUDIT procedure allows you to add a variable label to the summary.

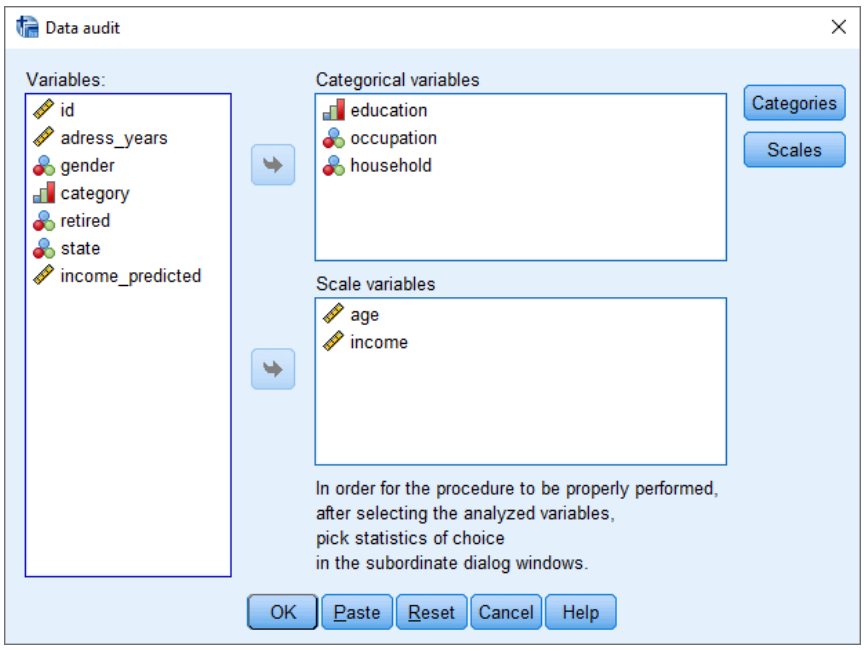


Figure 44 The window of procedure Data Audit

Result objects available in the PS DATA AUDIT procedure for categorical variables:

- Variable label;
- Number of observations: total, valid, missing;
- Values: unique, valid with labels, valid without labels, missing with labels, missing without labels;
- Statistics: Mode, Share of the mode, Median, Chi-square (value), Gini (value), Entropy (value), Chi-square (percentage), Gini (percentage), Entropy (percentage).

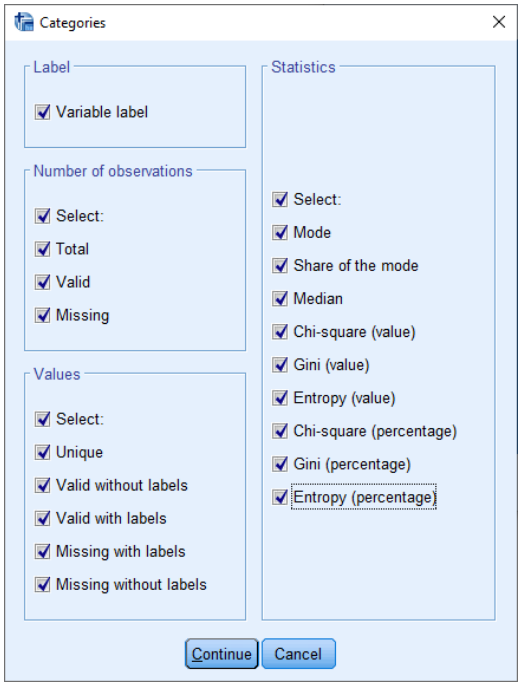


Figure 45 Sample content of the Categories dialogue box

Result objects available in the PS DATA AUDIT procedure for scale variables:

- Variable label;
- Number of observations: total, valid, missing;
- For outliers: Standard deviation, Quartiles, user-defined range;
- Statistics: Mean, Standard deviation, Variance, Minimum, Maximum, Range, Median, First quartile, Third Quartile, Interquartile range, Kurtosis, Skewness, Coefficient of variation.

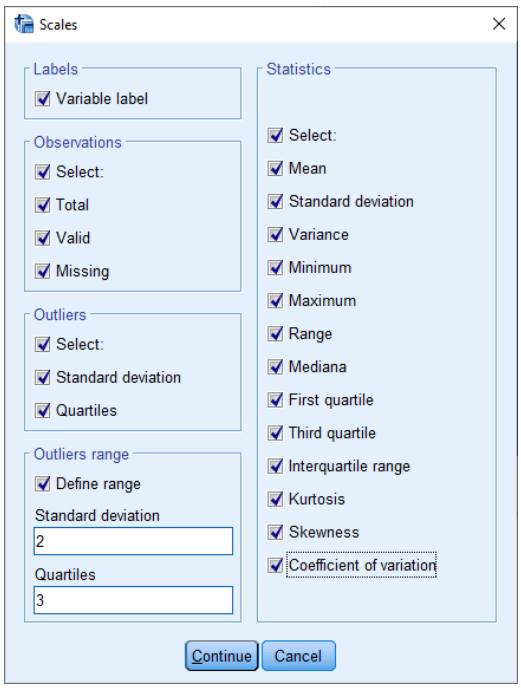


Figure 46 Sample content of the Scales dialogue box

4.3.7. Compare text

The [Compare text] procedure is used to assess the similarity of text strings. It contains 7 measures which determine if two strings are similar to each other.

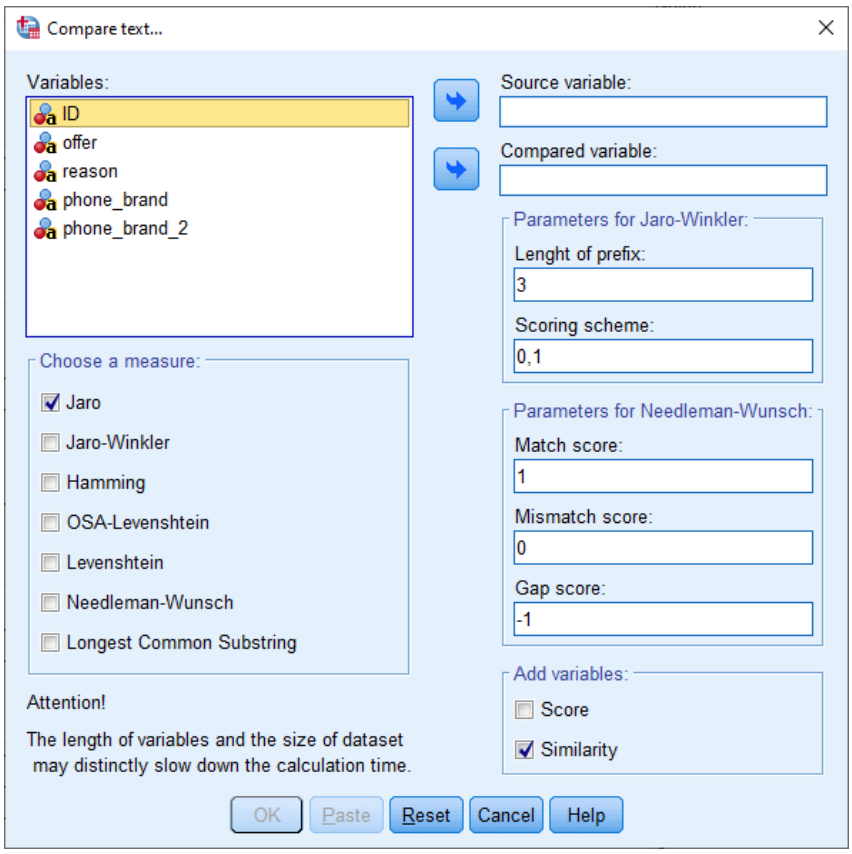


Figure 47 The window of procedure Compare text

To perform the procedure, it is necessary to indicate two text variables: *Source variable* and *Compared variable.* The order of them does not affect the procedure. The user can choose the distance measure from the following measures:

- Jaro distance (*Jaro*);
- Jaro distance with Winkler's correction (*Jaro-Winkler*);
- Hamming distance (*Hamming*);
- Levenshtein distance (*Levenshtein*);
- Levenshtein distance with sign transposition correction – Optimal String Alignment (*OSA-Levenshtein*);
- Needeleman-Wunsch measure (*Needleman-Wunsch*);
- *Longest Common Substring.*

For two measures (Jaro-Winkler and Needleman-Wunsch) parameters modification is possible. For the Jaro-Winkler distance, the user can specify the maximum length of the prefix and weight adjustment in the section [Parameters for Jaro-Winkler]. By default the length of prefix is 3, but prefix cannot be longer than 4. It is defined in the [Prefix length] field. What's more, the weight correction

can also be defined by the user in the [Scoring scheme] field (by default it is 0.1, however it cannot be bigger than 0.25).

In the Needleman-Wunsch measure, the user can also define individual weights in the section [Parameters for Needleman-Wunsch]. By default, the weight value for match score is 1 ([Match score] field), for gap score it is -1 ([Gap score] field) and for mismatch score – 0 ([Mismatch score] field).

The result of [Compare text] procedure is one or two new variables added to the data set, namely:

- *Score* – a rating of distance between analyzed strings (text). For Hamming it is the number of mismatching characters in each position. For Levenshtein or OSA-Levenshtein distances, *score* is the smallest number of changes needed to transform one string sequence into another. For the Jaro and Jaro-Winkler the *score* is the number of matching chars, however for the Needleman-Wunsch that rating is the difference between weights for matching chars and weights for gaps and mismatches. The *score* for Longest Common Substring distances is simply the length of the longest part of text that is common to both strings.
- *Similarity* – the normalized (0-1) similarity score between two strings. If the *similarity* value is close to 1 it means that strings are similar. Note, the *Similarity* score is the default variable for the Compare text procedure.

4.4. Graphs

[Graphs] contains a set of visualizations and charts that are useful for exploring and analyzing data both during diagnostics and reporting of results.

PS IMAGO Pack PRO offers the following additional charts:

- *Waterfall graph,*
- *Violin plot,*
- *Treemap,*
- *Ring chart,*
- *Series graph,*
- *Scatterplot with distribution graphs,*
- *Sankey diagram,*
- *Nightingale rose,*
- *Radar chart,*
- *Multidimensional scatterplot,*
- *Marimekko graph,*
- *Layered bar chart,*
- *Hierarchical graph,*
- *Heatmatrix map,*
- *Contingency map,*
- *Cloud,*
- *Table charts* (discussed in a separate section).

Most charts in menu *Graphs* have a number of common settings for title and appearance of the chart that are grouped in a menu opened with [Properties].

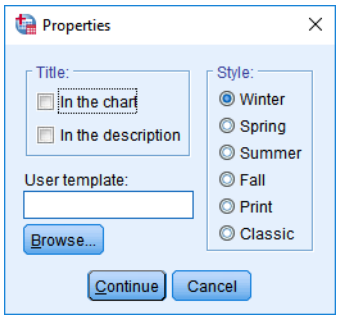


Figure 48. An example of menu Properties

This menu consists of the following sections:

- Section *Title* defines how the title of the chart is displayed. When *In the chart* is enabled, the title is displayed in the chart field. If *In the description* is selected, the title is shown in the report navigation pane as item title, which makes it possible to refer to it using its name.
- In *User template*, you can select the template for the chart. You can type the path to the template or select it with [Browse].
- In section *Style*, you can select the color palette for the chart. The following options are available: *Winter*, *Spring*, *Summer*, *Fall*, *Print*, and *Classic*. You can also select *Lights* and *Inversed Lights* for some charts.

[Properties] for [Heatmatrix map] and [Contingency Map] feature an additional label presentation method specific to these visualizations:

- *Cell labels* – presentation of values in cells;
- *Bar labels* – presentation of values in summaries on bars.

[Properties] for [Radar Chart] contain additional components of visualization:

- *Grid* – auxiliary lines on the chart;
- *Lines with points* – presentation as lines with markers (points).

If [Properties] contain additional, unique settings, the visualizations have separate menus to define the title and color scheme for the chart. The specific content of [Properties] is discussed with the description of each chart.

Menu [Titles] is opened with the button of the same label available in the main window of the chart wizard. It allows you to define the following title parameters:

- You can enter any title in *Custom title*;
- With *In the chart,* the title is displayed in the chart field;
- With *In the description,* the title is shown in the report navigation pane as item title, which makes it possible to refer to it using its defined name.

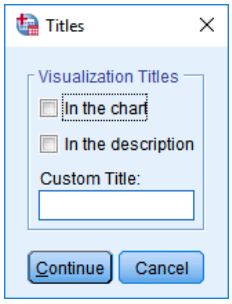


Figure 49. The chart title settings window

The [Style] button in the main window of the chart wizard opens a menu for defining the color scheme and size of visualization.

- The color scheme is defined in *Style*;
- In *Graph size (centimeters)*, you can set the width and height of the chart in *Width* and *Height*.

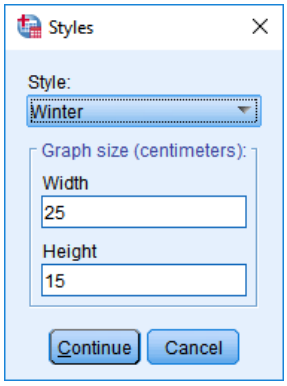


Figure 50. The chart style settings window

[Treemap] and [Hierarchical Graph] can additionally have the transparency of visualization fields set depending on the options used. In the case of [Cloud], the menu lets you select a custom template.

4.4.1. Waterfall graph

[Waterfall graph] is similar to the Layered Bar Chart. Bars represent the frequency of categories of the selected variable or can be created based on the total value of an indicated quantitative variable. As opposed to standard Layered Bar Charts, a Waterfall graph presents each analyzed category with a separate bar starting on top of another category. The total height of bars is the total size or sum.

With this chart, you can visualize changes in the analyzed value in individual units of time that make up a total change over the whole analyzed period. The chart can show both increases and decreases. This way, the [Waterfall graph] can be an important supplement of time series analysis. Positive and negative values are automatically presented using different colors.

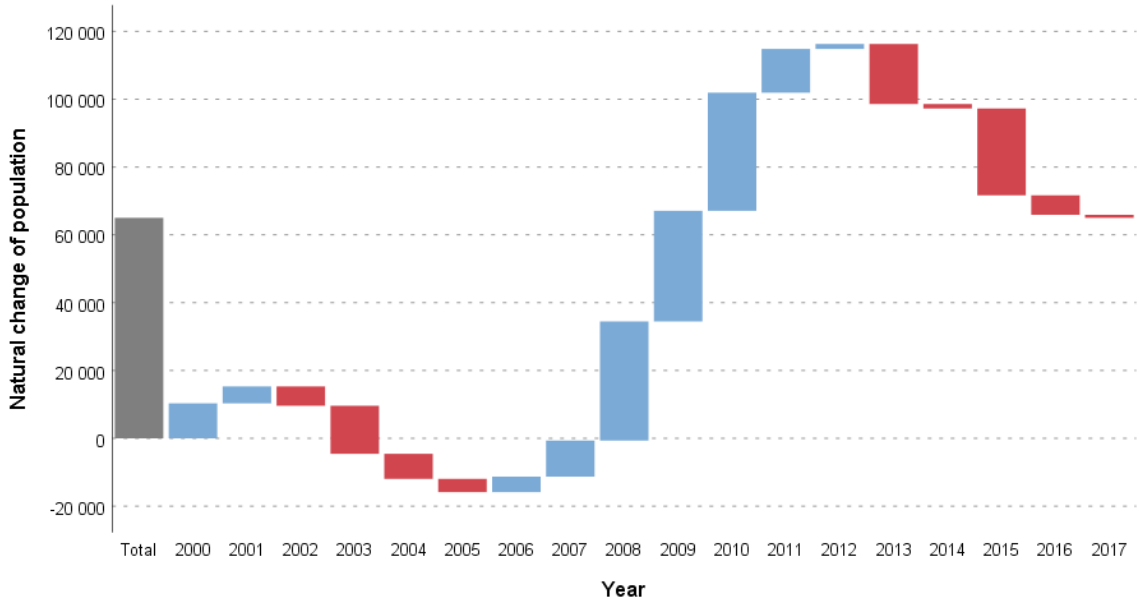


Figure 51. A Waterfall graph (Birthrate in Poland; Source: Eurostat; access: 24.04.2019)

In the basic window of the procedure, you can select the variable that will define categories by moving it from *Variables* to *Categories*. The variable has to be a qualitative variable and must not be stored as a string variable. Optionally, you can indicate the variable the sum of values of which will be used to build the structure on a chart in *Values (optional)*. The analyzed variable must be a quantitative variable. If no variable with values is indicated, the chart is based on the size.

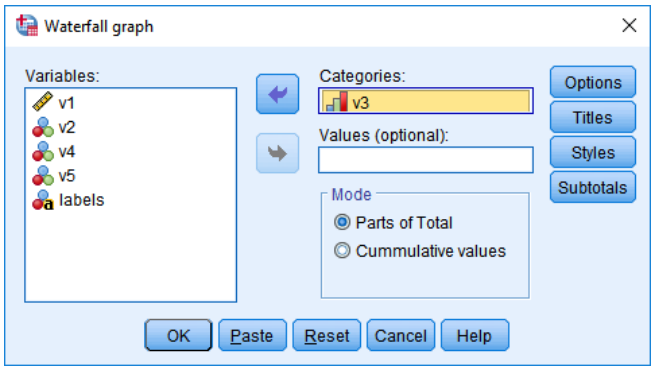


Figure 52. The Waterfall graph wizard

In the *Mode* section, you can define the ordering direction for categories on the chart. There are two options:

- *Parts of Total* – categories are ordered top-down. Only positive values can be used on the chart;
- *Cumulative values* – categories are ordered bottom-up. Values of the optional variable can be positive or negative, which accommodates decreases.

Press [Options] to define detailed parameters of the chart.

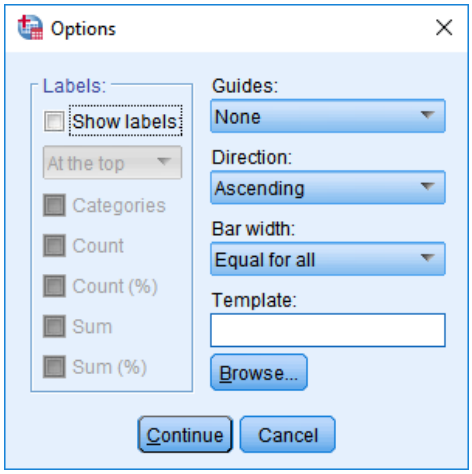


Figure 53. Waterfall graph options

In *Labels*, you can add labels to the chart.

- *Show labels* – shows labels and activates additional options, locations of labels, and their content.
- The list below lets you specify the position of labels – possible positions: At the *top* (over the chart) and *On bars*.
- *Categories* – displays names of categories.
- *Count* – displays counts of individual categories. If a value variable is selected in the basic window of the chart, the size is not shown on the chart.
- *Count (%)* – displays the proportion of individual categories in the total size. If a value variable is selected in the basic window of the chart, the values are not shown on the chart.
- *Sum* – this option is available only if a value variable is selected in the basic window for defining the chart. Shows the sum of the value variable for individual categories.
- *Sum (%)* – this option is available only if a value variable is selected in the basic window for defining the chart. It shows the proportion of each category of the value variable in the total sum for all categories.

Option *Guides* defines additional horizontal lines for a chart. The following are available:

- *None* – no auxiliary lines. Horizontal lines on the chart will be related to the scaling of the vertical axis (by size or sum);
- *Steps* – lines connect the top and base of bars only;
- *Lines* – lines connect tops and bases of bars with the vertical axis.

In the *Direction* list, you can define the order of categories. Available variants:

- *Ascending* – the chart is created from left to right and summaries and the total bar are shown left to the summarized categories;
- *Descending* – the chart is created from right to left and summaries and the bar are shown right to the summarized categories;

In *Bar width*, you can define the dimensions of summary bars. Available variants:

- *Equal for all* – the width of summary bars is the same as the width of category bars;

- *Totals & Subtotals thinner* – the width of summary bars is smaller than the width of category bars;
- *Totals & Subtotals thicker* – the width of summary bars is greater than the width of category bars;

In *Template*, you can select the template for the chart. You can type the path to the template or select it with [Browse].

The [Titles] button in the main window of the chart wizard opens a menu where you can define the title of the chart and its appearance options. It is discussed in section 4.4.

The [Styles] button in the main window of the chart wizard opens a menu for defining the color scheme and dimensions of the chart. It is discussed in section 4.4.

The [Subtotals] button lets you define up to 6 subtotals on the plot and assign them custom labels. The subtotals are shown on the chart as an additional summary bar. Each subtotal is defined in a separate section.

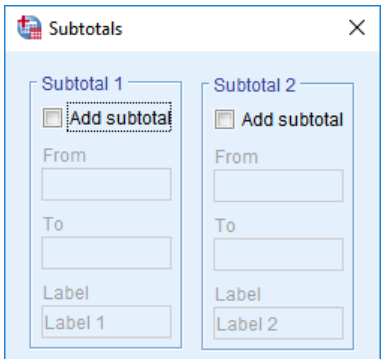


Figure 54. A part of the Subtotals menu, section for defining Subtotal 1

To activate the option to define a subtotal, enable *Add subtotal*. Set the minimum (*From*) and maximum (*To*) values. You can also set the name for the subtotal in this section (*Label*). The value range for subtotals (minimum and maximum) must be based on the empirical data range. Ranges of subtotals may overlap. Subtotals' bars are shown on the chart. Their height is the total size or sum for categories falling into the defined range.

In the [Subtotals] menu, you can also enable *Show total*, which shows a bar representing the total size or sum of values.

4.4.2. Violin Plot

The [Violin Plot] visualizes the distribution of a variable. It is used in circumstances similar to those of histograms, dot plots, or box plots. It combines the potential of the three types of data presentation. An additional option available in PS IMAGO PRO is to add the median and interquartile range to the visualization. The violin plot shows variable distribution as a symmetrical density plot. It lets you assess basic parameters of distribution of the analyzed variable and compare distributions in subtotals within a qualitative variable, if you wish. The vertical axis has values of the analyzed variable, while the horizontal axis represents category size.

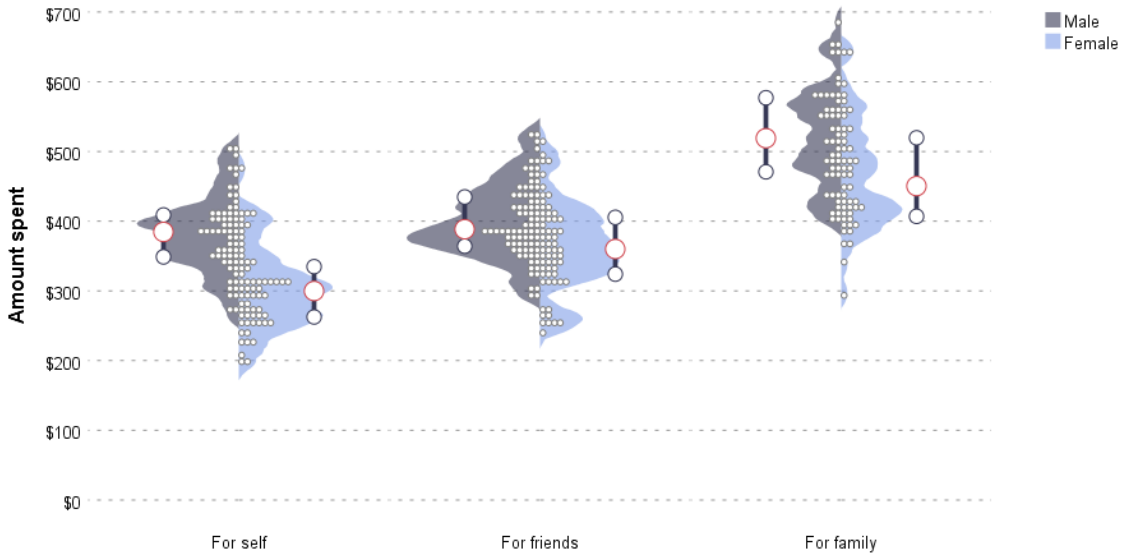


Figure 55. A violin plot (Monthly spending by target and gender)

The quantitative variable presented on the density plot is selected by moving it from *Variables* to *Values*. You may also select a qualitative grouping variable by moving it to *Categories (optional)*. A separate symmetrical density plot is generated for each category of the grouping variable. You may also use a dividing variable (only variables with two categories) that has to be moved from *Variables* to *Split (optional)*. This will divide plots into two asymmetric parts for each category of the dividing variable.

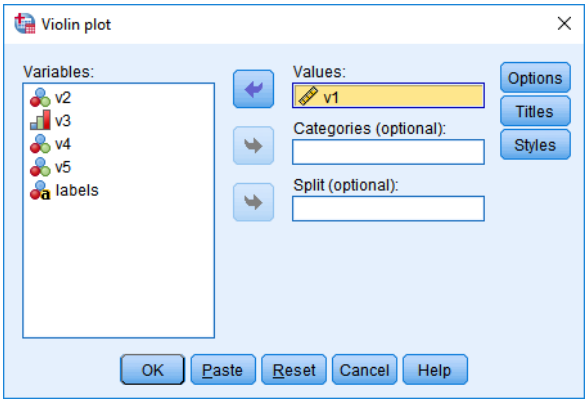


Figure 56. The Violin Plot wizard

The [Options] button allows you to define additional elements and parameters of the visualization.

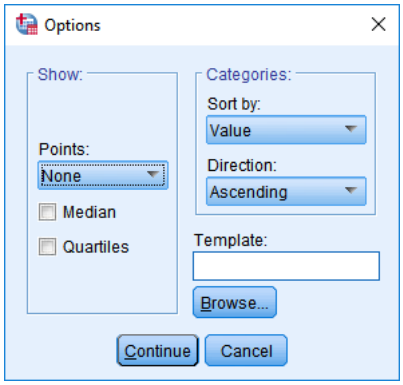


Figure 57. Violin Plot options

In *Show*,, you can add elements to each generated chart.

- If you select *Dotplot* in *Points*, you can add a symmetrical (if no dividing variable is used for the chart) or asymmetrical (if a dividing variable is used) dot plot. The number of observations representing a value range is presented by the number of dots. As a result, the width of the dot plot represents the size. Another variant, *Cases*, is to add a flat dot plot. The size is represented by the density of dots in this case.
- *Median* – the plot represents the median as a circle.
- *Quartiles* – the plot represents quartiles with a line reflecting the interquartile range.

In *Categories*, you can define the sorting direction on plots for individual subtotals according to the grouping variable. List *Sort by* allows you to select the sorting method: by the values of the grouping variable (variant: *Value*), grouping variable labels (*Label*), or the median of the analyzed continuous variable in individual subtotals (*Statistic*). You can also define the sorting direction with the *Direction* list. Available variants: *Ascending* and *Descending*.

In *Template*, you can select the template for the chart. You can type the path to the template or select it with [Browse].

The [Titles] button in the main window of the chart wizard opens a menu where you can define the title of the chart and its appearance options. It is discussed in section 4.4.

The [Styles] button in the main window of the chart wizard opens a menu for defining the color scheme and dimensions of the chart. It is discussed in section 4.4.

4.4.3. Treemap

The [Treemap] represents data structure using surface area. It is a visual support for results presented with frequency tables or crosstabs. The chart allows you to introduce another variable to build the structure and use a variable for coloring.

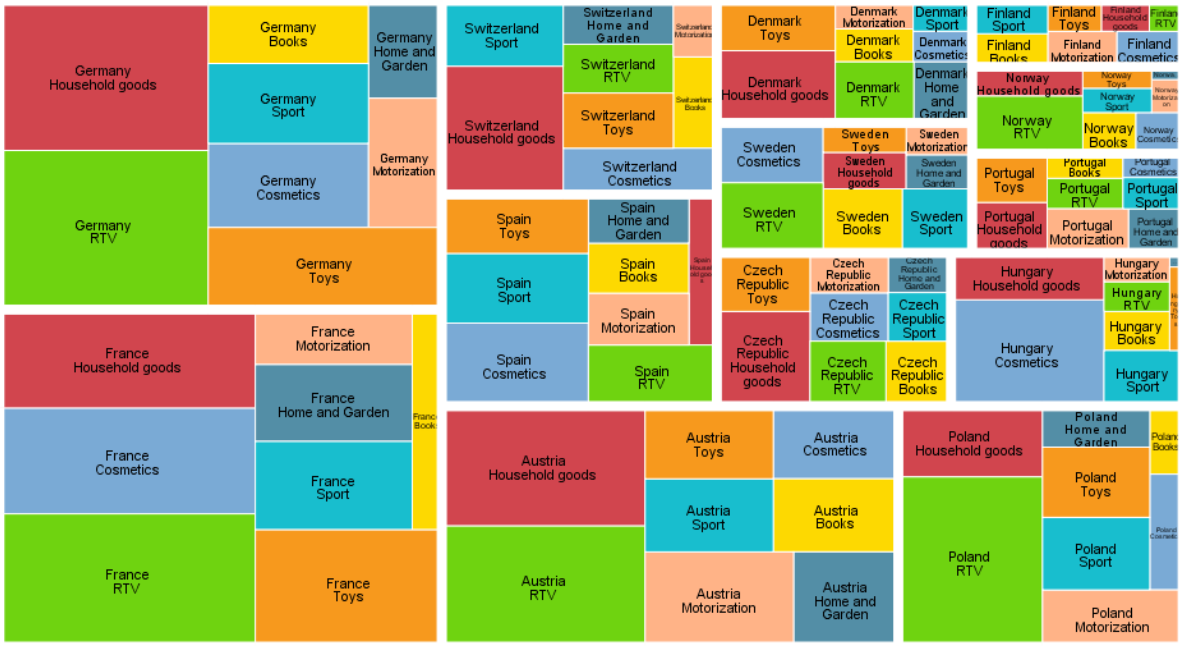


Figure 58. A treemap (Sales structure by countries and product types)

The grouping variable is selected by moving a qualitative variable (numerical nominal or ordinal variable) from *Variables* to *Cluster*. You can optionally indicate another variable to create subtotals (field *Subcluster*). Categories of this variable will be nested within categories of the variable in the *Group* field. The [Treemap] visualization can be based on frequency or aggregate quantitative variable that is selected by moving a variable to *Values (optional)*.

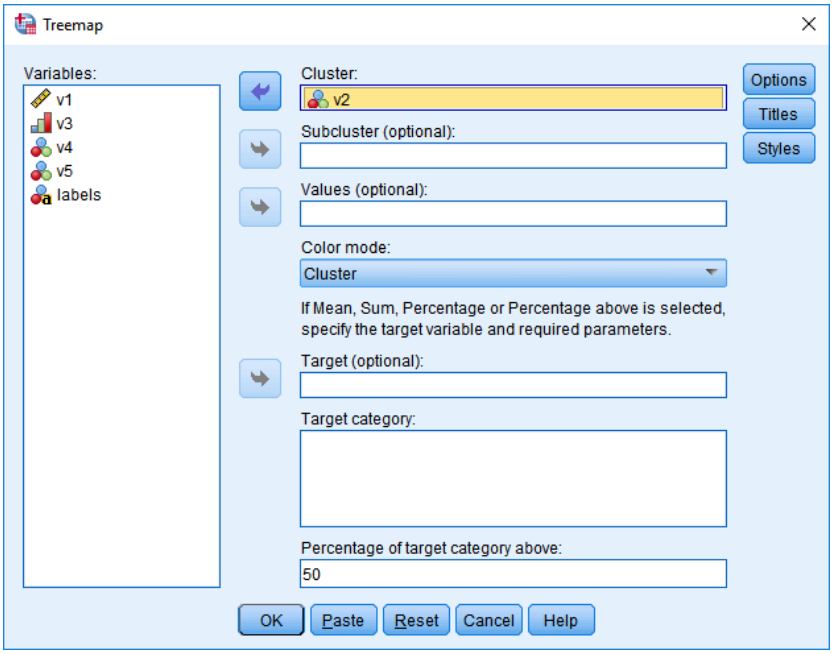


Figure 59. The Treemap wizard

In the *Target (optional)* field of the wizard, you can define an optional target variable used to color the chart. The target variable can be a quantitative or qualitative variable. Selection of a qualitative variable in the *Target (optional)* field activates a list of categories (field *Target category*) where you select the category. Next, define the percentage value in *Percentage of target category above* to be used by the procedure for conditional coloring of chart cells. A quantitative variable can color chart cells with a gradient according to the sum or mean.

The coloring method is selected in *Color mode*. The following are available:

- *Cluster* – the colors are regulated by the variable in *Group*;
- *Subcluster* – the colors are regulated by the variable in *Subtotal*;
- *Solid* – all cells of the chart are colored the same;
- *Unique* – each cell of the chart is a different color;
- *Mean (target variable)* – cells are gradient colored according to the mean of the quantitative target variable computed for cases in a specific group or subtotal;
- *Sum (target variable)* – cells are gradient colored according to the sum of the quantitative target variable computed for cases in a specific group or subtotal;
- *Percentage (target category)* – cells are gradient colored according to the percentage share of the selected category of the qualitative target variable computed for cases in a specific group or subtotal;
- *Percentage above (target category)* – cells are colored depending on whether the share of a selected category of target variable exceeds the threshold value defined in *Percentage of target category above* for cases in a selected group and subtotal.

[Options] let you define label display and content parameters, chart template loading, and Legend appearance.

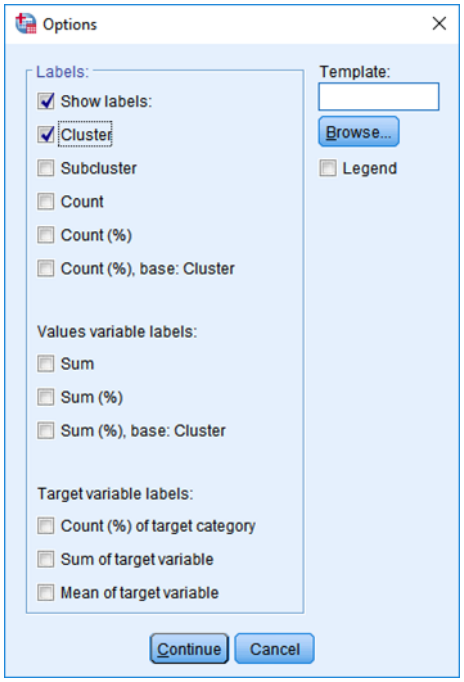


Figure 60. Treemap options

In *Labels*, you can select *Show labels* and define the appearance of the following elements:

- *Cluster* – the name of the category of the variable describing groups;
- *Subcluster* – the name of the category of the variable describing subtotals;
- *Count* – the number of cases classified to a specific cell of the chart;
- *Count (%)* – the percentage of cases classified to a specific cell of the chart. The percentage is calculated for the total number of cases;
- *Count (%), base: Cluster* – the percentage of cases classified to a specific cell where the percentage basis is the size of a specific category of the grouping variable.

In *Value variable labels*, you can also select:

- *Sum* – the sum of value variable calculated for cases in a cell;
- *Sum (%)* – the share in the aggregate sum of the value variable calculated for cases in a cell;
- *Sum (%), base: Cluster* – the share in the sum of the value variable calculated for cases in a cell. The percentage is calculated regarding the sum for cases in a category of the grouping variable.

In *Target variable labels*, you can also select:

- *Count (%) target variable* – the share of cases belonging to a category of the target variable in a cell;
- *Sum of target variable* – the value of the target variable calculated for cases in a cell;
- *Mean of target variable* – the value of the target variable calculated for cases in a cell;

In *Template*, you can select the template for the chart. You can type the path to the template or select it with [Browse].

The [Legend] button displays the legend. It is shown only if a target variable and one coloring option using its values had been defined.

The [Titles] button in the main window of the chart wizard opens a menu where you can define the title of the chart and its appearance options. It is discussed in section 4.4.

The [Styles] button in the main window of the chart wizard opens a menu for defining the color scheme and dimensions of the chart. It is discussed in section 4.4.

4.4.4. Ring Chart

The [Ring Chart] is a tool for presenting qualitative variables in a form similar to a standard pie chart. The basis for assessing the proportion in a structure is the angle of the ring section representing a specific category. An additional grouping variable can be used to generate more rings of the chart. The structure can be presented both using the category size and the sum of a selected quantitative variable.

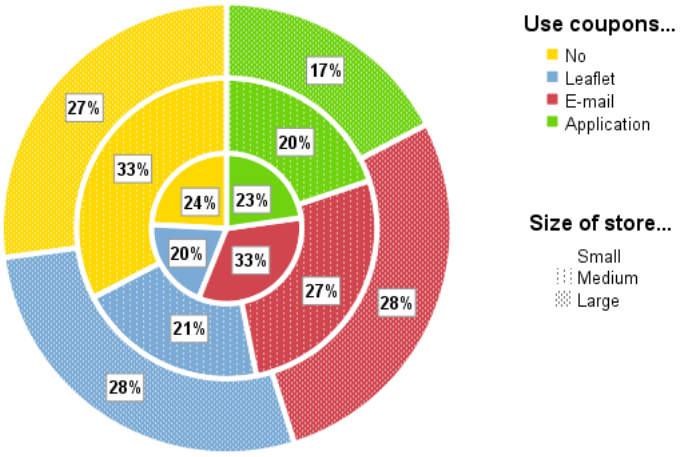


Figure 61. A ring chart (Use of shopping vouchers by store size)

The variable for creating sectors of the ring are defined by moving a qualitative variable from *Variables* to *Ring sector creates*. The sectors are of different colors.

The quantitative variable to calculate the structure of categories shown on sectors is selected by moving it from *Variables* to *Slices summarize.* If no summarizing variable is selected, the chart is based on the size of categories of the variable that creates the sectors.

A chart can show several rings created with a qualitative variable. To define it, move a selected variable from *Variables* to *Stacking*. A separate ring with a unique pattern is created for each category of the selected variable.

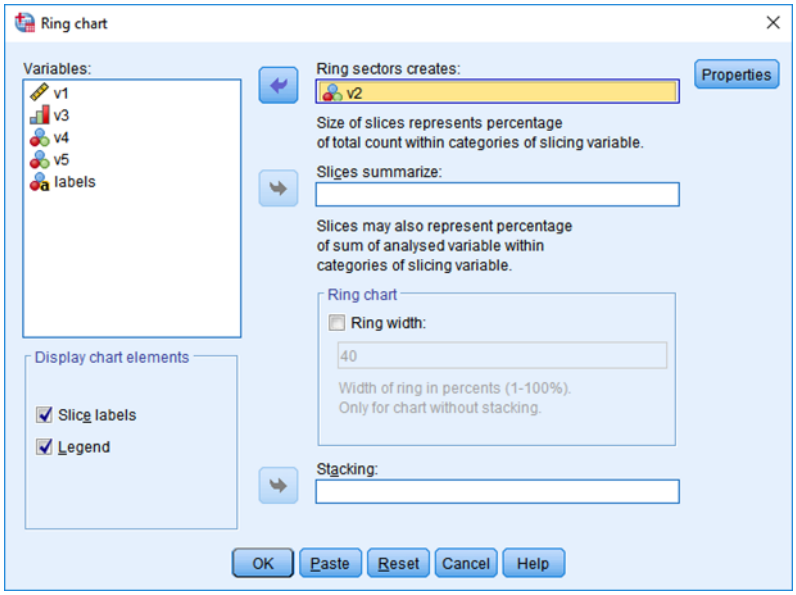


Figure 62. The Ring Chart wizard

In *Ring chart*, you can define the thickness of the ring from 1 (no chart) to 100 (pie chart). To set a custom value, enable *Ring width* and then enter a value in the activated field. You can modify the width of the ring only if no variable for creating the summary was selected.

In *Display chart elements*, you can define additional elements shown on the chart:

- *Slice labels* – shows percentage values;
- *Legend* – shows the legend.

With [Properties], you can define the appearance of the chart title, load a custom template, and select the color scheme. Settings in this menu are discussed in detail in section 4.4.

4.4.5. Series graph

The [Series graph] is an extension of the line chart and area chart. With it, you can quickly generate a chart for time series data, take into account a seasonal factor, and optionally add events to a time line. The chart can juxtapose the size and selected descriptive statistics for an analyzed variable. Options for presenting cumulated values are available as well.

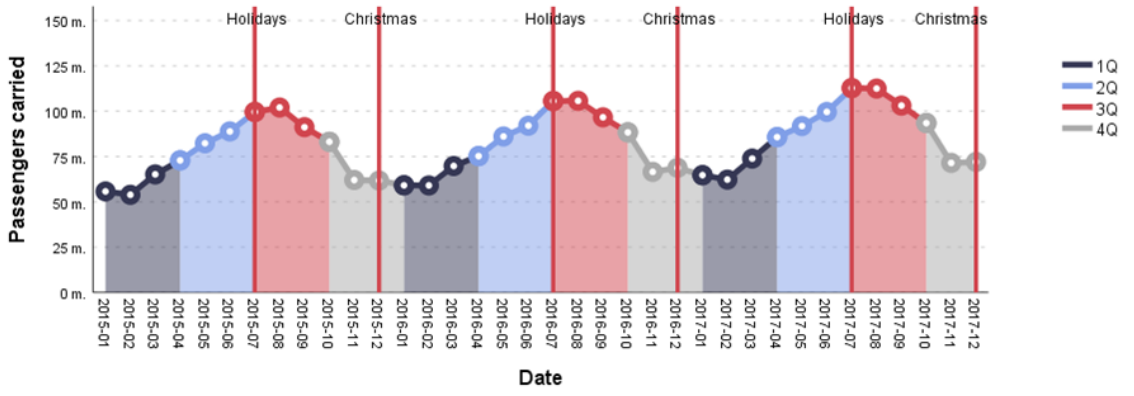


Figure 63. A Series graph (The number of passengers served on EU airports; Source: Eurostat; access: 24.04.2019)

To define a [Series graph], move a variable defining a time series from *Variables* to *Series*. Depending on the format of data, you can define a quantitative value variable as well by moving a variable to *Values (optional)*. If no value variable is used, the visualization is based on the frequency of the series variable.

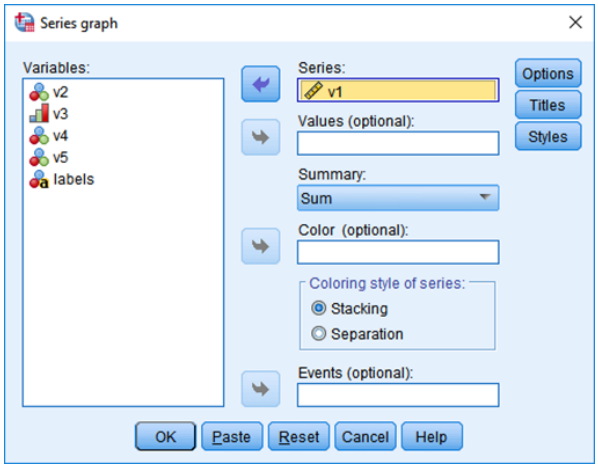


Figure 64. The Series graph wizard

List *Summary* lets you select the statistic to be calculated for the value variable using the time unit presented on the chart. The following are available:

- a selected descriptive statistic: *sum*, *mean*, *median*, *minimum*, *maximum*, *count*, *standard deviation*,
- *Sum cumulative* – values are presented as a total sum of all preceding values together with a specific time interval. The end of the series is the sum of all values;
- *Count (%)* – the percentage share of the number of events from a specific time interval in all events described by the series;
- *Count (%) – stacked* – this option is available only if a color variable is defined. The Series graph becomes a stacked area chart. Sizes of categories add up to 100% for the time interval so that the evolution of the structure of the variable can be shown.
- *Count (%) – cumulative* – values are presented as a total sum of all preceding values together with a specific time interval. The end of the series is 100%;
- *Sum – stacked* – this option is available only if a color variable is defined. The Series graph becomes a stacked area chart. Sums of values for categories add up to 100% for the time interval, so the evolution of the structure over an analyzed time interval can be presented.

In *Color (optional)*, you can indicate a qualitative variable the categories of which will be used to color the area on the chart.

The following options are available in *Coloring style of series*:

- *Stacking* – values in individual time intervals overlap. If categories of the color variable are independent of time intervals (such as division into regions), this is the right mode.
- *Separation* – values in individual time intervals are separated. This mode can be used to show the seasonality effect.

In *Events (optional)*, you can indicate a qualitative variable that describes an event that can be shown on the chart. All values apart from 0 (zero) are shown on the chart as vertical lines.

The [Options] button in the main window of the chart wizard contains additional options for the chart.

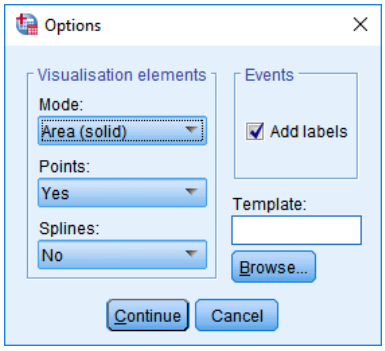


Figure 65. Series graph options

In section *Elements of visualization*, you can define the following parameters of your visualization:

- *Mode* – fill of the area below the time series curve (variants: *Area (solid), Area (moiré), lines* – no color),
- *Points* – shows or hides value markers on the chart (variants: *Yes* or *No);*
- *Splines* – smoothing of lines between points in time intervals (variants: *Yes* or *No*).

If you enable *Add labels* in *Events*, lines reflecting events in the time series are shown with labels of values of the event variable indicated in the wizard.

In *Template*, you can select the template for the chart. You can type the path to the template or select it with [Browse].

The [Titles] button in the main window of the chart wizard opens a menu where you can define the title of the chart and its appearance options. It is discussed in section 4.4.

The [Styles] button in the main window of the chart wizard opens a menu for defining the color scheme and dimensions of the chart. It is discussed in section 4.4.

4.4.6. Scatterplot with Distribution Graphs

The [Scatterplot with Distribution Graphs] presents the relationship between two quantitative variables as a scatterplot. Additionally, margins of a scatterplot show the distribution of both analyzed variables as a box plot or histogram. The visualization can, therefore, help assess both the shape of the relationship between variables and how typical each case is.

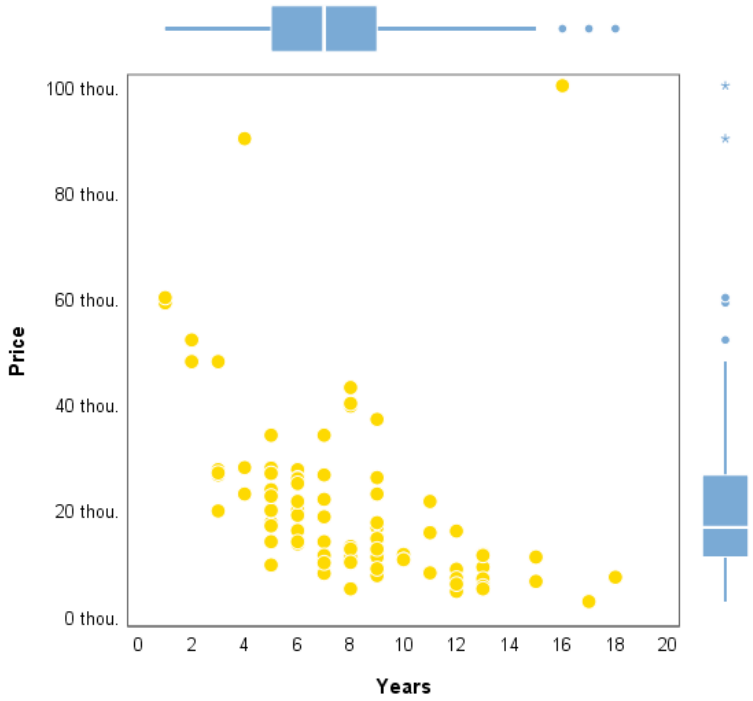


Figure 66. A Scatterplot with Distribution Graphs (The effect of age on the price of a used car)

To define a [Scatterplot with Distribution Graphs], indicate quantitative variables on the X- and Y-axis by moving them from *Variables* to *X dimension* and *Y dimension*.

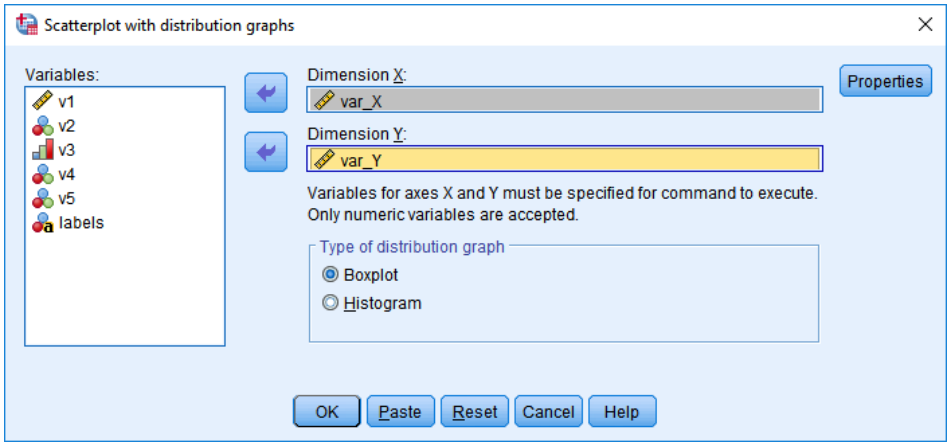


Figure 67. The Scatterplot with Distribution Graphs wizard

In *Type of distribution graph*, define the presentation of the distribution of variables on axes. There are two options:

- *Boxplot* – margins of the chart contain box plots showing the median, interquartile range, min-max values, and outliers;
- *Histogram* – margins of the chart contain histograms showing the shape of distribution and sizes of individual values grouped into intervals.

With [Properties], you can define the appearance of the chart title, load a custom template, and select the color scheme. Settings in this menu are discussed in detail in section 4.4.

4.4.7. Sankey Diagram

The [Sankey Diagram] is a visualization for presenting flows between categories or segments. It is dedicated to analyzing migration, trade, and tourism or energy flow and loss (in power engineering). It works just as well for presenting relationships in contingency tables with large numbers of categories. The diagram can show relationships among several variables. An additional coloring variable can be used as well. The thickness of links between categories on the chart represents the number of cases (or a color variable statistic) in both the connected categories.

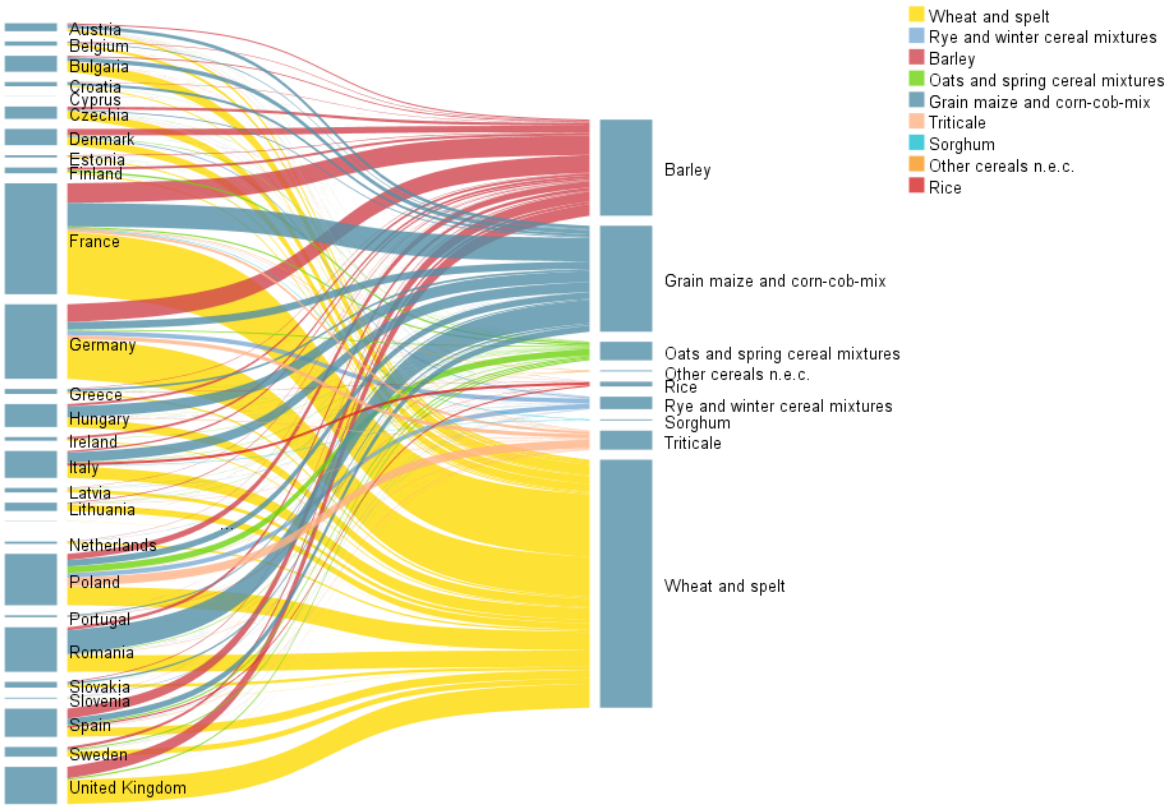


Figure 68. A Sankey diagram (Cereals output in EU countries in 2017; Source: Eurostat; access: 24.04.2019)

Variables to be presented on the chart are selected by moving variables from *Variables* to *Nodes*. Variables are shown in the order in which they were added to this field (left to right). Optionally, indicate the quantitative weighing variable or a variable whose summarized values are to be shown on the chart in *Sum of (optional)*.

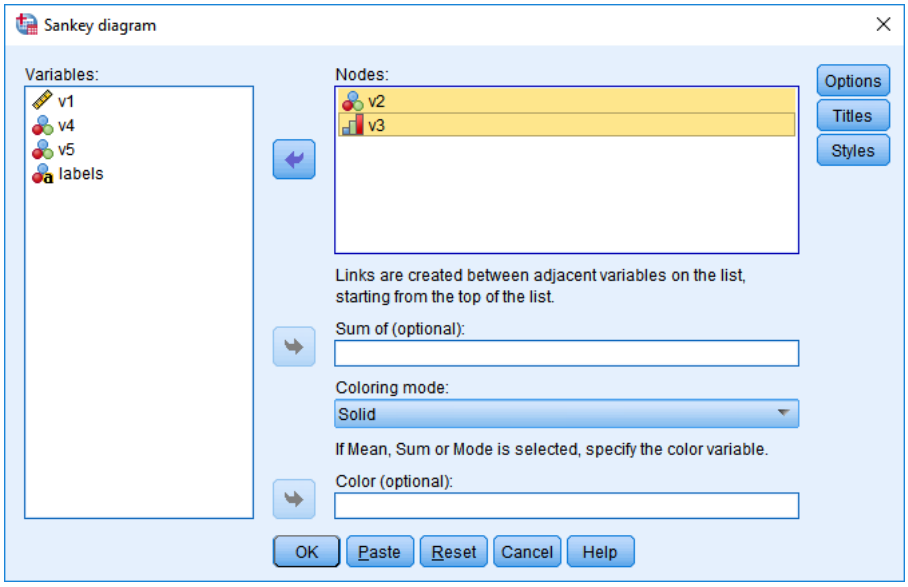


Figure 69. The Sankey Diagram wizard

The following chart coloring modes can be selected from the *Coloring mode* drop-down list.

- *Solid* – the chart is monochromatic;
- *From* – the coloring is based on the category of the source variable;
- *To* – the coloring is based on the category of the target variable;
- *Mean (color variable)* – gradient coloring based on the mean of a quantitative color variable computed for each link;
- *Sum (color variable)* – gradient coloring based on the sum of a quantitative color variable computed for each link;
- *Mode (color variable)* – coloring based on the mode of a qualitative color variable computed for each link.

In *Color (optional),* indicate a variable used for optional coloring of the chart. The color variable can be a qualitative or quantitative variable.

The [Options] button in the main window of the chart wizard contains additional settings for the diagram.

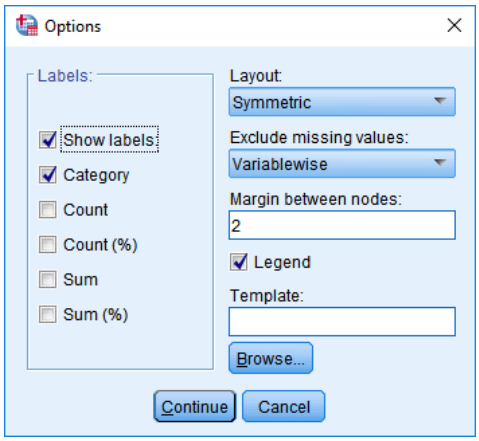


Figure 70. Sankey Diagram options

In *Labels*, you can define labels shown on the chart. After enabling *Show labels*, you can define the content of the label. The following options are available: *Category, Count, Count (%), Sum, Sum (%).*

In *Layout*, you can set how categories of the source variable shown on the left-hand side of the chart are justified. The following options are available: *Symmetric* (centered), *Top, Bottom*.

In *Exclude missing values*, you can set the following methods of handling missing data. Available are: *Variablewise* (cases are excluded only if data are missing for a specific variable) or *Listwise* (the procedure includes only those records that have valid values for all variables).

In *Margin between nodes*, you can define the break between categories shown on the diagram.

If you enable *Legend*, a legend is displayed on the chart. The legend is shown only if you select coloring using a color variable.

In *Template*, you can select the template for the chart. You can type the path to the template or select it with [Browse].

The [Titles] button in the main window of the chart wizard opens a menu where you can define the title of the chart and its appearance options. It is discussed in section 4.4.

The [Styles] button in the main window of the chart wizard opens a menu for defining the color scheme and dimensions of the chart. It is discussed in section 4.4.

4.4.8. Nightingale Rose

The [Nightingale Rose] is a visualization presenting data with one or two qualitative variables on a polar coordinate system. On the chart, look at the height (radius) of individual sectors, not their angle (the sectors result from the division of a complete circle into equal parts depending on the number of categories of the grouping variable). The interpretation of the visualization is identical to the stacked bar chart (no option to accumulate to 100%) as it shows moduli, not a percentage. The height (radius) may depend on the size and statistics of an additional quantitative variable.

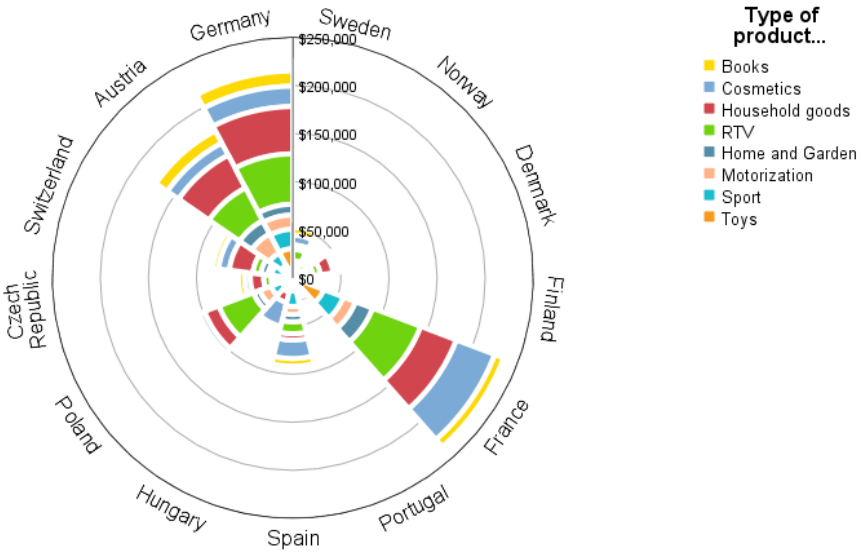


Figure 71. A Nightingale rose (summary of transaction values by country and product structure)

You can define the variable used to divide the disc into equal sectors by moving a selected qualitative variable from *Variables* to *Slices of the diagram are created by*. To assess the structure of individual sectors, move a selected qualitative variable from *Variables* to *Slices summarize*. You may also select a quantitative summarizing variable by moving it to *Stacking*.

The chart may be based on the size of categories of the variable that generates the sectors or the summarized variable. To analyze the size, enable *Count* in *Statistics*. If you indicate a summarizing variable, you can base the visualization on a sum or mean calculated for each sector. To do this, enable *Sum* or *Mean* in *Statistics*.

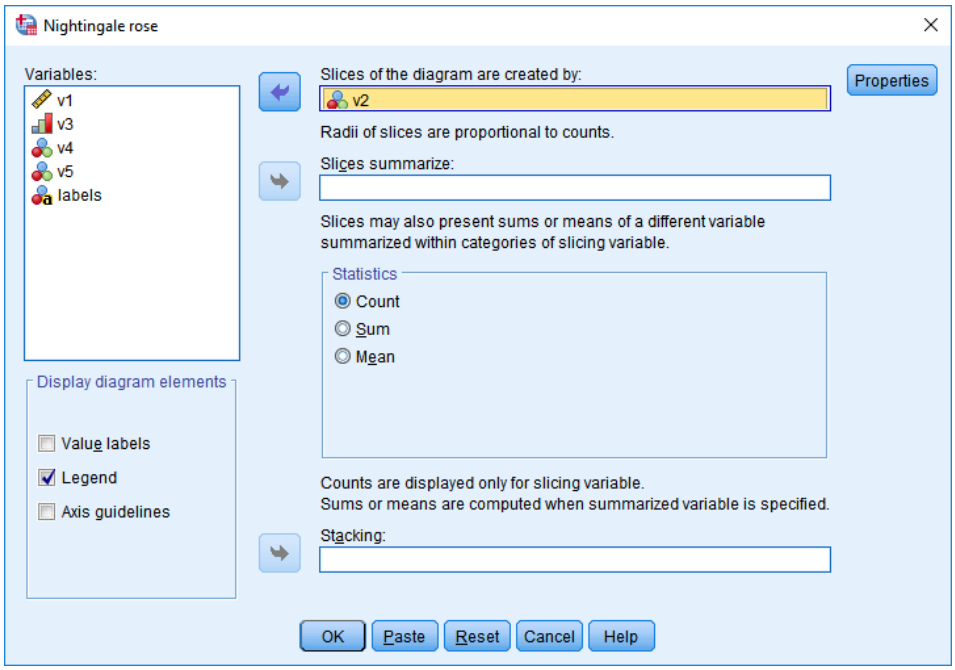


Figure 72. The Nightingale Rose wizard

Section *Display chart elements* has the following options:

- *Value labels* – the graph shows labels with variable values (size or statistic of the summarising variable).
- *Legend* – shows the legend with names of categories of the variable based on which the summary is created.
- *Axis guidelines* – the chart contains an axis with values, leader lines, and names of categories of the variable based on which the sectors are created

With [Properties], you can define the appearance of the chart title, load a custom template, and select the color scheme. Settings in this menu are discussed in detail in section 4.4.

4.4.9. Radar Chart

The [Radar Chart] can compare statistics of several quantitative variables on what resembles a radar screen or a spider web. Quantitative variables are represented by consecutive axes on a polar coordinate system. Their summaries are identified on intersections of axes with lines on the chart.

You can also use a qualitative variable to juxtapose summaries of analyzed variables in subtotals. They are shown on the chart as separate lines in unique colors. This way, the chart can be used to compare descriptive statistics of variables and analyze segments or target groups.

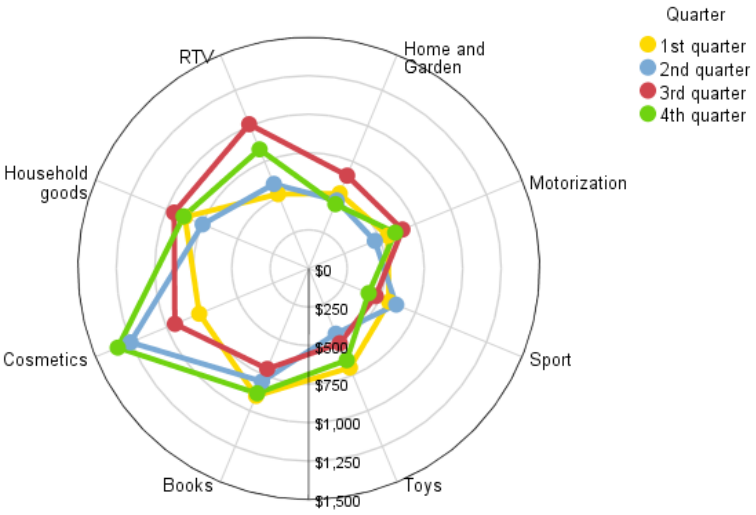


Figure 73. A radar chart (The average value of the transaction for product categories by quarter)

Variables to be presented on the chart are selected by moving them from *Variables* to *Analyzed variables*. The variables should have a quantitative level of measurement. You may also select a color variable by moving a qualitative variable to *Color variable (optional)*. A separate line is generated for each category of the qualitative color variable and each point on the chart reflects a quantitative variable.

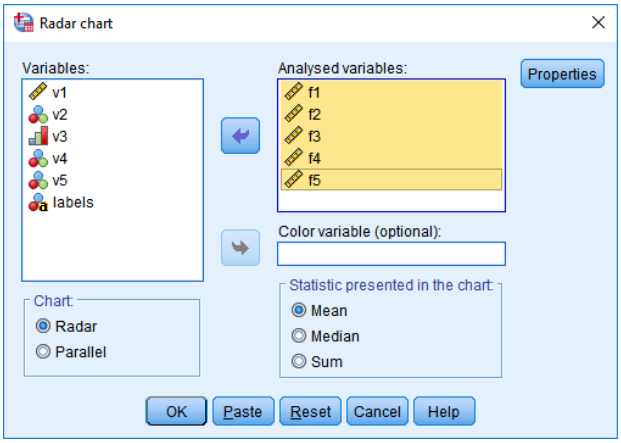


Figure 74. The Radar Chart wizard

In *Chart*, define how the chart is presented. Two options are available there:

- *Radar* – the chart looks like a radar (polar coordinate system);
- *Parallel* – creates a line chart.

In *Statistic presented in chart*, set the statistic of the quantitative variable shown on the chart. The following options are available: *Mean*, *Median*, *Sum*.

With [Properties], you can define the appearance of the chart title, load a custom template, and select the color scheme. Settings in this menu are discussed in detail in section 4.4.

4.4.10. Multidimensional Scatterplot

The [Multidimensional Scatterplot] is an extension of the traditional scatterplot. It can analyze two quantitative variables and include three additional dimensions expressed as colors, sizes, and shapes of markers.

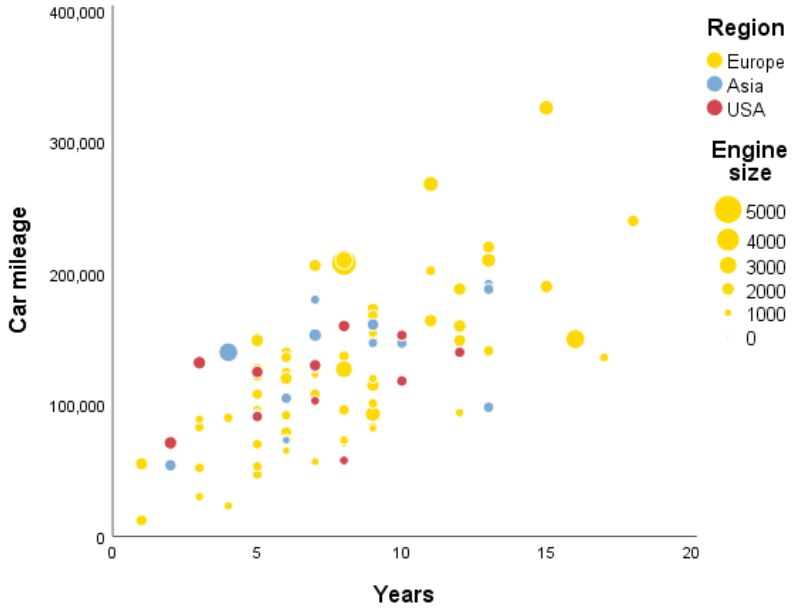


Figure 75. A Multidimensional scatterplot (The relationship between the age and mileage of a used car, including the country and engine displacement)

To define a scatterplot, move selected variables from *Variables* to *X axis dimension of scatterplot* and *Y axis dimension of scatterplot*. Additional dimensions to differentiate points on the chart can be defined by moving variables to fields: *Shape*, *Color* and *Size*. The size variable should be a quantitative variable, and the shape and color variables should be qualitative variables.

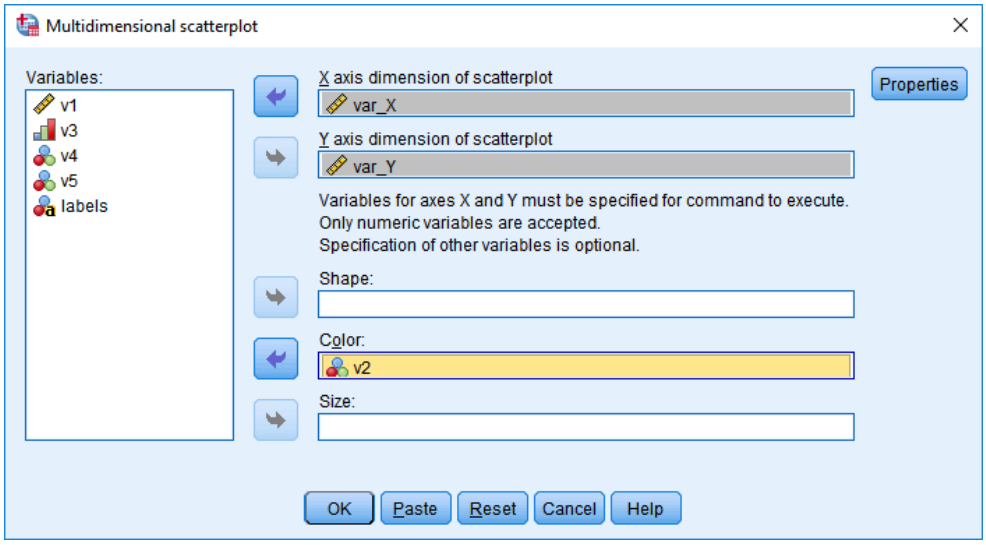


Figure 76. The Multidimensional Scatterplot wizard

With [Properties], you can define the appearance of the chart title, load a custom template, and select the color scheme. Settings in this menu are discussed in detail in section 4.4.

4.4.11. Marimekko graph

The [Marimekko graph] is an extension of a bar chart stacked to 100% within a category where the width of the bar is proportional to its share in the total size. Analysis can be based on the frequency and summarizing variable both for the X- and Y-axis.

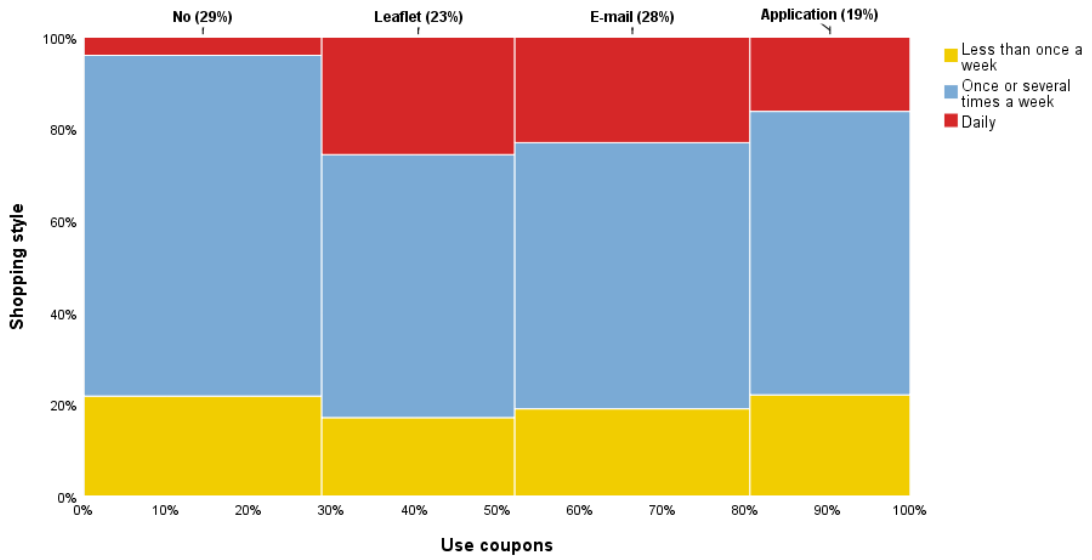


Figure 77. A Marimekko graph (The structure of transactions by purchasing style and voucher use)

To define axes, move selected qualitative variables from *Variables* to *X axis* (the variable represented by bars) and to *Color* (categories of variables represented by colors). To create a summary for a quantitative variable in categories of the grouping variable, move the quantitative variable to *X axis summary variable (% of sum)*. The quantitative variable affects the width of bars. You can put a quantitative variable in *Y axis summary variable (% of sum)*. The quantitative variable affects the color division of the bar. The width of bars is calculated from size. You can also use a summarizing variable both on the X- and Y-axis.

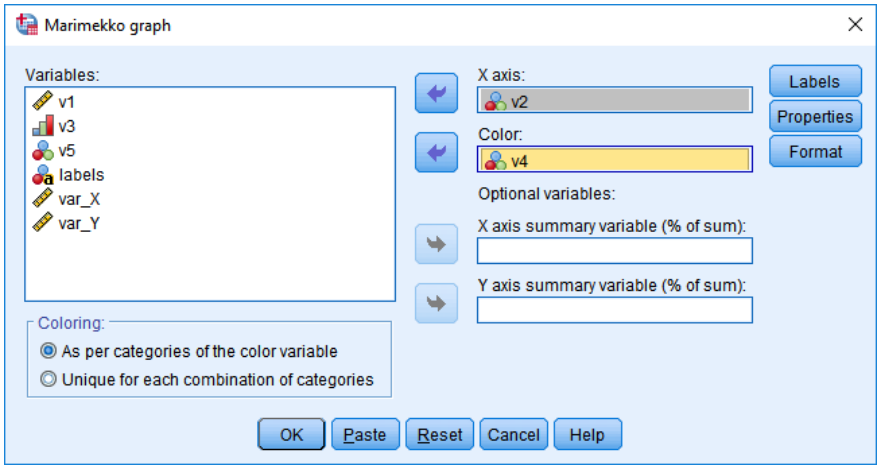


Figure 78. The Marimekko graph wizard

In *Coloring*, specify how individual categories are colored:

- *As per categories of color variable*;
- *Unique for each combination of categories*.

The [Labels] button in the main wizard window opens a menu where you can define content of labels shown on the chart.

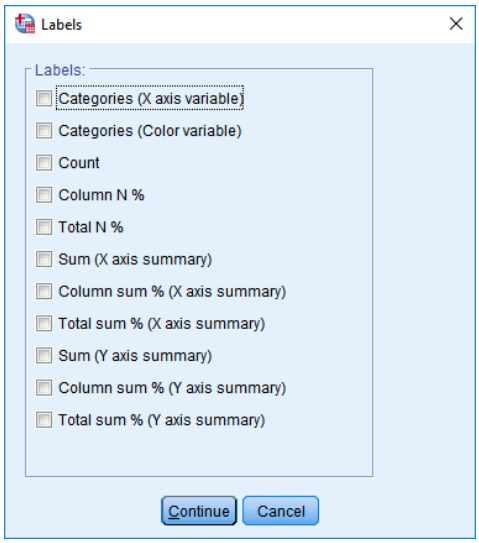


Figure 79. Menu Labels of the Marimekko graph

In *Labels*, there are the following appearance options:

- *Categories (X axis variable),*
- *Categories (Color variable),*
- *Count,*
- *Column N %,*
- *Total N %,*
- *Sum (X axis summary),*
- *Column sum % (X axis summary),*
- *Total sum % (X axis summary),*
- *Sum (Y axis summary),*
- *Column sum % (Y axis summary),*
- *Total sum % (Y axis summary).*

With the [Properties] button in the main window of the wizard, you can define the title, legend, and color settings, axis labels or use a custom template.

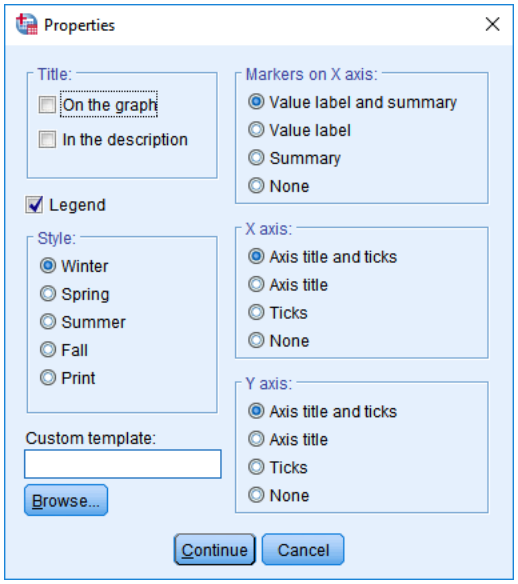


Figure 80. Marimekko graph options

Section *Title* defines how the title of the chart is displayed. When *On the graph* is enabled, the title is displayed in the chart field. If *In the description* is selected, the title is shown in the report navigation pane as item title, which makes it possible to refer to it using its name.

With the *Legend* option, you can display the legend with names of categories of the color variable.

In section *Style*, you can select the color palette for the chart.

In *Custom template*, you can select the template for the chart. You can type the path to the template or select it with [Browse].

Section *Markers on X axis* modifies the description of the grouping variable located above bars in the upper part of the chart. The following options are available there:

- *Value label and summary,*
- *Value label,*
- *Summary,*
- *None.*

Sections *X-axis* and *Y-axis* define display settings for elements of description of the X-axis and Y-axis.

- *Axis title and ticks,*
- *Axis title,*
- *Ticks,*
- *None*.

The [Format] button in the main window for defining the chart opens a menu where you can define the size of the visualization by entering values in *Width* and *Height* under *Graph size (centimeters)*.

4.4.12. Layered Bar Chart

The [Layered Bar Chart] juxtaposes two values using bars. You can both use a reference variable and a custom fixed reference value. If you choose the *Lights* or *Inversed Lights* color scheme, the bar of

the compared variable is colored depending on whether it shows a value higher or lower than the reference variable.

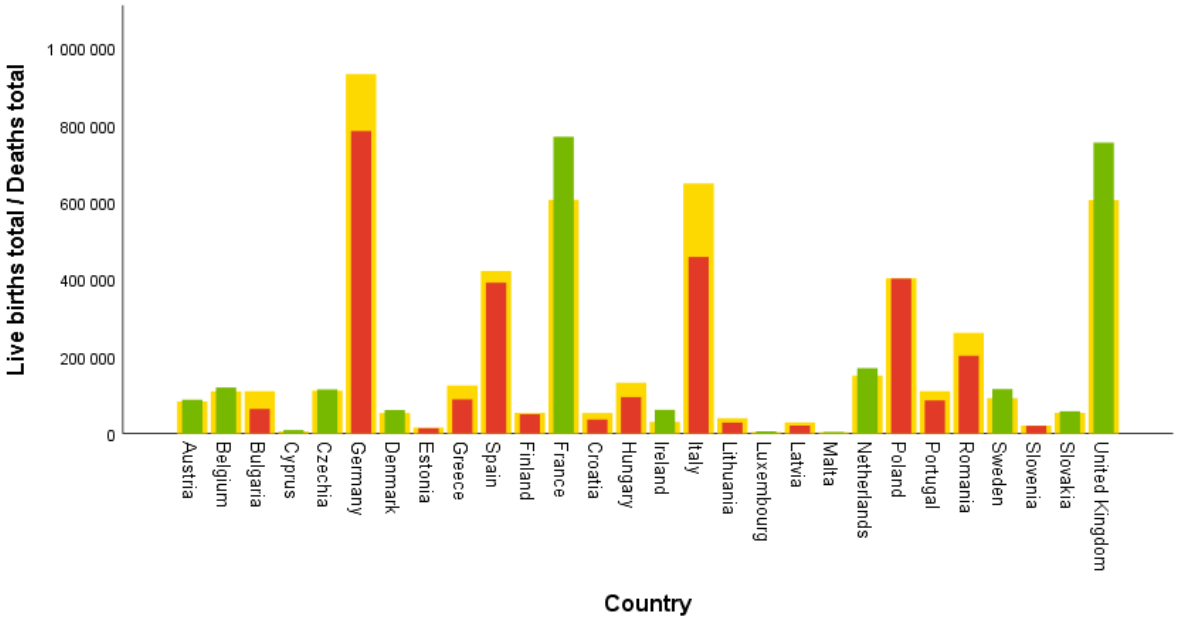


Figure 81. An Layered Bar Chart (The number of births vs the number of deaths in EU countries in 2017; Source: Eurostat; access: 24.04.2019)

To define the chart, move a selected qualitative grouping variable from *Variables* to *Categories (X-axis)*. Next, indicate a variable with current values (*Analyzed variable (Y axis)*) and the reference variable (*Reference variable (Y axis)*). The variable containing current values is shown as thinner bars in the front, while values of the reference variable are presented as slightly broader bars in the background.

Values of the compared variable can be referenced to a fixed value specified by you. To do this, enable *Value* in *Compare variable with single value* and enter the value in the field below it.

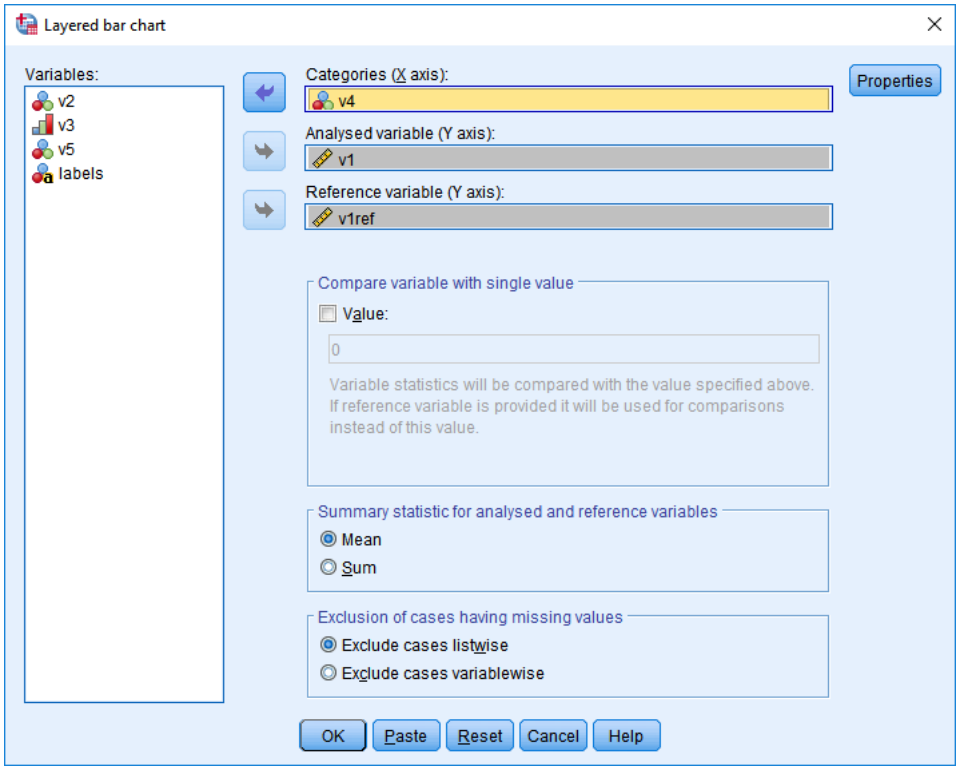


Figure 82. The Layered Bar Chart wizard

When working with raw data, you can compare sums or means of the compared variable and the reference variable depending on your choices. To select a statistic, tick the right field in *Summary statistic for analyzed and reference variables.* The following are available: *Mean* and *Sum*.

Define how missing data are handled in *Exclusion of cases having missing values* in the main chart wizard. There are two options:

- *Exclude cases listwise,*
- *Exclude cases variablewise.*

With [Properties], you can define the appearance of the chart title, load a custom template, and select the color scheme. Settings in this menu are discussed in detail in section 4.4.

4.4.13. Hierarchical Graph

The [Hierarchical Graph] presents data with hierarchical structure at different aggregation levels where superior groups (such as sale regions) can be divided into subtotals (such as points of sale). The chart can show a structure by the size and statistics of a summarized variable. The target completion on each level separately can be included as well. The chart can show up to five structural levels. The length of the edge of each element is proportional to the share of the category in the total size of the *Root* variable. If you introduce an optional quantitative variable *Values (optional)*, its sum percentage can be used.

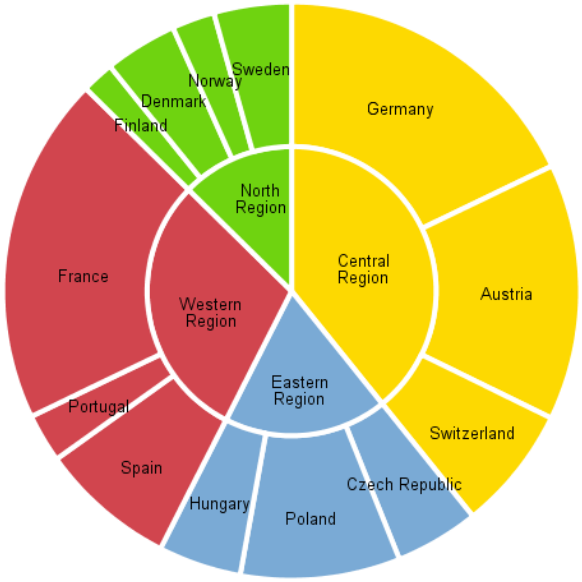


Figure 83. A hierarchical graph – option sunburst (The sales structure by regions and countries)

Levels are defined by moving a selected qualitative variable from *Variables* to *Root* and then to individual levels: (*Level 1*, *Level 2*, *Level 3*, and *Level 4*). You can, optionally, use a quantitative variable *Values (optional)*.

In *Target (optional)*, you can define the variable that will be used to color the chart. If you select a quantitative variable, you can use a gradient according to the sum or mean after defining the coloring mode in *Color mode*. If you put a qualitative variable into *Target category*, categories of the variable are shown and one has to be selected. Depending on the defined coloring mode, the chart is filled with either a gradient or two contrasting colors specified by whether or not the condition in *Percentage of target category above* is met. Specify the threshold level for coloring the chart there.

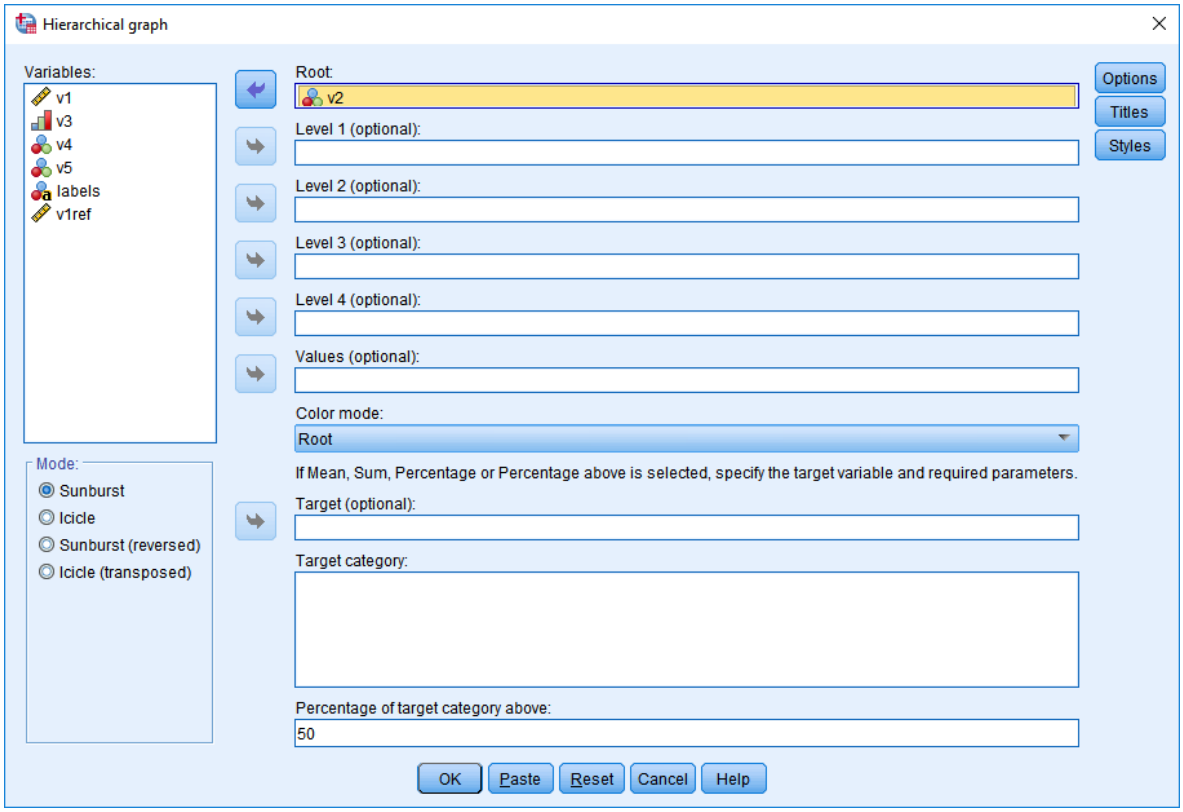


Figure 84. The Hierarchical Graph wizard

In *Color mode*, define the coloring mode for the chart:

- *Root* – each category of the basic variable is assigned a different color propagated onto other levels;
- *Root & Level* – each category of the *Basis* and *Level* variables are assigned a unique color;
- *Solid* – the chart is monochromatic;
- *Unique* – each field on the chart is a different color;
- *Mean (target variable)* – gradient coloring according to the mean of the target variable calculated for each field;
- *Sum (target variable)* – gradient coloring according to the sum of the target variable calculated for each field;
- *Percentage (target category)* – each element is colored with the intensity proportional to the share of the size of the target category.
- *Percentage above (target variable)* – chart fields are colored in two colors depending on whether the percentage of the indicated categories is higher or lower than the threshold level you define.

There are four modes of visualization available in the *Mode* section:

- *Sunburst* – a circular chart with the basis in the center and levels in consecutive outward rings;
- *Icicle* – a rectangular chart with the basis on top and consecutive levels below each other;

- *Sunburst (reversed)* – a circular chart with the basis on the outermost ring and consecutive levels increasingly closer to the center (a mirror image of *Sunburst*);
- *Icicle (transposed*) – a rectangular chart with the basis in the left-hand end and structure levels descending towards the right (transposition of *Icicle*).

The [Options] button in the main wizard window defines the label, legend, and sorting settings. A custom template can be opened there as well.

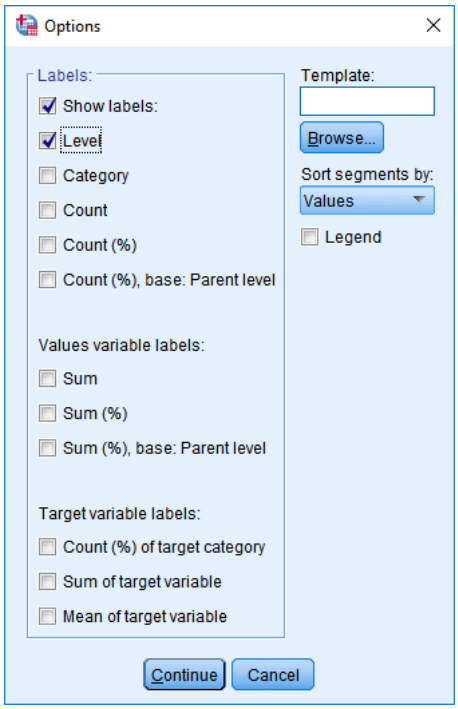


Figure 85. Hierarchical Chart options

In *Labels*, you can define labels shown on the chart. To do this, enable *Show labels* to activate other fields in the section:

- *Level* – the label of the variable indicated on this level;
- *Category* – the label for values of the variable shown in the field of the chart;
- *Count* – the number of cases in the field;
- *Count (%)* – the percentage of cases in the field (in the whole set);
- *Count (%), base: Parent level* – the percentage of cases in the field (in the superior level).

In *Values variable labels*:

- *Sum*;
- *Sum (%)* – the percentage in the field (in the sum of values computed for the whole dataset)*;*
- *Sum (%), basis: Superior level* – the percentage in the field (in the sum of values computed for the superior level).

In *Target variable labels*:

- *Count (%), target category;*
- *Sum of target variable;*

- *Mean of target variable.*

In *Template*, you can select the template for the chart. You can type the path to the template or select it with [Browse].

List *Sort segments by* lets you change the order of categories of individual variables/levels shown on the chart. You can sort by *Values* and *Statistic*.

With the *Legend* option, you can display the legend with labels of categories of the target variable.

The [Titles] button in the main window of the chart wizard opens a menu where you can define the title of the chart and its appearance options. It is discussed in section 4.4.

The [Styles] button in the main window of the chart wizard opens a menu for defining the color scheme and dimensions of the chart. It is discussed in section 4.4.

4.4.14. Heatmatrix map

The [Heatmatrix map] is a form of presenting data in a crosstab with a nested quantitative variable. Values in table cells are values of a selected statistic of a quantitative variable in subtotals identified by the assignment to categories of the row and column variables. An important feature of the Heatmatrix map is the possibility to apply gradient coloring depending on values. The visualization additionally shows a summary of statistics of individual categories of the row and column variable represented by a bar on table margins.

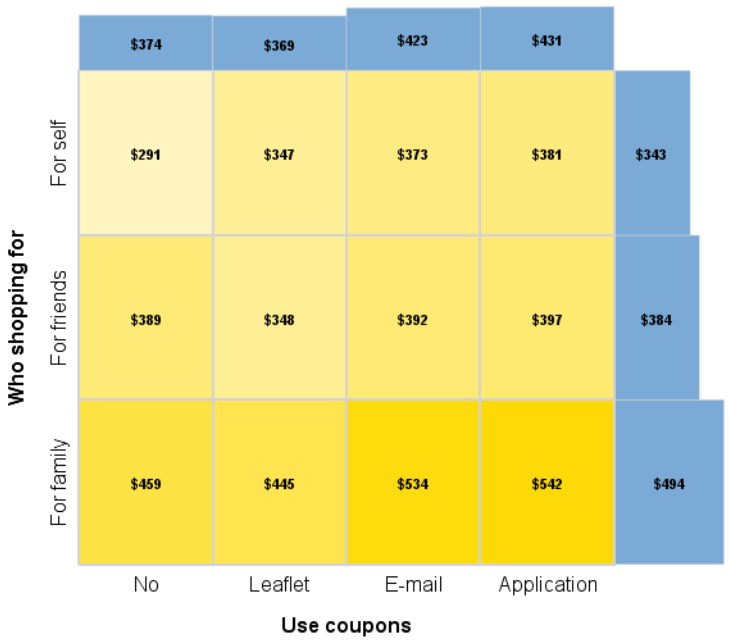


Figure 86. A Heatmatrix map (The mean value of transactions by voucher use and purchase target)

In the [Heatmatrix map] wizard, define the row variable by moving a selected qualitative variable from *Variables* to *Row variable*. Define the column variable the same way by moving it to *Column variable*. The next step is to select the variable to summarize for which statistics will be calculated in individual cells. To define it, move a selected quantitative variable to *Summarized variable*.

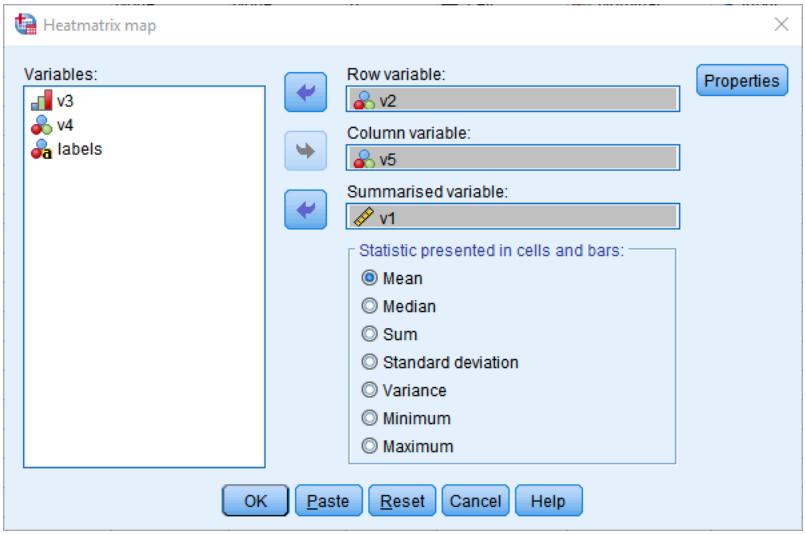


Figure 87. The Heatmatrix map wizard

In *Statistic presented in cells and bars*, select the statistics of the summarized variable that will be presented in the table and as summaries. The following are available: *Mean*, *Median*, *Sum*, *Standard deviation*, *Variance*, *Minimum*, and *Maximum*.

With [Properties], you can define the appearance of the chart title, load a custom template, and select the color scheme. Settings in this menu are discussed in detail in section 4.4.

4.4.15. Contingency Map

The [Contingency Map] is a visualization technique for crosstabs. It can gradient color cells depending on their value and display a bar representing the sizes of individual categories of the row or column variable (marginal profiles).

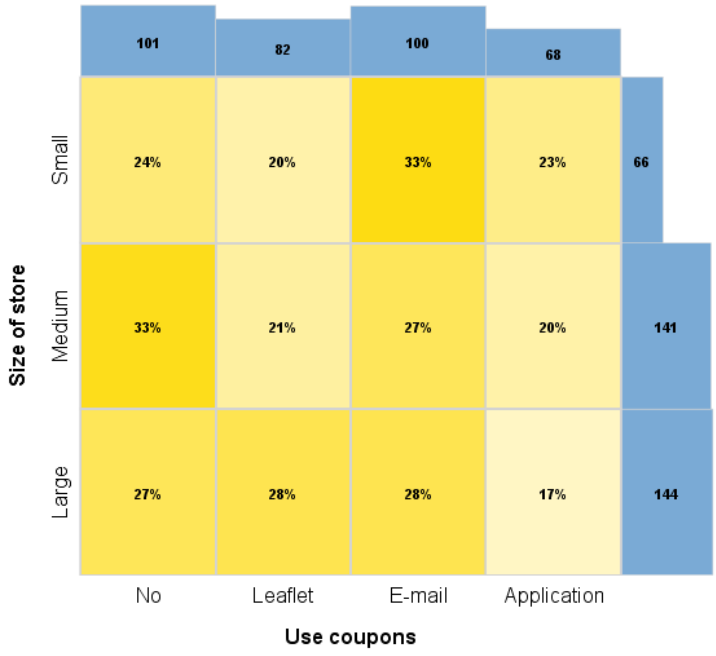


Figure 88. A contingency map (The use of vouchers by store size [percentage in row])

To build a [Contingency Map], define the row variable by moving a selected qualitative variable from *Variables* to *Row variable*. Define the column variable the same way by moving it to *Column variable*.

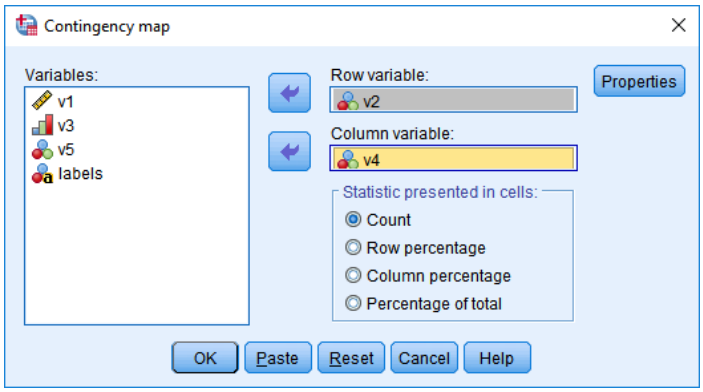


Figure 89. The Contingency Map wizard

In *Statistic presented in cells*, indicate values to be displayed on the visualization. The following options are available: *Count*, *Row percentage*, *Column percentage*, *Percentage of total*.

With [Properties], you can define the appearance of the chart title, load a custom template, and select the color scheme. Settings in this menu are discussed in detail in section 4.4.

4.4.16. Cloud

The [Cloud] is a visualization for presenting sizes of categories of a qualitative variable or summary for a quantitative variable by a grouping variable. It works best when presenting variables with multiple categories. The visualization is a word cloud or, in the case of PS IMAGO PRO, a bubble cloud. The size of the word or bubble represents the size of category or sum of the variable summarized by individual categories of the grouping variable. The procedure additionally has several coloring modes, also involving an additional variable.

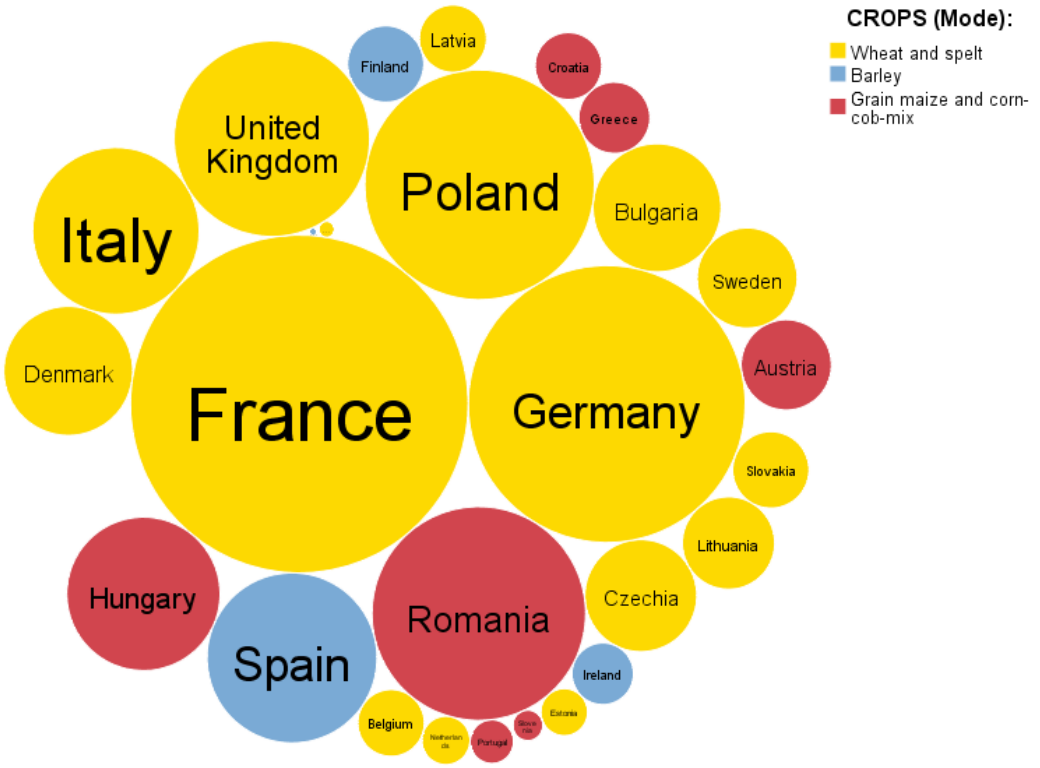


Figure 90. A cloud – the bubbles mode (Cereals output in EU countries in 2017, including the dominant crop for each country; Source: Eurostat; access: 24.04.2019)

To select a grouping variable the categories of which will be represented by words or bubbles, move a qualitative variable from *Variables* to *Categories*. Optionally, you can define the variable to summarize in *Sum of (optional)*. The visualization is then based on the sum of the variable, not the size. You can additionally indicate a qualitative or quantitative color variable in *Color (optional)*, which will be the basis for coloring bubbles or words.

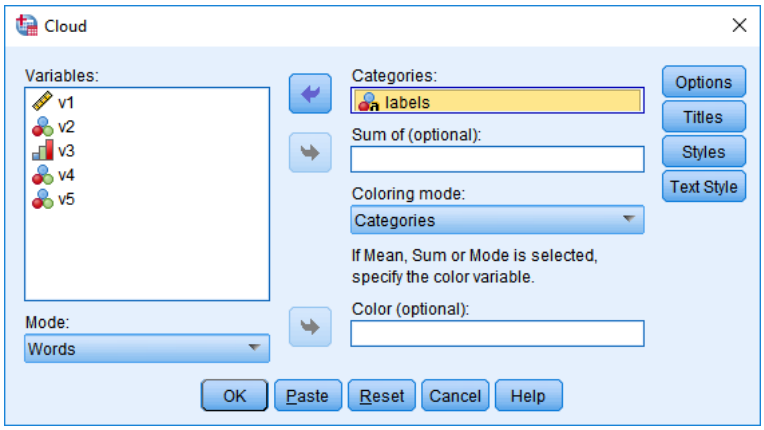


Figure 91. The Cloud wizard

This visualization can take two forms in PS IMAGO PRO, which you select in the *Mode* list. The following options are available:

- *Words* – the visualization is presented as a word cloud;
- *Bubbles* – the visualization is presented as a bubble graph;

You can select the coloring mode in the *Coloring mode* list.

- *Categories* – coloring by categories of the grouping variable;
- *Hollow* – in the bubble mode – only borders are presented;
- *Solid* – all items on the chart are the same color;
- *Summary* – gradient coloring based on the size of the category variable or sum of the summary variable;
- *Mean (color variable)* – gradient coloring according to the mean of the quantitative color variable;
- *Sum (color variable)* – gradient coloring according to the sum of the quantitative color variable;
- *Mode (color variable)* – coloring according to the dominant category of the quantitative color variable in the category of the grouping variable.

The [Cloud] wizard has additional options available with separate buttons.

The [Options] button in the main window of the wizard offers options for label, Legend, and category order appearance.

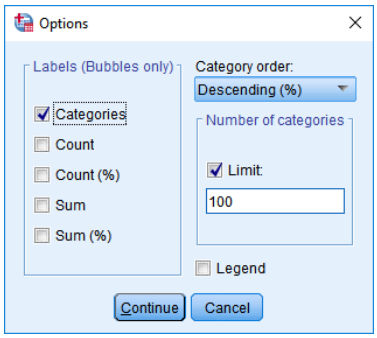


Figure 92. Cloud options

- In the bubble mode, you can display labels that can be defined in *Labels (Bubbles only)*. The following options are available: *Categories*, *Count*, *Count (%)*, *Sum*, *Sum (%)*.
- *Category order* offers the following methods for ordering categories in the visualization: *Descending (%)*, *Ascending (%)*, *Alphabetical*, *Random*, *Color variable*.
- In *Number of categories*, you can restrict the number of displayed categories. To do this, enable *Limit to* and enter a value in the field below.
- Option *Legend* allows you to display a legend with labels of color variable categories or color intervals for coloring according to statistics of the color variable or summary variable.

The [Titles] button in the main window of the chart wizard opens a menu where you can define the title of the chart and its appearance options. It is discussed in section 4.4.

The [Styles] button in the main window of the chart wizard opens a menu for defining the color scheme and dimensions of the chart. It is discussed in section 4.4.

The [Text style] button in the main chart wizard window offers options to define parameters of the font used for labels on the chart:

- *Font family* – defines the font;
- *Font weight* – select *Regular* or *Bold*;
- *Color* – coloring of the labels;
- *Font style* – available is *Regular* and *Italics*.

4.5. Table Charts

4.5.1. Table Charts: introduction and common settings

[Table Charts] combine charts and tables. They can compute several statistics for a summarized quantitative variable in categories of a quantitative grouping variable shown in table rows. Table cells can contain numerous statistics for values of the quantitative variable and distribution of the grouping variable. What is special about this chart is the visualization for every category of the grouping variable depending on the selected type of table chart in marginal table cells.

Table charts have different applications and additional options depending on the visualization used. PS IMAGO PRO offers the following types of table charts:

- *Series* – for presenting a time Series graph with categories of a grouping variable and an optional color variable;
- *Layered* – for comparing statistics of two summarized variables;
- *Histogram* – represents the distribution of a continuous variable;
- *Error bar* – shows error bars for a summarized variable;
- *Boxplot* – shows box plots for a summarized variable;
- *Bars* – shows bars with a selected statistic of a summarized variable;

Regardless of the type of visualization, table charts have several common settings discussed below.

The [Statistics] menu has several descriptive statistics to present in a table. Measures available for the grouping variable are *Count* and *Percent of count*, while for the analyzed variable: *Mean*, *Median*, *Sum*, *Minimum*, *Maximum*, *Standard deviation*, and *Variance*. Depending on the measures presented in the table, you can gradient color table cells. Make the selection in *Column coloring*. The statistics that can be used to color the table are the same as for displaying tables.

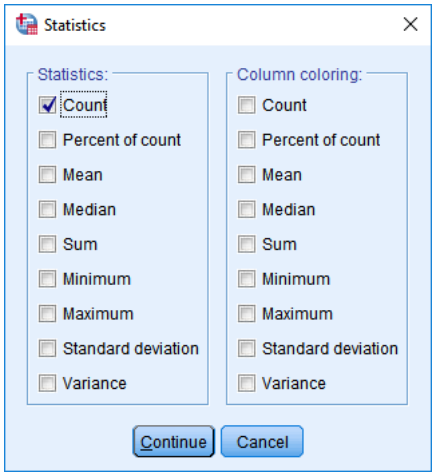


Figure 93. The Statistics menu of Table Charts

Additionally, to visualize the [Table layeredbars chart], you can compute each of the statistics mentioned above for the analyzed variable and the reference variable separately in [Statistics]. The difference between the variables is a unique measure. Column coloring now also includes statistics available for [Table layeredbars chart].

Menu [Properties] lets you define visualization settings in detail.

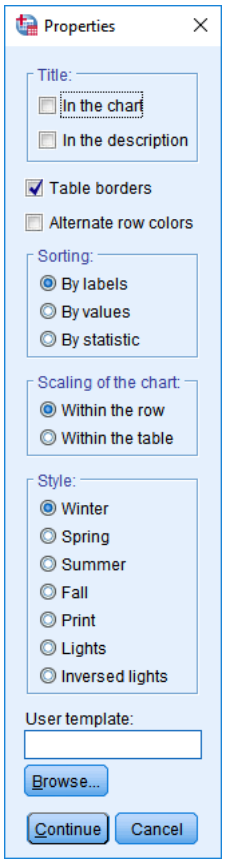


Figure 94. An example of the Options menu for Table Charts

The settings are grouped into sections that are mostly common to all Table Charts. We will discuss options available for selected visualizations as well.

- Section *Title* lets you put a title on your chart (*In the chart*) or in the item description in the navigation panel of the report window (*In the description*).
- With *Table borders*, you can turn cell border on and off.
- With *Alternate row colors*, you can enable coloring of every other row, which makes it easier to read values in large tables.
- Section *Sorting* lets you select sorting options: by labels of the grouping variable (*By labels*), by values of the grouping variable (*By values*), and by a statistic of the analyzed variable presented on bars (*By statistic*).
- Section *Scaling of the chart* lets you select how charts in a table are scaled. You can select the optimum scaling for each chart (default: *Within the row*) or the same scale for all charts (*Within the table*).
- In section *Style*, you can define the color palette for charts and tables.

- In the *Custom template* field, you can indicate a predefined template for visualization settings and color scheme. The [Browse] button allows you to define the path to the right directory and select the template file.

Additional options for some charts:

- Section *Missing data* available for [Table layeredbars chart] allows you to decide what to do with missing data. The following options are available: *Excluded cases listwise*: such observations are not shown on the visualization. The other option is *Exclude cases variablewise*. When it is enabled, statistics are calculated for both variables separately using valid observations.
- Section *Reporting of grouping variable counts* is available for [Table error bar chart], [Table boxplot], and [Table bar chart]. It can exclude missing data from reporting (*Cases with missing values are excluded*) or include them (*Cases with missing values are included*)
- Section *Chart* gives you a choice between two available forms of visualization. The following are available for [Table boxplot]: *Boxplot* and *Point* plot. The following are available for [Table bar chart]: *Bars* and *Point-spike* chart.

With the [Format] menu, you can define sizes of elements of the visualization.

- Section *Row height settings (centimeters)* defines the height of table headers (field: *Headings*) and table cell height (field *Data*).
- In section *Column width settings (centimeters)*, you can set the width of table cells that contain names of categories (field *Categories*), values of statistics (field *Statistics*), and cells with charts (field *Chart*).

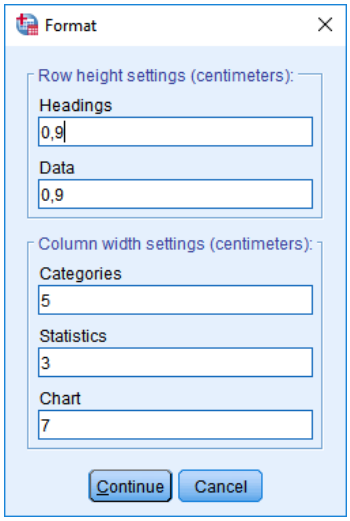


Figure 95. Format settings for Table Charts

4.5.2. Table series chart

A series chart added to a table can present statistics using three variables. The first one divides the analysis into groups presented as consecutive rows of the table. The second one lends its categories to be shown as the X-axis of the chart (such as consecutive months, but any qualitative variable can be used). The third one is shown as lines, layers, or bars and shows statistics of a qualitative variable

(such as sales volume). You can, optionally, use a fourth variable showing categories as separate graphic elements such as lines.

Region	Count	Mean	Sum	Maximum	Amount spent by Transaction date Sum
Central Region	244	$1,932	$471,288	$16,739	
Eastern Region	164	$1,341	$219,981	$15,769	
Western Region	264	$1,360	$358,990	$13,161	
North Region	124	$1,224	$151,819	$6,770	

Jan 2005 Feb 2005 Mar 2005 Apr 2005 May 2005 Jun 2005 Jul 2005 Aug 2005 Sep 2005 Oct 2005 Nov 2005 Dec 2005

Figure 96. A Table series chart (The variability of income and summary of transactions by regions)

The table will be based on categories of a grouping variable. It has to be defined by moving a selected qualitative variable from *Variables* to *Grouping variable*. The variable to be shown on charts is selected by moving it to *Series variable*. Statistics shown on charts are computed for the quantitative variable defined in *Analyzed variable*. You can also use an additional variable by moving it to *Color variable (optional)*. Statistics of the analyzed variable are presented for each category of the color variable as separate lines, fields on bars, or stacked areas.

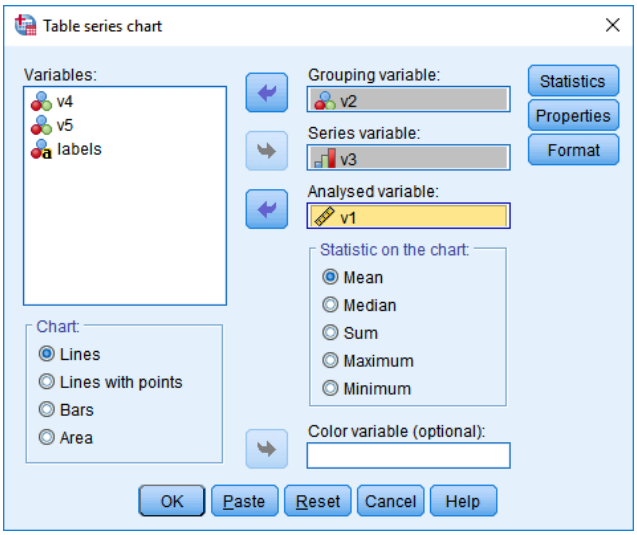


Figure 97. The Table series chart wizard

In *Chart*, you can define the type of visualization presented in the table. The following types of charts are available:

- *Lines,*
- *Lines with points,*
- *Bars,*
- *Area.*

In *Statistic on the chart*, you can define the statistic to be presented with charts. One of the following descriptive statistics can be used for the analyzed variable: *Mean*, *Median*, *Sum*, *Maximum*, and *Minimum*.

You can define the statistics shown in tables for Table Charts. Options available in menu [Statistics] are discussed in section 4.5.1.

Menu [Properties] allows you to configure detailed settings for the visualization. The available options are described in section 4.5.1.

Menu [Format] defines the sizes of visualizations and their elements. For available options, see section 4.5.1.

4.5.3. Table layeredbars chart

A chart added to a table helps compare the statistics of two variables using overlaid bars. It is an expansion of the Layered Bar Chart discussed in section 4.5.1. You can also display additional comparative statistics in the table for analyzed variables in categories of the grouping variable. The analyzed variable will be shown on a thinner bar in the front, while the reference variable is in the background with its statistic shown as a thicker bar in the back.

Region	Difference	2nd half of 2005 Sum	1st half of 2005 Sum
Central Region	163,120	$317,204	$154,084
Eastern Region	90,621	$155,301	$64,680
Western Region	100,838	$229,914	$129,076
North Region	45,444	$98,632	$53,188

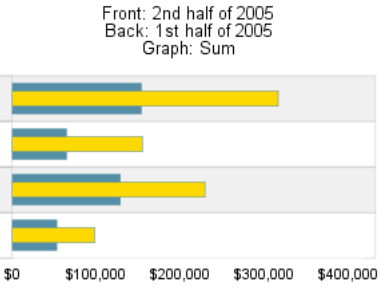


Figure 98. An Table layeredbars chart (Comparison of income in the second and first half of the year in regions)

The variable used to build the table is selected by moving a qualitative variable from *Variables* to *Grouping variable*. The analyzed variable is indicated by moving a quantitative variable to *Analyzed variable*. The reference variable is selected by moving a quantitative variable to *Reference variable*.

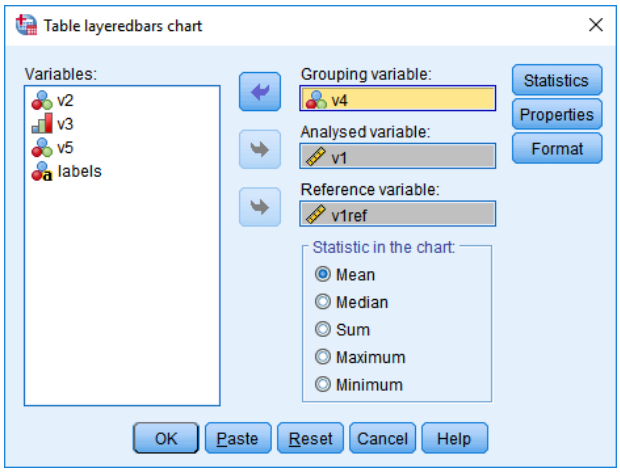


Figure 99. The Table layeredbars chart wizard

In *Statistic in the chart*, you can define the descriptive statistic to be presented on bars for the compared variables. The following are available: *Mean*, *Median*, *Sum*, *Maximum*, and *Minimum*.

You can define the statistics shown in tables for Table Charts. Options available in menu [Statistics] are discussed in section 4.5.1.

Menu [Properties] allows you to configure detailed settings for the visualization. The available options are described in section 4.5.1.

Menu [Format] defines the sizes of visualizations and their elements. For available options, see section 4.5.1.

4.5.4. Table Histogram

The [Table Histogram] is a type of the table chart where the distribution of a quantitative variable in each category of a grouping variable is visualized as a histogram. Optionally, the chart can be a stacked histogram showing the distribution of the analyzed variable in categories of an additional color variable. The histograms have a common horizontal scale described in the bottom section of the table, which makes it possible to compare distributions of the analyzed variable in individual categories of the grouping variable.

Use coupons	Count	Mean	Minimum	Maximum	Amount spent Count
Application	68	$431	$253	$685	
E-mail	100	$423	$256	$644	
Leaflet	82	$369	$227	$568	
No	101	$374	$195	$597	

Figure 100. A table histogram (The distribution of transactions by the use of vouchers and customer gender)

The grouping variable is selected by moving a variable from *Variables* to *Grouping variable*. The quantitative variable, the distribution of which is presented on the histogram is moved to *Analyzed variable*. The optional color variable is indicated in the *Color variable (optional)* field.

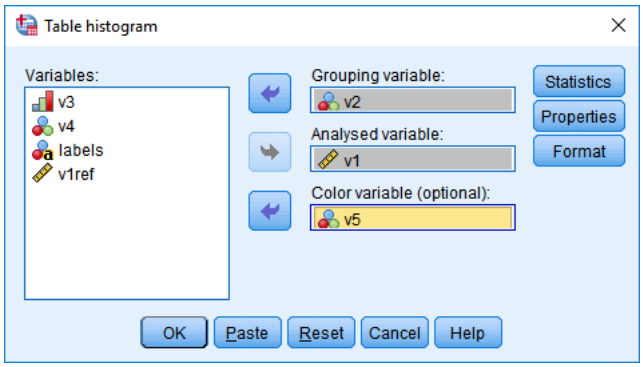


Figure 101. The Table Histogram wizard

You can define the statistics shown in tables for Table Charts. Options available in menu [Statistics] are discussed in section 4.5.1.

Menu [Properties] allows you to configure detailed settings for the visualization. The available options are described in section 4.5.1.

Menu [Format] defines the sizes of visualizations and their elements. For available options, see section 4.5.1.

4.5.5. Table error bar chart

The [Table error bar chart] is intended to compare the differences between means of an analyzed variable within categories of a grouping variable. The charts allow you to assess the dispersion of values around group means through confidence intervals, standard errors of the mean, or standard deviations as well. The uniform horizontal scale helps assess differences in the central tendency among distributions of the quantitative variable in categories of the grouping variable. Charts may also show the median.

Use coupons	Count	Mean	Standard deviation	Amount spent Confidence interval (95%)
Application	68	$431	$99	
E-mail	100	$423	$88	
Leaflet	82	$369	$75	
No	101	$374	$87	

Figure 102. An Table error bar chart (The comparison of the mean value of transactions by voucher use)

Move the chosen grouping variable to build table rows from *Variables* to *Grouping variable*. The quantitative variable the distribution of which is to be shown on the charts is defined by moving it to *Analyzed variable*.

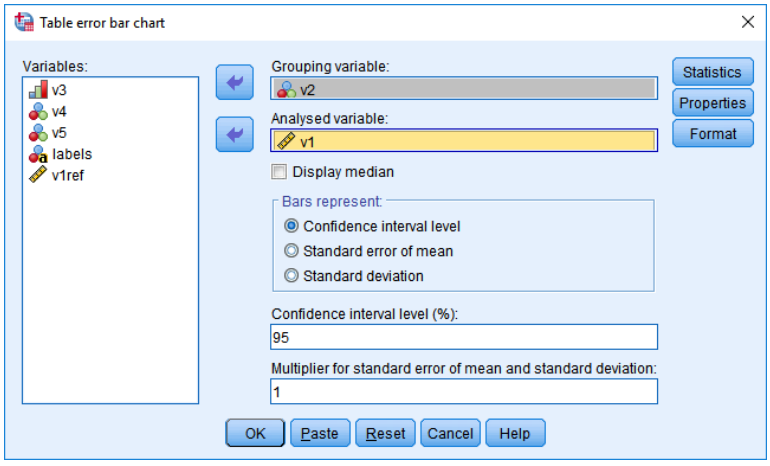


Figure 103. The Table error bar chart wizard

To display the median, tick *Display median*.

In *Bars represent*, you can define the error measure presented on charts:

- *Confidence interval level;*

- *Standard error of mean;*
- *Standard deviation.*

New parameters are available depending on the selected measure.

- In *Confidence interval level (%)*, define the level of significance to calculate limits of confidence intervals (95% by default);
- In *Multiplier for standard error of mean and standard deviation*, you can specify the number of standard deviations (or optionally, standard errors of the mean) for an interval on the chart (1 by default).

You can define the statistics shown in tables for Table Charts. Options available in menu [Statistics] are discussed in section 4.5.1.

Menu [Properties] allows you to configure detailed settings for the visualization. The available options are described in section 4.5.1.

Menu [Format] defines the sizes of visualizations and their elements. For available options, see section 4.5.1.

4.5.6. Table boxplot

The [Table boxplot] compares the differentiation of distributions of an analyzed variable within categories of a grouping variable using box plots. The chart can help assess visually the skewness and density of distribution and identify outliers. A uniform horizontal scale for charts helps compare visually the analyzed distributions. Optionally, the mean can be shown next to the median.

Use coupons	Count	Median	Minimum	Maximum	Amount spent
Application	68	$408	$253	$685	
E-mail	100	$412	$256	$644	
Leaflet	82	$376	$227	$568	
No	101	$378	$195	$597	

Figure 104. A Table boxplot (The comparison of quartiles of expenses according to voucher use)

In the chart wizard, define the grouping variable by moving a selected qualitative variable from *Variables* to *Grouping variable*. Define the continuous quantitative variable for which the statistics are to be calculated by moving it to *Analyzed variable*.

In the main window of the wizard, you can tick *Display mean* to show the mean on visualizations in the table.

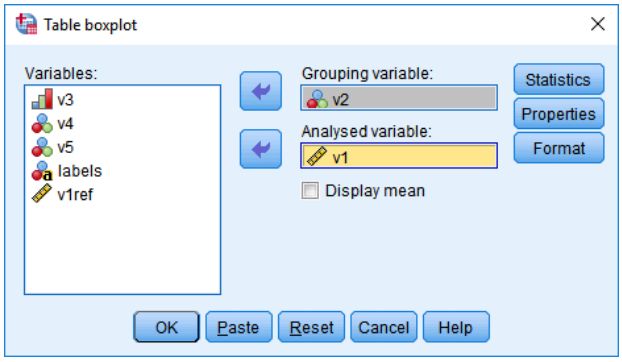


Figure 105. The Table boxplot wizard

You can define the statistics shown in tables for Table Charts. Options available in menu [Statistics] are discussed in section 4.5.1.

Menu [Properties] allows you to configure detailed settings for the visualization. The available options are described in section 4.5.1.

Menu [Format] defines the sizes of visualizations and their elements. For available options, see section 4.5.1.

4.5.7. Table bar chart

The [Table bar chart] shows selected descriptive statistics of a quantitative variable by categories of a quantitative grouping variable. Additionally, a bar chart shows a selected statistic. The chart summary can be based on the size of the grouping variable and descriptive statistics of the quantitative variable.

Type of product	Count	Mean	Sum	Maximum
RTV	317	$785	$248,943	$16,739
Household goods	267	$865	$231,051	$5,531
Cosmetics	147	$1141	$167,711	$11,807
Toys	260	$570	$148,200	$5,699
Sport	258	$498	$128,488	$3,565
Motorization	174	$579	$100,701	$3,850
Books	112	$814	$91,186	$5,164
Home and Garden	162	$530	$85,798	$2,986

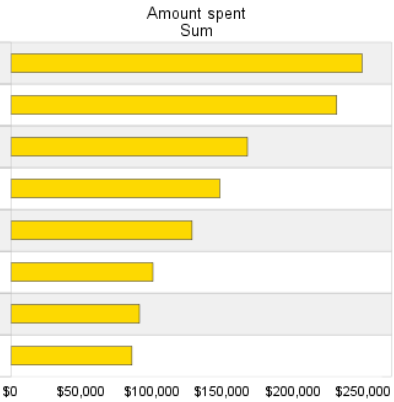


Figure 106. A Table bar chart (Summary of transactions by product types)

The grouping variable is selected by moving a qualitative variable from *Variables* to *Grouping variable*. The quantitative variable for which statistics are to be shown should be moved to *Analyzed variable (optional)*.

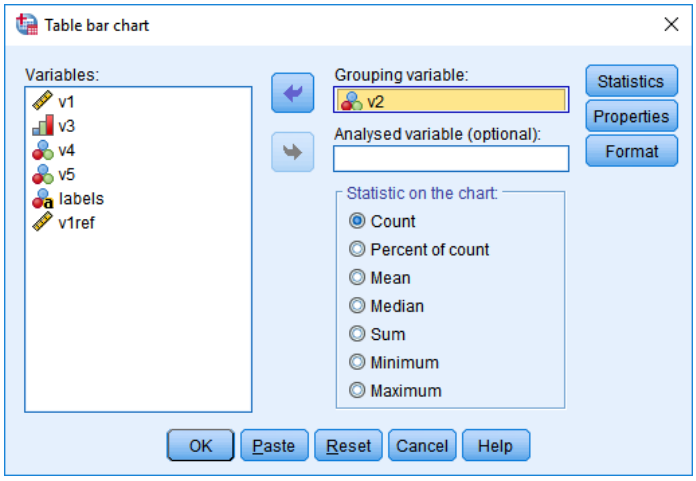


Figure 107. The Table bar chart wizard

In *Statistics on the chart*, you can select the descriptive statistic to be shown. The following options are available: *Count*, *Percent of count*, *Mean*, *Median*, *Sum*, *Minimum*, *Maximum*.

You can define the statistics shown in tables for Table Charts. Options available in menu [Statistics] are discussed in section 4.5.1.

Menu [Properties] allows you to configure detailed settings for the visualization. The available options are described in section 4.5.1.

Menu [Format] defines the sizes of visualizations and their elements. For available options, see section 4.5.1.

4.6. Dashboard

4.6.1. Dashboards: introduction and common settings

Visualizations in [Dashboard] are dashboards intended to quickly provide Legend information in an attractive and clear manner. Dashboards usually compare values to reference values, compare results with targets, or analyze results in subtotals. You can also use a custom alert variable (such as values below a set threshold or significance of a difference).

Before starting work with dashboards in PS IMAGO PRO, you need to prepare the dataset. In the case of these visualizations, the set should be aggregated by a variable with categories that are then shown on the visualization. Each category in the set has to be unique. The quantitative variables you use must represent the right statistics for grouping categories fit for the purpose (such as the mean or sum).

The dashboards discussed in the next sections, [Dartboard] and [Arrows & Traffic Lights] have common options for chart titles and styles.

The [Titles] button in the main window of the dashboard wizard opens a menu where you can define the title of the graph and its appearance options. In *Visualization titles*, you can enter a custom title in *Custom title*. With *In the chart* enabled, the title is displayed in the chart field. If *In the description* is selected, the title is shown in the report navigation pane as item title, which makes it possible to refer to it using its defined name. Option *In the chart* is available only for the [Dartboard].

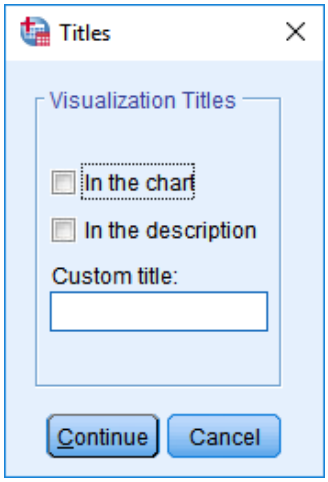


Figure 108. The dashboard title window

The [Styles] button in the main window of the chart wizard opens a menu for defining the color scheme and dimensions of the chart. The color scheme is defined in *Style*. You can also define chart dimensions here. In *Graph size (centimeters)*, enter the required width and height of the chart in *Width* and *Height*.

The [Arrows & Traffic Lights] can use a custom template in this menu. You can type the path to the template or select it with [Browse] in *Custom template*.

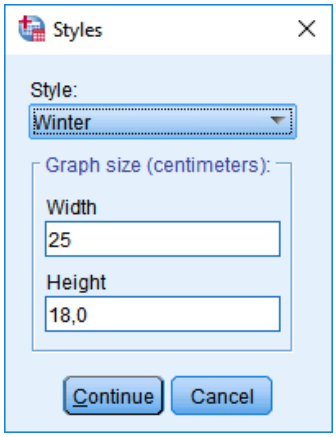


Figure 109. The Dartboard style window

The [Properties] button in the main window of the dashboard wizard opens a menu where you can define detailed appearance settings of the visualization. It looks similar for all [Percentage of Target] and [Percentage of Target Thresholds] dashboards.

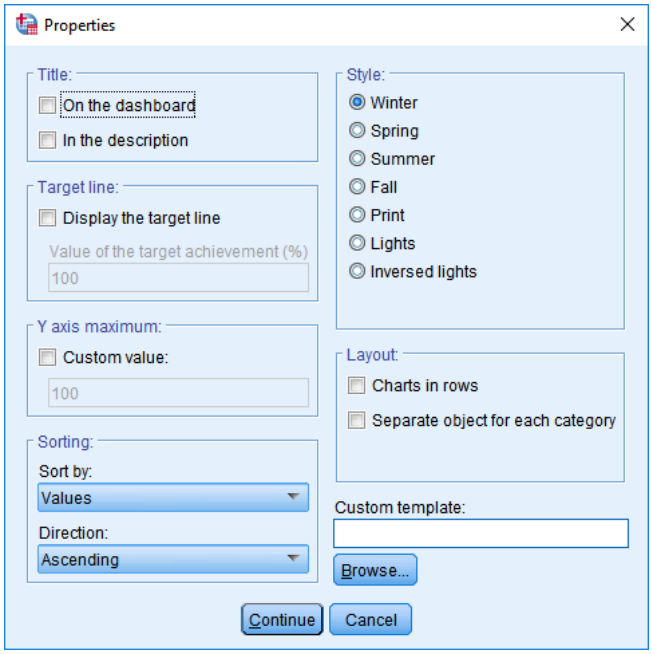


Figure 110. The dashboard Properties window

With [Properties], you can configure the following dashboard options:

- Section *Title* lets you put a title on your dashboard (*On the dashboard*) or in the item description in the navigation panel of the report window (*In the description*).
- Section *Target line* is where you can enable a target line on each gauge (as a percentage of the target variable). To display it, tick *Display the target line* and enter a percentage in *Value of the target achievement (%)*.
- In *Y-axis maximum*, you can define the maximum value for all gauges. To do this, tick *Custom value* and enter a value in the field below it (as a percentage of the target variable).
- In *Sorting*, you can define principles of sorting categories of the grouping variable. On the *Sort by* list, you can set sorting by values of the grouping variable (*Values*), labels of the grouping variable (*Labels*), and by target completion level (*Target achievement*). You can also set the sorting direction here, in *Direction*: *Ascending* or *Descending*.
- In section *Style*, you can select the color palette for gauges. Options *Lights* or *Inversed lights* color the slider or needle depending on the level of target completion for [Percentage of Target] dashboards.
- In *Layout*, you have options for chart arrangement. If you tick *Charts in row*, gauges are displayed one below another. If you tick *Separate item for each category*, the visualization is split into independent items in the report navigation window for each category of the grouping variable;
- In *Custom template*, you can select the template for the chart. You can type the path to the template or select it with [Browse].

Dashboard types have several unique sections in menu [Properties].

- Dashboards [Percentage of Target: Thermometers] and [Percentage of Target Thresholds: Thermometers]: this window can additionally display horizontal grid lines on the visualization for more precise reading. To show them, enable *Grid lines* in *Dashboard look*.

- Dashboards [Percentage of Target: Bars] and [Percentage of Target Thresholds: Bars]: table coloring options. In *Dashboard look*, you can additionally configure the visualization by enabling *Cell outlines, Alternate row colors*, and *Separate item for each category*.
- You can define the volume of a single beam for dashboard [Percentage of Target: Bars] in a filled chart option (section *Capacity of the beam* (%)). Select Custom and enter a value into the field.
- For dashboard [Percentage of Target Thresholds: Bars], you can add target completion threshold lines in '*Colored*' dashboard options by enabling Threshold lines.
- Dashboard [Percentage of Target: Bricks] has a different layout of the [Properties] menu described in section 4.6.9.
- The menu for dashboard [Dartboard] was described in section 4.6.2;
- The menu for dashboard [Arrows & Traffic Lights] was described in section 4.6.4;

The [Format] button in the main dashboard wizard window opens a menu where you can set visualization dimensions:

- *Custom width (centimeters)* – enter the desired width;
- *Custom height (centimeters)* – enter the desired height;
- *Gauge size multiplier* – sets the gauge-to-description ratio.

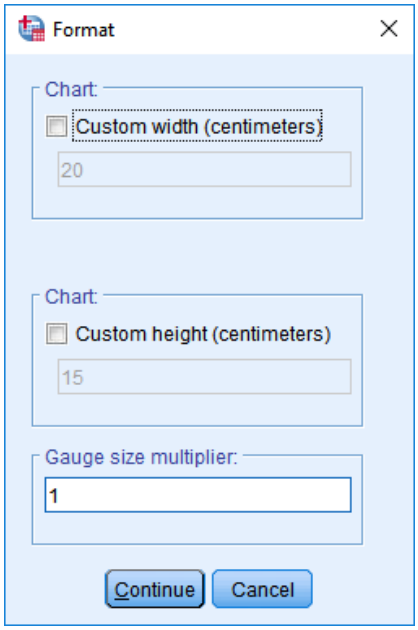


Figure 111. The Dashboard format window (Gauges and Thermometers)

Dashboards [Percentage of Target: Bars] and [Percentage of Target Thresholds: Bars] are similar to table charts. Their additional functionality is the presentation of custom alerts. In the [Format] menu, you can define size settings of a table that is an integral part of the visualization.

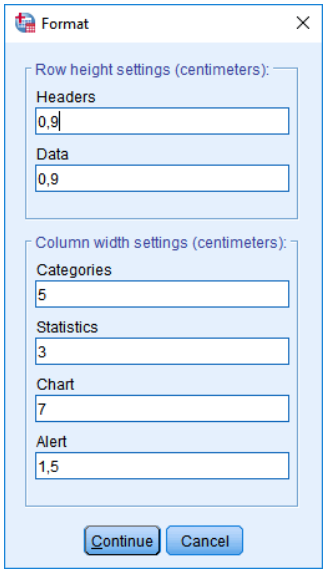


Figure 112. The Dashboard format menu (Bars)

The [Format] button for dashboards [Percentage of Target: Bars] and [Percentage of Target Thresholds: Bars] sets the following parameters:

- Section *Row height settings (centimeters)* defines the height of table headers (field: *Headers*) and table cell height (field *Data*).
- In section *Column width settings (centimeters)*, you can set the width of table cells that contain names of categories (field *Categories*), values of statistics (field *Statistics*), cells with charts (field *Chart*), and warnings (field *Alert*).

Additionally, dashboard [Percentage of Target: Bricks] has header height settings (section *Headers*) and label size settings (section *Labels*) in menu [Format] apart from standard formatting settings.

The [Legend] button in the main window opens a menu where you can define dashboard legend parameters in detail.

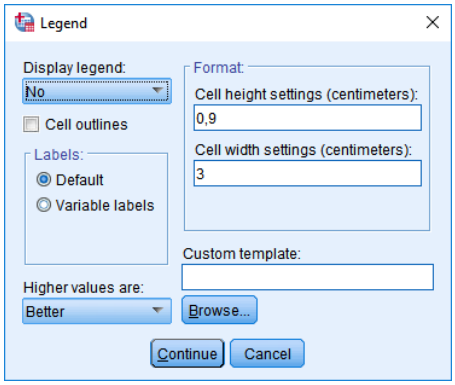


Figure 113. Settings of dashboard Legend

In *Display legend*, define how the legend is displayed.

- Value: *No* – No Legend is displayed;
- Value: *Horizontally* – The legend layout is horizontal;
- Value: *Vertically* – The legend layout is vertical.

With *Cell outlines*, you can display cell borders on the legend.

With *Labels*, you can define how labels are assigned to items in the legend. Labels can be assigned automatically (*Default*) or the main item label can be assigned according to the label of the variable; automatic labels are used for other cases (*Variable labels*).

Option *Higher values are* specifies what labels are assigned to the item related to target completion in the legend. If you choose *Better*, an item above the target value is described as *Good,* and an item below the target is *Bad*. If you choose *Worse*, an item above the target value is described as *Bad* and an item below the target, is *Good*.

In *Format*, you can modify the height and width of a cell by entering specific values (in centimeters) in *Cell height settings (centimeters)* and *Cell width settings (centimeters)*.

In *Custom template*, you can apply a separate chart template file to the legend. You can type the path to the template or select it with [Browse].

4.6.2. Matrix

The procedure presents the degree of completion of a target in the designated groups on the dashboard. The PS DASHBOARD MATRIX procedure compares the actual values of the task implementation with the target values and presents the results in the form of a table. Depending on the selected mode, the colors of the markers or, additionally, their shape, represent the exceeding of the threshold values or the target completion status. The use of threshold values allows for visualisation in three colors (percentage of target completion below or above the upper threshold and percentage of completion between thresholds). Lack of thresholds use results in the two-color visualisation (values above or below the plan).

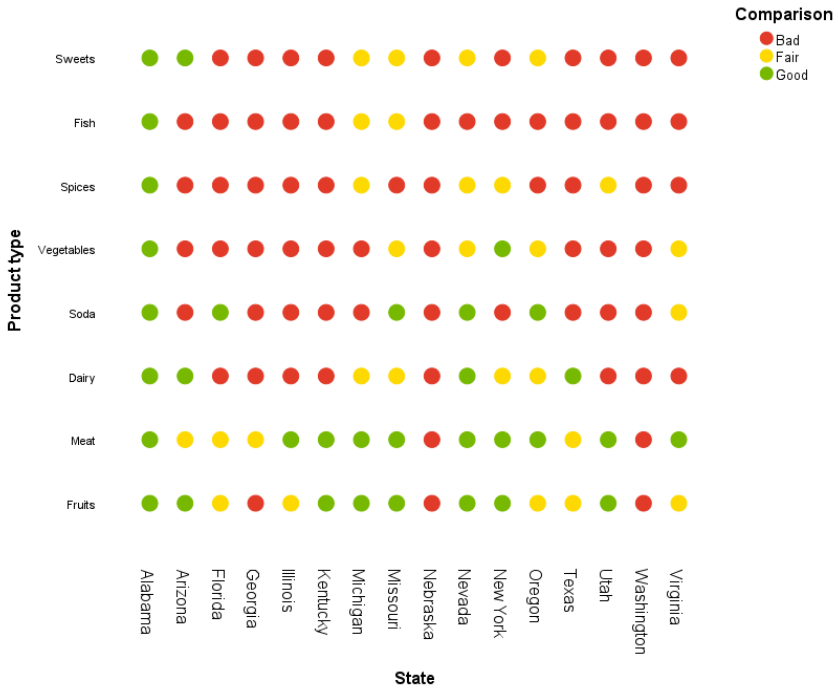


Figure 114 Dashboard matrix output object

The procedure requires the following variables to be indicated for proper operation:

- Variable that will be presented in table columns - [Column variable] field;
- Variable that will be presented in the table rows - [Row variable] field;
- Variable with actual values - [Actual values (Current)] field;
- Variable with reference values - [Target values (Planned)] field.

The following can be indicated as optional variables:

- Variable responsible for scaling markers in the table - [Marker size] field.

After selecting the [Use thresholds] option, it is possible to use variables with threshold values:

- Variable with a lower threshold - [Percentage below] field;
- Variable with an upper threshold - [Percentage above] field.

Visualisation works in one of two modes, which should be selected in the *Chart type* section:

- *Lights*: exceeding the threshold or target values will be marked with colors only;
- *Arrows*: exceeding the threshold or target values will be marked with colors and arrow visualization.

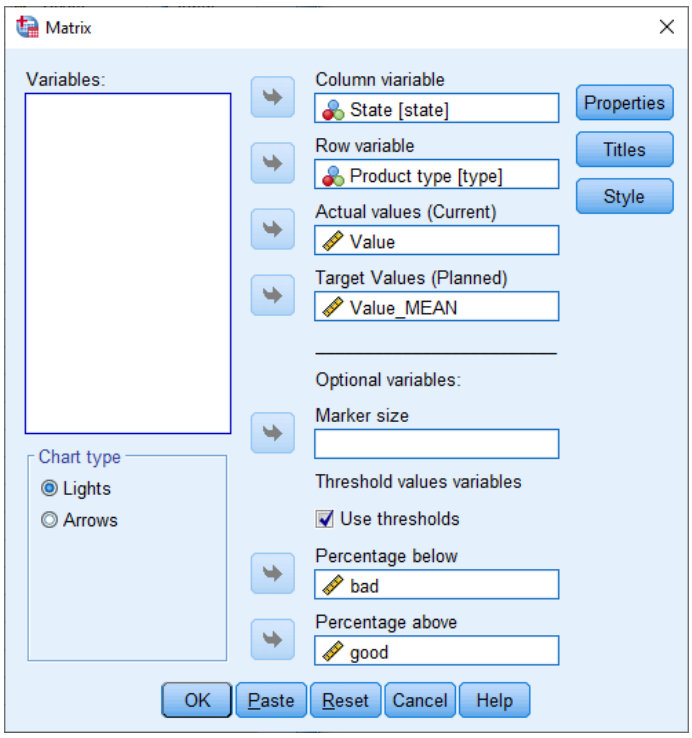


Figure 115 The window of procedure Matrix

The *Properties* window allows you to select detailed visualisation settings:

- The *Marker type* list allows you to define the shape of the markers displayed on the graph. You can choose from circles, squares and stars. Note! This option works only if in the main window of the procedure, in the [Chart type] section, the Lights mode has been selected;
- The *Column header* section allows you to select the location of the column headers. It is possible to display headers above and below the columns;

- The *Grid display* option enables the display of the cell grid in the table;
- The *Legend display* option displays the legend.

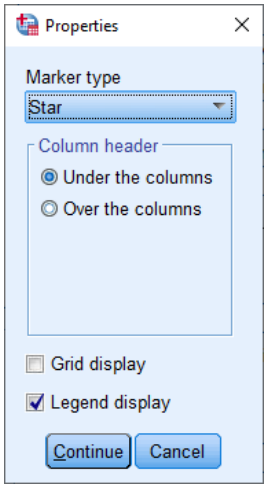


Figure 116 Matrix options window

The [Titles] button in the main window of the chart wizard opens a menu where you can define the title of the chart and its appearance options. It is discussed in section 4.6.1.

The [Styles] button in the main window of the chart wizard opens a menu for defining the color scheme and dimensions of the chart. It is discussed in section 4.6.1.

4.6.3. Dartboard

The [Dartboard] is a non-standard method of presenting results in subtotals in relation to a reference value. Results are shown as a dartboard showing analyzed categories so that higher values are closer to the center than lower ones. You can define intervals for dashboard [Dartboard]. They are represented by color bands. You can also add a reference line. Values in individual groups can be presented using the distance to the center, point size, and the intensity of the color of the point representing a group.

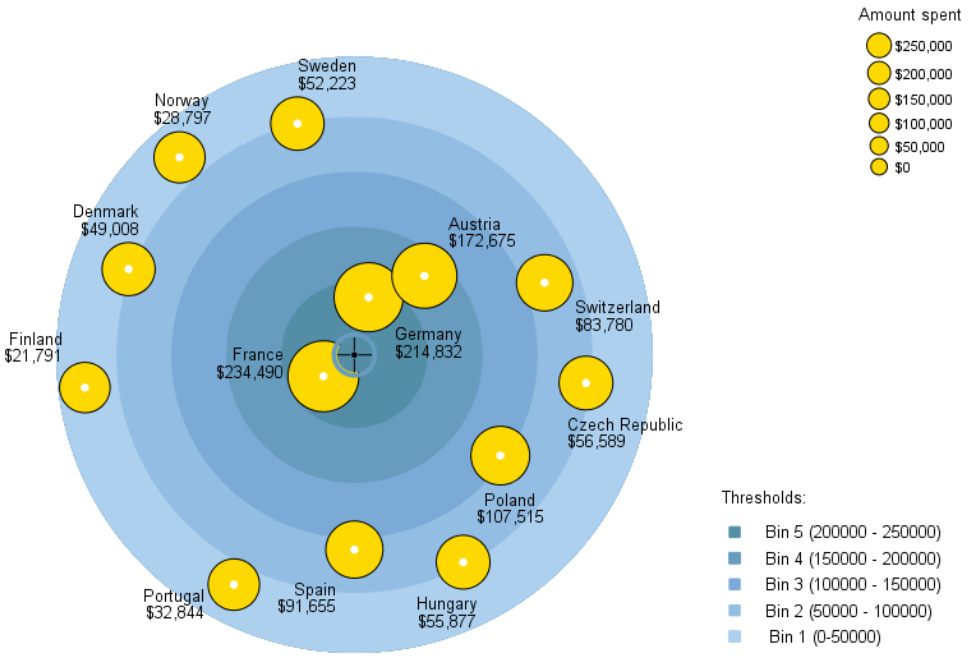


Figure 117. A dartboard dashboard (Sale value by country)

The grouping variable is selected by moving a variable from *Variables* to *Categories*. The analyzed quantitative variable should be moved to *Values*.

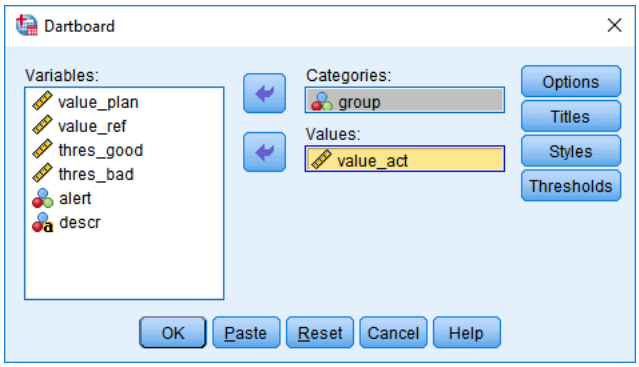


Figure 118. The Dartboard wizard

The [Options] button in the main wizard window opens a menu for defining several appearance settings for the visualization.

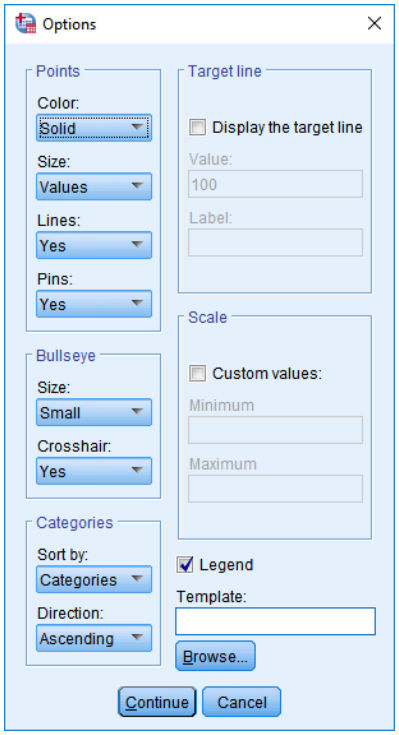


Figure 119. Dartboard options

In *Points*, there are settings for points that represent categories of the grouping variable shown on the visualization.

- In *Color*, you can set the coloring mode for points by category (variant *Categories*), uniform (variant *Solid*), or with a gradient by values (variant *Values*);
- In *Size*, you can choose how points are scaled by the value of the analyzed variable (variant *Values*) or set a uniform size (variants *Small* or *Large*);
- With *Lines*, you can show or hide lines connecting points to the center of the chart (variants *Yes* and *No*);
- Also, groups can be presented as points or pins if you set *Pins* to *Yes* or *No*.

In section *Bull's-eye*, field *Size*, you can select the size of the point representing the bull's-eye (options: *Small*, *Large*). In *Crosshair*, set whether a cross (*Yes*) or point (*No*) is displayed.

In *Categories*, you can define principles of sorting for categories of the grouping variable shown as points on the chart. With *Sort by*, you can set sorting by values of the grouping variable (*Categories*), labels of the grouping variable (*Labels*), and by statistics of the analyzed variable (*Values*). You can also set the sorting direction here, in *Direction*: *Ascending* or *Descending*.

In *Target line*, you can optionally define parameters for a target line to be shown regardless of the options for dividing the dartboard into sections. If you enable *Display the target line*, the *Value* field is activated where you can define the position of lines and the *Label* field where you can set the label for the line that is shown in the legend.

Section *Scale* lets you enter the minimum (dartboard's edge) and maximum (bull's-eye) values. These values are limits for intervals that are generated automatically or defined by you. To define them, tick *Custom values* and enter values in *Minimum* and *Maximum*.

With *Legend*, you can display a legend containing the color scale and size scale for points representing categories of the grouping variable, interval values, and the target line label, as appropriate.

In *Template*, you can select the template for the chart. You can type the path to the template or select it with [Browse].

Settings in [Titles] were described in the introductory section 4.6.1.

Settings in [Styles] were described in the introductory section 4.6.1.

The [Thresholds] button in the main wizard window defines intervals shown as bands on the dartboard.

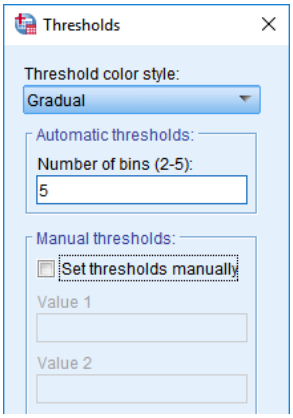


Figure 120. A part of the threshold definition window

Option *Threshold color style* sets the color sequence for thresholds. You can use a gradient color from the brightest at the outside to the darkest in the center (option *Gradual*) or two alternating hues (option *Alternant*).

In *Automatic thresholds*, you can define the number of intervals shown on the visualization. In *Number of bins (2–5)*, you can enter 2 to 5 thresholds. The dartboard is divided into the set number of equal intervals. The initial and final values depend on the maximum and minimum values defined in menu [Options].

Alternatively, you can enter values and optional labels for intervals manually. To do this, go to *Manual thresholds*, tick *Set thresholds manually*, and then enter threshold values in consecutive fields. You can, optionally, enter label names in the fields below. Also, when you define the intervals manually, the initial and final value (the marginal value of the first interval and the value of the bull's-eye) are set by defining the maximum and minimum values in [Options]. Enter threshold values for individual intervals into the fields.

4.6.4. Arrows & Traffic Lights

Dashboard [Arrows & Traffic Lights] can present categories of a grouping variable in three custom intervals, thresholds that can be freely considered bad, mediocre, and good. It can show either arrows or lights.

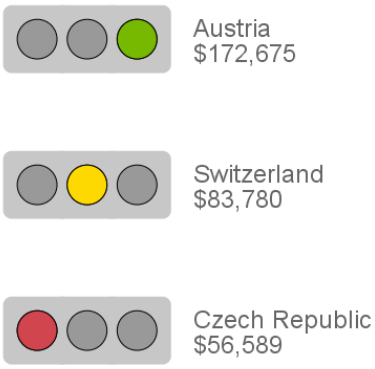


Figure 121. An element of Arrows & Traffic Lights, Traffic Lights mode (The sales value in three selected countries)

The grouping variable is defined by moving a qualitative variable from *Variables* to *Categories*. The analyzed quantitative variable is defined by moving a variable to *Values*.

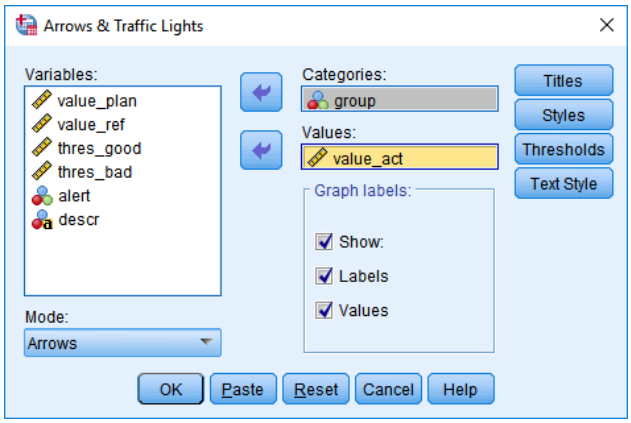


Figure 122. The Arrows & Traffic Lights wizard

In *Graph labels*, you can define the description of categories shown on the visualization by ticking *Show*. You can display labels of the grouping variable (option *Labels*) and values of the analyzed variable (option *Values*). If you disable *Show*, category descriptions are not displayed.

The *Mode* drop-down list offers a selection of types of visualization and presentation of values of the analyzed variable for categories of the grouping variable.

- The *Arrows* mode shows values for categories of the grouping variable using tilt and color of arrows. With colors, you can present the assignment to the three intervals the threshold values of which can be calculated automatically or customized in *Thresholds*. Arrows can point not only straight upwards or downwards: a positive angle means values above the central value, while a negative angle means values lower than the central value. The central value (0 degrees) is the arithmetic mean of the minimum and maximum in the dataset.
- The *Traffic lights* mode helps assess the classification to one of three intervals using traffic lights. Threshold values for the intervals can be computed automatically or defined by the user with the *Thresholds* menu. The light color and its position on the stack are evaluated.

Settings in [Titles] were described in the introductory section 4.6.1.

Settings in [Styles] were described in the introductory section 4.6.1.

The [Thresholds] button in the main wizard window defines three intervals shown as arrow or light colors. Section *Scale* is where you can enter custom values for the *Minimum* and *Maximum*. When these fields are left empty, the highest and the lowest values in the data are used.

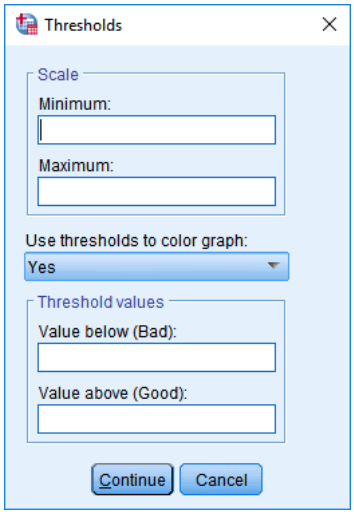


Figure 123. The menu for defining thresholds

Option *Use thresholds to color graph* allows you to decide whether threshold values should determine coloring (option *Yes*) or all elements should be the same color (option *No*).

In *Threshold values*, you can enter values of thresholds that identify a 'bad' result in *Value below (Bad)* and 'good' in *Value above (Good)*. If these fields are left empty, the min.-max. range is automatically divided into three equal parts.

The [Text styles] button in the main chart wizard window offers options to define parameters of the font used for labels on the chart:

- *Font family* – defines the font;
- *Font weight* – select *Normal* or *Bold* font;
- *Font size* – defines the font size;
- *Font style* – available are *Normal* and *Italics*;
- *Color* – coloring of the labels;
- *Justification* – alignment selection (*Left*, *Center*, *Right*).

4.6.5. Dashboards Percentage of Target – introduction

Dashboards in the [Percentage of target] subsection compare values of a quantitative variable for individual categories of a grouping variable with a set planned value (target). Values shown on the dashboard result from a relative (percentage) comparison of values of an analyzed value with planned values. You can, optionally, include values of a third (reference) variable on the visualization and values of a custom dichotomous alert variable calculated and saved in the dataset as 0/1.

[Percentage of Target] dashboards come in 4 varieties in PS IMAGO PRO:

- *Gauge* – a visualization shown as a gauge with a pointer;
- *Thermometers* – a visualization of a liquid thermometer;

- *Bars* – a visualization similar to a table chart (with selected statistics) where an alert variable can be used;
- *Bricks* – a visualization in the form of bricks filling up empty spaces.

4.6.6. Dashboards Percentage of Target: Gauge

The [Gauge] shows the level of completion of the target using generic gauges resembling speedometers generated for each category of the grouping variable. You can also add a text variable with any text (such as a value of a statistic) to be used as a description of individual gauges.

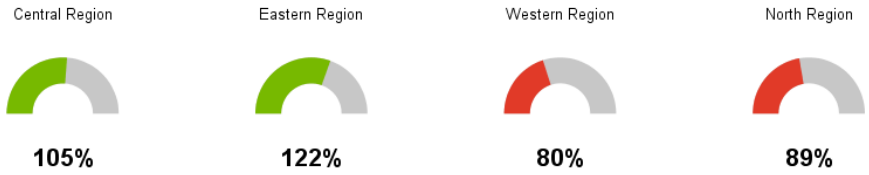


Figure 124. A percentage of target: gauge dashboard (The completion of sales target by region)

The grouping variable is defined by moving a qualitative variable from *Variables* to *Group categories (Categories)*. Move the quantitative variable with the analyzed values to *Actual values (Actual)*. The variable with planned values that are the reference points for the actual values need to be moved to *Target value (Plan)*. You can, optionally, use a text variable with descriptions for each category of the grouping variable. Move it to *Description* in *Optional variables*.

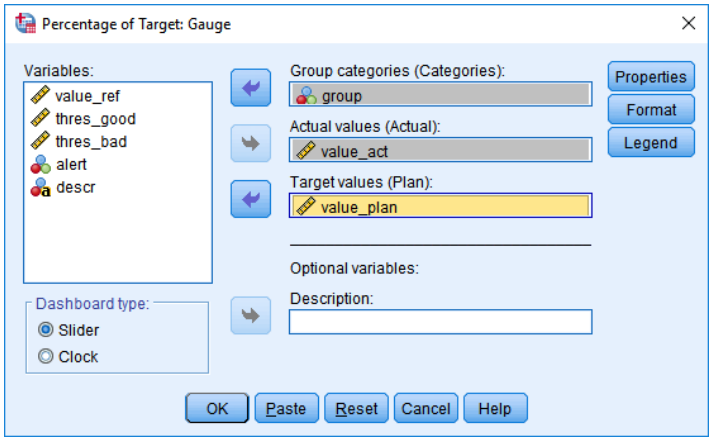


Figure 125. The Percentage of Target: Gauge wizard

You can choose the type of the visualization in *Dashboard type*. Two options are available:

- *Slider* – a visualization of a slider filling up the gauge area depending on the target completion level;
- *Clock* – a visualization of a pointer representing the target completion level by indicating values on the gauge.

The [Properties] button in the main window of the dashboard wizard opens a menu where you can define appearance settings of the visualization. They are discussed in detail in section 4.6.1.

The [Format] button in the main window opens a menu where you can define visualization dimensions. For details of available options, see section 4.6.1.

The [Legend] button in the main window opens a menu where you can define legend parameters. For details of available options, see the initial section on common dashboard settings (4.6.1).

4.6.7. Dashboard Percentage of Target: Thermometers

The [Percentage of Target: Thermometers] dashboard shows the level of completion of the target using a generic thermometer for each category of the grouping variable. Charts can present a reference variable value as a circle as well (such as a value for a previous period). You can also, optionally, add a text variable with any text (such as a value of a statistic) to be used as a description of individual gauges.

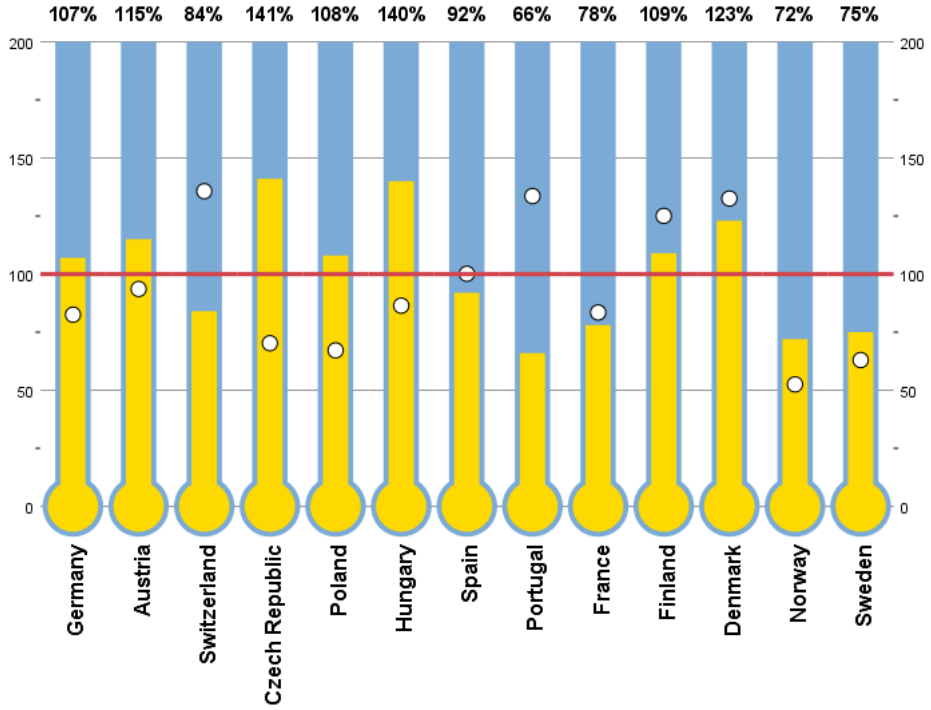


Figure 126. A percentage of target: thermometers dashboard (The completion of sales target by office at home)

The grouping variable is defined by moving a qualitative variable from *Variables* to *Group categories (Categories)*. Move the quantitative variable with the analyzed values to *Actual values (Actual)*. The variable with the planned values that are the points of reference for the actual values should be moved to *Target values (Plan)*. In *Optional variables*, you can define an additional variable with reference values by moving it to *Reference values (reference)*. You can, optionally, use a text variable with descriptions for each category of the grouping variable. Move it to *Description*.

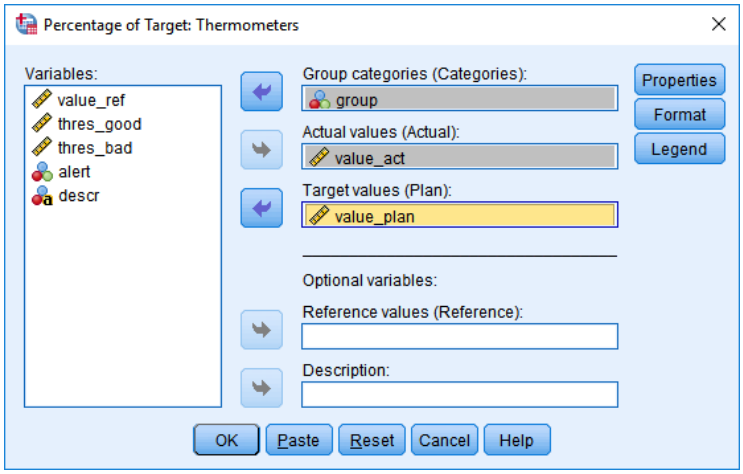


Figure 127. The Percentage of Target: Thermometers wizard

The [Properties] button in the main window of the dashboard wizard opens a menu where you can define appearance settings of the visualization. They are discussed in detail in section 4.6.1.

The [Format] button in the main window opens a menu where you can define visualization dimensions. For details of available options, see section 4.6.1.

The [Legend] button in the main window opens a menu where you can define legend parameters. For details of available options, see the initial section on common dashboard settings (4.6.1).

4.6.8. Dashboard Percentage of Target: Bars

The [Percentage of Target: Bars] dashboard shows the target completion level using a visualization similar to the table chart. The target completion level is represented by a bar filling a cell with the chart. Charts can present a reference variable value as a dot as well (such as a value for a previous period). The table may contain an additional custom alert variable as a dichotomous 0/1 variable. It is represented by a red dot in a separate column. You can also, optionally, add a text variable with any text (such as a value of a statistic) to be used as a description of individual categories.

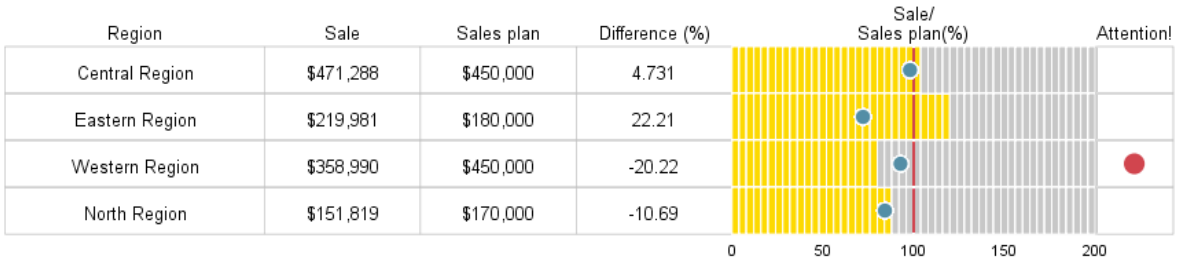


Figure 128. A percentage of target: bars dashboard (The completion of sales target by region)

The grouping variable is selected by moving variables from *Variables* to *Group categories (Categories)*. The variable shown on the chart should be moved to *Actual values (Actual)*, planned values, to *Target values (Plan)*. In *Optional variables*, you can put a reference variable (field *Reference values (reference)*), a variable with an alert (field *Alert*), and a description variable (field *Description*).

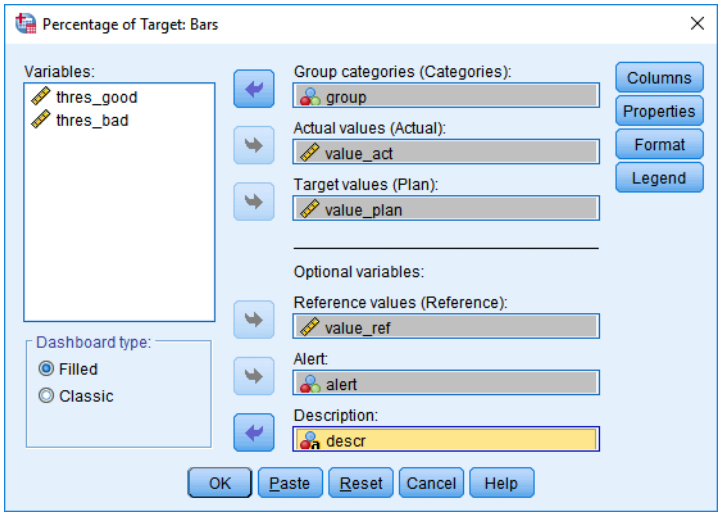


Figure 129. The Percentage of Target: Bars wizard

In *Dashboard type*, select one of two forms of the visualization:

- *Filled* – a visualization of colored beams filling the background;
- *Classic* – a visualization similar to the bar chart (no background).

The [Columns] button in the main window of the wizard offers a choice of statistics shown in table cells. You can also color individual columns of the visualization there.

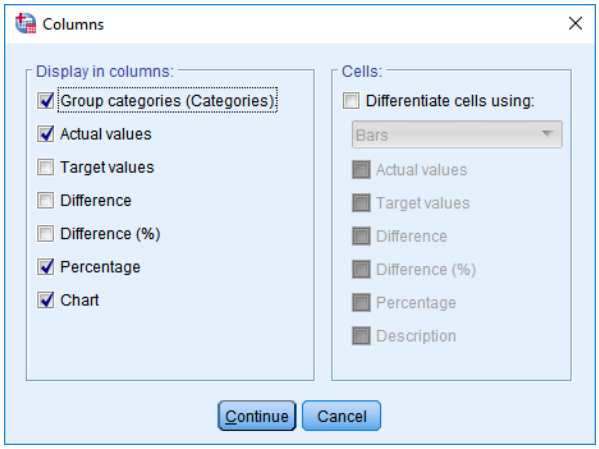


Figure 130. The Percentage of Target: Bars column settings

In *Display in columns*, you can enable columns with the following content: *Group categories (Categories)*, *Actual values*, *Target values*, *Difference*, *Difference (%)*, *Percentage* (target completion percentage), and *Chart*.

In *Cells*, you can define the fill of table cells after ticking *Differentiate cells using*. There are two fill modes available, gradient coloring (option *Gradient*) or bar chart fill (option *Bars*). Define the relevant columns to be colored in other fields. You can choose from *Actual values*, *Target values*, *Difference*, *Difference in %*, *Percentage*, and *Description*.

The [Properties] button in the main window of the dashboard wizard opens a menu where you can define appearance settings of the visualization. They are discussed in detail in section 4.6.1.

The [Format] button in the main window opens a menu where you can define visualization dimensions. For details of available options, see section 4.6.1.

The [Legend] button in the main window opens a menu where you can define legend parameters. For details of available options, see the initial section on common dashboard settings (4.6.1).

4.6.9. Dashboard Percentage of Target: Bricks

The [Percentage of Target: Bricks] show the level of target completion using a chart with filled and empty bricks. The target completion level is represented by the level of fill of the bricks.

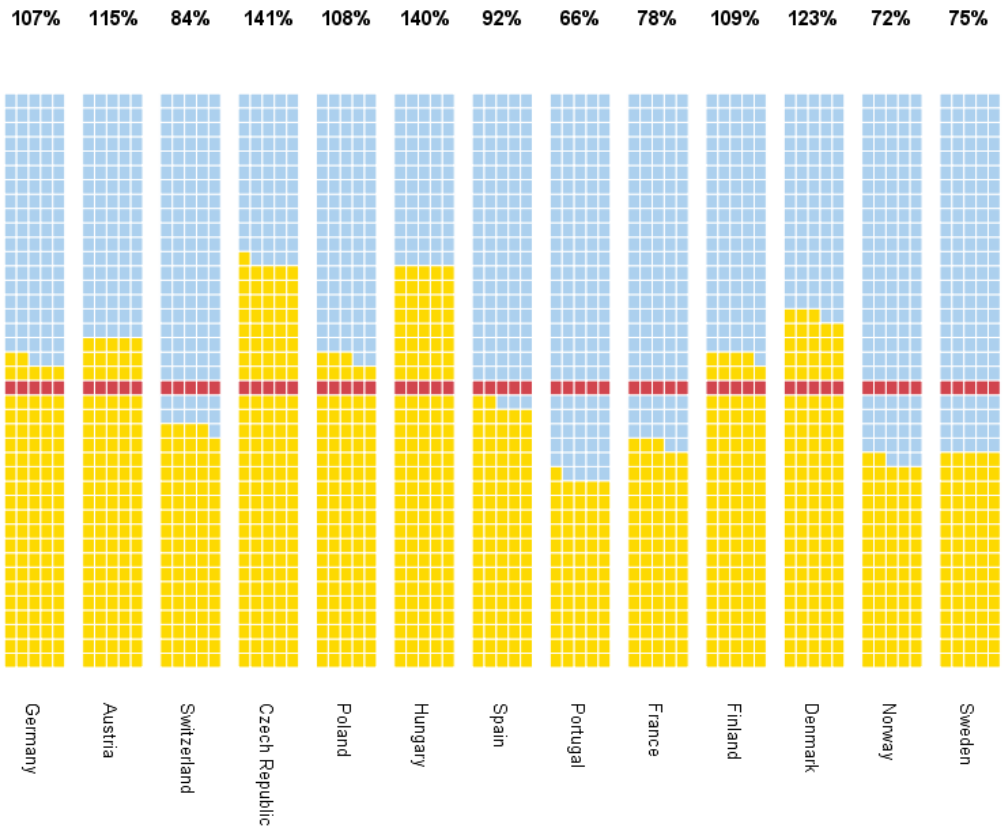


Figure 131. A percentage of target: bricks dashboard (The completion of sales target by office at home)

The grouping variable is selected by moving variables from *Variables* to *Group categories (Categories)*. The variable shown on the chart should be moved to *Actual values (Actual)*, planned values, to *Target values (Plan)*. In *Optional variables*, you can put a variable with an alternative description of categories (field *Description*).

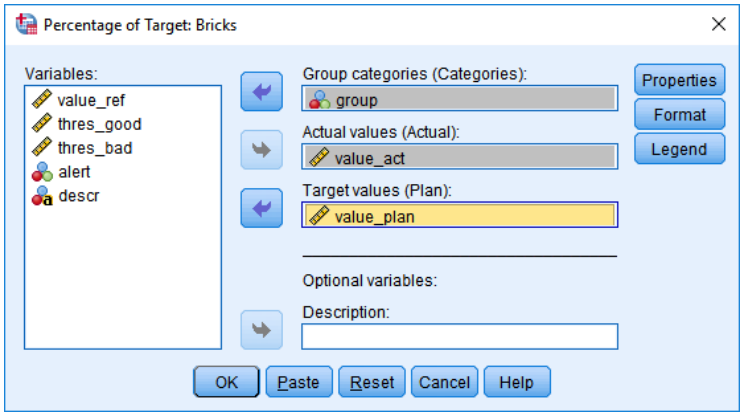


Figure 132. The Percentage of Target: Bricks wizard

The [Properties] button in the main window opens a menu where you can define appearance settings of the visualization.

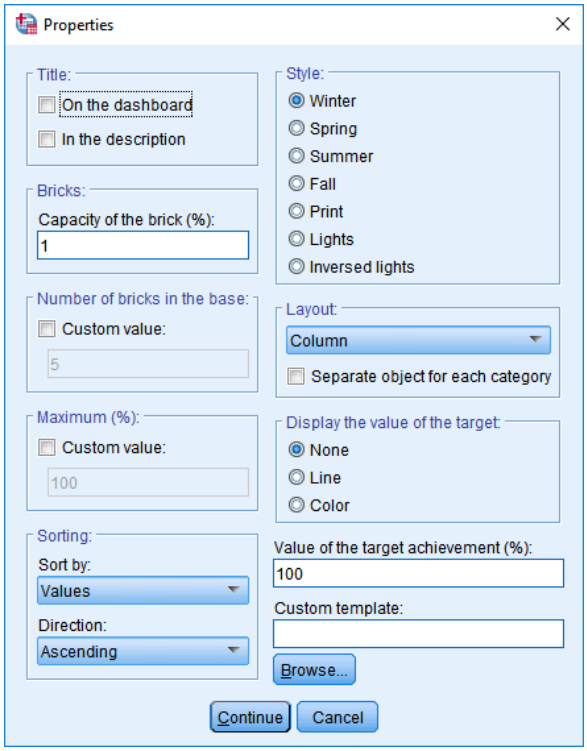


Figure 133. Settings of the Bricks dashboard

Menu [Properties] has the following settings for the visualization:

- Section *Title* lets you put a title on your dashboard (*On the dashboard*) or in the item description in the navigation panel of the report window (*In the description*).
- In *Bricks*, define the number of percentage points represented by a single brick. Enter the value in *Capacity of the brick (%)*.
- In *Number of bricks in the base* determine the width of the base of the visualization. Select *Custom value* and enter a value into the field.
- In *Maximum (%)*, you can define the maximum value for all charts. To do this, tick *Custom value* and then enter a value in the field below it (as a percentage of the target variable).

- In *Sorting*, you can define principles of sorting categories of the grouping variable. In *Sort by* list, you can set sorting by values of the grouping variable (*Values*), labels of the grouping variable (*Labels*), and by target completion level (*Target achievement*). You can also choose the sorting direction here, in *Direction*: *Ascending* or *Descending*.
- In section *Style*, you can select the color palette.
- *Layout* defines the brick layout for the visualization. Variant *Column* of the drop-down list arranges bricks as consecutive bars laid out horizontally (growing upwards). The *Rows* variant arranges bricks vertically, but they grow upwards as well. The *Rows (transposed)* variant arranges bricks vertically, but charts are reversed, and bricks grow from left to right. You can, additionally, generate a separate chart for each category of the grouping variable if you tick *Separate item for each category*.
- In *Display the value of the target,* you can add the target value for each chart. The *None* option hides the target value, option *Line* shows it as a red line, and option *Color* makes bricks representing values above the target a different color than bricks below the target.
- In *Value of the target achievement (%)*, you can define the percentage of target completion.
- In *Custom template*, you can select the template for the chart. You can type the path to the template or select it with [Browse].

The [Format] button in the main window opens a menu where you can define visualization dimensions. For details of available options, see section 4.6.1.

The [Legend] button in the main window opens a menu where you can define legend parameters. For details of available options, see the initial section on common dashboard settings (4.6.1).

4.6.10. Dashboards Percentage of Target Thresholds – introduction

Dashboards in the [Percentage of target Thresholds] subsection compare values of a quantitative variable for individual categories of a grouping variable with a set planned value (target). An additional feature of [Percentage of Target Thresholds] dashboards compared to the previous subtotal is the option to represent the target completion level as a percentage interval apart from a defined specific percentage value (*Target line*). Percentage threshold values should be introduced to the data set for each case. Below these values, values of an analyzed variable are below target; values exceeding these values are above target. Values between them are considered completion of a certain level of the target. The thresholds can be unique for each category of the grouping variable. With [Percentage of Target Thresholds], you can, optionally, include a second (reference) variable on the visualization and values of a custom dichotomous alert variable calculated and saved in the dataset as 0/1. The dashboards present a percentage comparison.

[Percentage of Target Thresholds] dashboards come in 3 varieties in PS IMAGO PRO:

- *Thermometers* – a visualization of a liquid thermometer;
- *Gauge* – a visualization shown as a gauge with a pointer;
- *Bars* – a visualization similar to a table chart (with selected statistics) where an alert variable can be used.

4.6.11. Dashboard Percentage of Target Thresholds: Thermometers

The [Percentage of Target Thresholds: Thermometers] dashboard shows the level of completion of the target using a generic thermometer for each category of the grouping variable. Charts can present a reference variable value as a circle as well (such as a value for a previous period). You can also, optionally, add a text variable with any text (such as a value of a statistic) to be used as a description of individual gauges. The thresholds are marked as fields in different colors that are the background for the symbolic liquid reflecting the target completion.

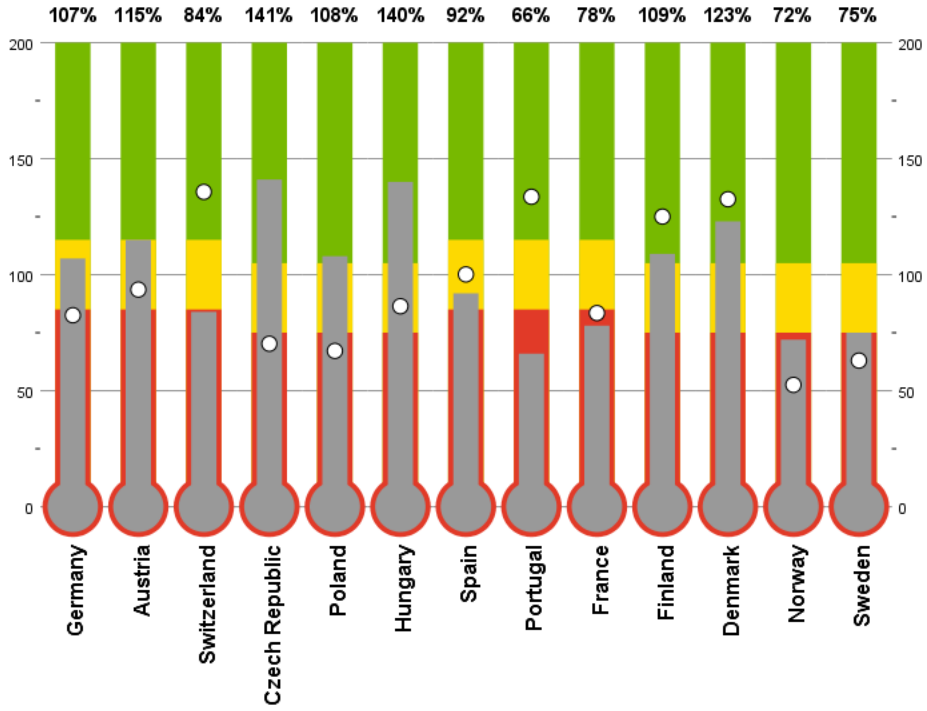


Figure 134. Percentage of Target: Thermometers (The completion of sales target by office at home)

The grouping variable is defined by moving a qualitative variable from *Variables* to *Group categories (Categories)*. Move the quantitative variable with the analyzed values to *Actual values (Actual)*. The variable with the planned values that are the points of reference for the actual values should be moved to *Target values (Plan)*. The variable representing a percentage interval below which the result of comparison with the target is considered bad has to be put into *Percentage below (Bad)*. Similarly, the variable representing a percentage interval above which the result of comparison with the target is considered better than expected has to be put into *Percentage above (Good)*. In *Optional variables*, you can define an additional variable with reference values by moving it to *Reference values (reference)*. You can, additionally, use a text variable with descriptions for each category of the grouping variable. Move it to *Description*.

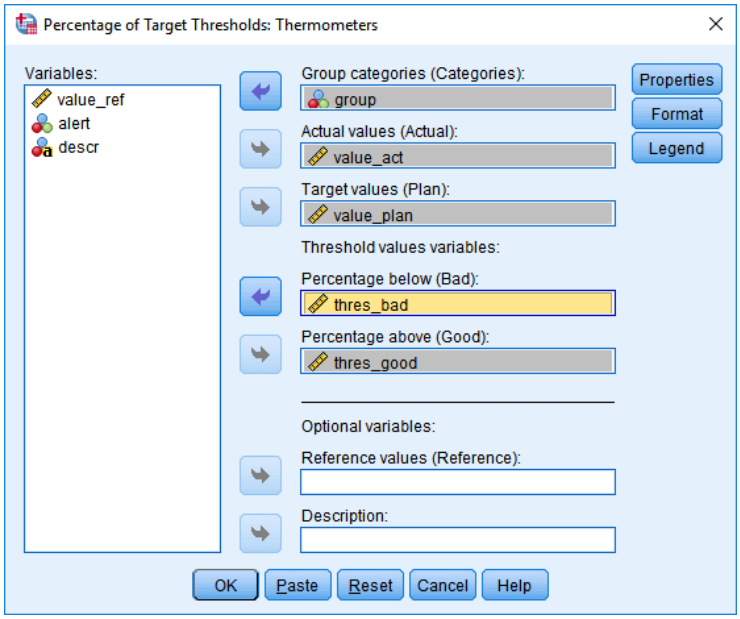


Figure 135. The Percentage of Target Threshold: Thermometers wizard

The [Properties] button in the main window of the dashboard wizard opens a menu where you can define appearance settings of the visualization. They are discussed in detail in section 4.6.1.

The [Format] button in the main window opens a menu where you can define visualization dimensions. For details of available options, see section 4.6.1.

The [Legend] button in the main window opens a menu where you can define legend parameters. For details of available options, see the initial section on common dashboard settings (4.6.1).

4.6.12. Dashboard Percentage of Target Thresholds: Gauge

The [Percentage of Target Thresholds: Gauge] shows the level of completion of the target using a generic gauge resembling a speedometer for each category of the grouping variable. You can put intervals on the gauge scale to identify values below and above the planned target completion. You can also add a text variable with any text (such as a value of a statistic) to be used as a description of individual gauges.

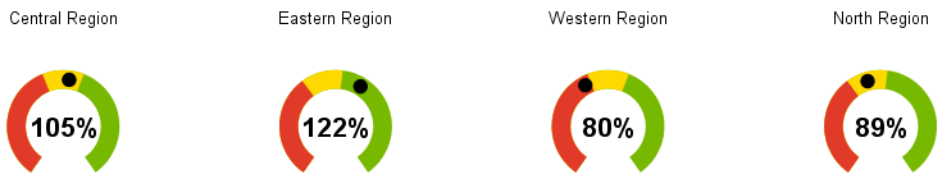


Figure 136. Dashboard Percentage of Target Thresholds: Gauge (The completion of sales target by region)

The grouping variable is defined by moving a qualitative variable from *Variables* to *Group categories (Categories)*. Move the quantitative variable with the analyzed values to *Actual values (Actual)*. The variable with the planned values that are the points of reference for the actual values should be moved to *Target values (Plan)*. Variables that define thresholds of target completion are put in *Percentage below (Bad)* – the value of the lower threshold and *Percentage above (Good)* – the value

of the upper threshold. You can, optionally, use a text variable with descriptions for each category of the grouping variable. Move it to *Description* in *Optional variables*.

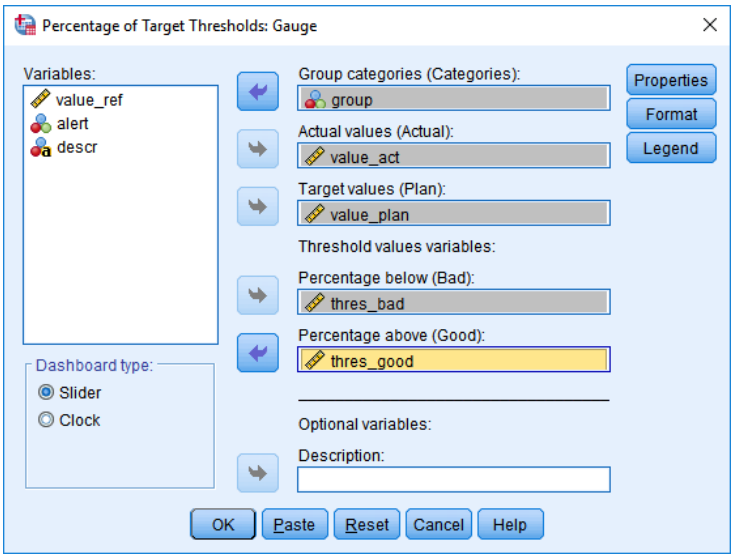


Figure 137. The Percentage of Target Thresholds: Gauge wizard

You can choose the type of visualization in *Dashboard type*. Two options are available:

- *Slider* – a visualization of a slider filling up the gauge area depending on the target completion level;
- *Clock* – a visualization of a pointer representing the target completion level by indicating values on the gauge.

The [Properties] button in the main window of the dashboard wizard opens a menu where you can define appearance settings of the visualization. They are discussed in detail in section 4.6.1.

The [Format] button in the main window opens a menu where you can define visualization dimensions. For details of available options, see section 4.6.1.

The [Legend] button in the main window opens a menu where you can define legend parameters. For details of available options, see the initial section on common dashboard settings (4.6.1).

4.6.13. Dashboard Percentage of Target Thresholds: Bars

The [Percentage of Target Thresholds: Bars] dashboard shows the target completion level using a visualization similar to the table chart. The target completion level is represented by a bar filling a cell with the chart. The bar background is custom upper and lower intervals. Charts can present a reference variable value as a line as well (such as a value for a previous period). The table may contain an additional custom alert variable as a dichotomous 0/1 variable. It is represented by a red dot in a separate column. You can also, optionally, add a text variable with any text (such as a value of a statistic) to be used as a description of individual categories.

Region	Sale	Sales plan	Difference (%)	Sale/ Sales plan(%)	Attention!
Central Region	$471,288	$450,000	4.731		
Eastern Region	$219,981	$180,000	22.21		
Western Region	$358,990	$450,000	-20.22		
North Region	$151,819	$170,000	-10.69		

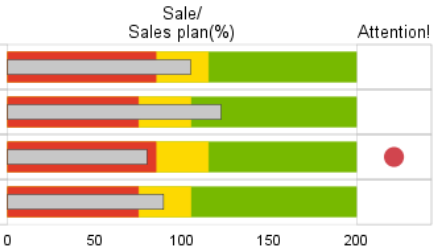


Figure 138. Dashboard Percentage of Target Thresholds: Bars (The completion of sales target by region)

The grouping variable is selected by moving variables from *Variables* to *Group categories (Categories)*. The variable shown on the chart should be moved to *Actual values (Actual)*, planned values, to *Target values (Plan)*. Variables that define thresholds of target completion are put in *Percentage below (Bad)* – the value of the lower threshold and *Percentage above (Good)* – the value of the upper threshold. In *Optional variables*, you can put a reference variable (field *Reference values (reference)*), a variable with an alert (field *Alert*), and a description variable (field *Description*).

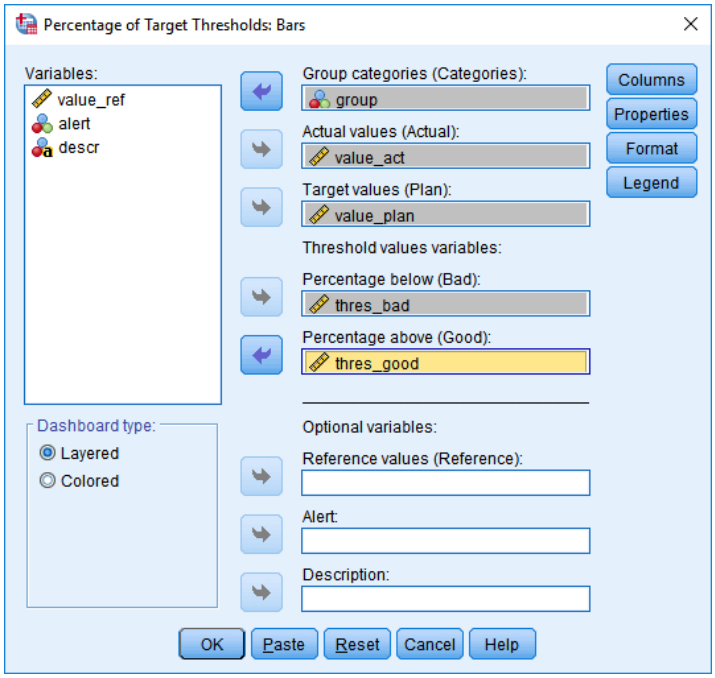


Figure 139. The Percentage of Target Thresholds: Bars wizard

In *Dashboard type*, select one of two forms of the visualization:

- *Layered* – an overlay chart where the intervals are in the background;
- *Colored* – bars fill a cell with the chart. The color of the bar depends on the result of the comparison with threshold values.

The [Columns] button offers a choice of statistics shown in table cells. You can also gradient color individual columns of the visualization there.

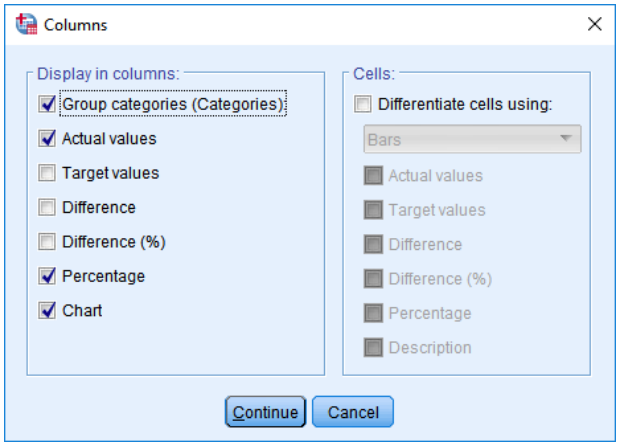


Figure 140. The Percentage of Target Thresholds: Bars column settings

In *Display in columns*, you can enable columns with the following content: *Group categories (Categories)*, *Actual values*, *Target values*, *Difference*, *Difference (%)*, *Percentage* (target completion percentage), and *Chart*.

In *Cells*, you can define the fill of table cells after ticking *Differentiate cells using*. There are two fill modes available, gradient coloring (option *Gradient*) or bar chart fill (option *Bars*). Define the relevant columns to be filled in other fields. You can choose from *Actual values*, *Target values*, *Difference*, *Difference (%)*, *Percentage*, *Description*.

The [Properties] button in the main window of the dashboard wizard opens a menu where you can define appearance settings of the visualization. They are discussed in detail in section 4.6.1.

The [Format] button in the main window opens a menu where you can define visualization dimensions. For details of available options, see section 4.6.1.

The [Legend] button in the main window opens a menu where you can define legend parameters. For details of available options, see the initial section on common dashboard settings (4.6.1).

4.7. Report

The [Report] section contains commands for transforming result items of PS IMAGO PRO procedures. They make work with report items automatic and make it easier to use the items for reporting purposes. The following commands are available there:

- *Output actions* – you can act on result items in the report editor window;
- *Insert Image* – imports a graphic file to the report editor;
- *Footnotes statistics* – moves descriptive statistics to the footer of the frequency table;
- *Table Coloring* – table coloring according to a selected scheme.

4.7.1. Output actions

The [Output actions] procedure performs a selected action on PS IMAGO PRO result items so that they can be used in automatic reporting procedures, among other things. The procedure is item type-dependent. You can also use optional filtering by description.

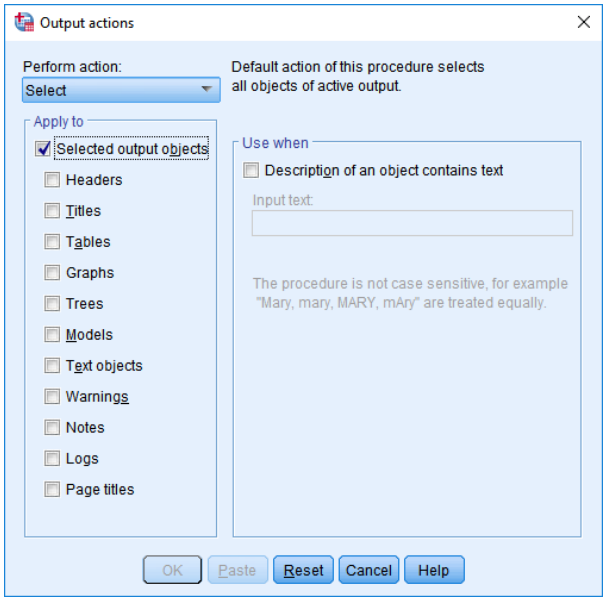


Figure 141. The window for defining procedure Output actions

In *Perform action*, you can define one of the following actions: select (option *Select*), hide (option *Hide*), show (option *Show*), and remove selected elements of a report (option *Delete*).

Select output items to allows you to indicate item types for which the action should be performed. You can choose from the following elements of the report: *Headers*, *Titles*, *Tables*, *Graphs*, *Trees*, *Models*, *Text items*, *Warnings*, *Notes*, *Logs*, *Page titles*.

In *Use when*, you can optionally define a filter for selecting report items. If no filtering condition is selected, the procedure acts on all items of this type. If you enable *Decription of an item contains*, enter a string. The procedure does not search item contents but their descriptions displayed in the items tree. It does not distinguish between upper and lower case letters.

4.7.2. Insert Image

Procedure [Insert Image] pastes an image file to a PS IMAGO PRO report. It can be used later when preparing a report in PS IMAGO Designer. By using the code of the procedure in the command editor, you can make the pasting operation automatic.

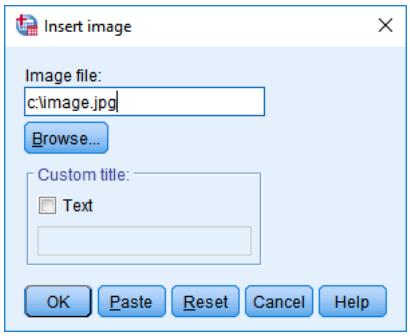


Figure 142. The Insert Image procedure window

In *Image file*, you can enter an access path to an image file or select it using the [Browse] button.

In *Custom title*, you can tick *Text* and then enter your own title for the image in the field below. The title of the image will be displayed in the report navigation window and makes it easier to refer to the image in other procedures.

4.7.3. Footnotes statistics

Procedure [Footnotes statistics] is used together with [Frequencies] as it can move descriptive statistics from the *Statistics* table to the footer of the *Frequencies* table. The procedure can be applied to all or selected results.

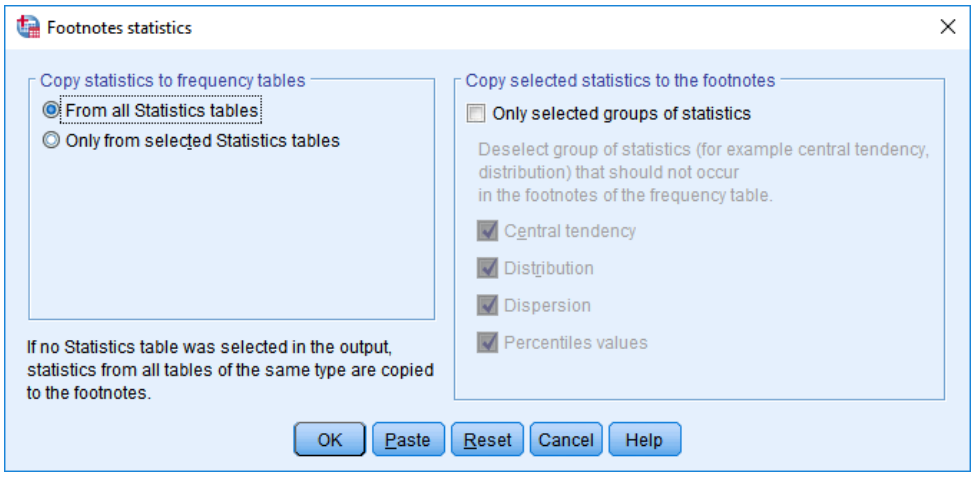


Figure 143. The window for defining procedure Footnotes statistics

The procedure is performed only if the active report window contains results of the [Frequencies] command, a *Frequencies* table and *Statistics* table. In *Copy statistics to frequency tables*, choose whether the procedure should be run for the whole report (option *From all Statistics tables*) or only for selected tables (option *Only from selected Statistics tables*). To run the procedure correctly for a selected table, select the right *Statistics* table from which descriptive statistics will be copied.

In *Copy selected statistics to the footnotes*, you can select a group of statistics (if a table contains multiple statistics). If you tick *Only selected groups of statistics*, four options to select measures are activated. Depending on the content of the *Statistics* table, the following descriptive statistics can be copied:

- *Central tendency* – the average, median, mode, and sum;
- *Distribution* – skewness and kurtosis;
- *Dispersion* – the standard deviation, variance, range, minimum, maximum, and the standard error of the mean;
- *Percentile values* – quartiles and percentiles.

4.7.4. Table Coloring

This procedure is useful when analyzing tables, mostly crosstabs, but it can also be applied for every tabular item resulting from a statistical procedure of PS IMAGO PRO. It will color selected tables according to a selected scheme.

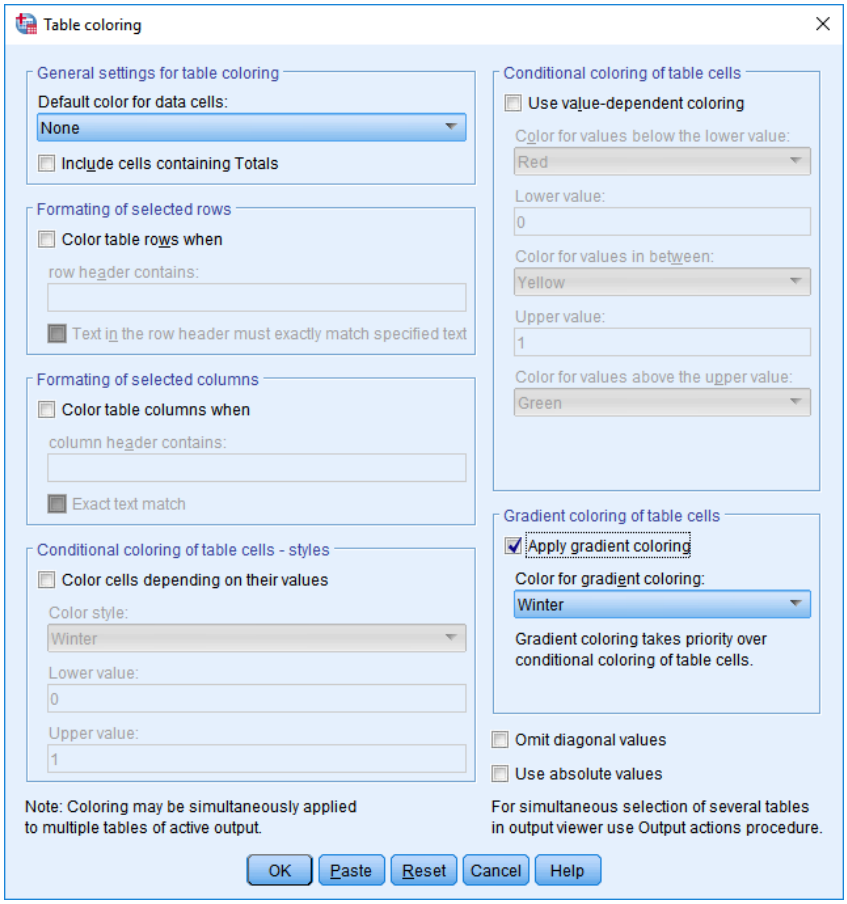


Figure 144. The window for defining procedure Table Coloring

In section *General settings for table coloring*, you can set the default table color. The procedure will color the table the color set in *Default color for data cells*. You can also enable summary coloring here. To do this, tick *Include cells containing Totals*.

In *Formatting of selected rows*, you can choose which rows will be colored. Just tick *Color table rows when* and enter a keyword in the activated field. The procedure will be performed only for those rows the header of which contains the whole string you entered. You can also modify the filter with *Exact text match*. Then the procedure colors only those rows the headers of which match the text exactly.

In *Formatting of selected columns*, you can choose which columns will be colored. Just tick *Color table columns when* and enter a keyword in the activated field. The procedure will be performed only for those columns the header of which contains the whole string you entered. You can also modify the filter with *Exact text match*. Then the procedure colors only those columns the headers of which match the text exactly.

Formatting of selected rows and *Formatting of selected columns* can be used with other coloring modes as well. Note that to color a selected row and selected column, the procedure needs to be rerun because the discussed filter options for columns and rows cannot be applied simultaneously.

In *Conditional coloring of table cells – styles*, you can color cells depending on values. Depending on the defined threshold values, cells are colored according to the scheme palette you selected. To include formatting, tick *Color cells depending on their values* in this section and define a color style by

selecting an option in *Color style*. To define threshold values, enter your values in *Lower value* and *Upper value*. Cells are colored depending on whether they belong to an interval below the lower limit, between the values, or above the upper limit.

Section *Conditional coloring of table cells*, colors cells depending on the values, but you can define the color for each interval as opposed to the previous option. Cells are colored using two or three colors depending on threshold values. To color cells, tick *Color cells depending on their values* in this section. To define threshold values, enter appropriate values into *Lower value* and *Upper value* and select colors from drop-down lists in *Color for values below Lower*, *Color for values in between*, and *Color for values above Upper*.

In *Gradient coloring of table cells*, you can enable gradient coloring; higher values will have more intensive colors. To color a table, enable *Apply gradient coloring* and select the color palette in *Gradient coloring*.

In the menu of the [Table Coloring] procedure, you can define two additional formatting options. If you enable *Omit diagonal values*, table diagonal is not colored, and the values in it are not taken into consideration for gradient coloring.

If you enable *Use absolute values*, you can use the coloring options you selected, but the color and gradient are selected based on absolute values instead of original values. Sign (+/–) is not taken into consideration, which is of great importance for tables containing differences or showing values of variables that may be negative.

4.8. Export to PS IMAGO Designer

Apart from the groups of analyzes, visualizations, and transformations discussed above, the application has a procedure to *Export to PS IMAGO Designer*. It saves PS IMAGO PRO report result items into a PS IMAGO Designer file (*.psid). The items can then be used in a report.

In *Output file location*, enter the path to the directory where the exported result items will be saved. You can indicate the directory manually or using the [Browse] button.

If you enable *Run PS IMAGO Designer*, the report building program is started after the export is completed.

5. PS IMAGO Designer

PS IMAGO Designer is an application for designing, updating, and preparing for publication of professional analytical reports both in terms of content and form.

PS IMAGO Designer has three modes:

- the Dashboard mode

  This mode is used to prepare reports to be published online (in the Internet or Intranet). Dashboard reports contain mainly result items of analyzes (tables and charts) put together to make dashboards with coherent content displayed on a single screen. The professional message is built through the selection of result items, their arrangement, connections, and the right text commentaries on the results. PS IMAGO Designer can publish Dashboard reports directly online (on the PS IMAGO Portal or in the PS IMAGO Portal Cloud, for example) or generate an HTML file ready to be integrated with any website.

- the Document mode

  In this mode, you work with a text processor dedicated to creating analytical reporting documents. Document reports feature mainly a formatted text illustrated with analysis results. The preparation of a Document analytical report requires numerous modifications, corrections, or updates of analytical items it contains. It may need content editing (data update, changed parameters of statistical analysis, change of result presentation form) or reformatting (such as colors, fonts, line type and thickness, range, and axis labels). These activities require substantial time and effort and are, unfortunately, not supported by standard word processors. The Document report editor of PS IMAGO Designer is very similar to other text processors (such as MS Word), but it has been integrated with an analytical tool (IBM SPSS Statistics) and equipped with features for convenient updating of analytical items put into the document when creating a report. The combination of features found in popular text processors with functionalities supporting analytical reporting makes reporting easier and faster. A finished report can be exported to DOCX or PDF.

- the mixed mode

  In this mode, you can simultaneously create a detailed Document report and a Dashboard with the Legend information from the report. It makes it easier to keep contents coherent in both reports and streamlines the process.

With PS IMAGO Designer, you can automatically update every of the three types of reports when result items they use are updated either because of updated analysis results (using more data, for example) or changed formatting of the result items (colors, fonts, axis labels, etc.).

For recurrent research/analytical reports, you can use ready-made templates and fill them with updated analysis results in a blink of an eye.

PS IMAGO Designer can fetch result items such as tables and charts from report files (SPV) of IBM SPSS Statistics and other images. The application can manage imported items and use them in reports. The program offers properties and features typical of DTP software, so you can:

- arrange analytical items more freely than just using layouts available in IBM SPSS;
- add comments and descriptions to items;

- format text in a way similar to classic text processors such as Word. Insert content lists, hyperlinks, cross-references, bibliographies, or bookmarks;
- work with documents iteratively: comments, accepting and rejecting changes, tracking changes;
- arrange reports into navigable screens/slides;
- update a predefined report based on changes in an SPV file;
- customize the appearance of the report using predefined or custom layouts and styles;
- export reports to HTML with a navigation menu;
- export to PDF using a layout defined in the application;
- edit items already in the report, including items used in Dashboard and Document modes simultaneously;
- publish results in PS IMAGO Portal or PS IMAGO Portal Cloud to be distributed in the Internet or Intranet;
- create a batch file for PS IMAGO Process to update reports periodically.

Designing the layout, appearance, and content of a report is a task for a designer or analyst authorized to manually publish a finished report in a repository, the PS IMAGO Portal (PS IMAGO Portal Cloud). Periodic reports can be published automatically via PS IMAGO Process.

To start your work with PS IMAGO PRO Designer, you need to have result items (tables, charts, images) in a IBM SPSS Statistics report file (SPV), a PS IMAGO Designer native file (PSID), or as image files (JPG, PNG).

5.1. Dashboard mode main menu

The features of the MAIN MENU are available under four tabs.

Figure 145. The main menu of PS IMAGO Designer

Tab PROJECT offers actions to open and save report files, refresh reports using updated data, or change the report mode.

Tab ITEMS has procedures for importing items, organising them in the application, and editing them.

Tab DASHBOARD manages report pages, its appearance, and can export a finished report.

Tab PROGRAM provides access to application settings and program information.

5.1.1. Tab Project

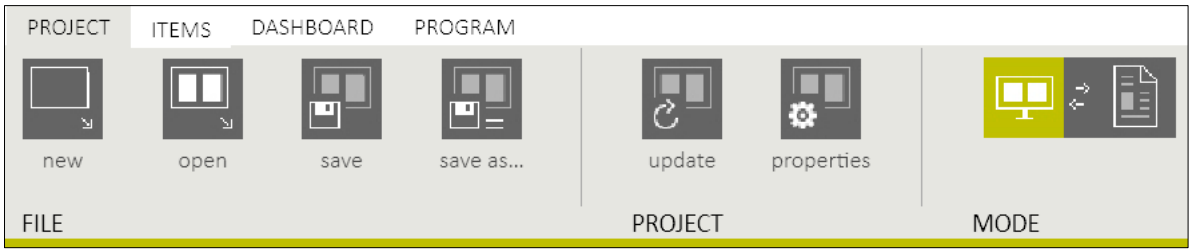


Figure 146. Tab PROJECT of PS IMAGO Designer

5.1.1.1. File

 *New* – creates a new report project.

The new project window has such parameters as the name and mode of the project (Dashboard mode vs Document mode). For the Dashboard mode, you can specify the resolution of the display used to present the report, style, and background for the report.

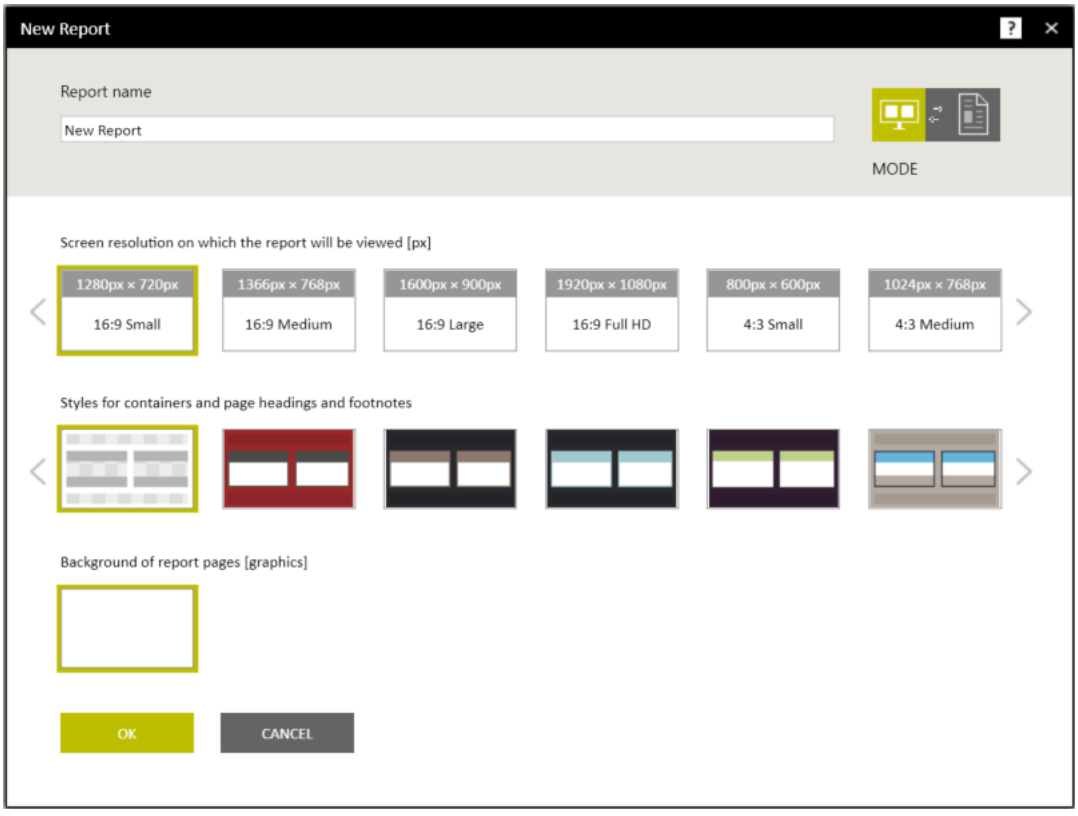


Figure 147. The new report window

The project name you define will be used when the report is published on the PS IMAGO Portal or exported to other formats. You can modify the name when working with the project in *Report Settings*.

An important step when building a report is to define the resolution of the device the report will be presented on. Reports should be designed with specific devices in mind. For example, a dashboard prepared for HD monitors (1920x1080) will be illegible on a smartphone (800x600). The actual size of a report page will be smaller than the specified resolution because space has to be left for standard browser scroll bars. It is possible to define (and then use) custom report resolutions. It is done in the *Application settings* window.

You can select the report style from over a dozen propositions. You can also define custom styles when working with the application. They will be available in the list of predefined styles. Styles have a different container, header, footer, and page formatting. The default style is the neutral one. You can choose the background for your report. It is particularly useful when report pages need to have an image such as a corporate logo.

 *Open* – opens an existing report project.

 *Save* – saves the current project.

 *Save as…* – saves the existing file with a specific name and in a specific location.

5.1.1.2. *Project*

 *Update* – updates result items in the whole report when data change (such as during another phase of survey research). After adding an update, remember that the content of a new PSID report file should be identical to the source report file used to create the Dashboard or Document in PS IMAGO Designer. The update affects the content of both Document and Dashboard reports because they share items in a common Project.

Figure 148. The Report files window

 *Properties* – the *Report Settings* window changes project name, adds or changes report description, and specifies the author. The report name is used in all export commands: when publishing a report in PS IMAGO Portal or exporting it to HTML, PDF, or PNG format. Report description and author info are for information purposes in PS IMAGO Designer but are available also for report publication in the PS IMAGO Portal result publication environment.

Report properties contain information about the resolution of the screen the report is designed on and the display it is intended for together with ratios and sources of files used in the report.

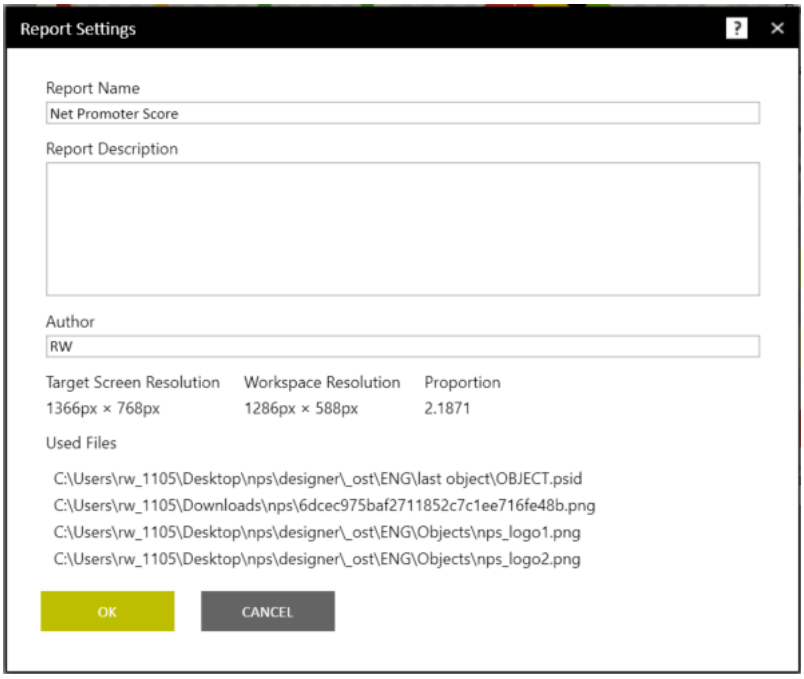


Figure 149. The Report Settings window

5.1.1.3. *Mode*

 This option switches between the Dashboard mode and the Document mode. You can design your report in the Dashboard and Document mode simultaneously. It is not required, however.

5.1.2. Tab Items

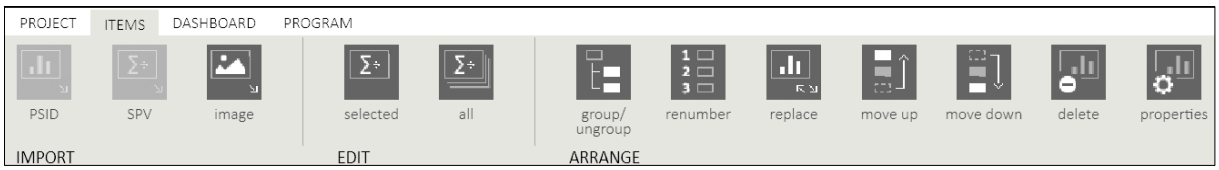


Figure 150. Tab ITEMS of PS IMAGO Designer

5.1.2.1. *Import*

 *PSID* – items can be imported from a PSID file, which is the native format of the program. The PSID file import icon opens a standard 'open file' dialogue box.

 SPV – if you click the icon for importing items from an SPV file, you can fetch analytical items directly from report file of PS IMAGO PRO. To do this, the machine used for the import has to have PS IMAGO PRO installed. During the import, IBM SPSS Statistics must be closed.

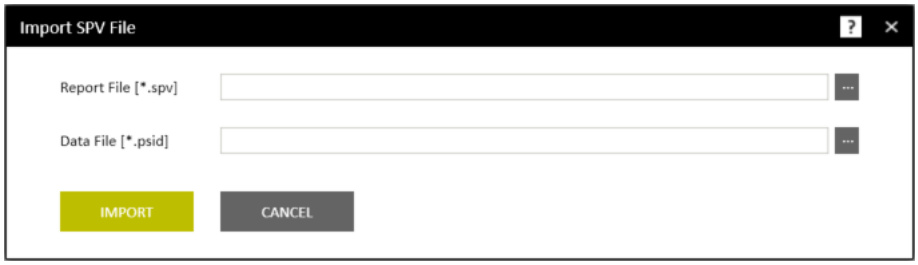


Figure 151. The SPV file import window

The SPV file import window requires you to indicate an SPV file (from which items will be imported) and a PSID file (PS IMAGO Designer data file), which will be created during the import. If an existing PSID file is selected, its content is overwritten.


Image – imports image files to the report so that they can be used in the design.

After importing items, you can display and modify properties of each of them, for example, change item names and add comments. Names and comments you add there can be displayed in titles and descriptions of containers.

5.1.2.2. *Edit*


Selected – when you select an item to be edited, PS IMAGO PRO is opened. The selected item or items are displayed in the result item window and can be edited. After you made your changes and selected *Save and return to PS IMAGO Designer*, the item will be automatically updated in PS IMAGO Designer. If the items you modified are already in a Dashboard or Document report, they are automatically replaced with the new versions.

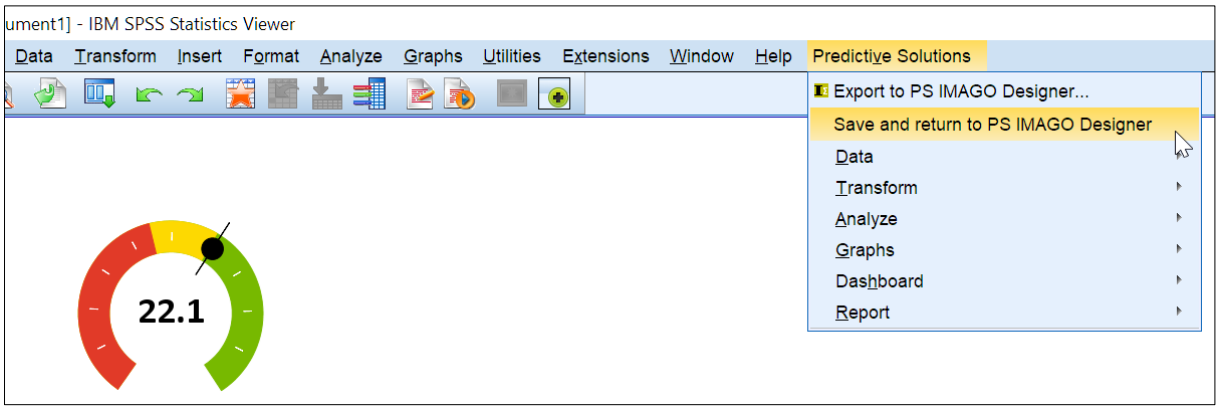


Figure 152. Editing an item in PS IMAGO PRO and selecting Save and return to PS IMAGO Designer.


All – when you select an item to be edited, PS IMAGO PRO is opened. All result items from the report are displayed in the result item window and can be edited. After you made your changes

and selected *Save and return to PS IMAGO Designer*, the item will be automatically updated in PS IMAGO Designer. If the items you modified are already in a Dashboard or Document report, they are automatically replaced with the new versions.

5.1.2.3. *Arrange*

 *Group/ungroup* – groups or ungroups selected items.

 *Renumber* – numbers items on the list.

 *Replace* – replaces a selected analytical item in a report with a different one, a chart or table from the item panel. If an item was used in a report in multiple places (for example both in a Dashboard report and in a Document report), all its instances are replaced with the new item. In the upper part of the window, there is a thumbnail of the item being replaced. Below it, there are thumbnails of available items with their names, sizes, item types, and information whether the item is in the report. Items can be previewed with a double-click on the thumbnail. If you enable [CLEAR CONTAINER SETTINGS], the following container settings are disabled: title, description, content comments, preview, and content information. Linked pages are not reset.

By pressing the [REPLACE] button, you replace all instances of the item in the report.

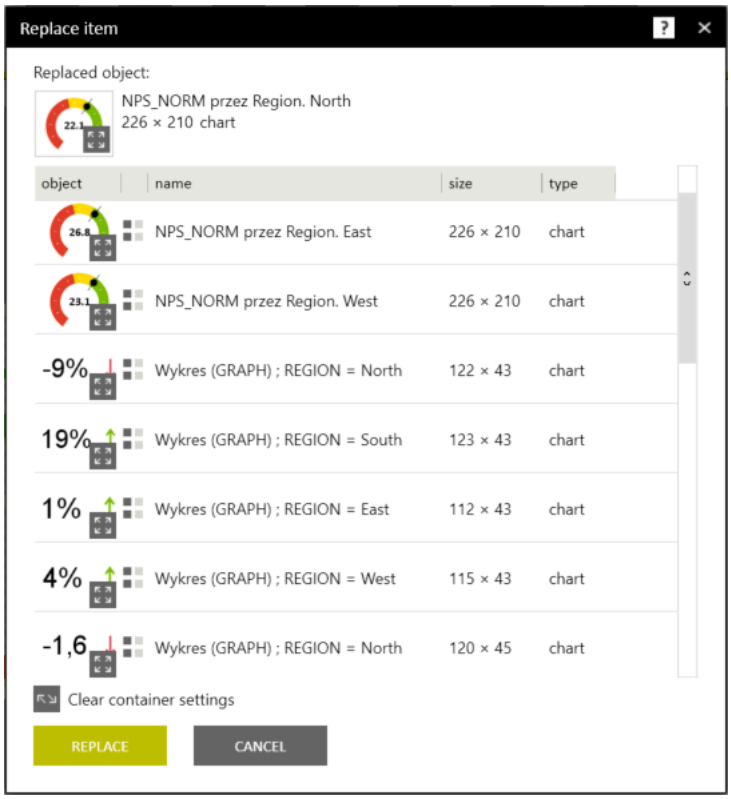


Figure 153. The Replace item window

 *Move up* – moves a selected item(s) up one item on the list.

 *Move down* – moves a selected item(s) down one item on the list.

 *Delete* – removes the selected item(s) from the item panel. To delete an item permanently from a report, delete it in IBM SPSS Statistics.

 *Properties* – modify item name, add a category, a note, or a comment. These items can be presented as elements of a finished report.

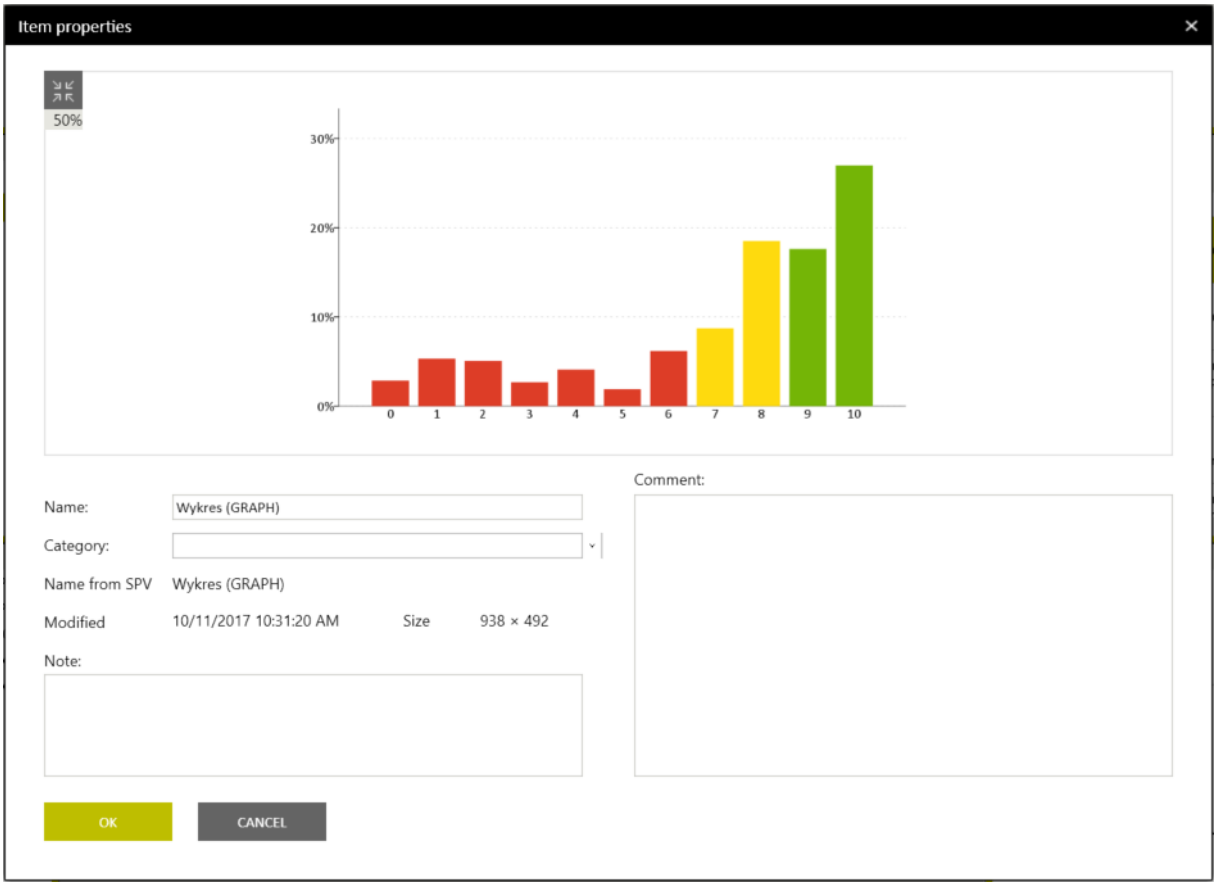


Figure 154. The Item properties window

5.1.3. Tab Dashboard

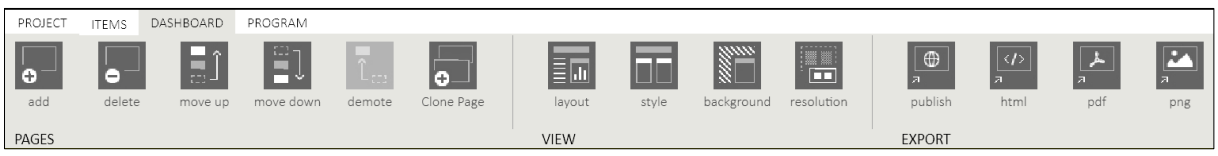


Figure 155. Tab DASHBOARD of PS IMAGO Designer

5.1.3.1. Pages


Add – the add page window can be used to add a new page with a set layout to a Dashboard report. You can select a predefined layout of a report page or design a new one. Tabs in the upper part of the window can be used to switch between four groups of predefined page layouts (no header and footer, with header and no footer, with footer and no header, and with footer and header). The division into groups makes it easier to find the layout you need. Selection is made by double-clicking or selecting a layout and clicking [OK]. When you select a layout, you can edit it by clicking the [EDIT] button. By selecting this option, you go to the layout design mode.

You can also design a completely new layout. It is done by clicking the [DESIGN] button. A custom layout has to be applied to the report page. It may also be saved in the PS IMAGO Designer default folder so that it is available on the list of predefined layouts.

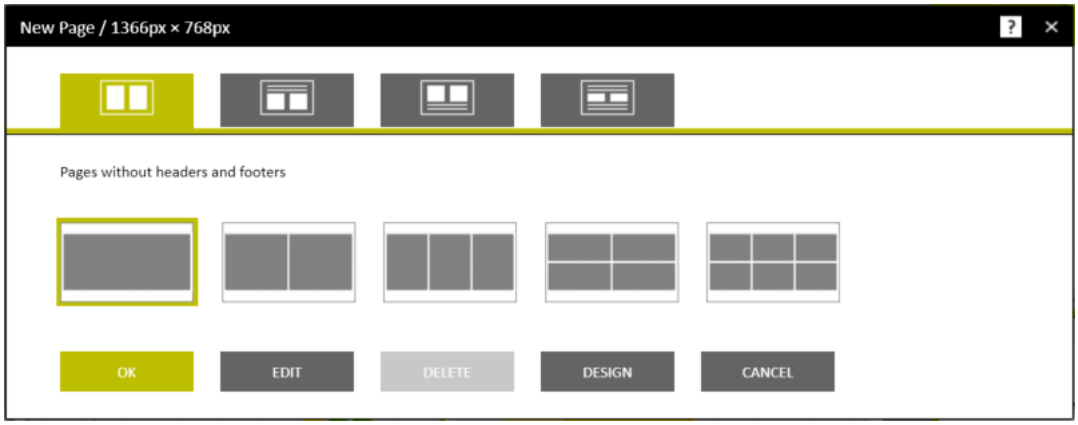


Figure 156. The add new report page window

Bear in mind that layouts are strictly related to the resolution the report is designed for. This means that a new layout is added only for the resolution it was designed for and is not displayed for other available resolutions. After a new custom resolution is added, it offers no predefined layouts and they have to be created.


Delete – deletes a selected report page.


Move up – moves a selected report page up one item.


Move down – moves a selected report page down one item.


Demote – disconnects a page linked to an item in a report.


Clone page – adds a copy of a selected report page at the end of the page list.

5.1.3.2. *View*

Layout – switches to the layout design mode, which facilitates creating a new layout of a page in the current resolution.

The upper part of the tool panel can be used to generate standard layouts. Layout items are generated by entering the number of rows and columns, margins, distances between containers, optionally height of the header and footer, and then clicking the [GENERATE] button. They may be subsequently modified individually in the workspace (with the mouse) or the panel using location and size fields (the CONTAINER section).

You can also create containers by moving analytical items from the item panel and putting them directly on the page you are designing. In the case of a container with content, a button to adjust the size of the container to the size of the item is displayed in the tool panel.

The layout you design may be saved as a custom layout and used later (with the PSIU extension). It may also be used directly on a new page, but in this case, it will not be saved and cannot be used in other pages and reports. You can exit the layout design mode any time with the [CANCEL] button. Your work will not be saved.

New layouts are created with the TOOLS section, where you can use the [GENERATE] button to insert a whole series of containers or the [INSERT CONTAINER] button to insert a single container in accordance with parameters set in the container generator.

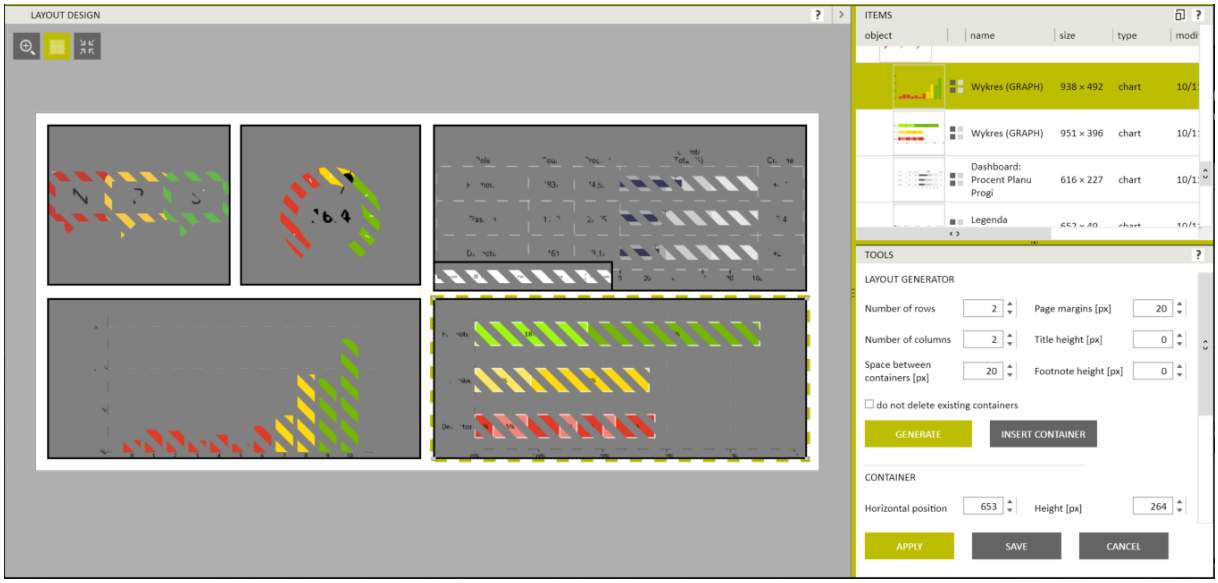


Figure 157. The page layout design mode of PS IMAGO Designer

Style – the page/item style window allows you to change the style (format) of the whole report, a selected page or pages, or selected elements of a page (containers, header, footer).

Available styles are displayed on the bar in the upper part of the window. Selecting one of them displays a preview of additional information: about the name and the size and color of the font of each page element (header, footer, and container title and description). When the window is opened, the preview displays the current style. It does not have to correspond to any predefined style.

A selected style can be applied to various elements of the report. If one page of the report is open and no item or group of items is selected, the selected style can be applied to the whole report, current page, or any range of pages. If an item (for example a container or a group of containers) is selected on a report page, the selected style will be applied to this selection only.

You can also delete styles you had defined (application's predefined styles cannot be removed).

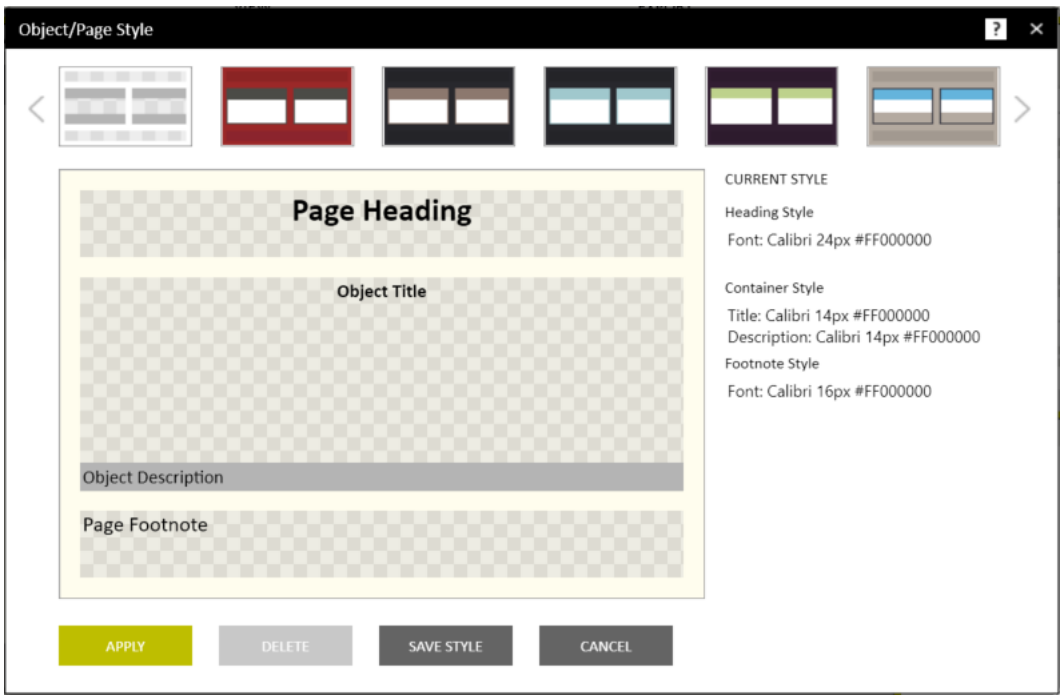


Figure 158. The page/item style selection window

Background – the page background window allows you to set the background for the current page, a range of pages, or the whole report. You can select an existing background (assigned to the current resolution) by double-clicking it or selecting it and clicking [OK]. The default option is *apply to page*, which displays an additional page selection window.

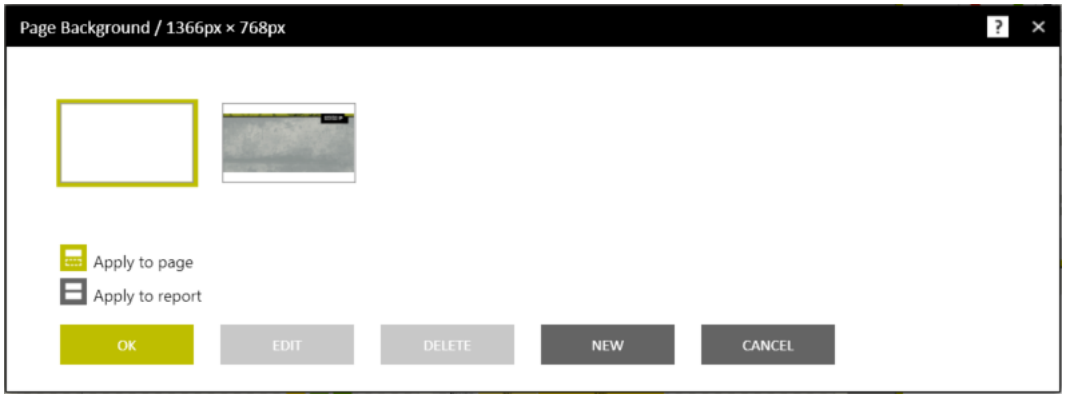


Figure 159. The page background window

This window has a list of all pages of the report (with the current one selected). It is possible to select any other page or page range to which the background will be applied.

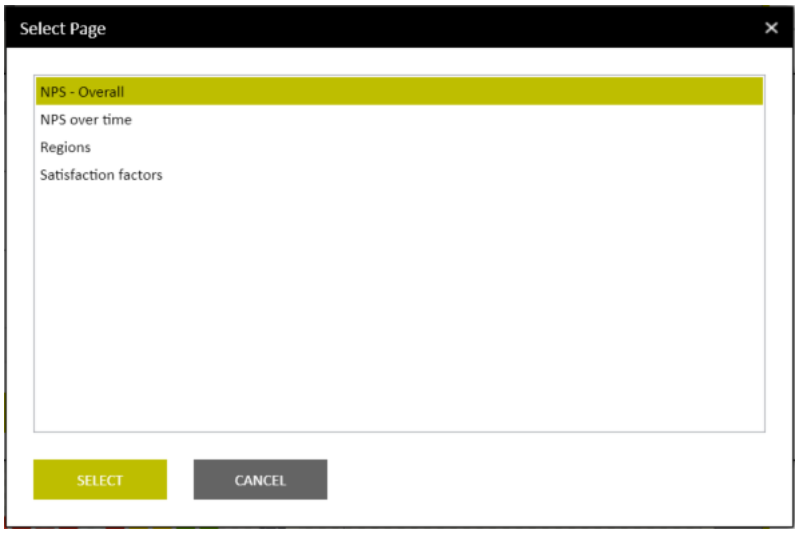


Figure 160. The window for selecting a page to which background will be applied

By switching to *apply to report* and confirming, you apply the background to all pages in the report. The selected background will appear on new pages as well.

It is possible to edit the existing background with the [EDIT] button or create a new one with the [NEW] button. Both the buttons switch the application into the background design mode.

The background design mode allows you to create a new background for the current report resolution.

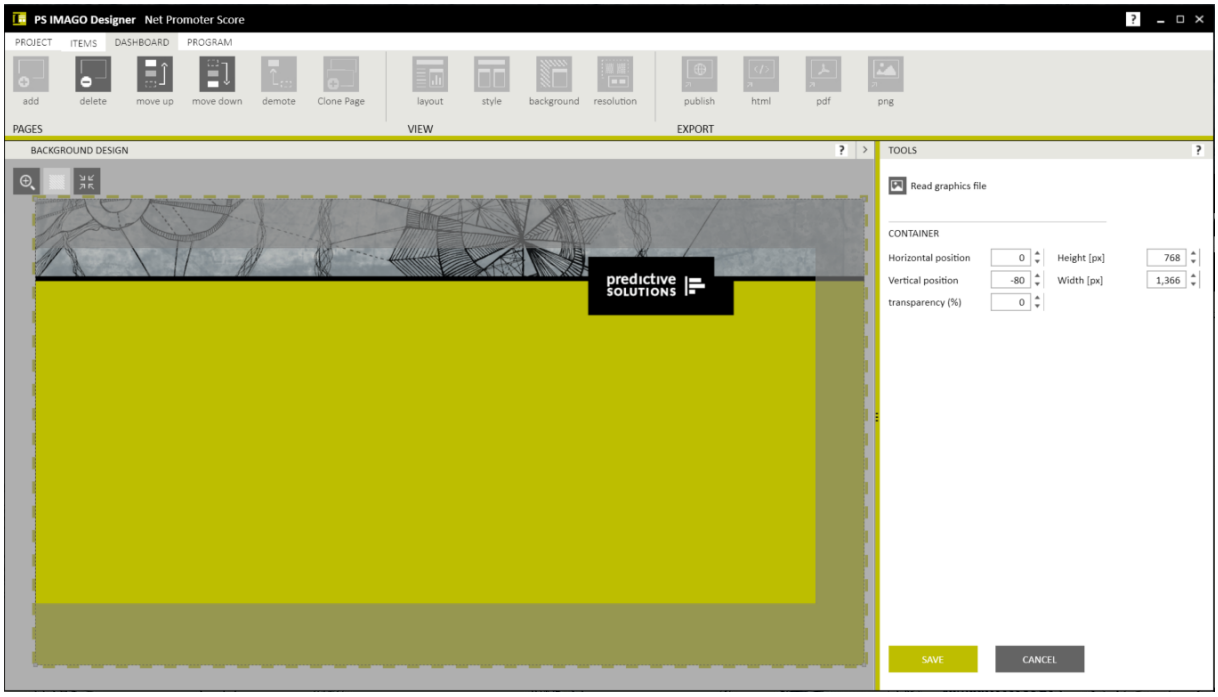


Figure 161. The background design mode

The [Read graphics file] button allows you to import any image in PNG, JPG, BMP, or GIF.

The image item is displayed in the BACKGROUND DESIGN workspace (the upper left corner). It can be proportionally scaled and placed anywhere in the area. If some part of it is outside of the workspace, it will be cropped. To apply a new background on the report page(s), it has to be saved. After a new background is created, you have to save it in the application's default folder.

You can delete an existing background with the [DELETE] option.

Resolution – the resolution window can be used to convert the current report to a new resolution.

This facilitates drafting a report in various versions (e.g. for a tablet, smartphone, or computer screen). The target resolution can be selected from among the predefined settings or entered manually. Report background is not converted (it is prepared for a specific resolution) as it may be distorted or cropped. Conversion of resolution may (but does not have to) cause the quality and legibility of a report to deteriorate, especially when the resolution is reduced. The report used for conversion is closed, and a new report in the target resolution is automatically displayed.

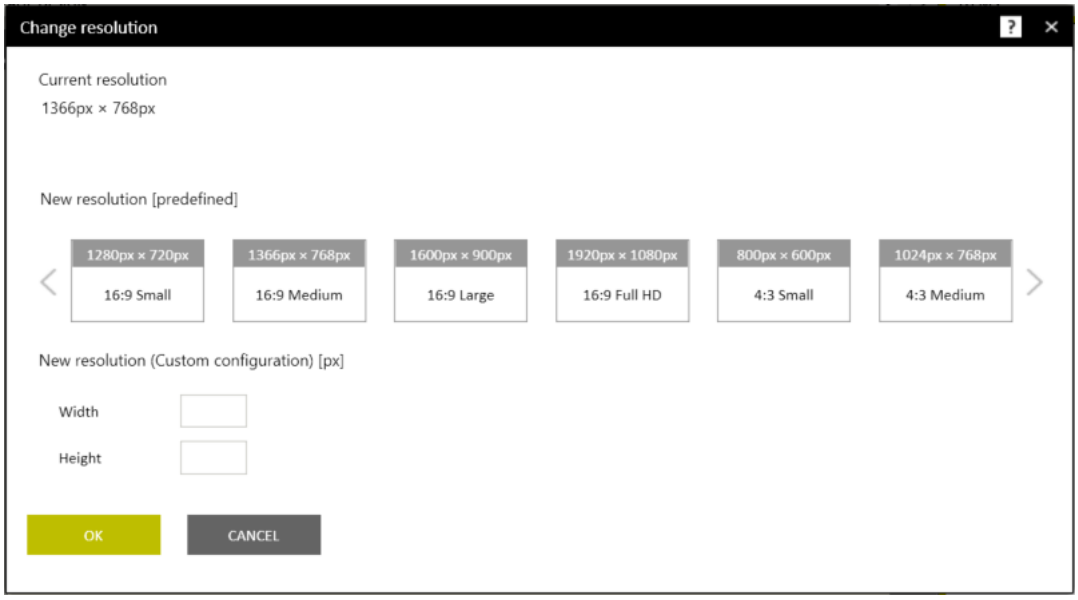


Figure 162. The Change resolution window

5.1.3.3. *Export*

You can publish reports on the PS IMAGO Portal, export Dashboard reports to HTML, PDF, and image files (PNG), and export Document reports to DOCX and PDF.


Publish – the window for publishing reports on the PS IMAGO Portal facilitates transfer of a report into the result distribution environment.

The first step is to log in to the PS IMAGO Portal. Machine name (or URL address) where the PS IMAGO Portal is run, login and password (signing in to PS IMAGO Portal is described in section 6.2 How to sign in to the PS IMAGO Portal and PS IMAGO Portal Cloud) are inserted by default from the application settings window. They can be entered and modified here as well. When working with PS IMAGO Designer, you can log in to various accounts and publish reports in various locations.

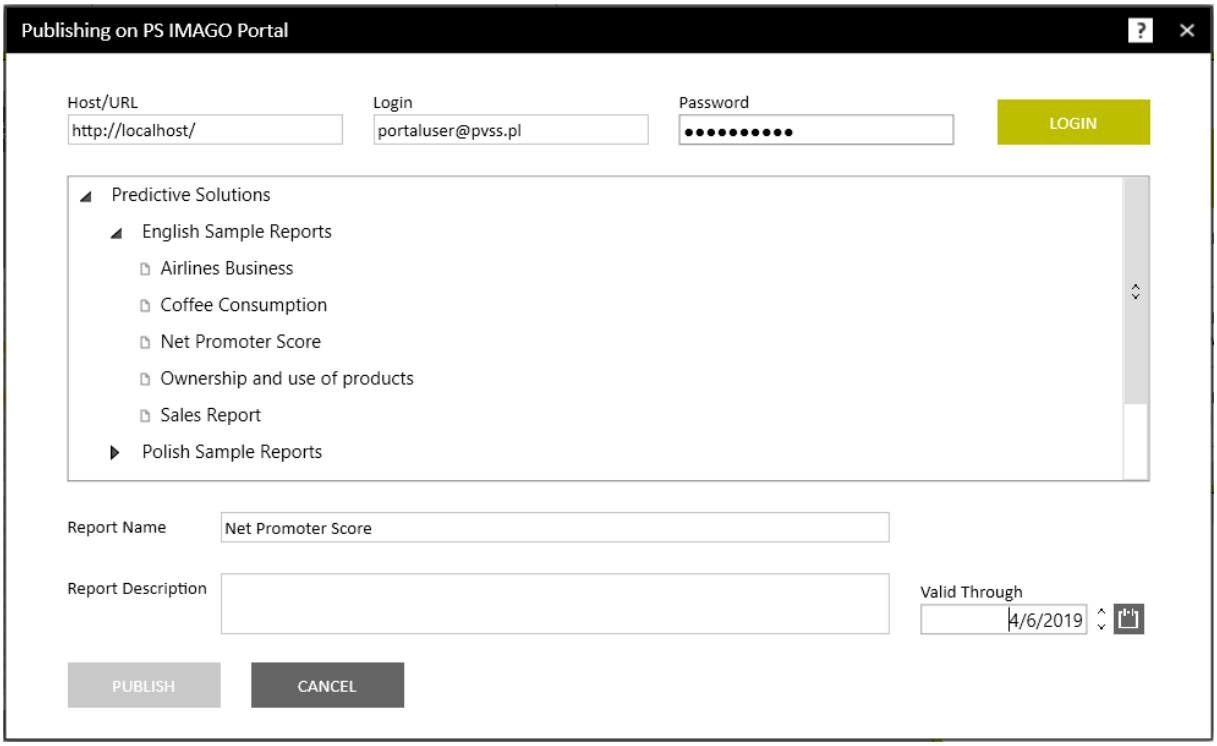


Figure 163. The window for publishing reports on the PS IMAGO Portal

After clicking the [LOGIN] button and correct authentication, a list of folders the user has access to is displayed.

The folder structure is explored by expanding and collapsing individual branches. A Dashboard may be published as a new report (if a folder is selected in the structure) or as another version of an existing report (if an existing report is selected in the structure). After specifying the publication location, you can change the report name and description (they were defined upon report creation or in the report properties window). Additionally, you can specify the report expiry date.


Html – saves a Dashboard report as an HTML file, which retains such functionalities as item comments, navigating pages with a menu in the upper left corner, and enlarging items.


Pdf – saves a Dashboard as a PDF file.


Png – saves a Dashboard as a PNG file.

5.1.4. Tab Program

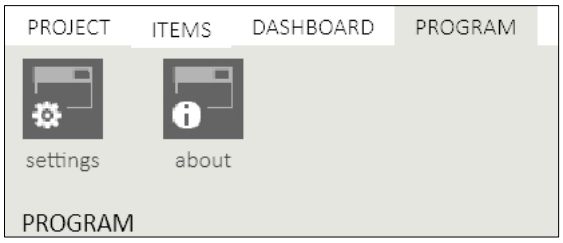


Figure 164. Tab PROGRAM of PS IMAGO Designer


Settings – in the application settings window, you can adjust it to your preferences. It consists of four tabs: GENERAL, FOLDERS, RESOLUTIONS, and MESSAGES.


About – shows information about the installed PS IMAGO Designer version.

5.1.4.1. *Settings – tab General*

The GENERAL tab changes settings such as whether to display the startup window, automatic definition of titles and descriptions when dropping an item into a container and change of grid size. It can also restore the default interface settings (panel width, item list appearance, etc.) and clean the list of recently used files.

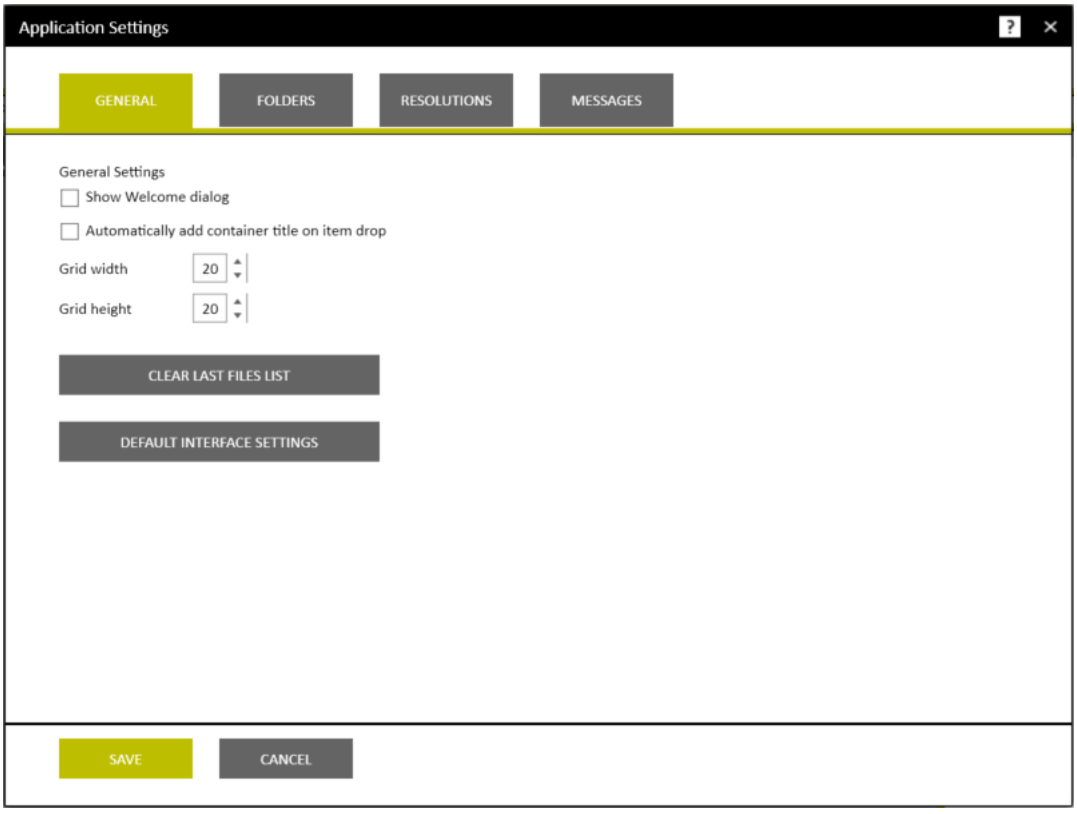


Figure 165. Application settings – tab General

5.1.4.2. *Settings – tab Folders*

The second tab, FOLDERS provides options to set the default folders for opening, saving, and exporting reports and user folders where layout, style, and background templates are saved. You can restore the default starting folders as well.

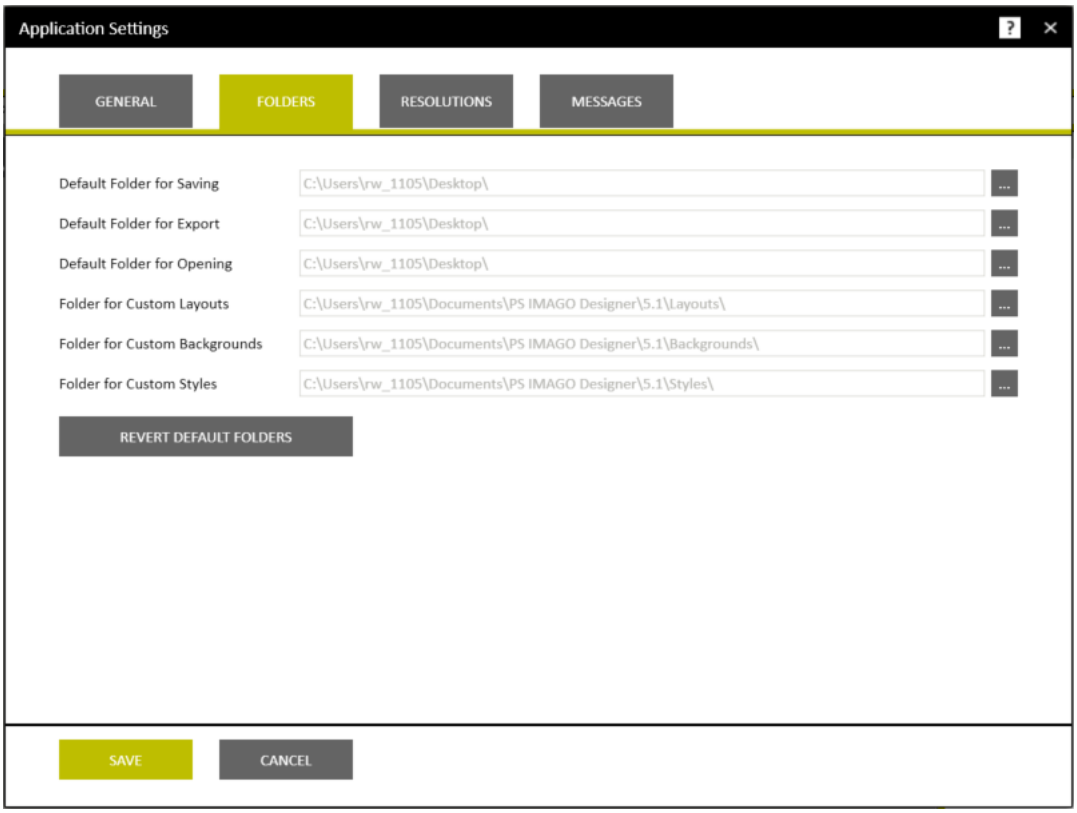


Figure 166. Application settings – tab Folders

5.1.4.3. *Settings – tab Resolutions*

The RESOLUTIONS tab facilitates defining custom report resolutions. To do this, specify the height and width of the screen (in pixels) and the displayed name. You can optionally add an infotip text.

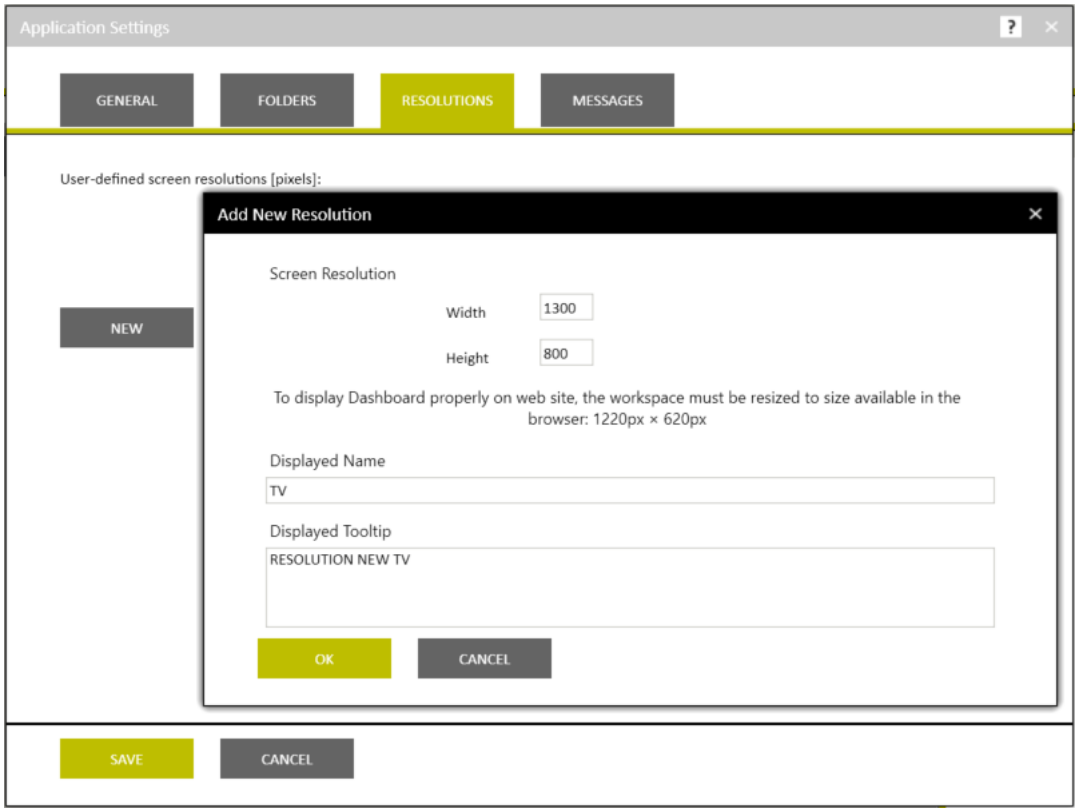


Figure 167. Application settings – tab Resolutions and the window for adding a new resolution

5.1.4.4. *Settings – tab Messages*

The last tab, MESSAGES specifies which message windows are displayed and which are disabled.

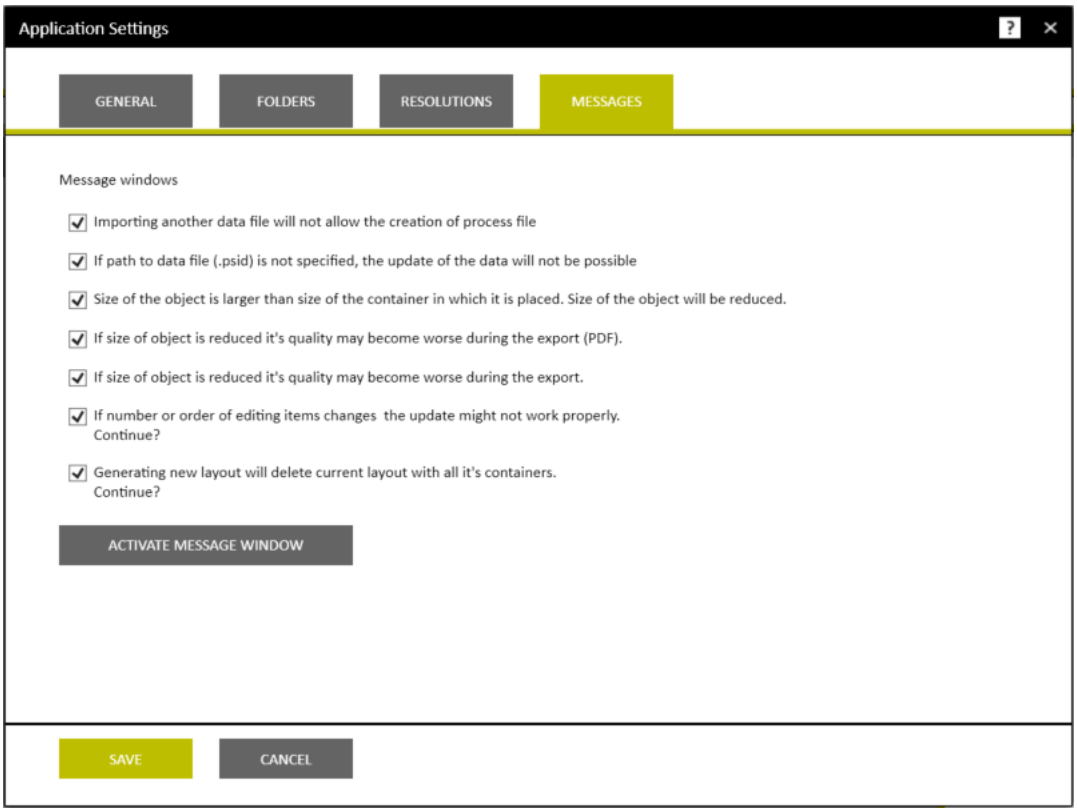


Figure 168. Application settings – tab Messages

5.2. Document mode main menu

The features of the MAIN MENU are available under eight tabs.

Figure 169. The main menu of PS IMAGO Designer

Tab PROJECT offers actions to open and save report files, refresh reports using updated data, or change the report mode.

Tab ITEMS has procedures for importing items, organizing them in the application, and editing them.

Tab DOCUMENT manages report pages, its appearance, and can export a finished report.

Tab TEXT has functionalities for formatting the text of the report. You can use default program styles or create your own from a formatted text.

Tab INSERT can insert various items into the report content (tables, images, symbols, etc.). Moreover, you can manage the content of the header and footer of the report and insert hyperlinks, bookmarks, or cross-reference from this tab.

Functionalities in the REFERENCES tab can insert tables of contents, footnotes, captions, and manage quotes and bibliographies.

The REVIEW tab has functions that can verify spelling, add comments to text, track changes, and manage changes in documents.

Tab PROGRAM provides access to application settings and program information.

5.2.1. Tab Project

Options in the Project tab of the Document mode are the same as options of the same tab in the Dashboard mode. See options listed in section 5.2.1 Tab Project.

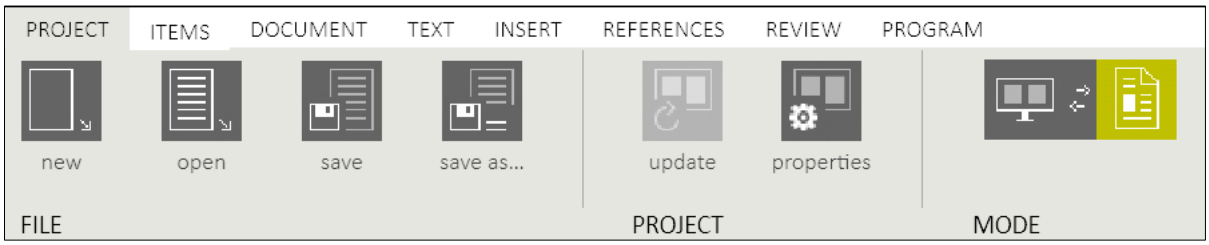


Figure 170. Tab PROJECT of PS IMAGO Designer

5.2.2. Tab Items

Options in the ITEMS tab of the Document mode are the same as options in the Dashboard mode. For options, see section 5.1.2 Tab .

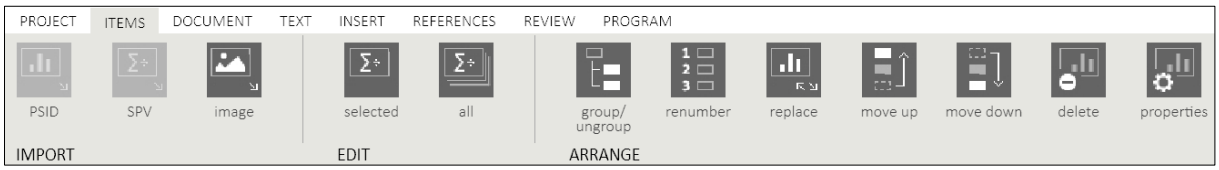


Figure 171. Tab ITEMS of PS IMAGO Designer

5.2.3. Tab Document

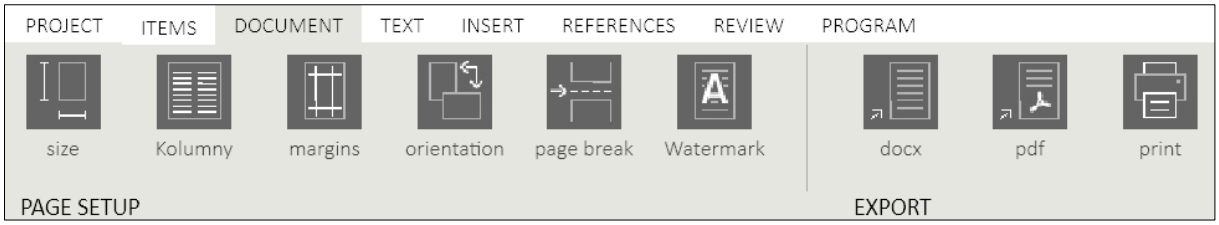


Figure 172. Tab DOCUMENT of PS IMAGO Designer

5.2.3.1. Page setup

 *Size* – changes page dimensions in the Document mode. You can choose A4, A5, B4, B5, and Letter.

 *Columns* – the default layout is a single column. Text can also be displayed in multiple columns. Columns are filled with text in the order they are displayed in.

 *Margins* – choose the width of margins for the current section. You can select one of three predefined sizes, normal, narrow, and wide.

 *Orientation* – switches between portrait and landscape.

 *Page break* – adds page breaks, section, or columns to the document.

 *Watermark* – adds text or image behind report text. Apart from predefined watermarks, you can create custom ones with the [Custom watermark] button.

Figure 173. The window for adding a watermark to a report

In the custom watermark settings, you can specify whether it is a textual or graphic watermark. You can specify the text, color, size, and font of a textual watermark. You can also define the arrangement of the watermark (horizontal or diagonal) and its transparency.

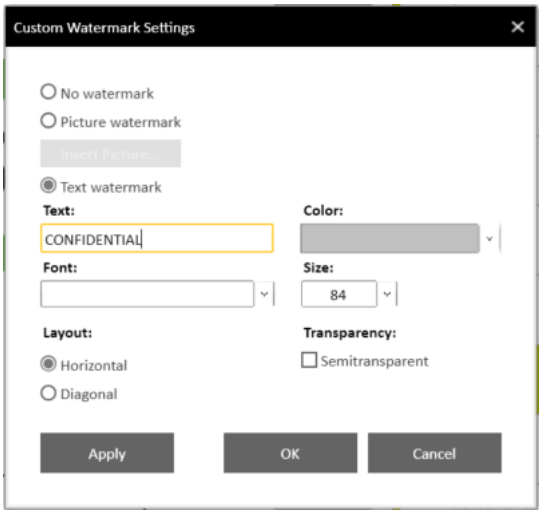


Figure 174. Custom watermark settings

5.2.3.2. *Export*


Docx – saves the report as DOCX.


Pdf – saves the report as PDF.


Print – prints the report.

5.2.4. Tab Text

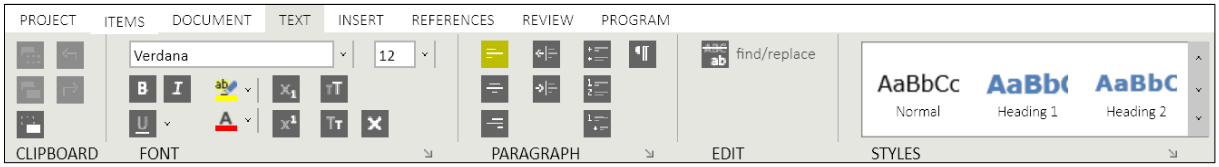


Figure 175. Tab TEXT of PS IMAGO Designer

5.2.4.1. *Clipboard*

In CLIPBOARD, you can cut or copy text or items and then paste them anywhere in your report. The CLIPBOARD section also has buttons to undo a command and redo an undone command.

5.2.4.2. *Font*

The FONT section offers options to change typeface, font size, add effects, and change the formatting. The  button additionally offers report font settings.

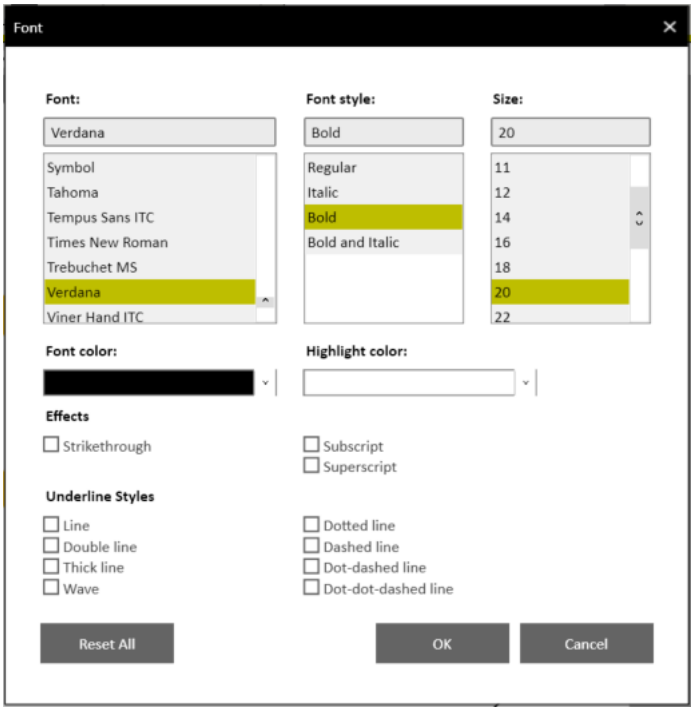


Figure 176. The Font window

5.2.4.3. *Paragraph*

The PARAGRAPH section contains options for defining alignment (left, centre, right), add indents, and define a numbered or bullet-point lists. You can also show nonprinting characters.

The  button offers additional options to select text alignment, background color, text direction (such as right-to-left), line spacing, and paragraph indent and leading sizes.

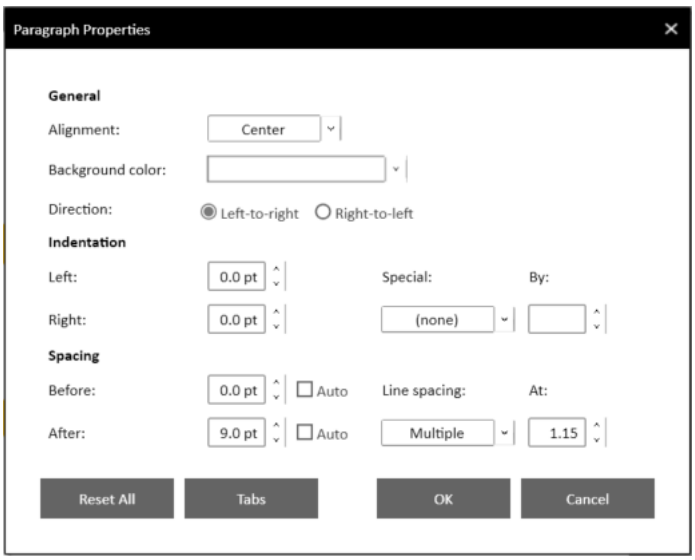


Figure 177. The Paragraph settings window

The *Paragraph properties* window has the [Tabs] button, which opens a new window where text tabulation can be set (text alignment settings).

Figure 178. The Tabs window

5.2.4.4. Edit

The EDIT section has options to *Find/replace* words or phrases with new text.

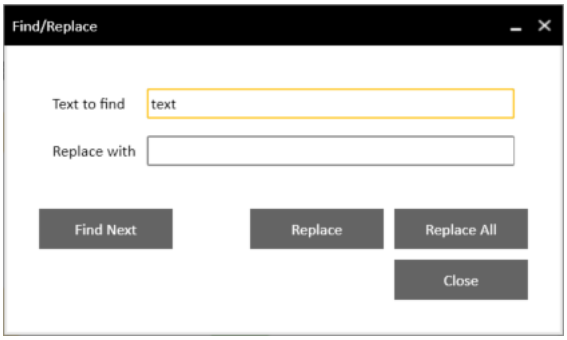


Figure 179. The Find/replace window

5.2.4.5. Styles

In order to quickly apply a set of formatting options that are coherent over the whole document, you can use predefined styles in the STYLES section. In order to apply a style, select the text to be formatted and then select a style from the style gallery.

After you click , you can access all styles available in the application.

To modify a style to fit your needs, click it.

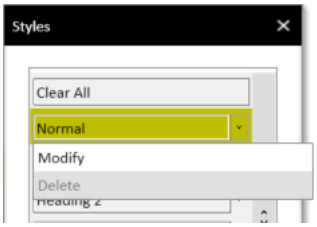


Figure 180. The window for modifying an existing style

You can also add custom styles by selecting formatted text and clicking [New]. In *Create new style from formatting*, you can specify the name of the new style, text formatting, and whether it should be available in the quick style list.

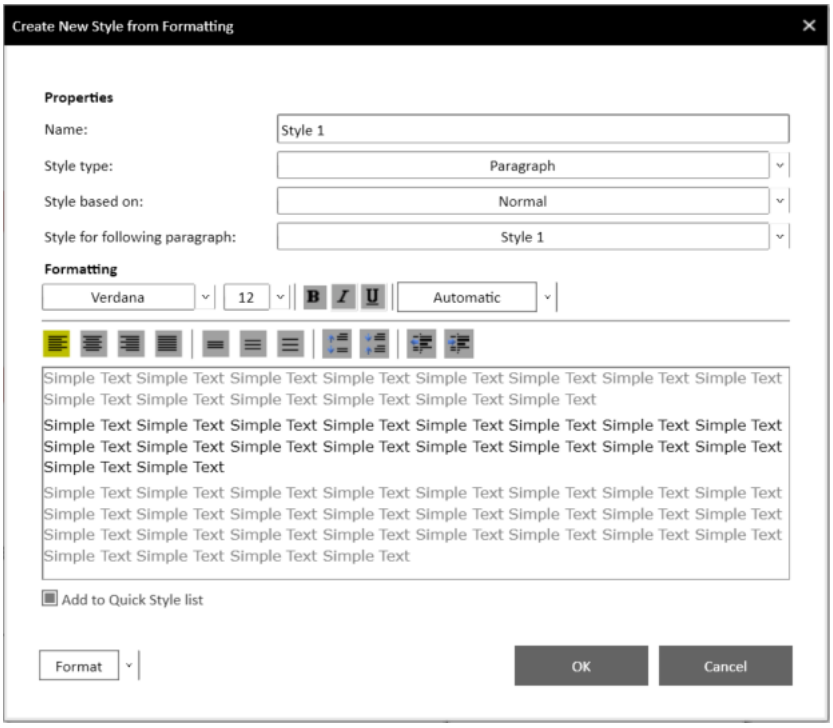


Figure 181. The Create new style from formatting window

5.2.5. Tab Insert

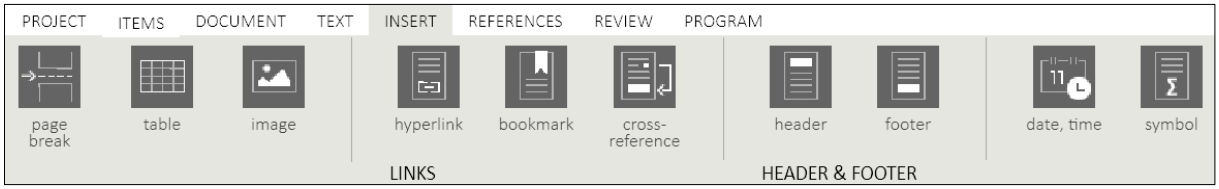


Figure 182. Tab INSERT of PS IMAGO Designer

5.2.5.1. *Insert*


Page break – inserts a manual page break to start a new page.


Table – inserts a table. The maximum table size is 8 columns by 40 rows.


Image – inserts an image file.

5.2.5.2. Links


Hyperlinks – after a word or phrase is selected and the [Hyperlink] button clicked, you can insert a hyperlink to an online URL or a location in the document.

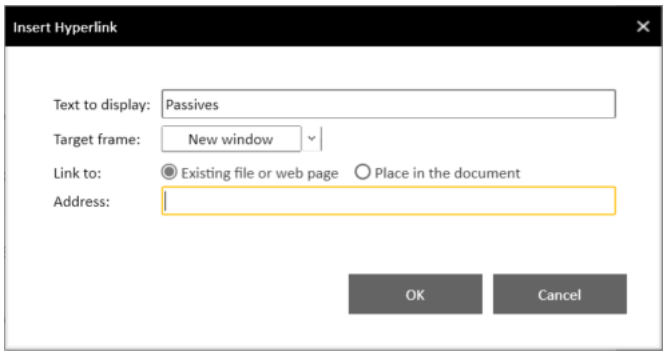


Figure 183. The Insert hyperlink window


Bookmark – works similar to real bookmarks: marks places you want to return to quickly. You can insert any number of bookmarks. You can give each bookmark a unique name, which makes them easily identifiable.

To add a bookmark, first, specify its location in your document. Next, enter its name and click [Add]. After you add a bookmark anywhere in the document and click [Bookmark], you can quickly move to the part of the document with [Go to].

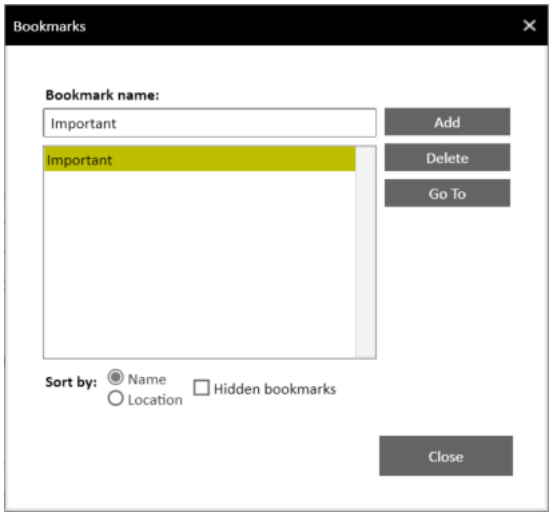


Figure 184. The Bookmarks window


Cross Reference – creates a link to another part of the same document. The cross-reference can be used with a chart, image, or section in your document. A cross-reference is a link to its target element.

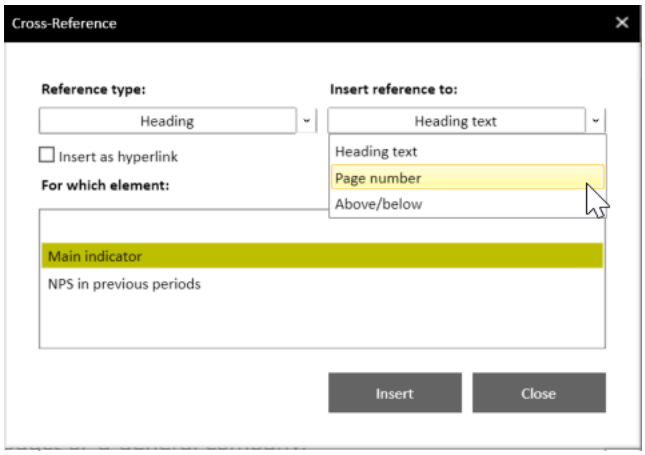


Figure 185. The Cross Reference window

5.2.5.3. Header and footer


Header and *Footer* – select one to add and format a header or footer to a page. You can insert page numbers and a date. You can also specify the location of the text, whether or not the header, footer, and page numbers should be displayed on the first page and odd and even pages.

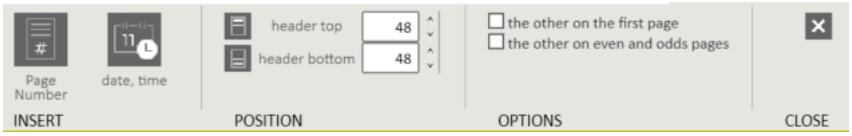


Figure 186. Options available after clicking [Header] and [Footer]

After you add a timestamp to a header or footer, you may choose its format and whether it should be automatically updated.

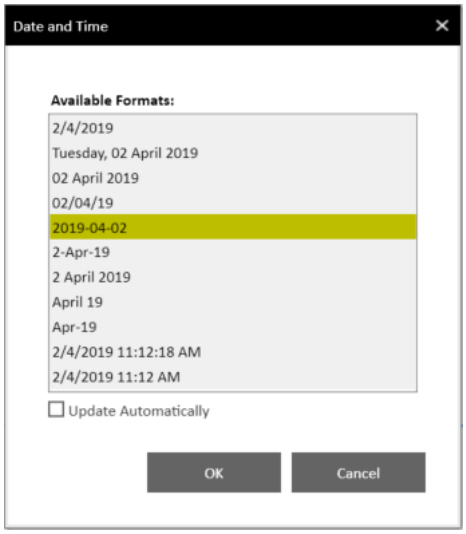


Figure 187. The window for inserting date and time

5.2.5.4. *Insert date, time, and symbol*

Date, time – inserts a timestamp using a predefined format anywhere in the document. You decide whether or not it should be automatically updated.

Symbol – inserts a symbol of your choice. To insert a symbol, select a font and then use the *Filter* field to select a group of symbols of interest. Next, click the left mouse button on a symbol to insert it into the selected place in the text.

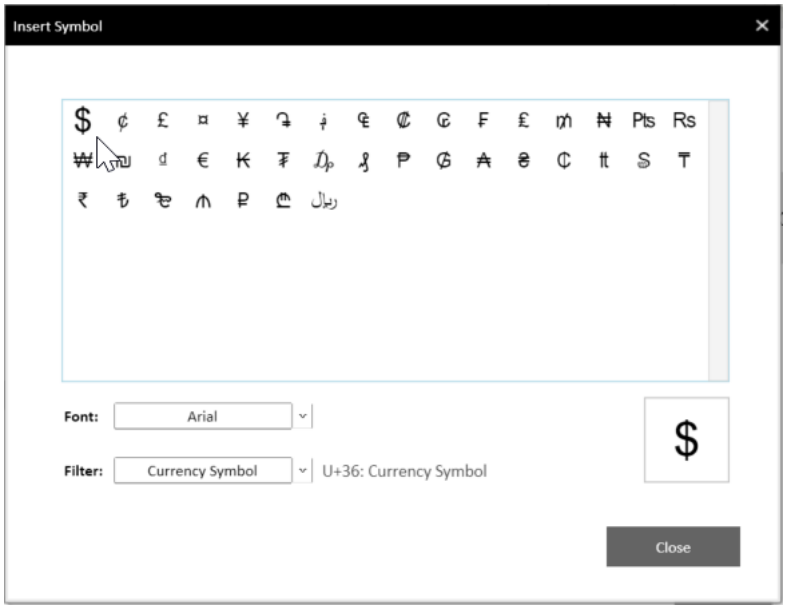


Figure 188. The Insert symbol window

5.2.6. Tab Reference

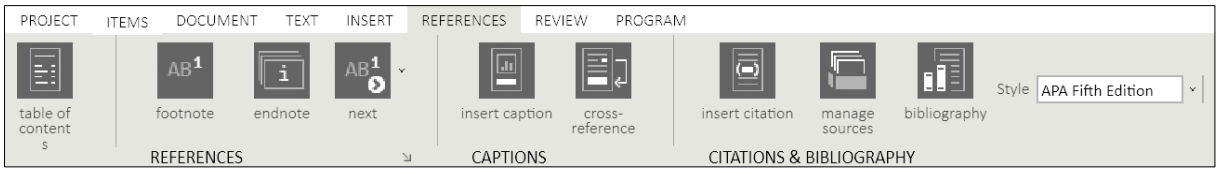


Figure 189. Tab REFERENCE of PS IMAGO Designer

5.2.6.1. *Table of Contents*

Table of Contents – to be able to create a list of contents, the document has to have headers. After clicking the button, you can add a table of contents for sections, subsections, and a table of figures.

You can specify whether a table of contents has page numbers, whether they should be aligned to the right and the leader character for tabulation. You can set the maximum header level to be included on the list in this window.

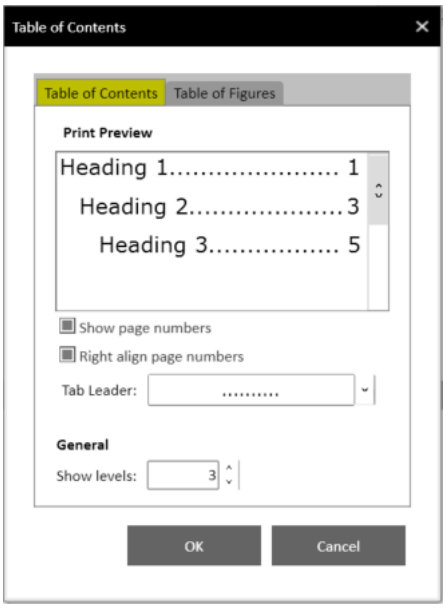


Figure 190. The Table of Contents window – tab Table of Contents

If you go to *Table of figures*, you can add a table of items anywhere in the document (option *Caption label*). You can specify whether page numbers should be displayed, whether they should be aligned to the right and the leader character for tabulation.

Figure 191. The Table of Contents window – tab Table of figures

5.2.6.2. *References*

Footnote – adds a footnote referring to a reference in the document.

Endnote – adds an endnote at the end of the document referring to a reference in the document.

If you click  , additional footnote and endnote settings are available. In this window, you can specify formatting (numbering formatting, custom mark, the first number of a numbering list) and apply the changes to the whole document or only its current section for both endnotes and footnotes.

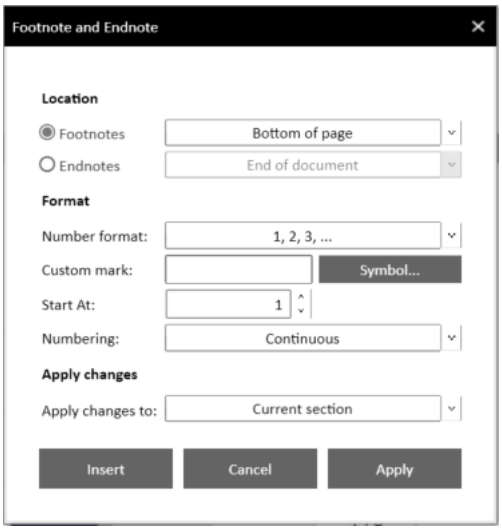


Figure 192. The Footnote and Endnote window

Next – goes to the next/previous footnote or endnote.

5.2.6.3. Captions


Insert caption – captions figures, equations, and other items. A caption is a numbered label such as 'Figure 1' that can be added to a figure, table, equation, or other item. It consists of a customisable text ('Figure', 'Table', 'Equation', or another text you enter using *New label*) followed by an ordinal letter or number (usually '1, 2, 3…' or 'a, b, v…') followed by a custom text.

In the *Caption* window, you can delete an existing label or add a new one and change formatting of caption numbering.

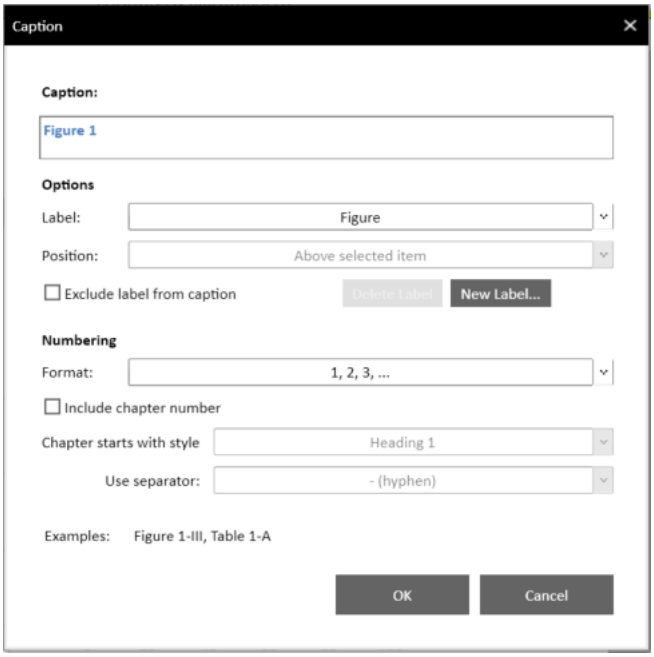


Figure 193. The Caption window


Cross Reference – creates a link to another part of the same document. The cross-reference can be used with a chart, image, or section in your document. A cross-reference is a link to its target element.

5.2.6.4. Citations and bibliography


Insert citation – inserts a reference to literature based on added sources. You can also add a new source in options.

In *Create source*, specify the type (such as book, film, paper) and fill in respective fields. The fields to be filled in depend on the type of source. Field *Tag name* unambiguously identifies the source.

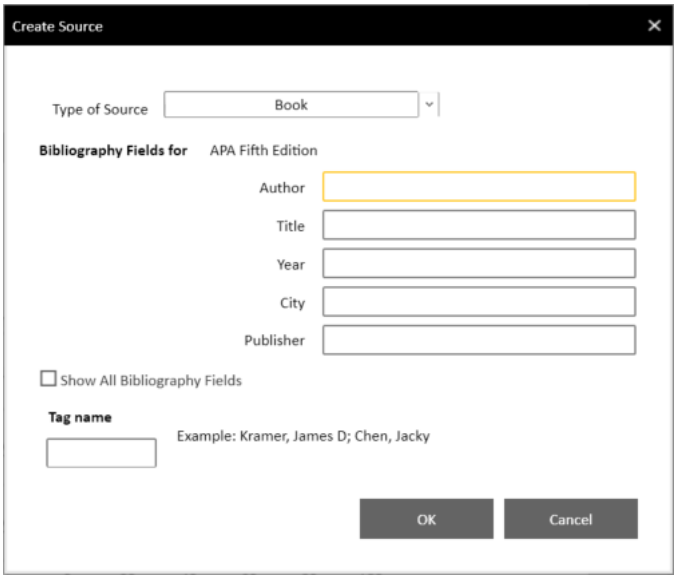


Figure 194. The Create source window

Manage source – lets you edit sources, add new ones, and remove existing ones. When selecting a source from the list, you can preview it and save it using a citation style of your choice.

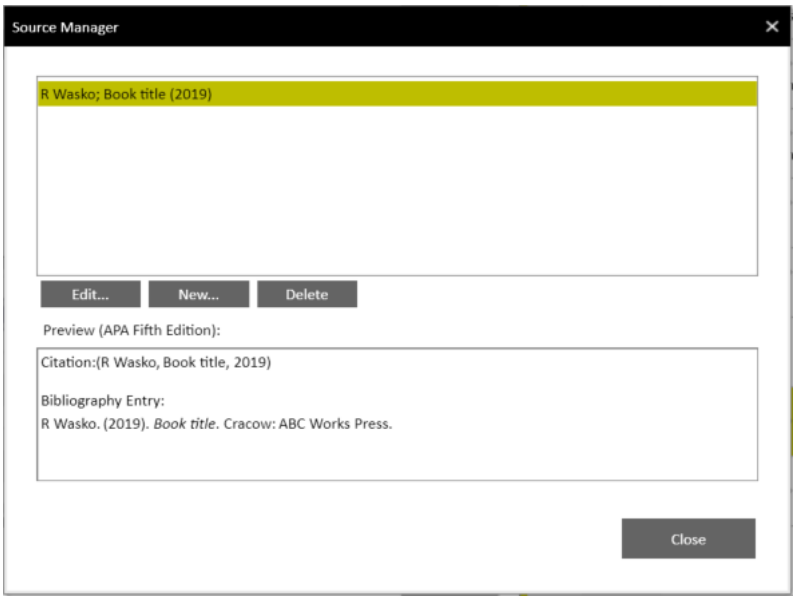
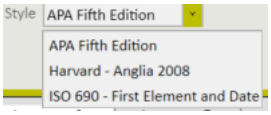


Figure 195. The Source Manager window

Bibliography – adds a list of all sources used in the document anywhere.



Style – the last item in CITATIONS AND BIBLIOGRAPHY sets the citation style. The citation style affects the notation of sources in the document and the bibliography. You can choose one of three available citation styles, APA Fifth Edition, Harvard 2008, and ISO 690.

5.2.7. Tab Review

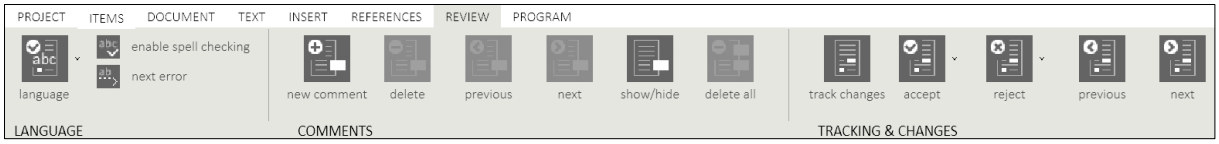


Figure 196. Tab REVIEW of PS IMAGO Designer

5.2.7.1. *Language*


Language – opens the *Spell checking* window, where you can check spelling mistakes.

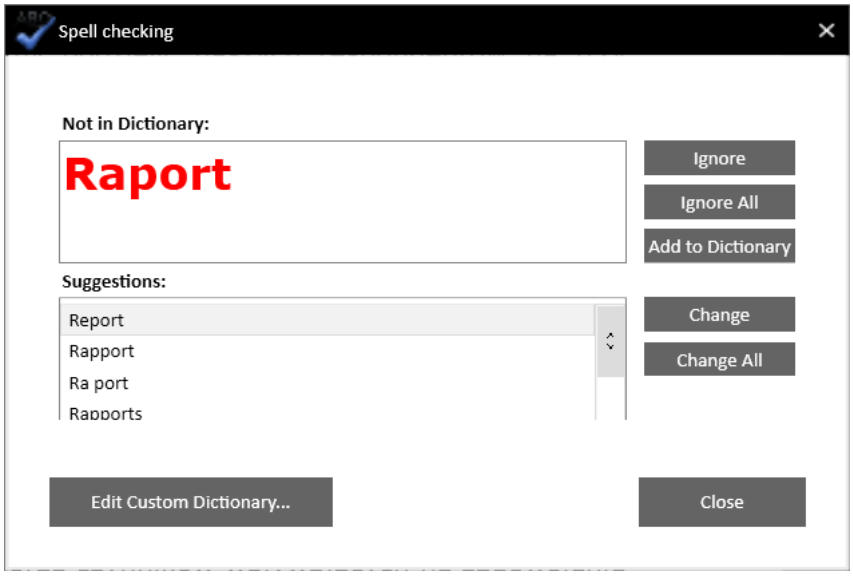


Figure 197. The Spell check window

Option *Edit custom dictionary* in the *Spell checking* window lets you add new words such as names, expert terminology, technical jargon, foreign words, or alternative spelling into the dictionary.

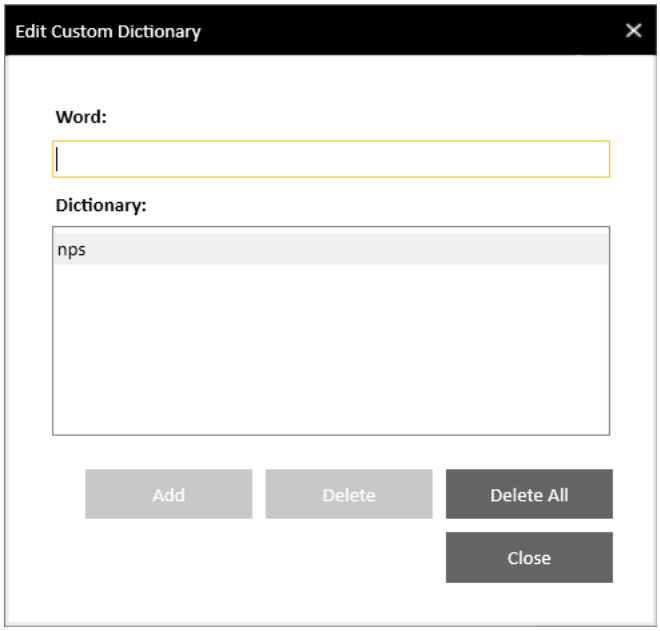
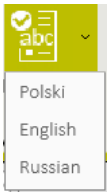


Figure 198. The Edit custom dictionary window



If you expand options for the [Language] button, you can change the language of the text. You can choose English, Russian, or Polish.

Enable check spelling – if enabled, the application spell checks the text and marks incorrect words in red.

Next error – moves to the next spelling mistake identified by the application.

5.2.7.2. *Comments*

You can add comments to the document, for example, when reviewing someone else's work or to make a note. Options in the COMMENTS section, allow you to:

- add new comments;
- delete existing comments;
- move among comments (buttons [Previous] and [Next]);
- hide or show comments (button [Show/hide]);
- [Delete all] – deletes all comments in the document.

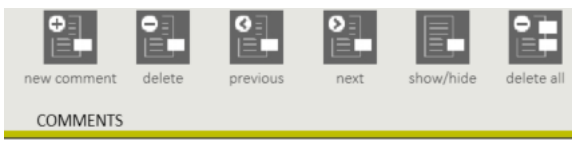


Figure 199. The COMMENTS section in the REVIEW tab

5.2.7.3. *Tracking changes*


Track changes – users can work on a document together and see changes, comments, and underlined text introduced by previous authors. This option shows all changes in the document.


Accept or *reject* changes in the document.

When you expand additional options for the [Accept] or [Reject] button, you can accept or reject an individual change and go to the next one or accept or reject all changes in the document.


Previous or *Next* – switch between the previous and next change in the document. With these options, you can quickly move among changes.

5.2.8. Tab Program

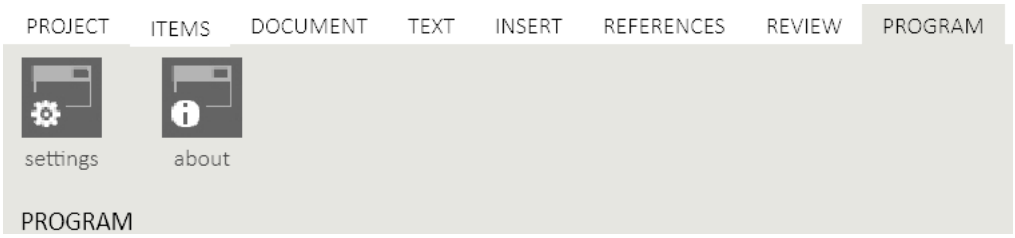


Figure 200. Tab PROGRAM of PS IMAGO Designer

For the options in the PROGRAM tab, see section 5.1.4 Tab Program.

5.3. The main window of PS IMAGO Designer

5.3.1. Dashboard mode window

The main window of PS IMAGO Designer consists of six sections for creating a report page, managing result items, and specifying properties of items and report pages.

The upper part of the window includes the MAIN MENU. It provides access to basic functions of the application grouped into functional groups. There are two panels on the right-hand side.

The ITEMS PANEL is a list of items that can be used when building a report.

The TOOLS PANEL can edit a selected element (page, text field, or container).

The left-hand side also has two panels. The PAGES PANEL is a list of pages you created. The PROPERTIES PANEL is where you can view details of the currently selected item.

The central part of the window is the PAGE DESIGN where the selected page is displayed.

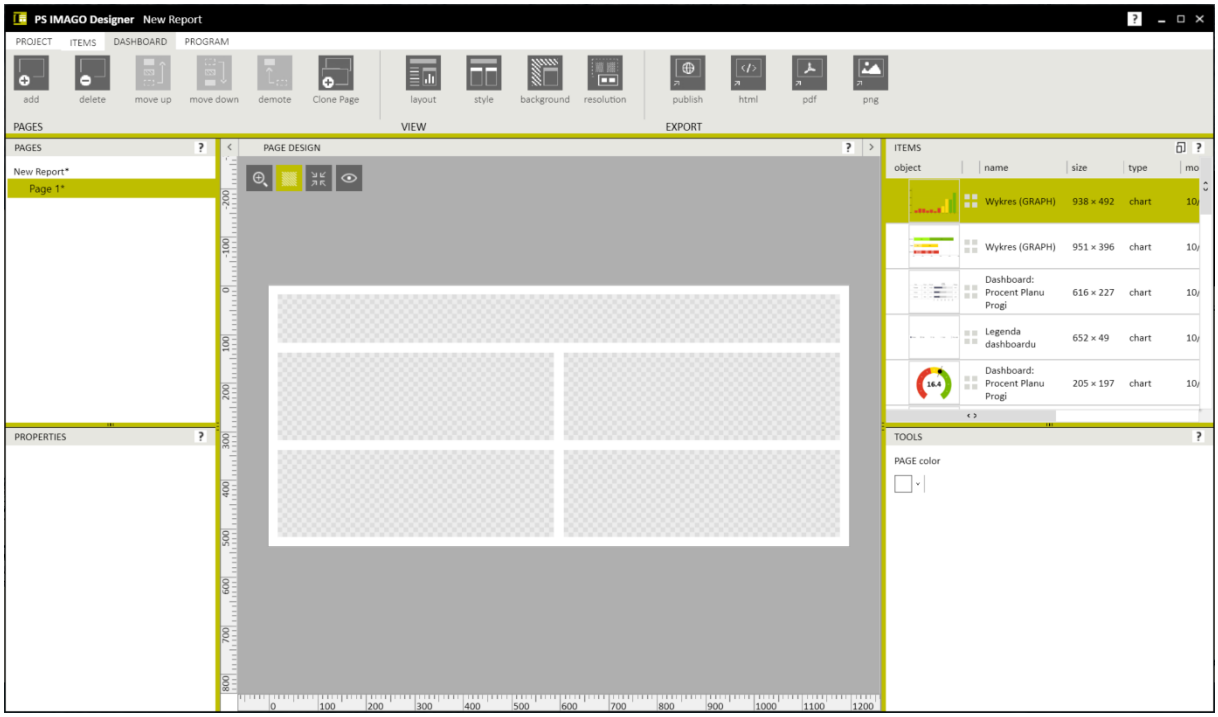


Figure 201. The main window of PS IMAGO Designer

5.3.1.1. *The Page Design*

The PAGE DESIGN is where you design individual pages of the report. A report page may have a header, a footer, and any number of containers. Containers are places where analytical items are inserted (drag-and-drop) from the list of items. You may add a title and an additional description. Double click the header and footer field to enter text.

Figure 202. The Page design in the Dashboard mode


Zoom – shows a page thumbnail that can be navigated and scaled. The dashboard page can be enlarged from 20% to 200%.


Displaying of background – hides or shows background that is already used in the dashboard.


Adjustment – adjust a report page to the area of the Page workspace so that all of it is displayed.


Preview – Shows the page in a browser window.

5.3.1.2. *Items panel*

For items to be displayed in the Items panel, they need to be imported from a data file (PSID), an IBM SPSS Statistics report file (SPV), or directly from image files. The Items panel can be modified by grouping, numbering, and sorting items.

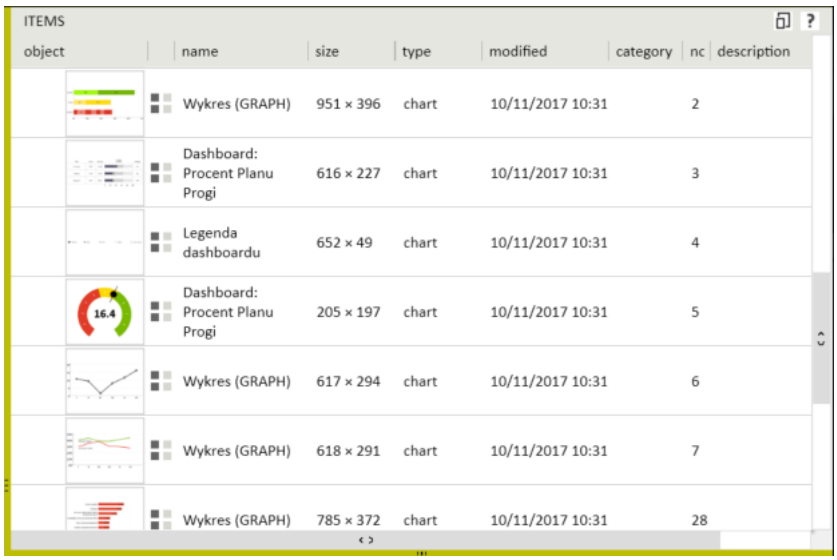


Figure 203. The ITEMS panel

Individual elements of the ITEMS panel are described using the following columns:

- *Object* – shows a preview of a result item. Double click an item to go to the item properties window where you can change item name, assign it to a category, add a note and a comment;
- *Name* – the name of a result item;
- *Size* – the size of an item in pixels;
- *Type* – information about the item type such as chart, table, image, group;
- *Modified* – the date of the recent modification of an item;
- *Category* – you can assign an item to custom categories in item properties. This way, result items can be categorized.

- *No.* – the number of a result item on the list. Imported items are not numbered by default. You may number items by clicking [Number] in the ITEMS tab or clicking the right mouse button on an item on the list and then clicking [Number items];
- *Description* – shows a description in item properties in the *Comment* field.

If you click the right mouse button on a selected item on the list, a menu with options that are also available in tab ITEMS is displayed.

Figure 204. List of available options for items under the right mouse button.

5.3.1.3. *The Tools panel*

The TOOLS panel is a context panel. Its content changes depending on the work mode and items currently selected in the PAGE DESIGN. When a page is selected, its color can be changed. To format a header or footer (fill color, border color, border thickness, border type, size, style, and color of the font, and text alignment), select them. If you select a container, you can define its mode (item mode or text mode). You can also add a title and description to a container. These fields can be edited and formatted just as the header or footer fields.

Also, when you select a container, a group of buttons is activated that can change the appearance and behavior of your report after it is published. They can add a comment to container content, pin related pages, show or hide 1:1 content preview (enabled by default), and insert information about the item (name, date of creation, etc.). Selecting two or more containers facilitates mass enabling and disabling of container title and description fields.

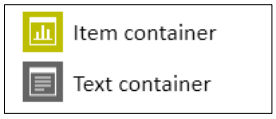


Figure 205. The container mode

The mode options let you define a container as an item container where you can put a result item or as a text container where you can enter text.

Item container

In the case of an item container, you can select the fill color  , container border color  , and its thickness  .

Other options allow you to change container padding when the item inside it is smaller than the container  or change item alignment in the container  .

The following options are available for item containers:

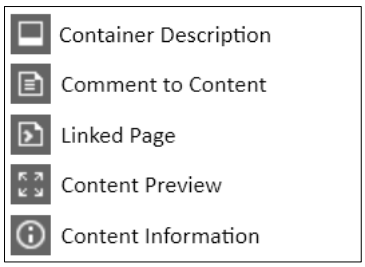


Figure 206. Options available in the Tools panel

- Container title

Adds a title to a container. Additional options change the color of the title field fill, change the font, its size, positioning, bold, and font color.

- Container description

Adds a description to a container shown below its result item. Additional options change the color of the title field fill, change the font, its size, positioning, bold, and font color.

- Comment to Content

You may add a title and description to the item container. After selecting this option, you may specify the color of the fill of the title field, the font, its size, color, bold, italics, and text alignment style.

The content comment adds a description to an item in the container. The recipient can display the comment by clicking a button in the bottom right corner of the item.

Figure 207. The window for editing item comments

- Linked page

An item can have a report page linked that may contain additional information. Items in the report can have assigned an external URL.

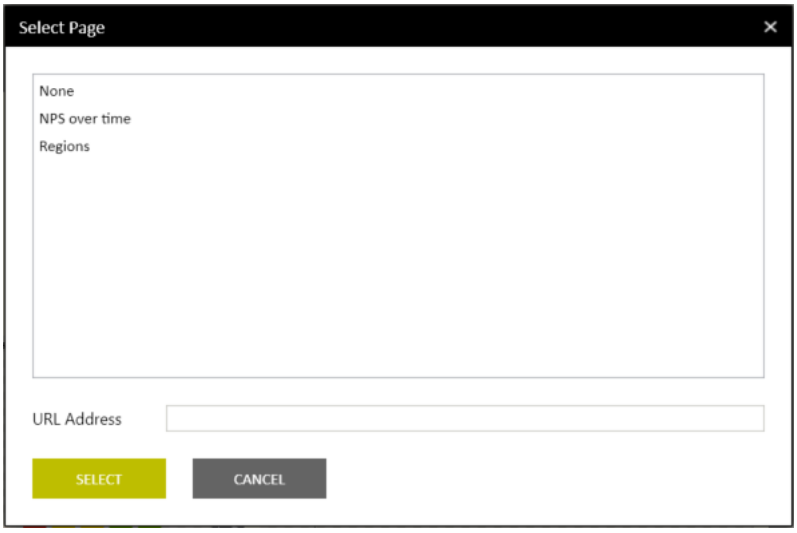


Figure 208. The window for linking a page to a result item

- Content preview

This option enlarges a result item in a container.

- Content information

If you enable this option, you can display information about an item such as its name, date of creation, item type, and dimensions.

- Page color

This option changes the background color for a dashboard page.

Figure 209. Selecting a color for a dashboard page

Text container

If you choose *Text container*, you can set the border line, its color and thickness just as for the item container.

In TEXT, you can specify text formatting. You can set the font, its size and color, and other formatting elements such as numbered lists, bullet-point lists, text alignment, etc.

Moreover, you can add a content comment to a container and use the *Linked page* option (see description of the *Item container*).

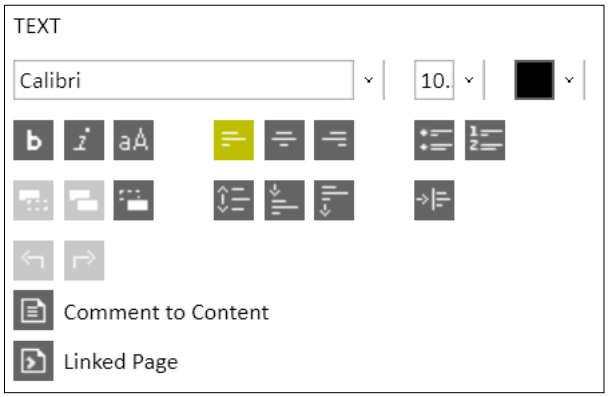


Figure 210. Options available in the Tools panel for the Text container mode.

5.3.1.4. The Pages panel

A report may be made up of one or many main pages and subpages linked to them.

Main pages of a target report (an HTML file) are navigated with a menu. Subpages are accessed via containers on main pages. The start page of an end report is the main page that is highest in the hierarchy.

In the PAGES panel, you can add new pages, remove pages, reorder main pages, and disconnect subpages. A page is turned into a subpage by moving it from the pages panel to a selected container in the report design window (also with an option in container properties).

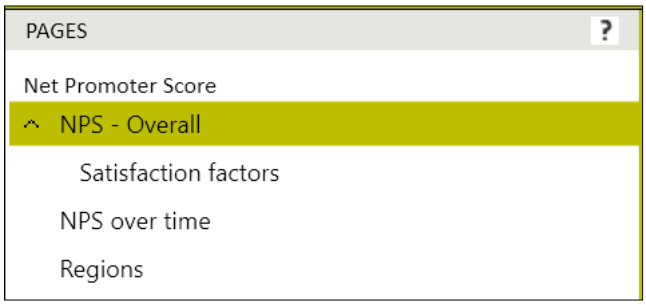


Figure 211. The PAGES panel

When you click a report page with the right mouse button, additional options are available for adding or removing report pages, moving pages up and down, and changing the name of a page.

5.3.1.5. The Properties panel

When an item is selected, this panel shows its name, date of creation, dimensions, and level of downscale.

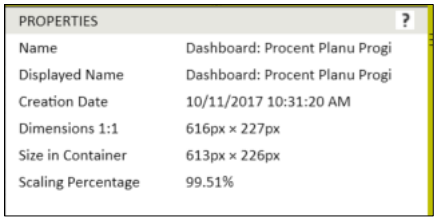


Figure 212. The PROPERTIES panel

5.3.2. Document mode window

5.3.2.1. Report workspace

To switch to the Document mode, go to the PROJECT tab, and switch to DOCUMENT in MODE. In the first window, you need to enter the name of the new report, specify the page size, and portrait or landscape orientation.

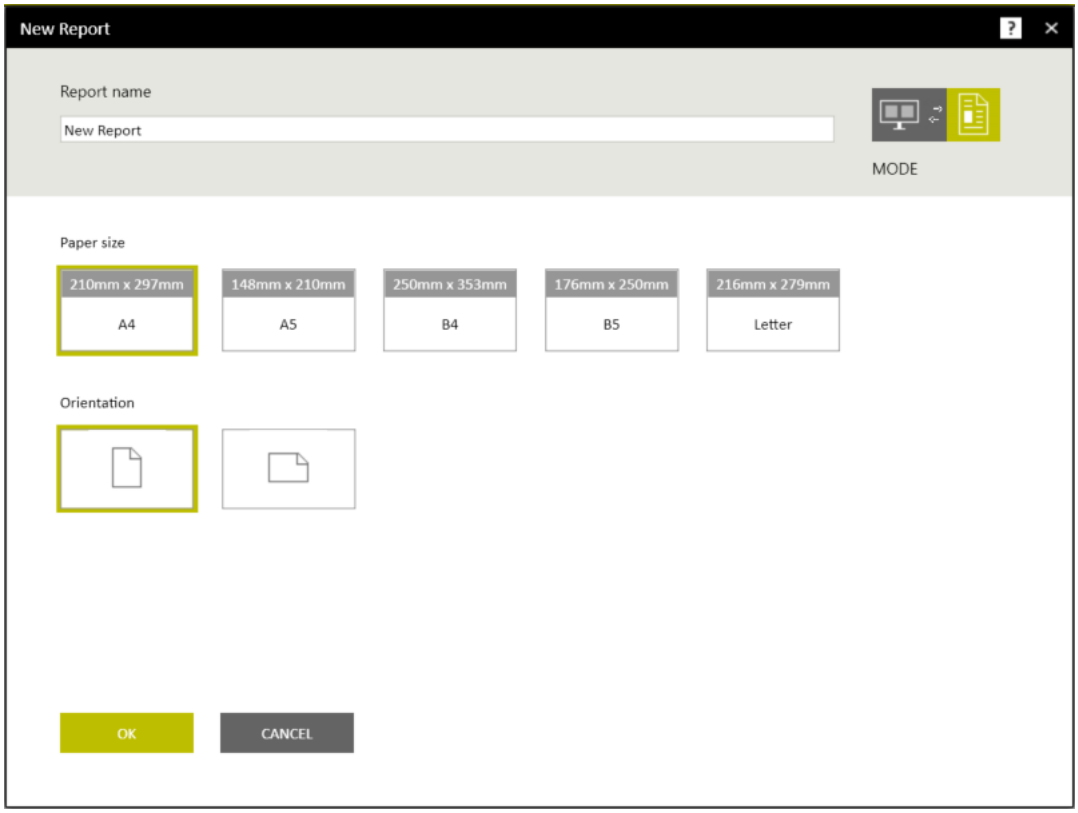


Figure 213. The new project window in the Document mode

You can prepare a detailed report using imported items in the report workspace in the Document mode. In the Document mode, items are inserted just as in the Dashboard mode. Just left-click an item and drag it to the page workspace. The report is created in a similar way to a standard text processor.

The bottom of the report workspace has options to scale the page. The page size can be set using a slider or selected as a percentage from a drop-down list. Moreover, you can select a print layout mode or Web layout mode .

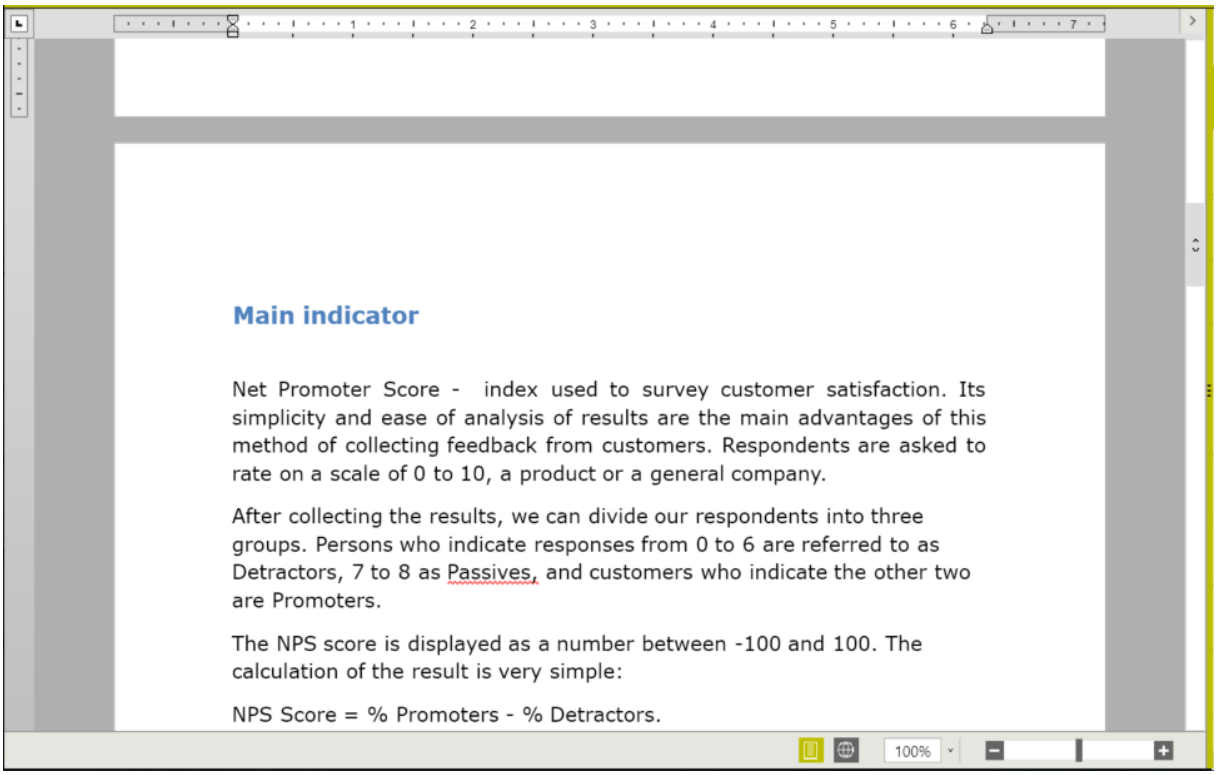


Figure 214. The report workspace in the Document mode

5.3.2.2. *Items panel*

As was the case for the Dashboard mode, there are result items you can use in your report on the right-hand side. For details of the options available for the ITEMS panel, see section 5.3.1.2 Items panel.

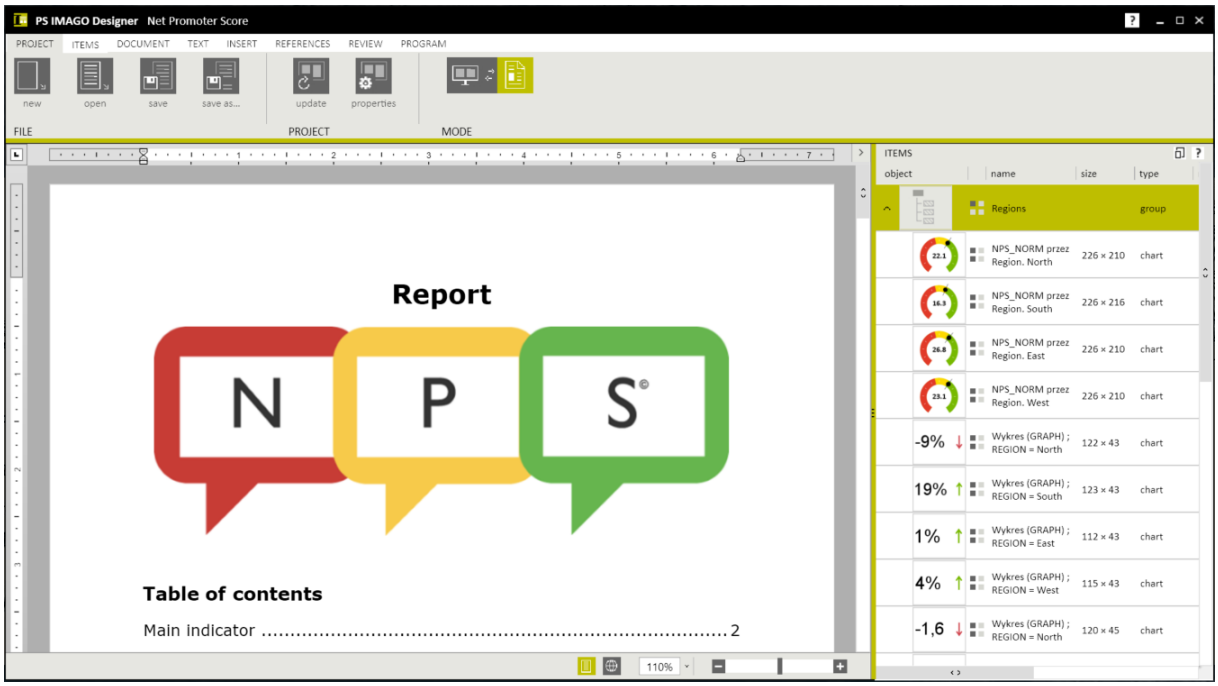


Figure 215. Designing a report in the Document mode

6. PS IMAGO Portal and Portal Cloud

The PS IMAGO Portal and its cloud counterpart, PS IMAGO Portal Cloud is a solution for storing analytical information relevant to company or organization operation in one place. It is an environment for publishing and presenting analytical reports created in PS IMAGO Designer.

Reports are published in a portal database repository and shared with authorized people as HTML pages.

Reports are viewed in a web browser with Java scripts enabled. The recipients need only to have a web browser and be authorized to view analytical reports of interest.

With the PS IMAGO Portal, you can:

- share reports (or other items) with authorized users;
- grant and manage user privileges;
- create and manage structures where reports are published;
- search reports, add them to favorites, etc.

One of the Legend intentions behind the design of the PS IMAGO Portal was to simplify the installation process as much as possible, facilitate easy migration to various hardware-software platforms, and simple administration of the environment.

Additionally, the PS IMAGO Portal Cloud is a secure, cloud-based, free option for safe gathering analytical information in one place.

The PS IMAGO Portal Cloud uses professional IT solutions to guarantee uninterrupted availability of the portal and total security of reports and data in it. Reports are published and stored on cloud servers. They can be accessed by authorized employees or members of an organization using any device from the Internet.

Published content is accessed using a secure SSL-certified communication protocol. Only those having adequate privileges can access the portal. Access privileges are granted and managed by an administrator, the person selected by the organization where the PS IMAGO Portal Cloud is used. Predictive Solutions ensures the efficient operation of the system and backups data regularly.

6.1. Installation and startup of PS IMAGO Portal Cloud

The PS IMAGO Portal Cloud provides a secure and easily available environment for sharing analytical reports without additional costs. Each company or organization with a license to use PS IMAGO PRO is entitled to use our cloud solution PS IMAGO Portal. The portal is installed completely automatically.

On the installation CD of the PS IMAGO Portal select PS IMAGO Portal Cloud, which opens a browser with a registration form website.

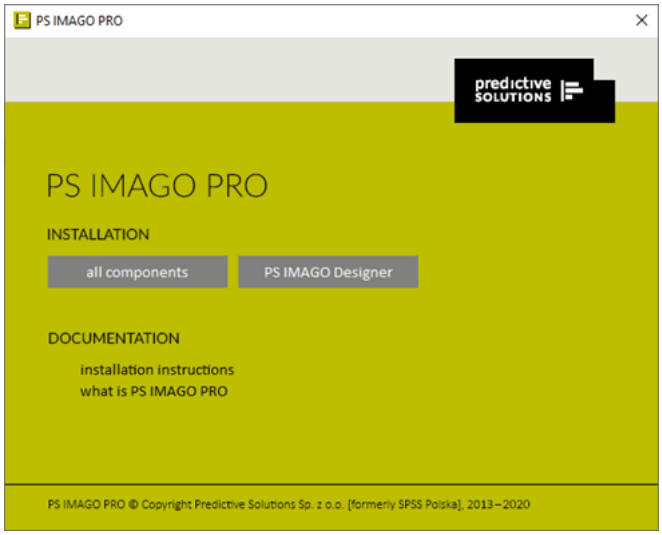


Figure 216. The window for selecting the PS IMAGO Portal and PS IMAGO Portal Cloud installer

To start the installation process, you need Predictive Solutions software license information such as license number and activation code from the license officer.

The portal is installed automatically in four steps:

- fill in the registration form;

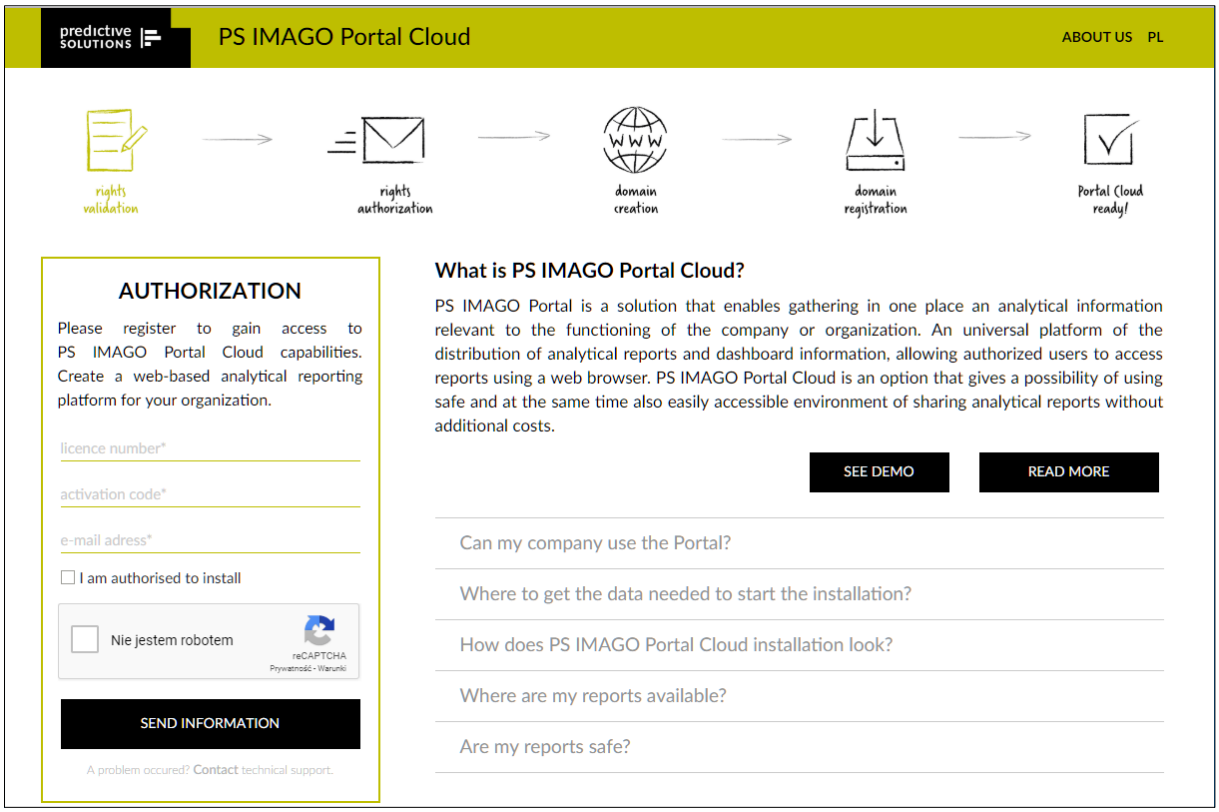


Figure 217. The PS IMAGO Portal Cloud authorization form

- receive an e-mail with a link to the installer;

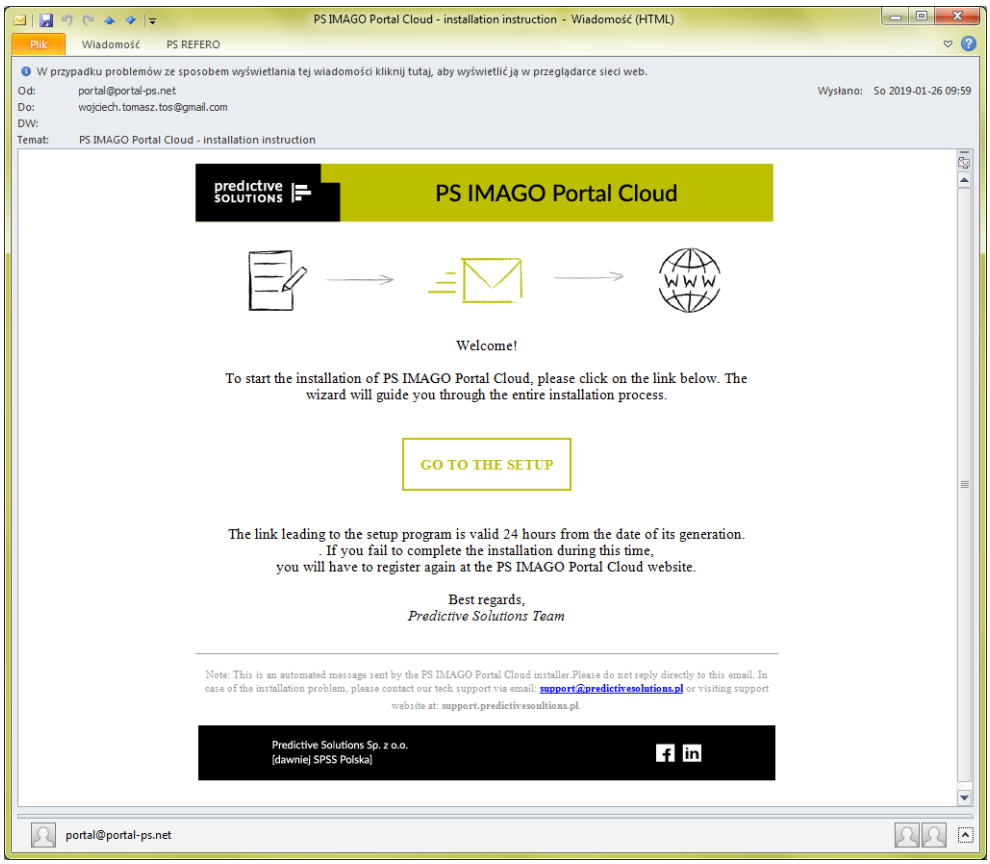


Figure 218. A message with a PS IMAGO Portal Cloud installation link

- go to the website specified in the e-mail by clicking [GO TO THE SETUP], which will start the installation process;
- choose a name for the portal and enter your password.

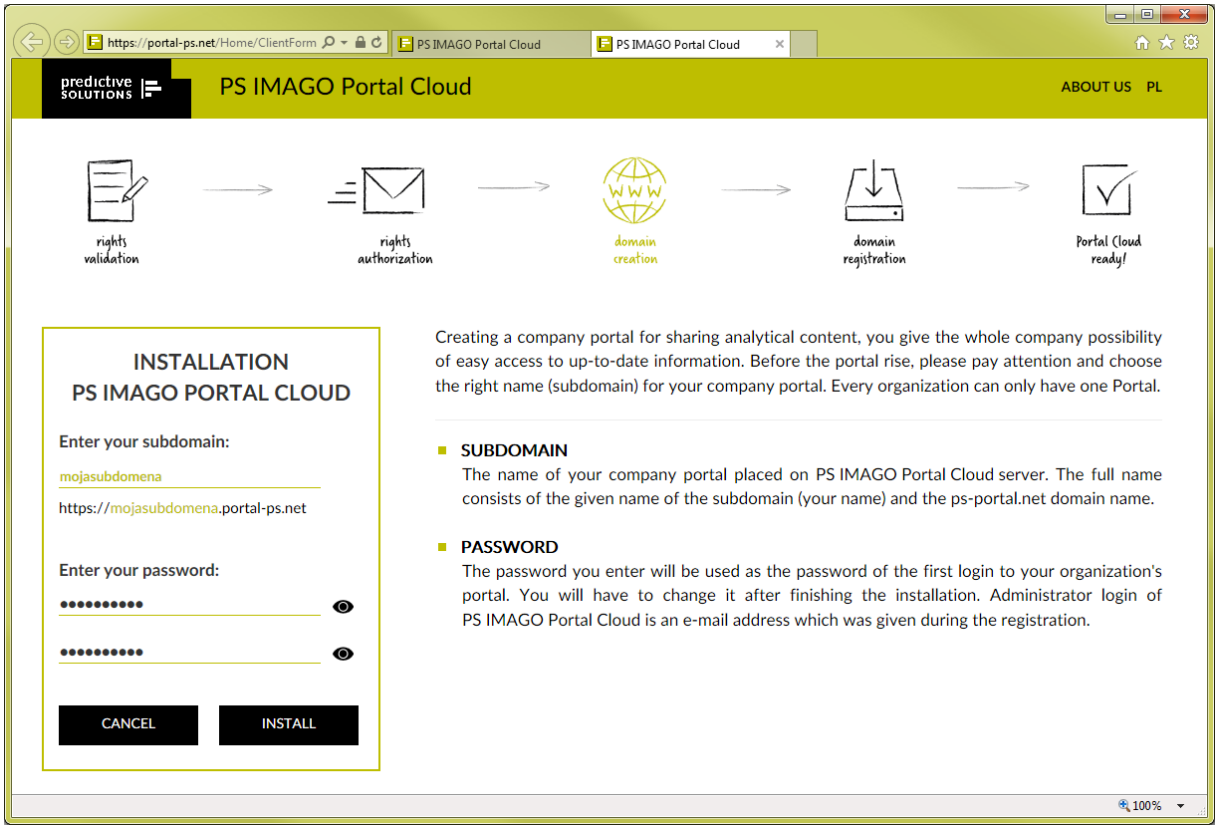


Figure 219. The window for creating a subdomain for the PS IMAGO Portal Cloud

The installation may take several minutes. Do not close the web browser during the installation.

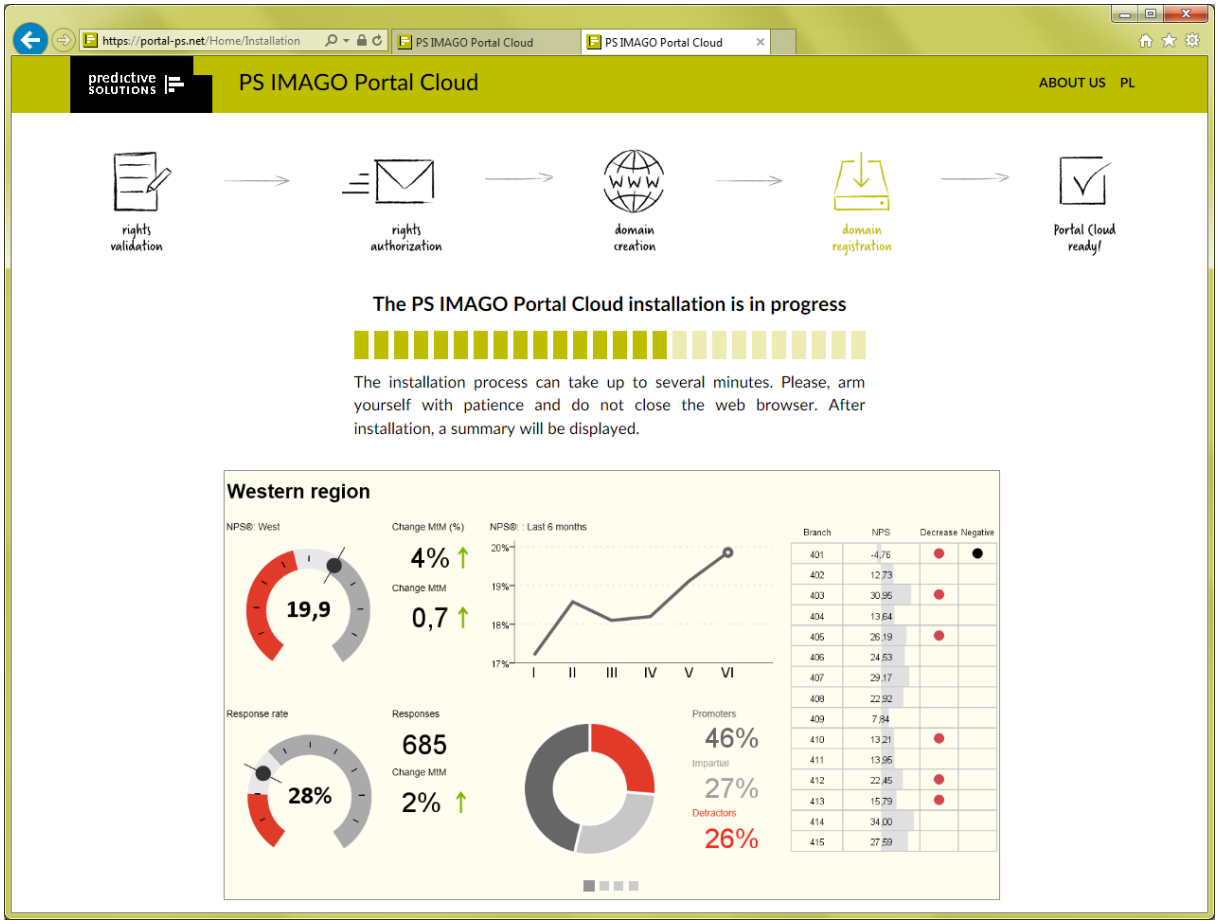


Figure 220. The PS IMAGO Portal Cloud installation window

All functionalities of the PS IMAGO Portal Cloud are identical to those of the PS IMAGO Portal, so the descriptions apply to both.

6.2. How to sign in to the PS IMAGO Portal and PS IMAGO Portal Cloud

To view published reports, you must first authenticate your credentials to view the content of the portal (or administer it) by entering your login and password. The credentials are provided to users by the system administrator. User's identifier (login) that allows them to sign in is their e-mail address. The password is an alphanumeric string. You can change your password any time in personal details in the system. Your password may expire after some time. Then, the system forces you to change it when signing in. Password validity period is set by the administrator.

When the PS IMAGO Portal is integrated with an Active Directory domain, users may sign in using the same credentials (login and password) as those used to sign in to the Windows system integrated with the domain.

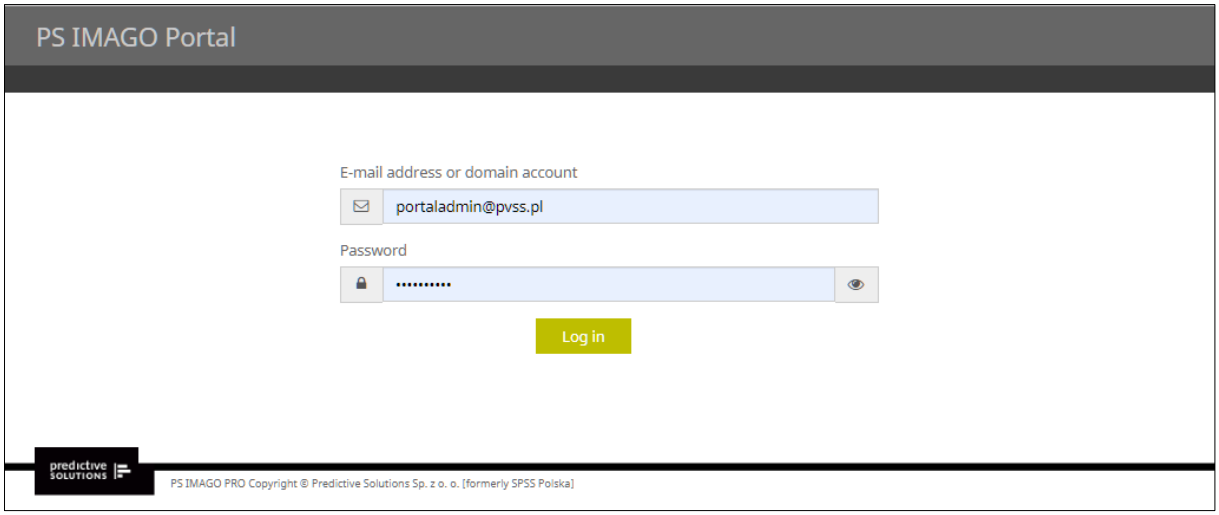


Figure 221. Signing in to the PS IMAGO Portal

6.3. How to change password

You can change your password in your details. Click your login in the upper right corner of the screen to go to the form where you can change your password. You can also change the interface language there. To change your password, enter your old password and then enter your new password twice. The password must conform to the principles set by the administrator of the PS IMAGO Portal or PS IMAGO Portal Cloud. They are specified below the form used to change the password. By default, the password should be 8 to 40 characters long. It has to consist of small and capital letters and digits (at least one of each). Your password must not contain diacritics. You may need to change your password when it expires. It is then done during signing in to the PS IMAGO Portal.

If you use an Active Directory domain to sign in (your Windows login), you cannot change your password in the portal.

6.4. Home page

After you sign in, a home page is displayed. It consists of two sections. You can put hyperlinks to your favorite reports into one of them. The other section may contain links to reports (or other documents) published on the Portal in a specific period. Lists of reports are in tables that can be sorted and filtered using a search tool. The home page may show administrative messages to portal users. They are drafted by the administrator in the portal management module.

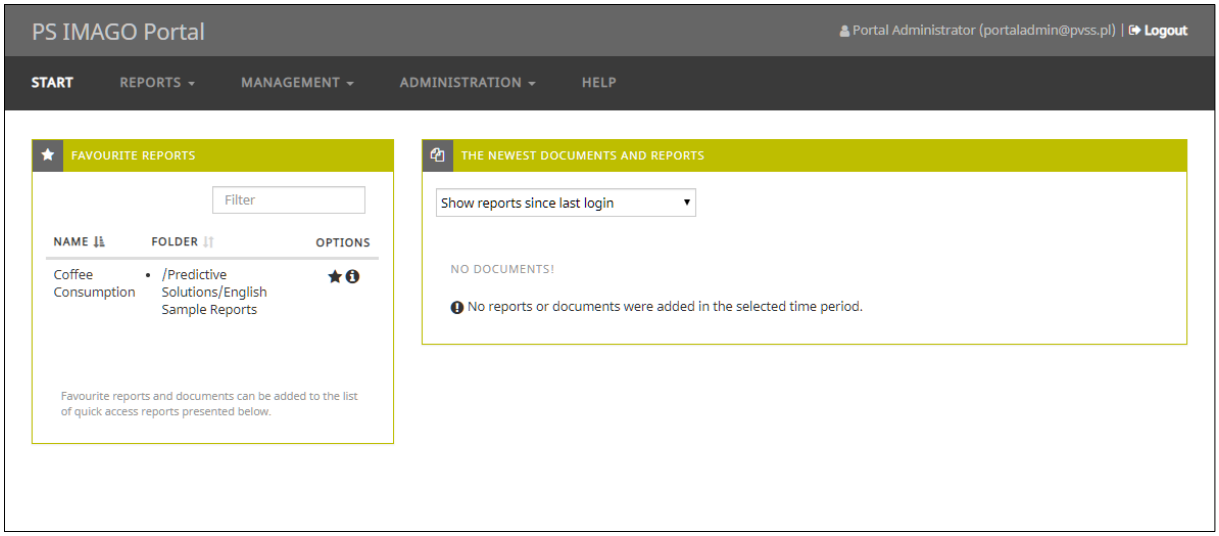


Figure 222. The PS IMAGO Portal home page

6.5. Reports

There is a menu in the upper part of each page of the portal. You can use it to go to the REPORTS page where the whole content of the portal repository available to the signed-in user is shown among other things. Apart from tables with report lists, the report page shows a tree directory structure with the content of the repository of the PS IMAGO Portal (PS IMAGO Portal Cloud). The hierarchical folder tree may reflect the organizational structure of a company or its business goals. The folder structure is created by the administrator or a manager in the portal management module. Depending on your permissions, you see only those folders, reports, and documents you are authorized to see. The home page of PS IMAGO Portal shows a list of the latest reports and documents in various folders (after you select VIEW in the REPORTS menu). You see a list of only those documents you are authorized to see. The sortable and searchable table has columns with the name and type of document, its location in the portal database structure, and the publication date. Tables with reports in folders also have columns *Author* and *Expiry*. The *Expiry* column shows the expiry date of the report if set during publication. Expired documents are not available to regular users but administrators see all expired documents and can change report validity if necessary. The last column of report tables shows options for specific reports. In the *Options* column, there are icons marking the report as added or removed from your list of favorite documents shown on the home page. The column shows an icon for displaying report details as well. The report is opened by clicking its name.

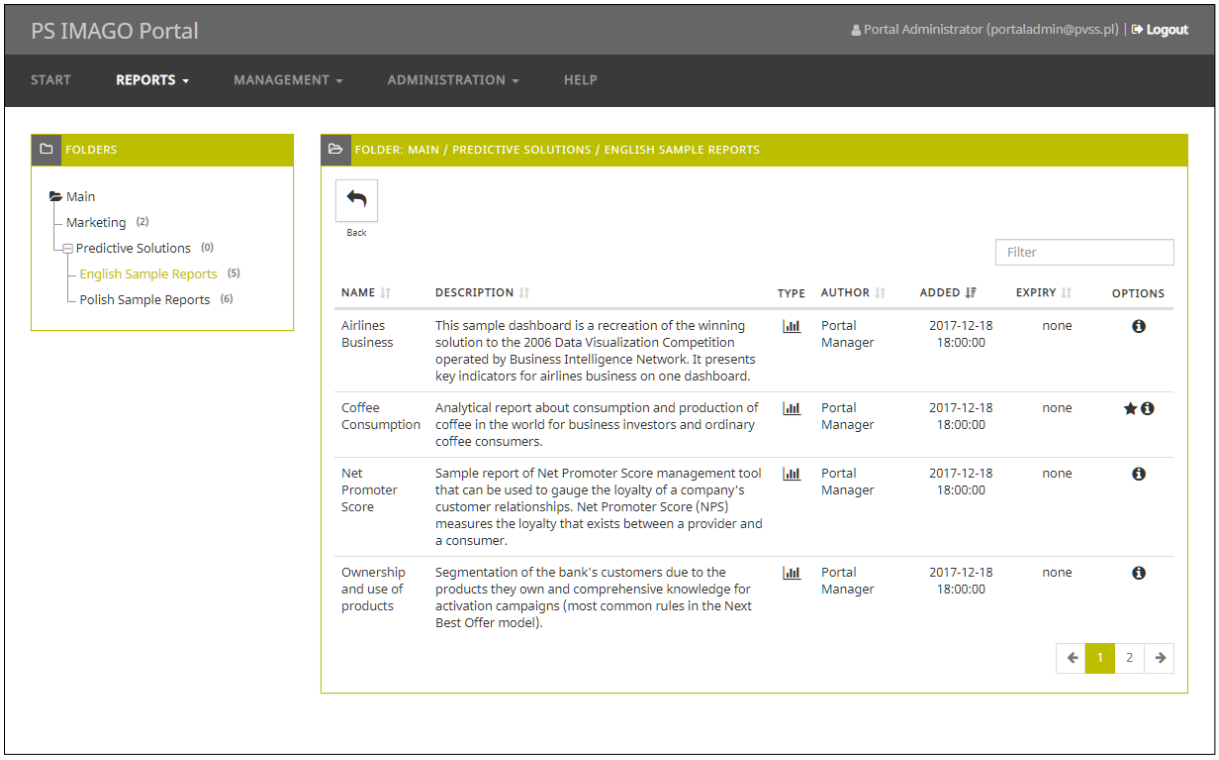


Figure 223. A list of reports and documents in the portal folder structure

6.5.1. How to view content

When you click a report name, a new browser tab with the report content is opened. Each report is an independent system of linked HTML documents with its page appearance template independent of the portal, and an internal navigation system. The content and layout of a report are specified in PS IMAGO Designer when it is built. Functional elements of reports are based on JavaScript and HTML5. It is advisable to use the latest versions of your web browser to view them (Chrome, Firefox, Internet Explorer, Safari, Opera). Only then can complete and correct functionality of your report be guaranteed.

In principle, only those users who are signed in to the system can view published reports. Content of the PS IMAGO Portal repository can be viewed only by signed-in users even when accessed via a link. There is an exception when a specific report is shared by an administrator or manager of the PS IMAGO Portal with anonymous users. They do not need to sign in to access the report. Credentials are provided by the administrator or manager.

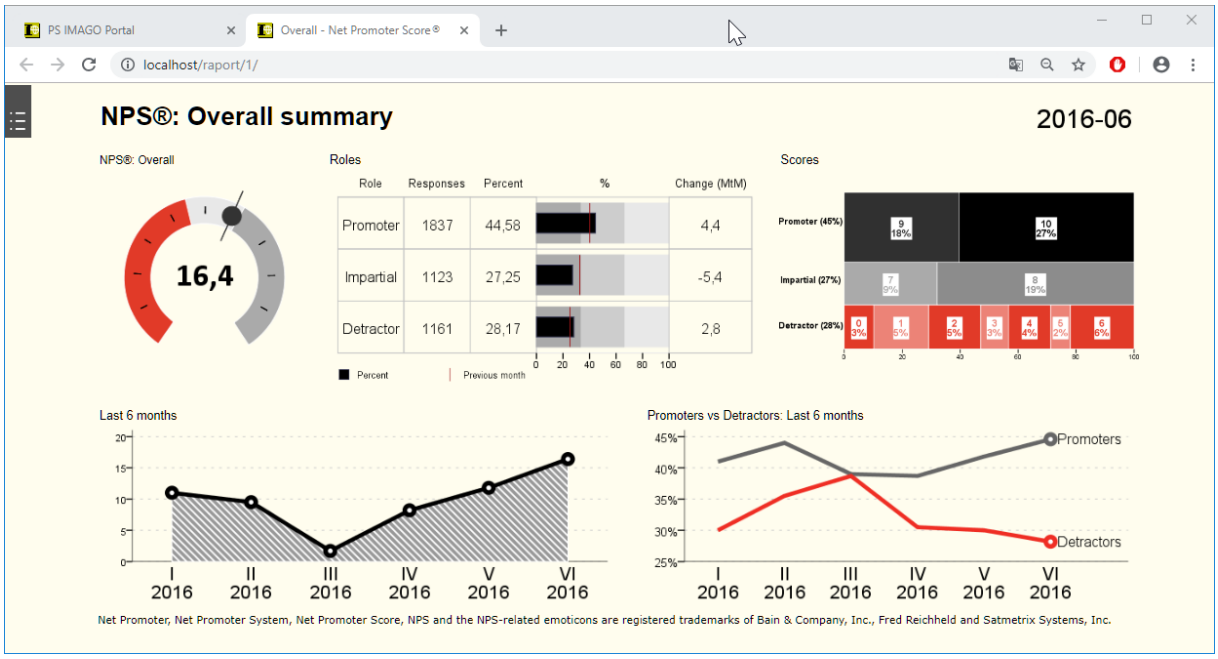


Figure 224. An example of an analytical report.

6.5.2. Details

The details page shows metadata of the report (*Name*, *Description*, *keywords*, dates: *Created* and *Expiry*, *report type*, and *Folder* with the report) and a summary of all versions of the report with their publication dates. A selected version can be opened by clicking its name on the *Object versions* list. Details of each version can be viewed by clicking the details icon in the *Options* column. An administrator or manager can lock any versions of a report. They are not available to regular users. The same applies to expired reports. Both a manager and administrator can change expiry dates. Reports and their locked or expired versions are visible to administrative users only. If the first published version of a report is locked, the whole report is unavailable, also to administrators and managers. The report details page can also show a table with a list of component files of a report published on the portal. The list is displayed as a configuration setting. By default, the file table is not displayed.

There is a set of buttons visible to all users with the following functions above report details:

- *Open* – opens a report in a new browser window (the most recent version is always opened);
- *Favorites* – adds a report to the list of favorite documents;
- *Subscription* – enables subscription notifying of new report versions;
- *Download* – downloads an archive with the report (zip file).

Managers and administrators can use the following additional buttons:

- *Edit*
- *Location*
- *Lock/Unlock*
- *Remove*
- *Anonymous*
- *Version*

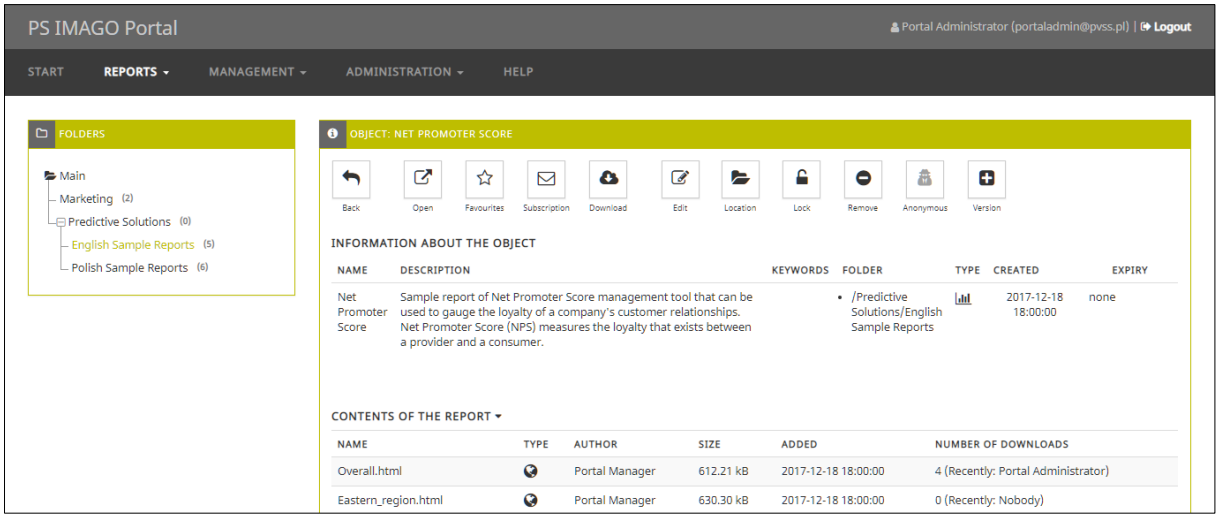


Figure 225. Details of a report

These buttons allow managers and administrators to manage items in the portal's repository. Click *Edit* to go to the item (report) properties page where an administrator can change the *Name* or *Description* of a report, add *Keywords* useful for searching, and change the report expiry date.

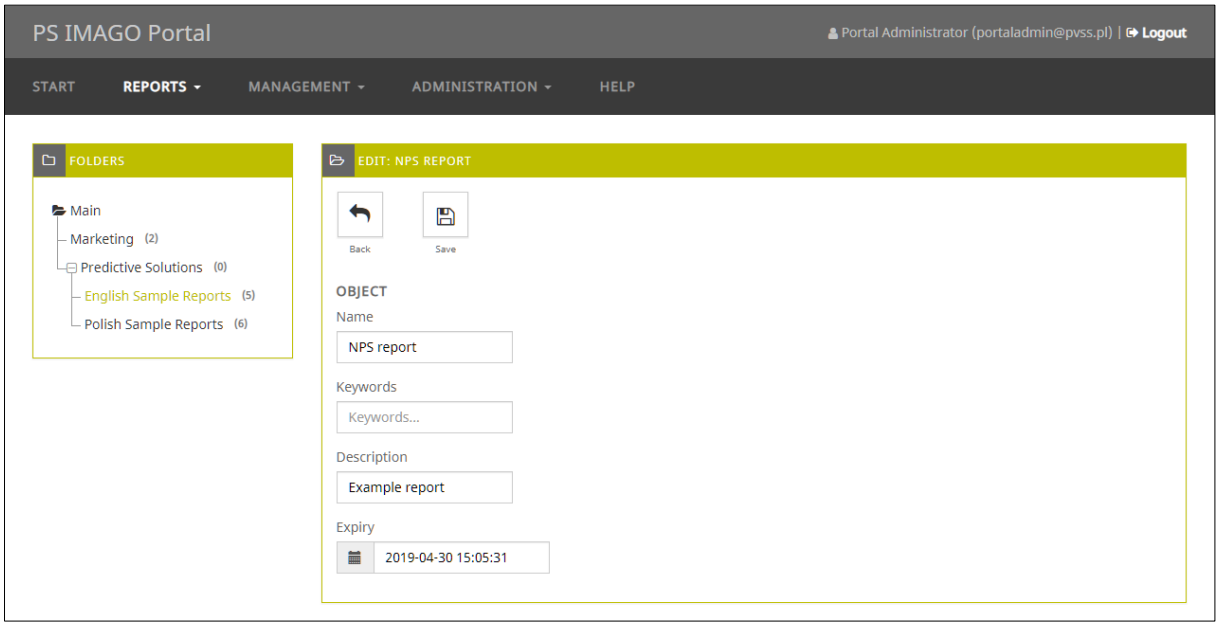


Figure 226. Editing report properties

After you select *Location*, you can select folders where the report will be shared with authorized users. A report can be displayed in more than one folder.

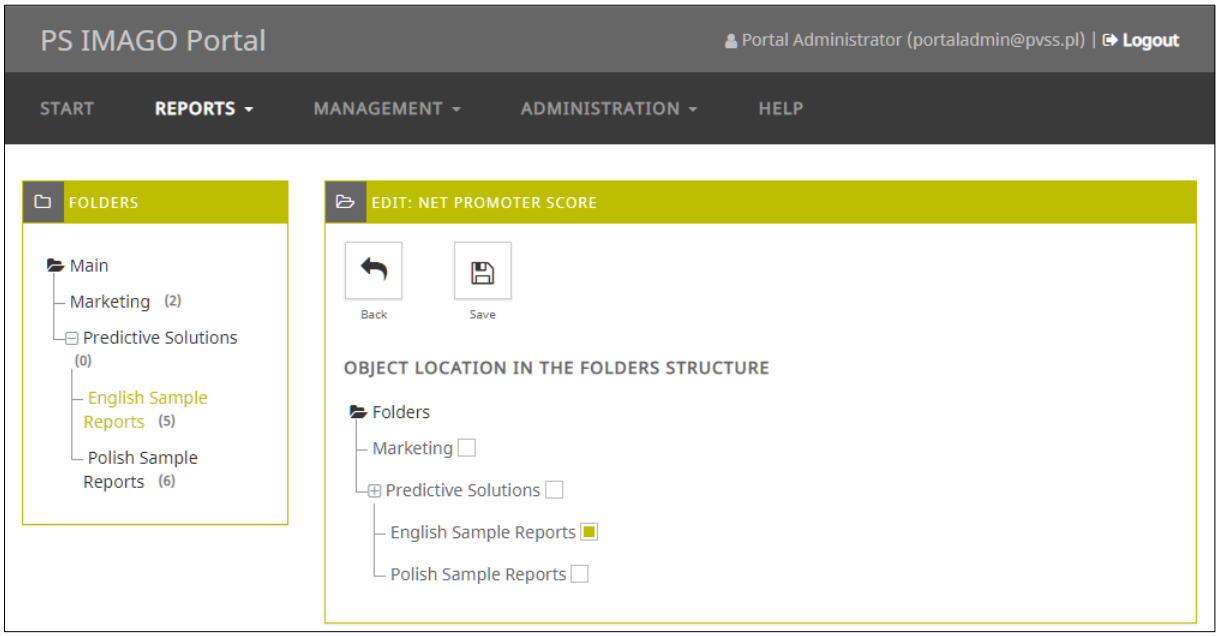


Figure 227. Changing report presentation location

An administrator or manager can also publish a new report version manually using the [Version] button.

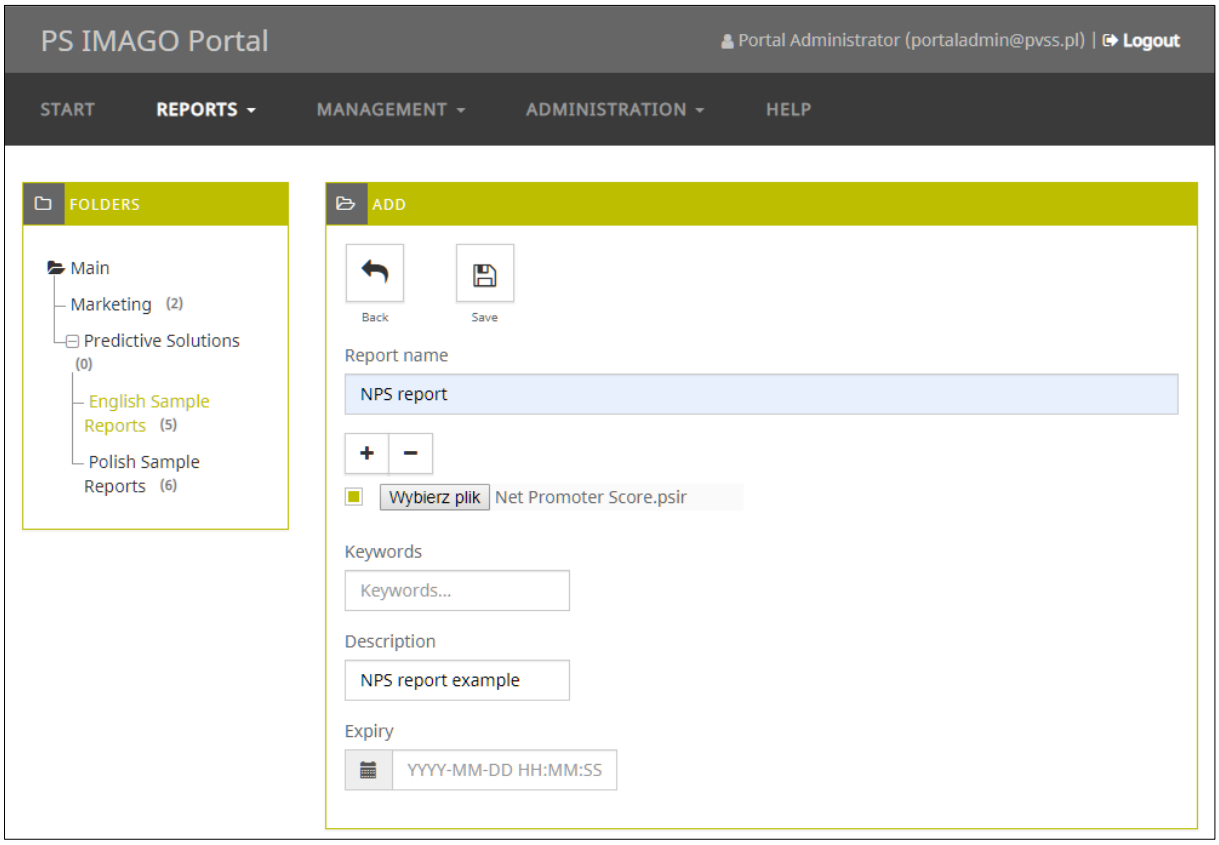


Figure 228. Adding new report version

To delete a report, a manager or administrator clicks [Delete] (Remove).

An administrator may lock selected versions of a report. It is done with the [Lock] button (Lock) in report details after a report version is selected on the version tree. Note that if the first published version of a report is locked, the report is completely unavailable, also to administrators. Locked versions are greyed out on the report version tree. When their name is clicked, a locked padlock icon is displayed. When this icon is clicked, the item is unlocked.

After you click [Anonymous] (Anonymous), anonymous users can access the report, which means that every user with a link to the report can see its content without signing in to the portal.

6.5.3. Subscription

Reports published in the PS IMAGO Portal can be subscribed to. Each user decides whether they want to receive e-mails with information about new versions of reports published on the portal. If a system administrator enabled the report subscription mechanism (disabled by default), users can subscribe to reports in report details. Each report's menu has a [Subscription] button with an envelope icon Subscription. You subscribe to reports by clicking this button. If a subscription is active, the envelope turns black Subscription. When an analyst publishes a new report version, the system sends a notification to all users who subscribed to the report. The notification is sent to users' e-mails that are also their system logins. The content of the notification is specified by a system administrator.

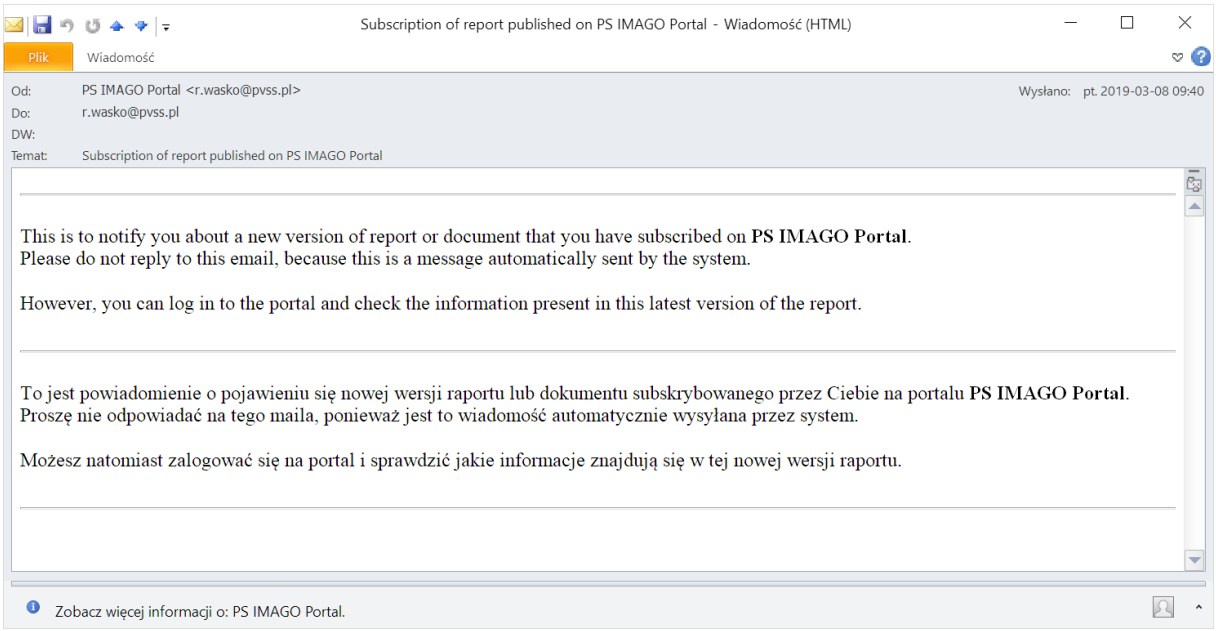


Figure 229. A notification about a new report version published on the PS IMAGO Portal

Below the notification text, the e-mail contains a direct link to the subscribed report. Click it to open a web browser with a sign-in page to the portal. A report can be viewed only if you sign in to the portal.

You can unsubscribe at any time. You can unsubscribe from report notifications in its details by clicking the [Subscription] icon marked by a black envelope.

You can only be notified about new versions of reports you selected. You are not notified about new versions of other reports unless you subscribe to the reports.

6.5.4. How to publish reports

Analytical reports are published on the portal from PS IMAGO Designer. It is a component of PS IMAGO PRO, just as the PS IMAGO Portal (PS IMAGO Portal Cloud).

Figure 230. A report project in PS IMAGO Designer

To publish a report created using PS IMAGO Designer on the Portal, activate the publishing function with the publish icon in the EXPORT menu. Fill in the authorization form (Login, Password) and specify the address (URL) of the host with the PS IMAGO Portal or PS IMAGO Portal Cloud in the dialogue box. After you click [LOGIN], the window shows the folder structure and item list in the portal repository if the credentials were correct. The folder structure is created by an administrator in the portal management module. Depending on your permissions, when you are publishing a report you see only those folders and reports you are authorized to see.

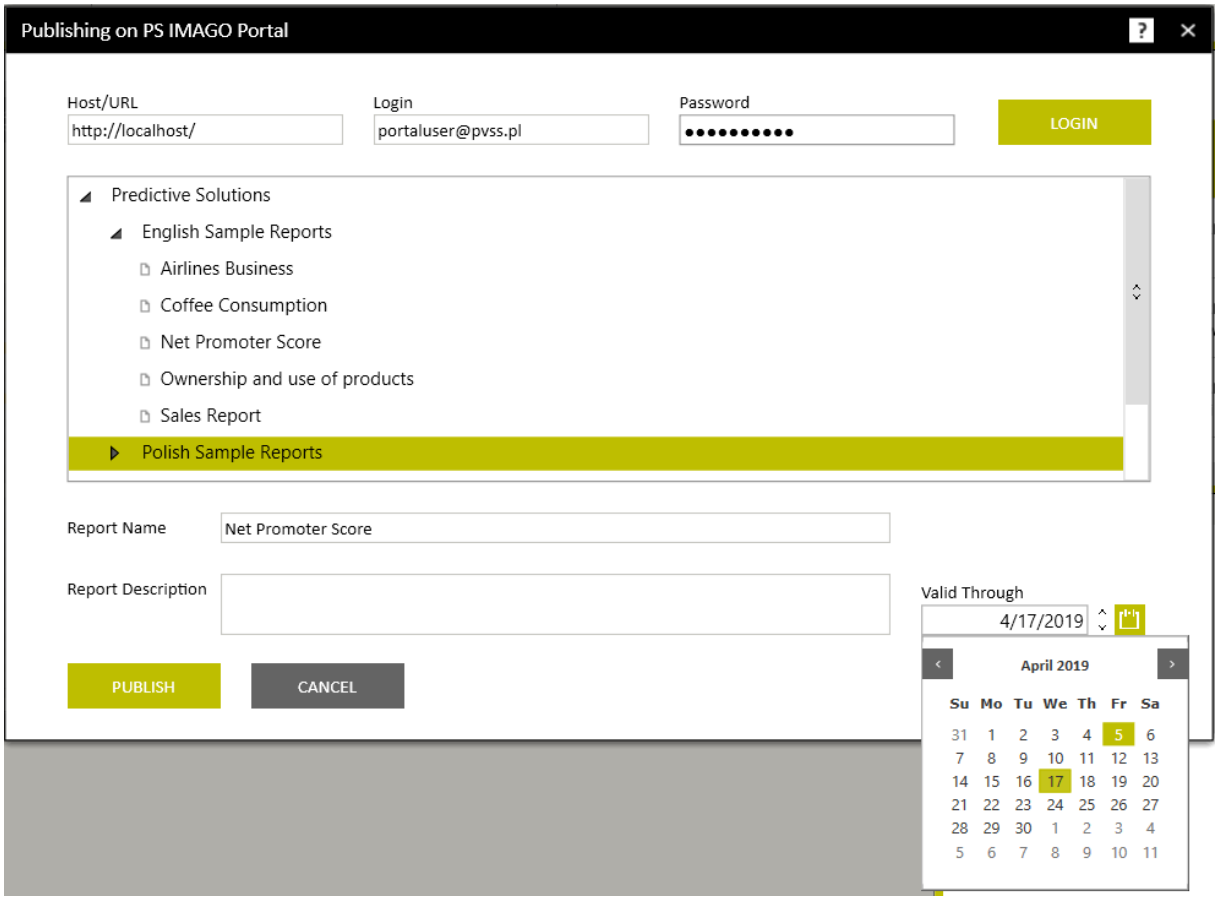


Figure 231. The window for publishing reports in PS IMAGO Designer

If a new report is another version of an already published report, the publishing user indicates a previous version of the report in the folder structure. Otherwise, if only a folder is indicated, the report built in PS IMAGO Designer is published as a completely new one even if its name is identical to that of a report already in the same folder. A published report can be immediately viewed in a browser and is included in the list of reports available to Portal users. A published report takes privileges after the folder it was published in. Users who are members of groups with access rights to the folder will see the new report when browsing folders or searching the repository.

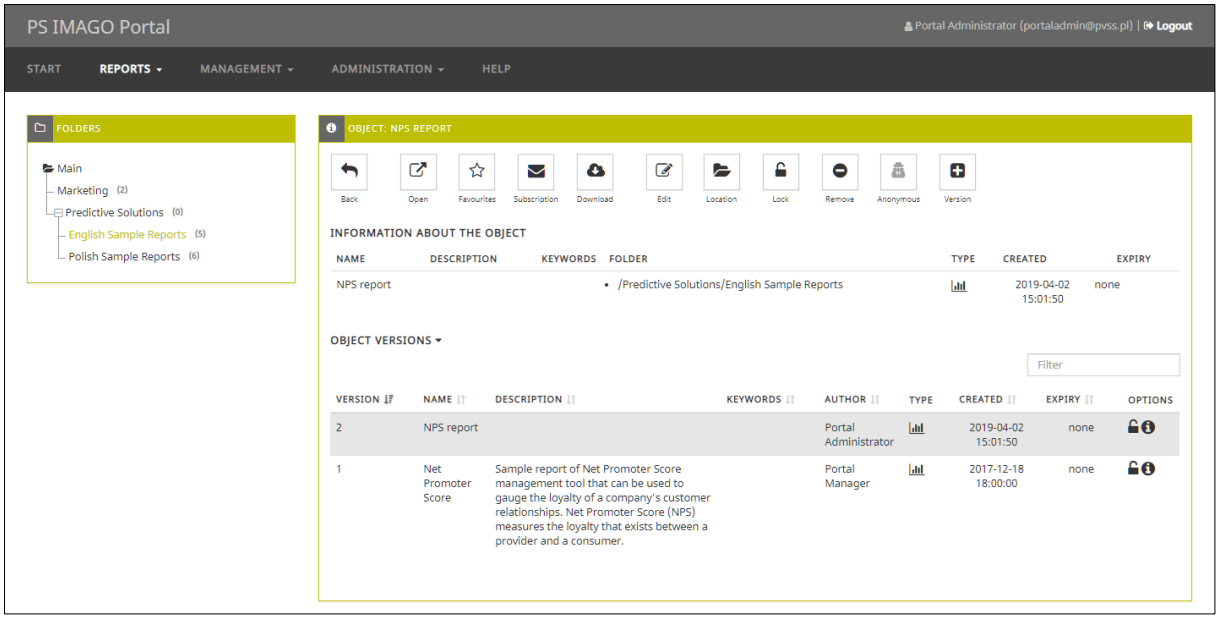


Figure 232. A new version of a report published on the portal

If you click the name of a report or the [Open] button when browsing the folder structure, a new browser tab is opened to show the report. The application always opens the most recent version of a report. Each report is a system of linked HTML documents independent of the portal. Depending on the imagination of the designer using PS IMAGO Designer, a report may have its individual page appearance template independent of the portal and an internal navigation system.

6.5.5. How to search

The search function for finding reports and other documents published in the portal repository is available in the REPORTS menu, SEARCH. By default, the function searches by report name, hence the *Search in report names* option is enabled by default. All words typed in the *Search* field are searched. If the whole exact phrase is to be searched, tick *Search the exact phrase* in the ADVANCED SEARCH options.

You can also search reports the component files of which contain the words of interest in their names. The smallest search word has to consist of three characters. In the case of other types of items in the PS IMAGO Portal repository (such as notes), you can search their content as well. Tick *Search in titles of other documents*.

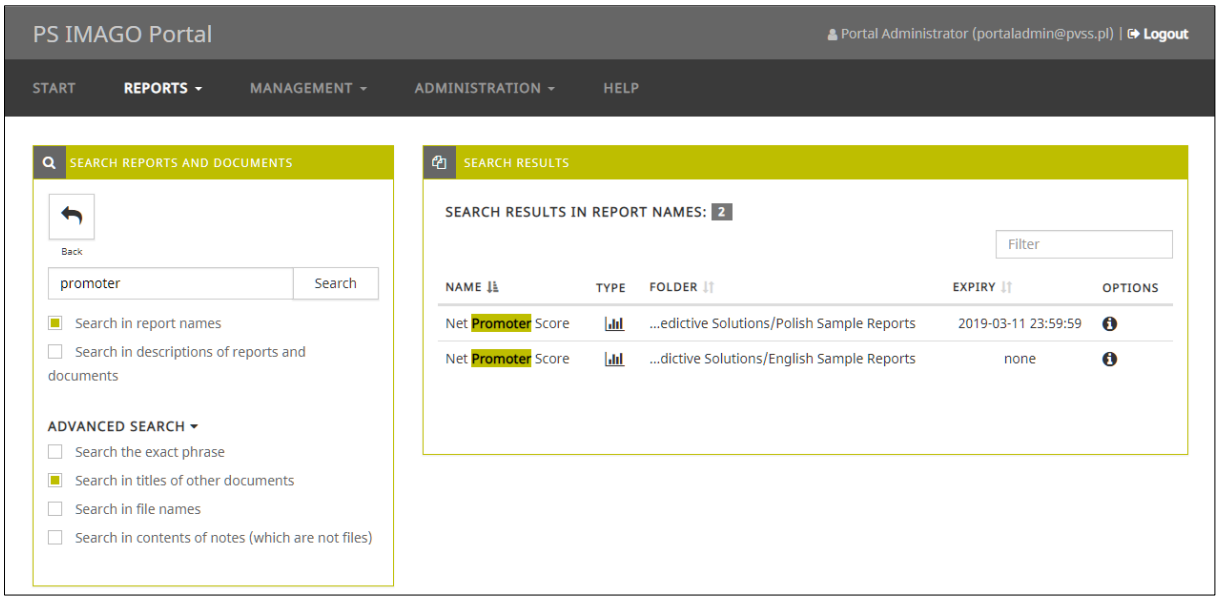


Figure 233. The report search page

Search results are presented as a list of reports that meet the criteria. Reports that meet different criteria are listed separately. The tables can be sorted and filtered. Click a report name on the list to go to its page. After you click an info icon in the *Options* column of a result table, a details page is opened. You can perform actions on the report, such as open its previous version if it meets search criteria.

6.6. How to manage the PS IMAGO Portal and PS IMAGO Portal Cloud

The PS IMAGO Portal was designed to simplify the installation process as much as possible, facilitate easy migration to various hardware-software platforms, and ensure simple administration of the environment. Therefore, managers and administrators do not need to be highly qualified IT technicians. On the other hand, this user-friendly administration module is powerful enough to ensure security both of the information stored in the system and of sharing operations. Administrative functions allow you to order analytical information to support decision-making on various tiers of corporate management.

6.6.1. System management tools

PS IMAGO Portal system management tools are located in the MANAGEMENT menu. This menu is available to users who have managerial or administrative privileges. With the management tools, you can manage groups, users, the repository structure, and the item basket. Administration work can be made much easier with the right use of these tools. They can also make the system operational faster. This is the go-to tab when you are preparing the system for work within your organization.

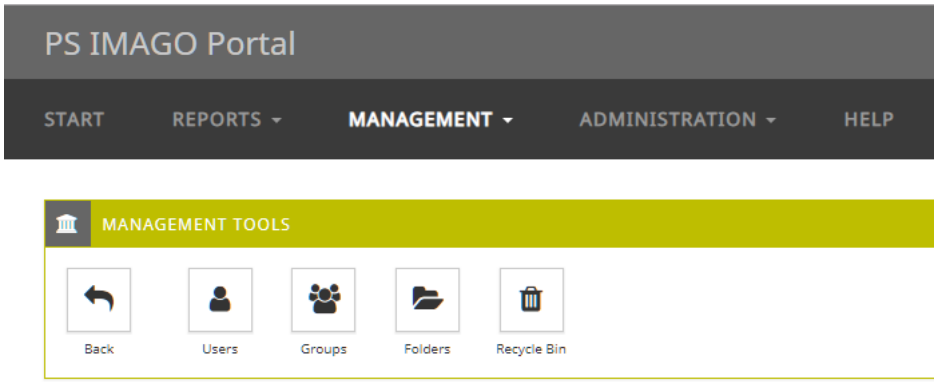


Figure 234. The PS IMAGO Portal management module

To optimize administrative operations, perform the basic administrative actions in the specific order when deploying the system:

- create user groups reflecting the corporate structure;
- create a folder structure in the PS IMAGO Portal (PS IMAGO Portal Cloud) repository that reflects the structure of the organization or its business goals and assign the groups privileges to the folders;
- create user accounts and assign them to appropriate groups;
- configure other aspects of the PS IMAGO Portal (such as color themes, custom words in the interface);
- monitor the functioning of the system. In the case of problem reports, view logs of component applications, the operating system, etc.

The right order of the managerial and administrative actions during setup will save time during administration at the stage of commissioning and maintenance.

6.6.2. How to create and edit user groups

The first administrative action during system startup is to create user groups. A newly installed system has only group *Everybody* in MANAGEMENT and GROUPS. It is a built-in group that can be used when building a custom corporate structure. The name group can be edited, if necessary. Group *Everybody* contains accounts of all users of PS IMAGO Portal created when users are added. This group can be neither deleted nor locked. The group of the currently signed-in administrator or manager cannot be locked or deleted as well. To add a new group, click [Add]. Enter the name of a new group into the form in ADD GROUP OF USERS.

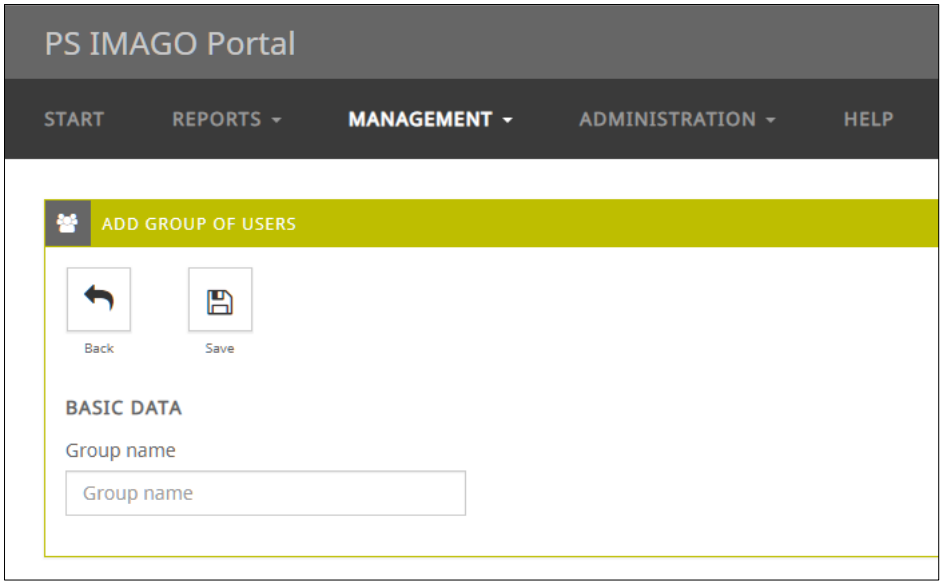


Figure 235. Adding a user group

After you click [Save], the new group is displayed on the user group list.

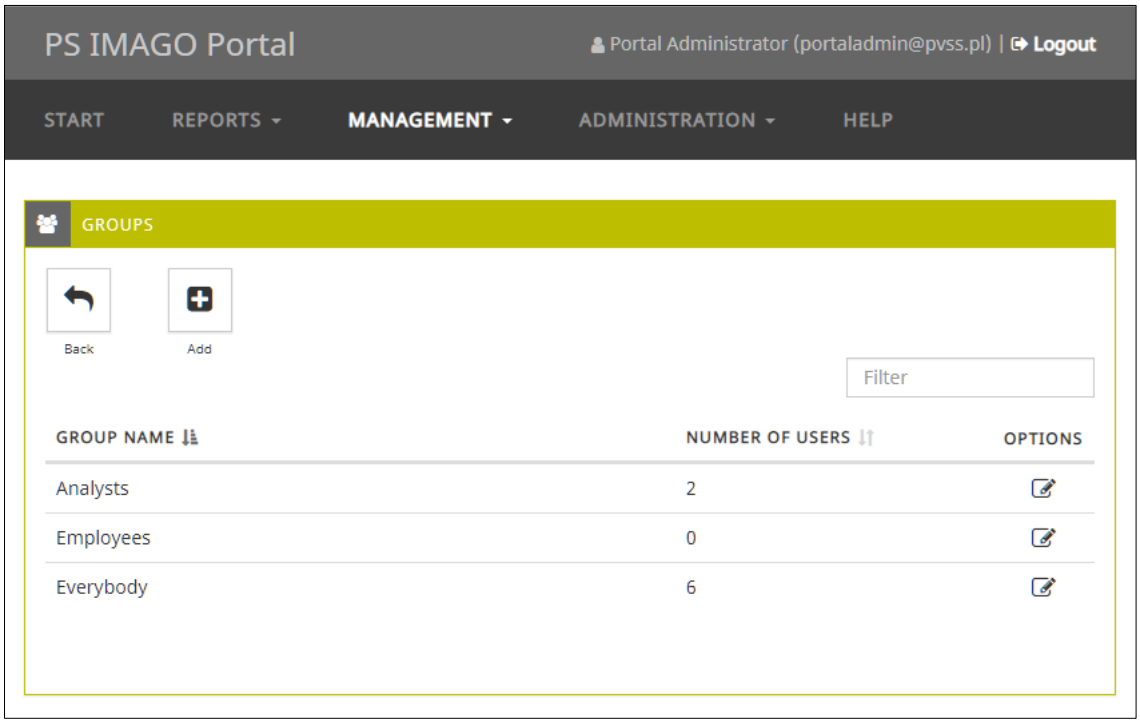


Figure 236. The user group view

In column *Options* of the table with user groups, there is a pencil icon (). After a manager or administrator clicks it, they navigate to the EDIT GROUP OF USERS page where they can perform various actions regarding the group: change its name, lock it or delete it. To change the name of the edited group, modify the *Group name* field and click [Save]. The minus icon (Remove) deletes a group. You can delete every group apart from *Everybody*. Also, every group (except *Everybody*) is lockable. It

is done by clicking [Lock] when editing a group. A locked group is marked with a locked padlock

(Unlock). When a group is locked, users in this group cannot access folders assigned to that group. If a user had group privileges to access folders and reports in those folders, when the group is locked, the access is denied.

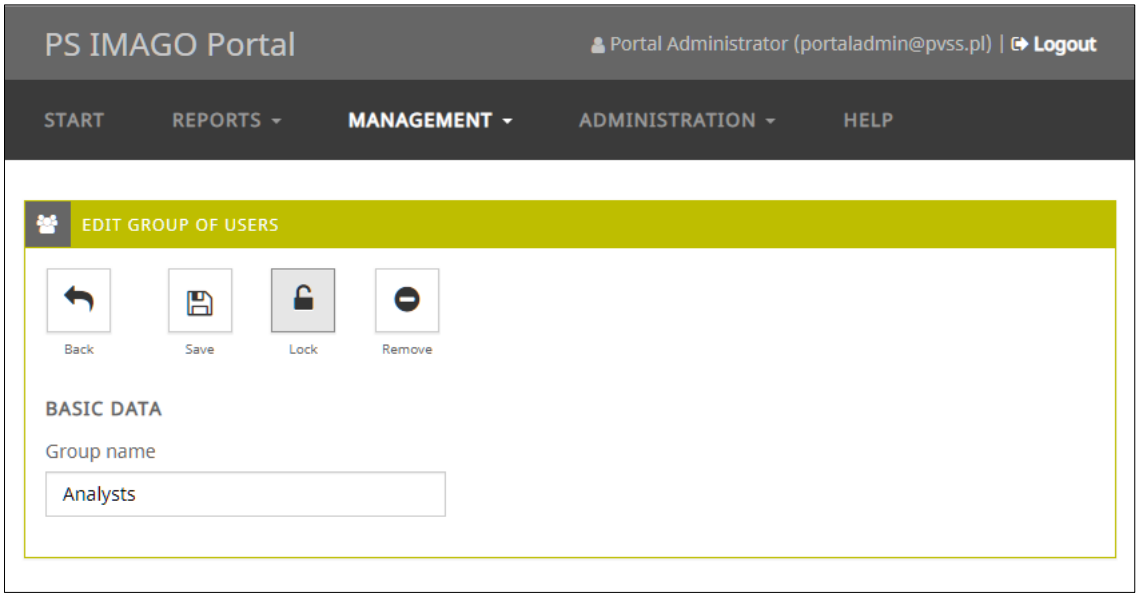


Figure 237. The EDIT GROUP OF USERS window

6.6.3. User roles

Each user of the PS IMAGO Portal or PS IMAGO Portal Cloud has a role. This makes it easier to manage user privileges. The Role is defined when the user is added or edited.

Users of the PS IMAGO Portal (PS IMAGO Portal Cloud) can have the following Roles:

- Anonymous User,
- Guest,
- User,
- Manager,
- Section Administrator,
- Portal Administrator.

The table below shows details of actions available depending on the role.

Action	Role					
	Anonymous user	Guest	User	Manager	Section Administrator	Portal Administrator
Sign in to the system	NO	YES	YES	YES	YES	YES
Change password on demand	NO	NO	YES	YES	YES	YES
Change interface language	NO	NO	YES	YES	YES	YES
Preview repository structure for the group	NO	YES	YES	YES	YES	YES
Preview whole repository structure for the section	NO	NO	NO	YES	YES	YES
Preview a report shared with the public (link)	YES	YES	YES	YES	YES	YES
Preview a report acc. to group privileges	NO	YES	YES	YES	YES	YES
Preview any report (incl. expired)	NO	NO	NO	YES	YES	YES
Preview report details	NO	YES	YES	YES	YES	YES
Search reports	NO	YES	YES	YES	YES	YES
Subscribe to a report	NO	YES	YES	YES	YES	YES
Publish a report using PS IMAGO Designer	NO	NO	YES	YES	YES	YES
Publish a report manually	NO	NO	NO	YES	YES	YES
Publish notes	NO	NO	NO	YES	YES	YES
Publish files	NO	NO	NO	YES	YES	YES
Manage reports	NO	NO	NO	YES	YES	YES
Manage users	NO	NO	NO	YES	YES	YES
Manage user groups	NO	NO	NO	YES	YES	YES
Manage folders	NO	NO	NO	YES	YES	YES
Restore items from a bin	NO	NO	NO	YES	YES	YES
Publish and edit messages	NO	NO	NO	NO	YES	YES
Configure the appearance of the Portal	NO	NO	NO	NO	YES	YES
Configure Active Directory	NO	NO	NO	NO	NO	YES
Configure report subscription	NO	NO	NO	NO	NO	YES
Configure interface language	NO	NO	NO	NO	NO	YES
Configure/edit sections	NO	NO	NO	NO	NO	YES
Configure security settings for passwords/sessions	NO	NO	NO	NO	NO	YES
Configure file types	NO	NO	NO	NO	NO	YES

6.6.4. Create and manage users

User accounts are created, user privileges managed, and group assignment is done in MANAGEMENT -> USERS. Login and password in the PS IMAGO Portal (PS IMAGO Portal Cloud) are defined when a

new user is added (the [Add] button and then window ADD USER) or user data are edited. User's identifier (Login) that allows them to sign in is their e-mail address. The Password is an alphanumeric string that meets the default requirements (or those set by a Portal administrator) specified in the *Rules* for passwords. User password has a validity period (one month by default). After this time, the system forces you to change it when signing in.

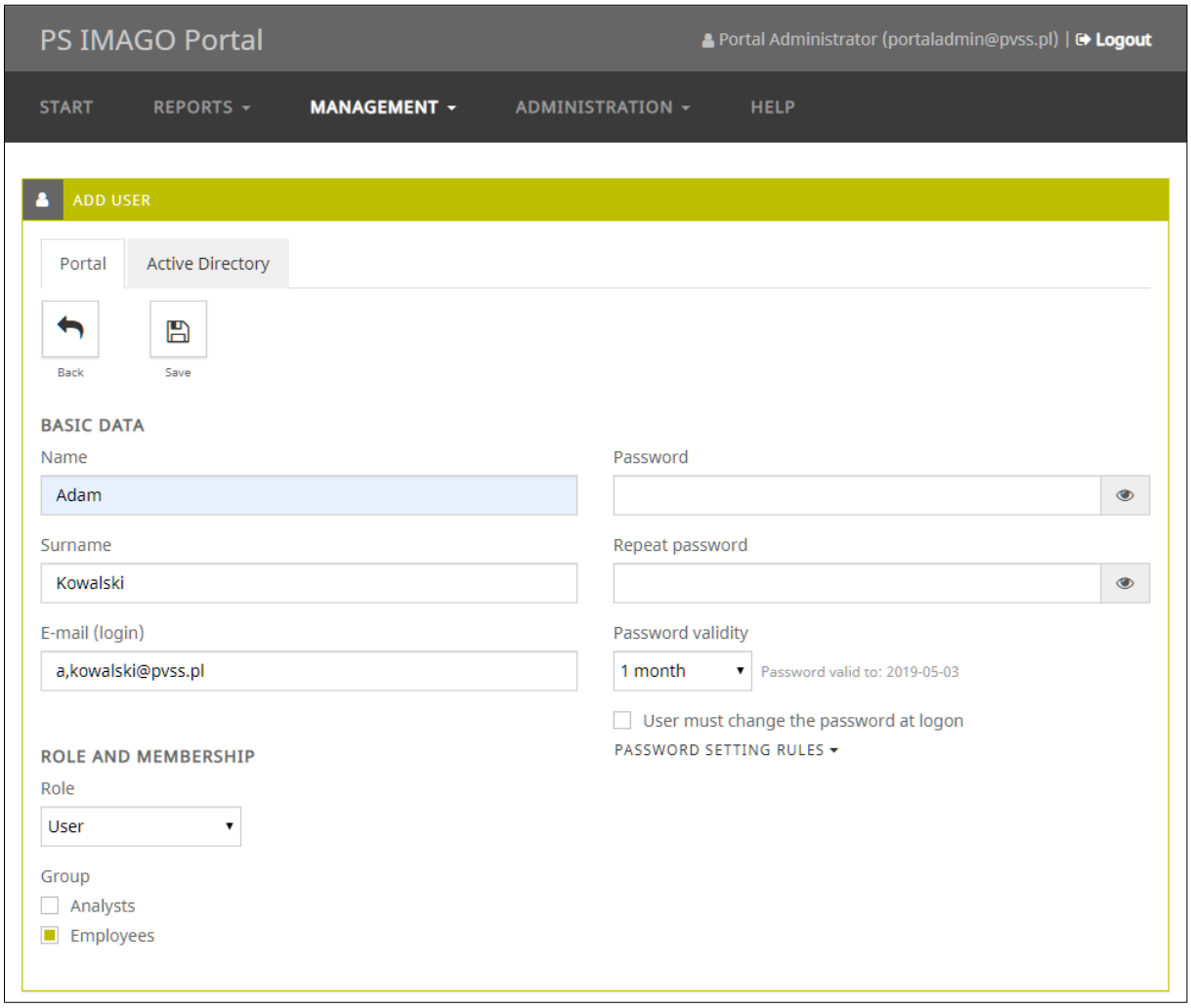


Figure 238. Adding a new user

When a user account is being created (or later) it can be granted certain administrative privileges (the Role), and it can be assigned to a group. The following fields have to be filled in as well: *Name* and *Surname*. User definition is completed by clicking [Save]. The user appears on the user list.

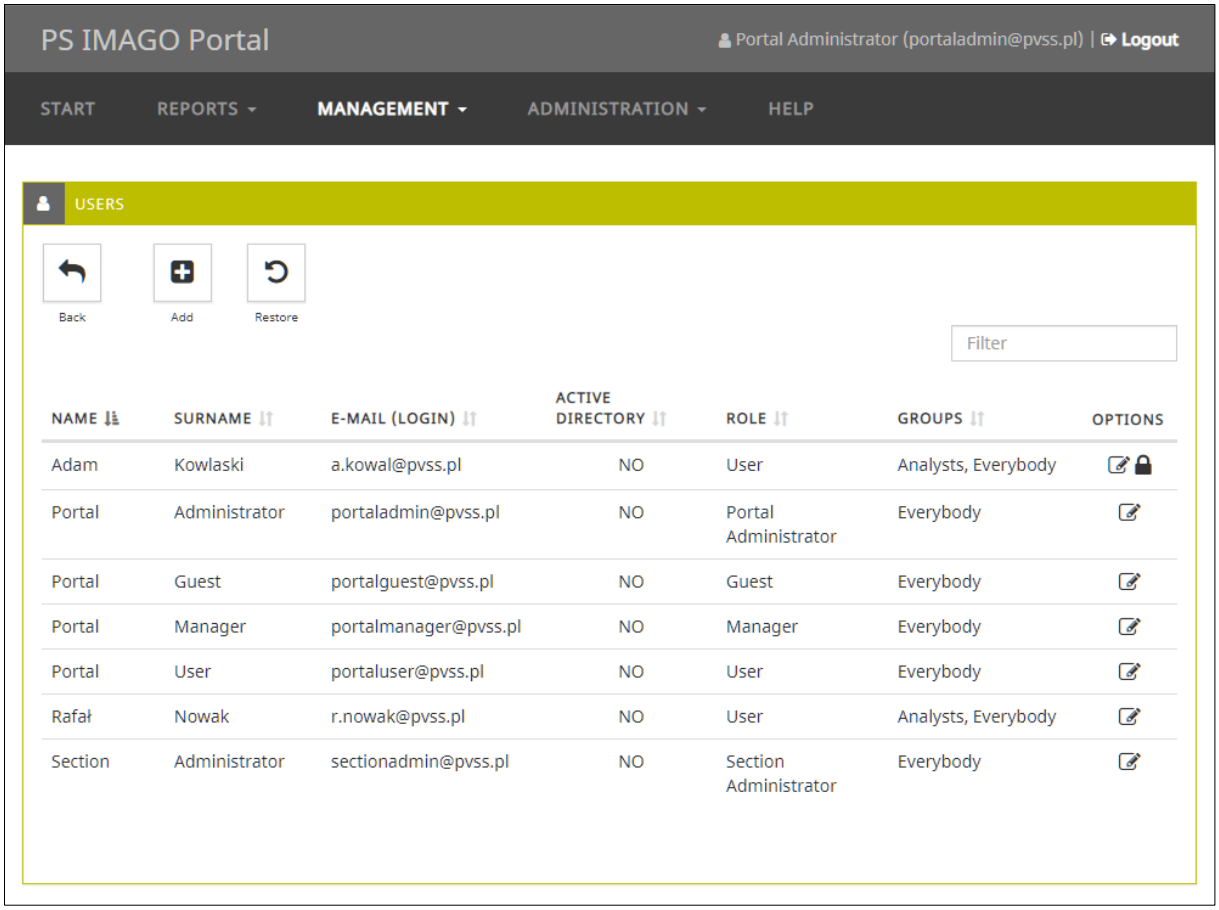


Figure 239. A list of PS IMAGO Portal users

In the *Options* column of the user table, there are action icons. User editing ( ) can change all data. The edit form is identical to the one used when adding a new user. The only difference is additional action icons: Lock (Lock) and Delete (Remove).

The unlocked padlock icon (Lock) locks the user out of the system. The lock can be removed by clicking the padlock icon (Unlock). With the Remove icon, an Administrator or Manager can remove a user. As opposed to groups, a user cannot be completely deleted. Removed user accounts are kept in the bin and can be restored. A user can be restored with the Restore icon (Restore) above the user list table. A table on the user restoration page contains all removed accounts. They can be restored individually with the *Restore* icon ( ) in the *Options* column.

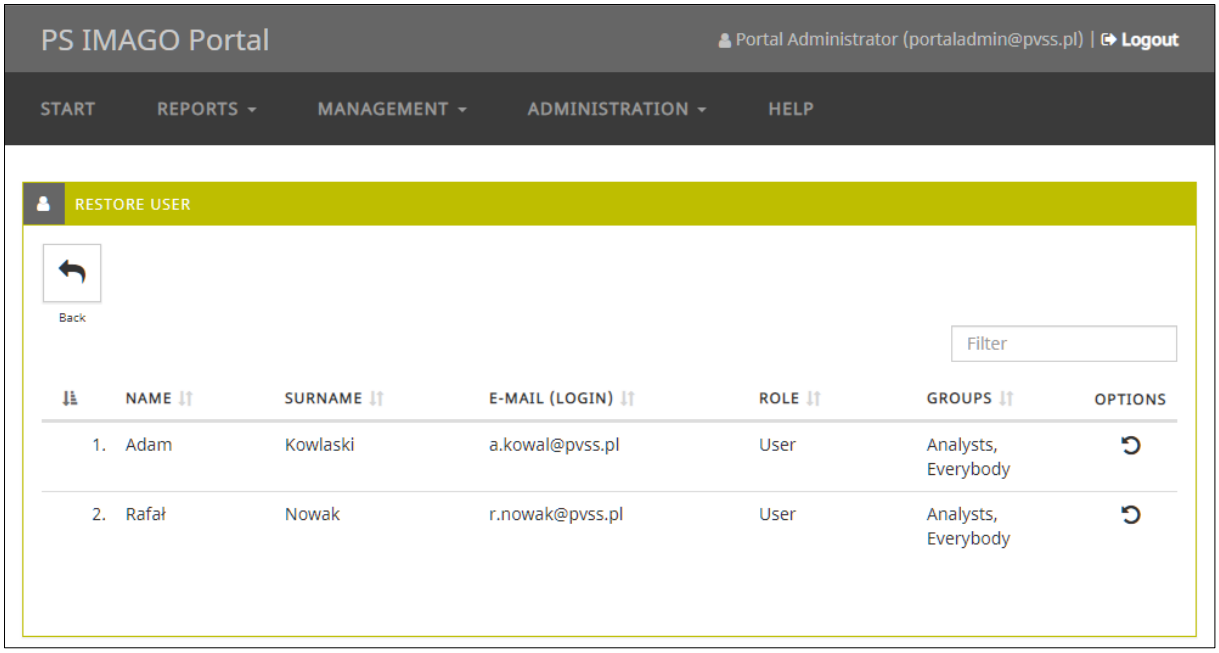


Figure 240. Restoring removed users

If an administrator of the PS IMAGO Portal or PS IMAGO Portal Cloud enabled signing in with an Active Directory domain, portal users can be added from among users of the domain. After selecting the add user option (MANAGEMENT → USERS → window ADD USERS → tab Active Directory), you can search for specific users or user groups in the domain. After persons or groups with names conforming to search criteria are added to the list of added users, assign them to groups defined in the Portal. Note that group assignment affects all users being added. Therefore, if users should belong to different groups and have different privileges, each has to be edited separately to change their assignment and privileges.

After clicking [Save], users defined in *Added* can sign in to the portal using their domain credentials. Users who can sign in this way have a YES in the Active Directory column on the user list.

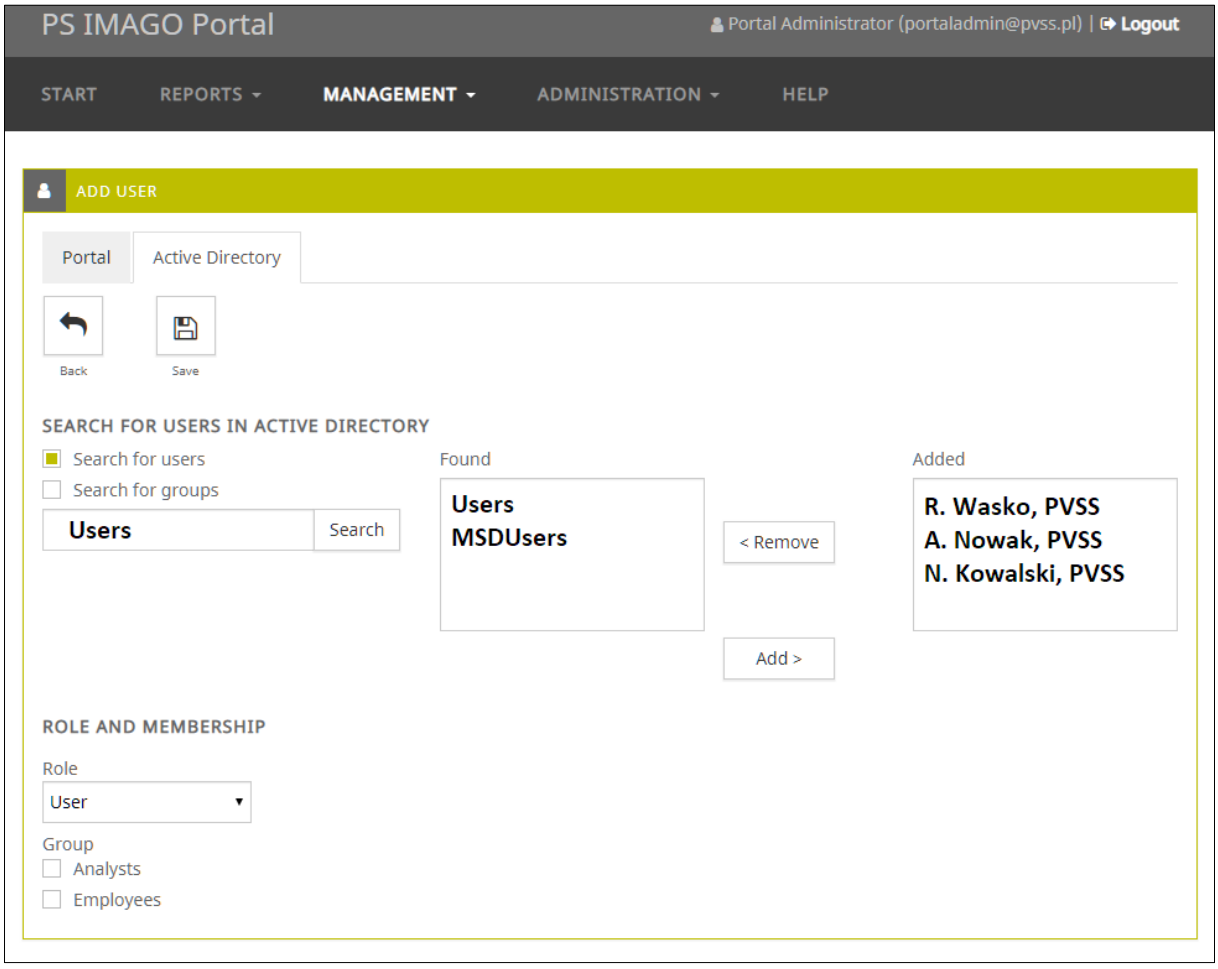


Figure 241. Adding users from Active Directory

If there is a user who had been defined among those added from Active Directory (i.e. a user added from AD has the same e-mail as a user already included in the PS IMAGO Portal database), the existing user gains a new ability to sign in using Active Directory. Such a user can sign in using two methods: via domain authorization (with AD login and password (or via the PS IMAGO Portal) by providing the login and password registered in the PS IMAGO Portal database.

6.6.5. Repository folder structure

Published reports are available in a folder structure. It is a Manager or Administrator who configures the structure. The hierarchical folder tree may reflect the organizational structure of a company or its business goals.

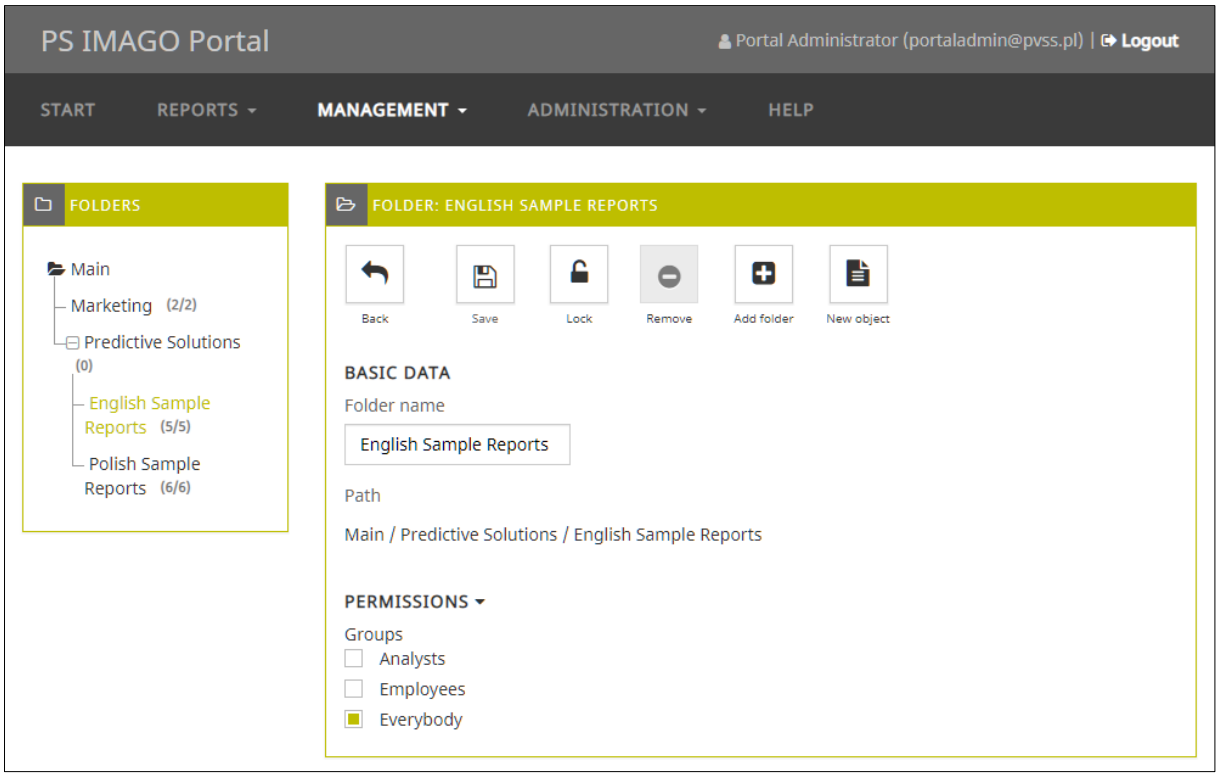


Figure 242. Creating the folder structure

The folder structure is created on page MANAGEMENT → FOLDERS reached from the main folder of the repository available to all users (group *Everybody*). Access rights for user groups defined in the system are set in subfolders. A new subfolder is created by filling in the *Folder name* field and clicking [Add folder], filling in the *Folder name* field and clicking [Save]. It is created as a subfolder of the folder on the folder tree. A new subfolder inherits access privileges of users in individual groups from its parent folder. Default settings can be modified both when a folder is being created (before confirming with [Add folder] and when editing an existing folder.

After a folder name in the folder structure is clicked, its properties are displayed on the right-hand side. You can change privileges and folder name there any time. It can also be deleted with [Remove] during editing. If a folder contains subfolders or reports, it cannot be deleted. It is not possible even if items from the folder are in the bin. Before deleting a folder, permanently remove its items

(documents, folders) from the BIN. Any folder that cannot be deleted has the Delete icon (Remove) greyed out. Every folder can be temporarily or permanently locked. No user group, even those authorised to access it, can access it or its content then. Only administrators and managers see locked folders in the folder structure. Its name is greyed out. To lock a folder, click the unlocked

padlock icon (Lock) on the toolbar on the folder properties tab. A locked folder is marked with a locked padlock (Unlock). Click it to unlock the folder.

6.6.6. Recycle Bin of Deleted Objects

Item (report, document, folder) removal from the PS IMAGO Portal (PS IMAGO Portal Cloud) repository is a two-stage operation. It is a safeguard against accidental deletion of an item by a manager or administrator. Deleted items go to the bin first. They can be permanently deleted on page RECYCLE BIN of removed items (MANAGEMENT→ RECYCLE BIN). After clicking Item details (ℹ), column *Options* of the table of removed items has the following buttons: [Restore] and [Remove]. If you click [Restore], the item is restored to its original location. With [Remove], administrators or managers can permanently remove items. The bin has button [Empty recycle bin], which removes all items from the bin (folders and reports). Use the functions for removing items from the bin carefully because these actions cannot be undone.

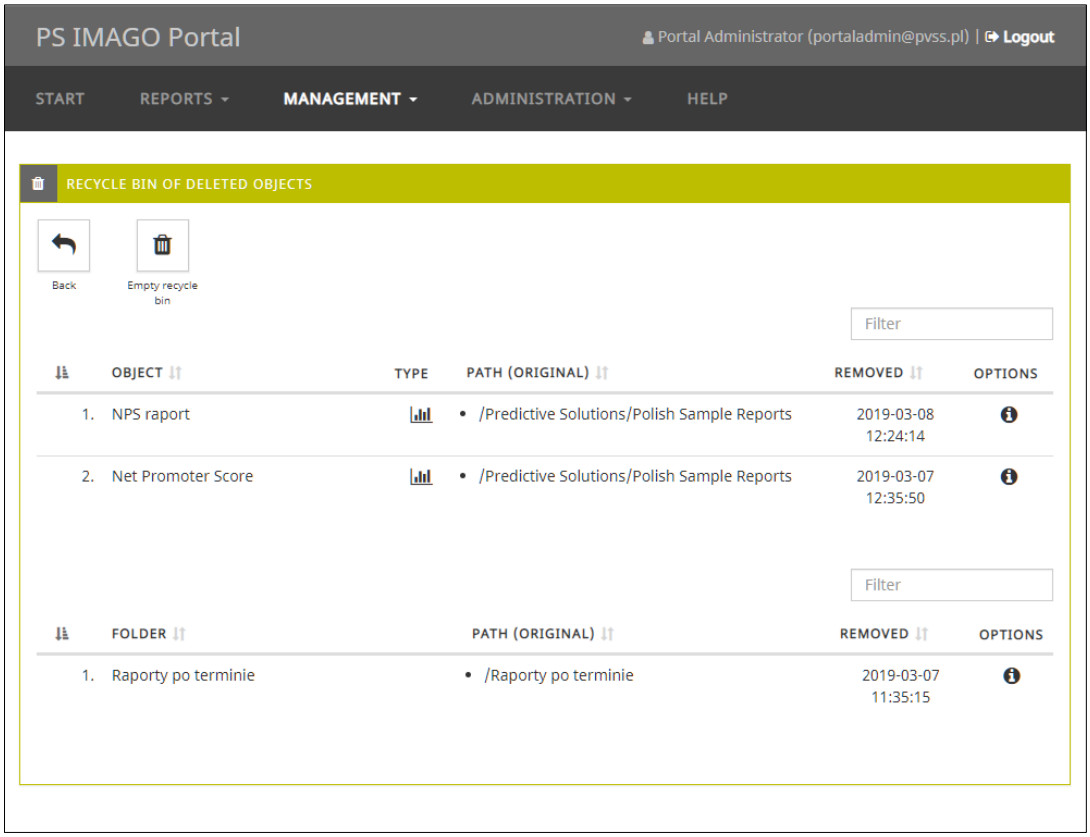


Figure 243. Recycle Bin of Deleted Objects

6.6.7. How to add items manually

Analytical reports are published on the PS IMAGO Portal (PS IMAGO Portal Cloud) from PS IMAGO Designer by analysts. When necessary, a manager or administrator can place a report or other item

(such as a text document or spreadsheet) into the portal repository structure. The PS IMAGO Portal has its file publication mechanism. To publish a report, a manager or administrator has to have all its component HTML files and metadata. They are created in PS IMAGO Designer when a report is being published and can be provided by an analyst. To publish files (text or binary), you just need to know their location.

To add an item (File, Report, or Note) to a selected folder, go to MANAGEMENT, FOLDERS, and click [New object]. Then, select item type in the next window and click [Next].

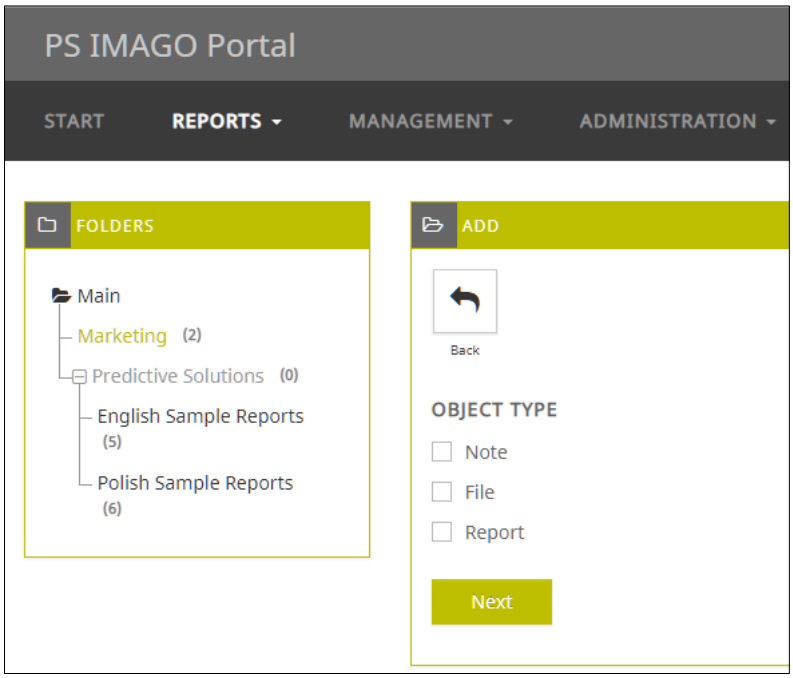


Figure 244. Selecting the type of a manually published item

To put a text note into a folder, compose a note in a text processor that can generate HTML code. Contents of notes are stored in PS IMAGO Portal database tables so that the search engine can search note content as well.

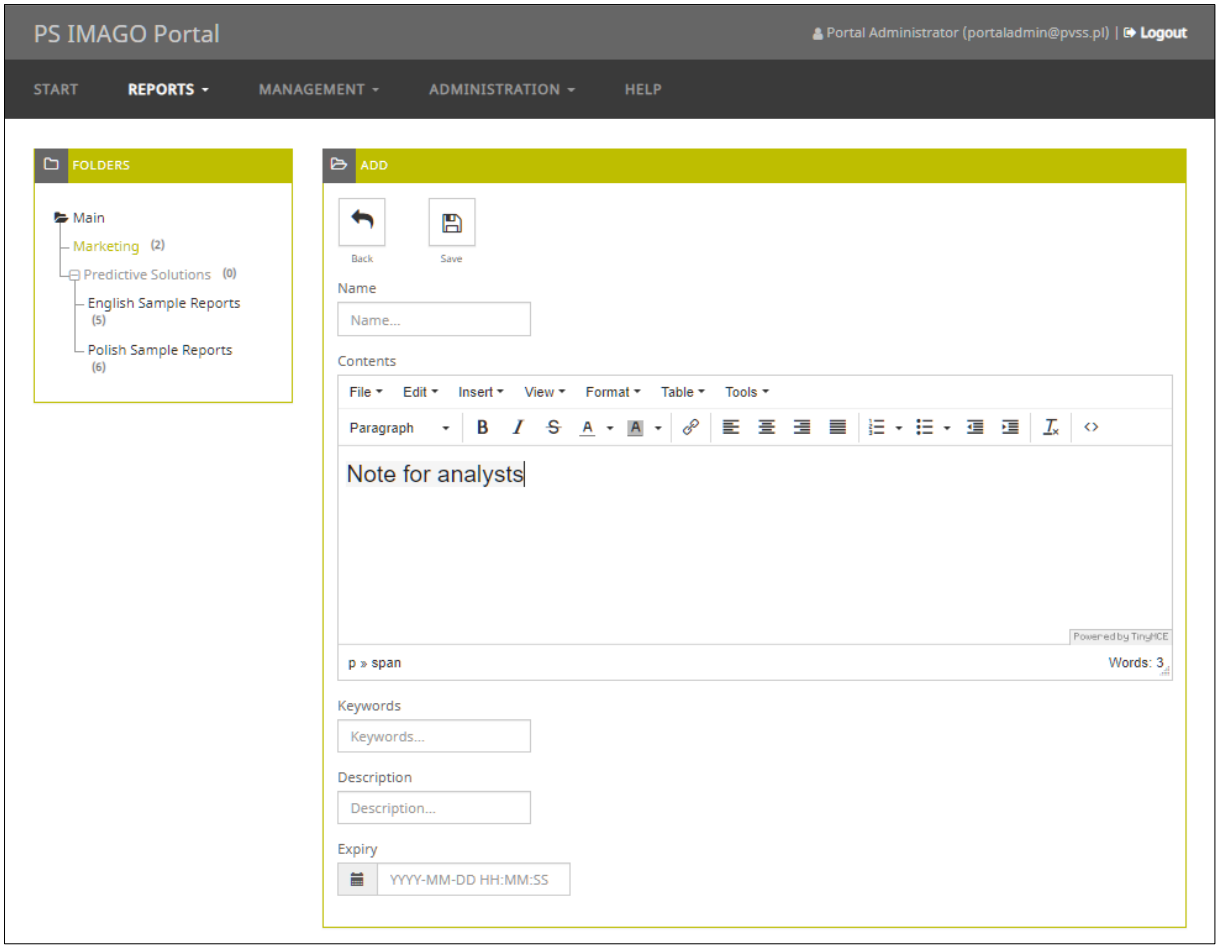


Figure 245. Adding a note

When adding a file, click [Next] to open a form to indicate its location on your local hard drive. Then enter keywords and a description of the file. You can also set the expiry date for the file here.

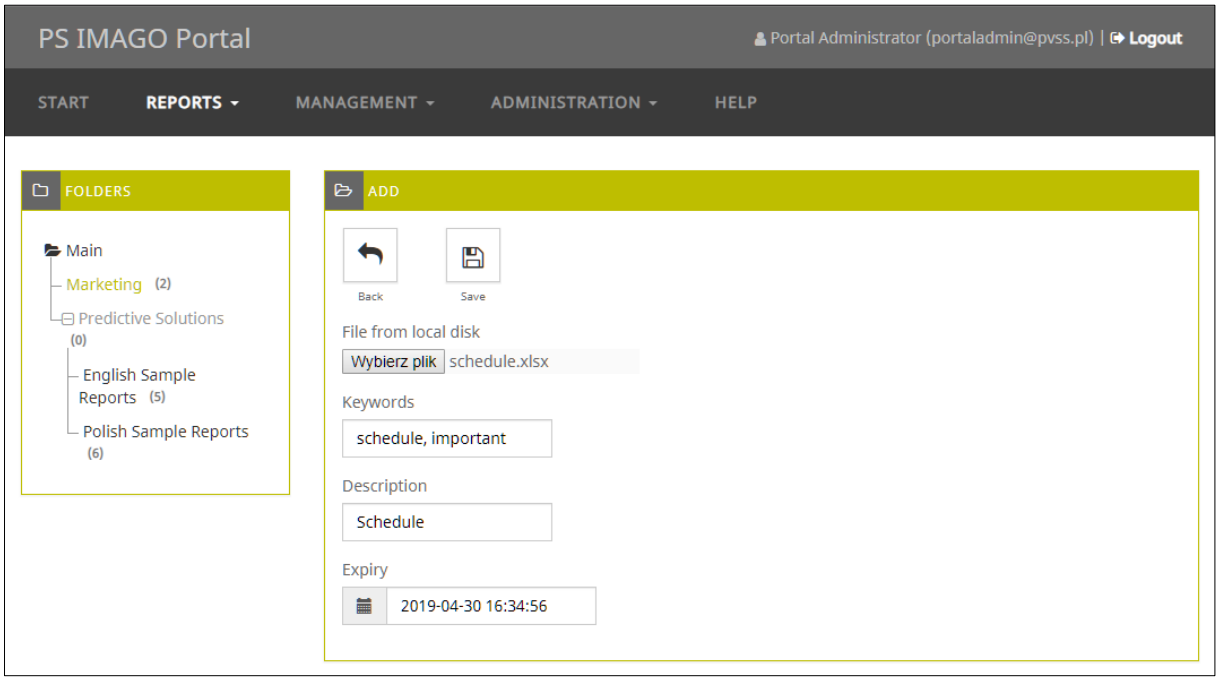


Figure 246. Publishing a file in a selected portal folder

Click [Save] to code the file and store it on a server. Links to files are saved in the repository and appear on the list of documents of the portal folder shortly.

Publication of items other than reports in the PS IMAGO Portal or Portal Cloud (such as documents) is intended to ensure the availability of all information relevant to analytical content in one place. For example, it is an established policy to publish planning documents and descriptions of campaign conditions together with reports analyzing marketing campaign results. It facilitates better understanding and interpretation of results if reports do not offer sufficient commentary on analytical items.

6.7. How to administer PS IMAGO Portal and PS IMAGO Portal Cloud

The PS IMAGO Portal can be adapted to specific needs and requirements of your organization to a large extent. This applies to website appearance or item presentation, for example. Some configuration options are available to Section Administrators and Portal Administrators. Others are for Portal Administrators only. Start the configuration by going to ADMINISTRATION, and then select the range of settings to be modified.

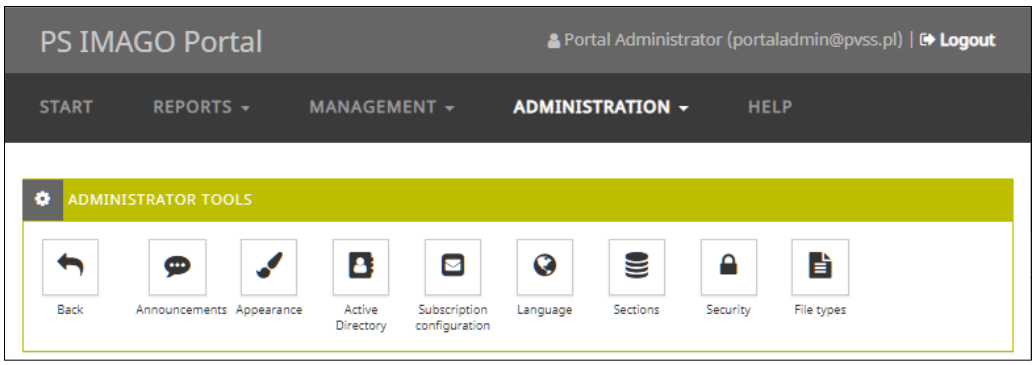


Figure 247. Configuration options available to a Portal Administrator

6.7.1. Announcements

The *Announcements* option allows a Section Administrator or Portal Administrator to add text to be displayed on the portal below the menu bar on the Home page. The edit field on the ANNOUNCEMENTS page offers advanced text formatting options an administrator may need.

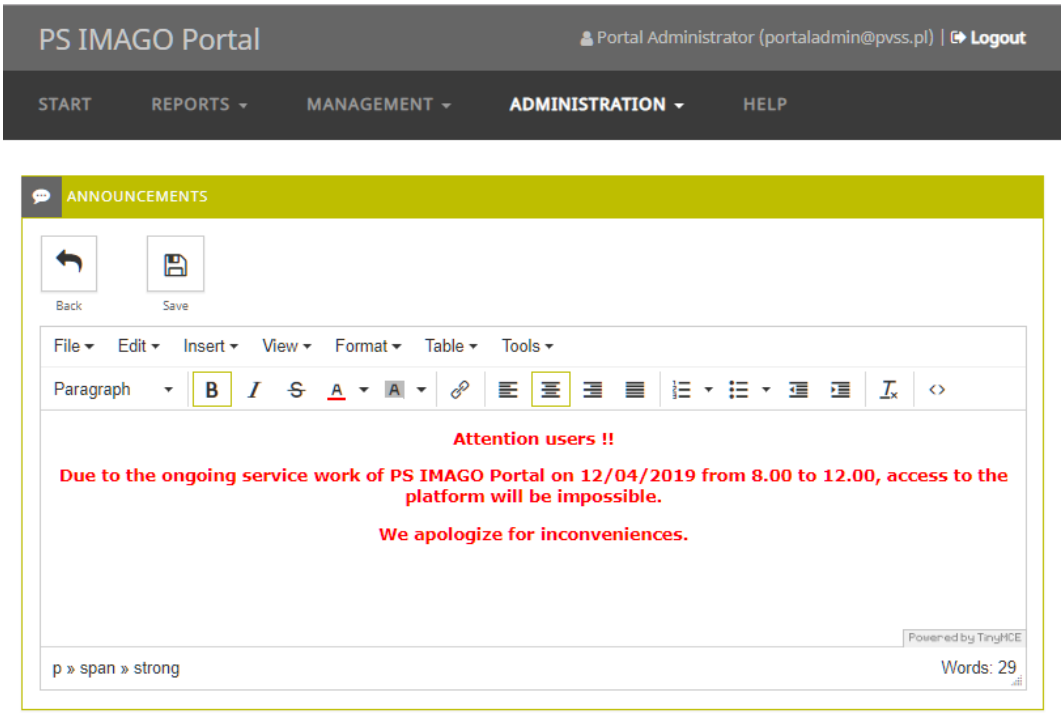


Figure 248. Adding an administration announcement

After it is confirmed with [Save], the announcement is displayed to all portal users after signing in or visiting the home page.

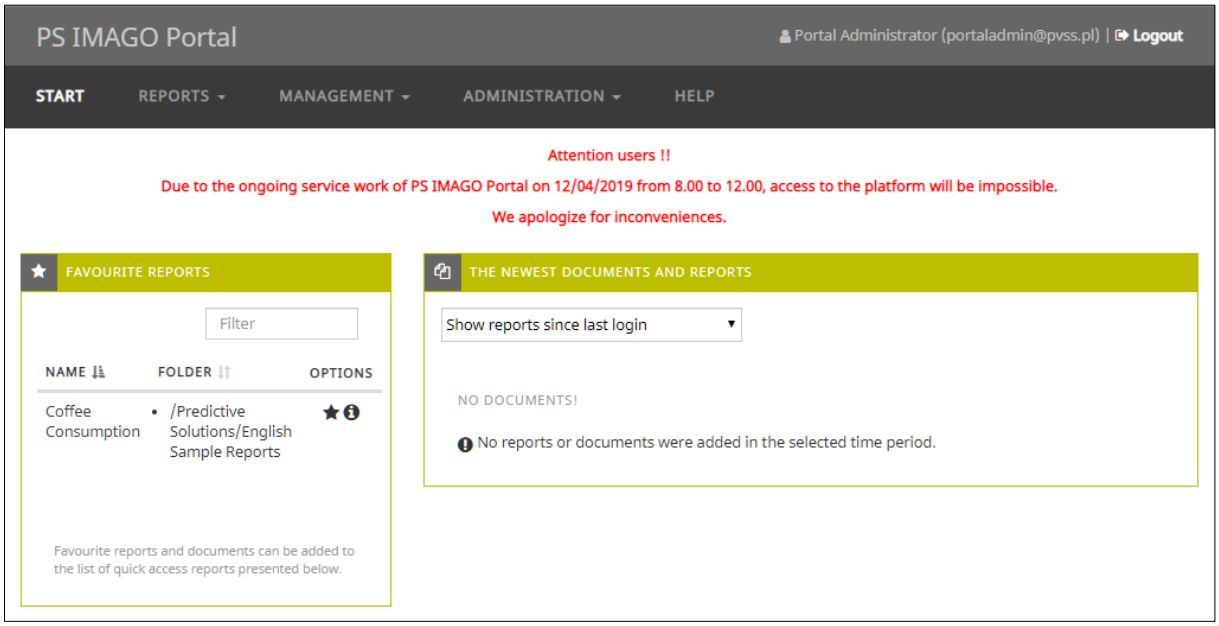


Figure 249. An announcement on the home page

6.7.2. Appearance

In the APPEARANCE menu, a Section Administrator or Portal Administrator can change the portal name displayed in the upper left corner of the screen (Title) and the general, predefined color theme (Website appearance). If you switch to the *Classic mode*, no additional visual effects are used. Values in *Number of rows in tables* and *Number of reports on list of the newest* set general parameters of viewing item lists. The *Show files in report details* switch determines whether item *Contents of the report* with details on all files in a report is displayed on the report's details page.

The HEADER item can enter formatted content, images, or links to websites that will be displayed on the top of every screen of the section, which can be used to adapt the website to corporate requirements, for example.

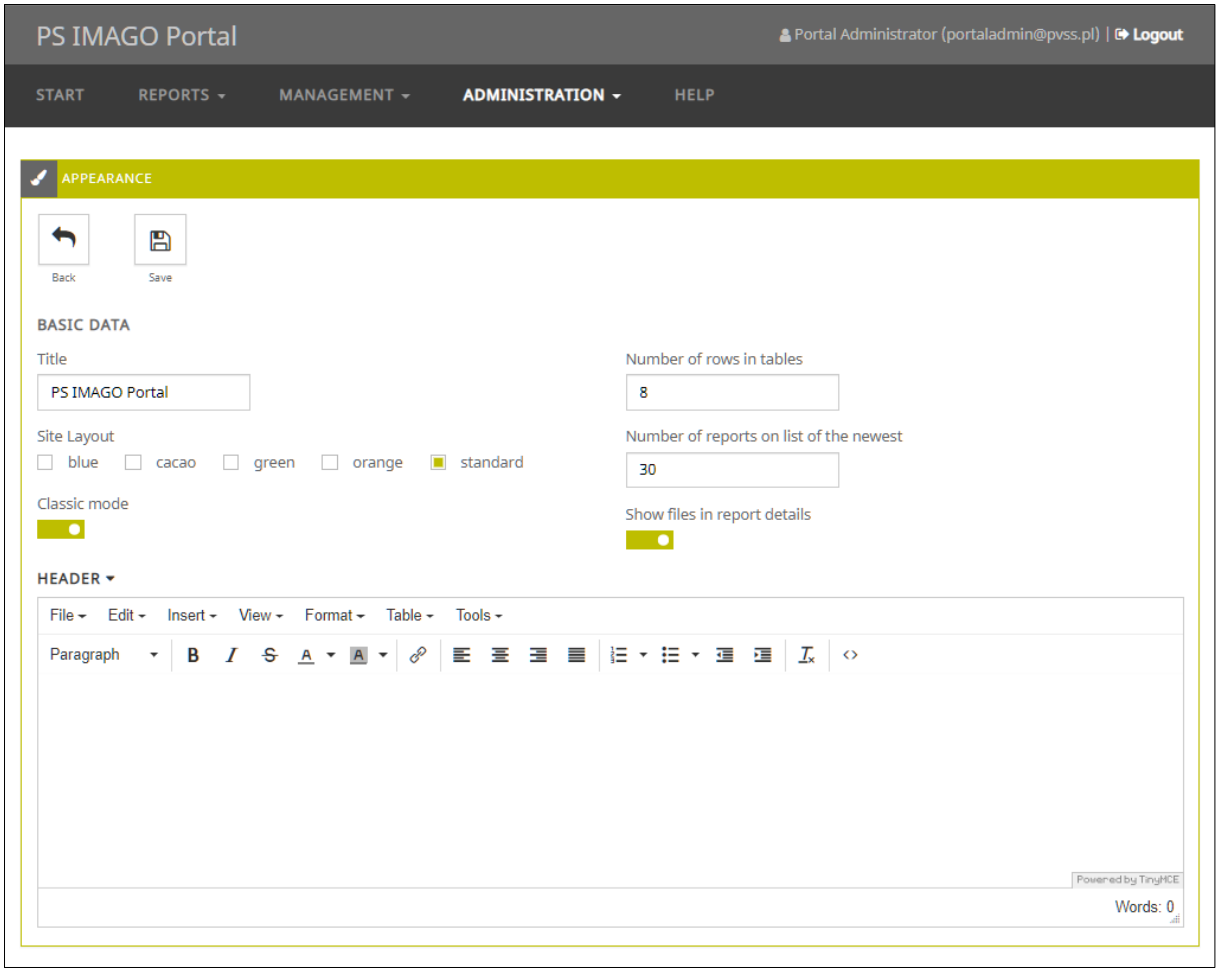


Figure 250. Configuration of the appearance of the portal

6.7.3. Active Directory

After selecting the ACTIVE DIRECTORY option, a PS IMAGO Portal or PS IMAGO Portal Cloud administrator can configure options for integrating the system with the Active Directory service so that Portal users can sign in using the domain's authorization mechanism. Having enabled *Login through Active Directory* (an On/off toggle switch) enter necessary configuration data into the form. These include the IP or name of a server with Active Directory enabled, the port for the service, full domain name, and information for the system account used to integrate the service.

The form has fields to enter information about the structure of the Active Directory, which helps with more effective searching for users or groups.

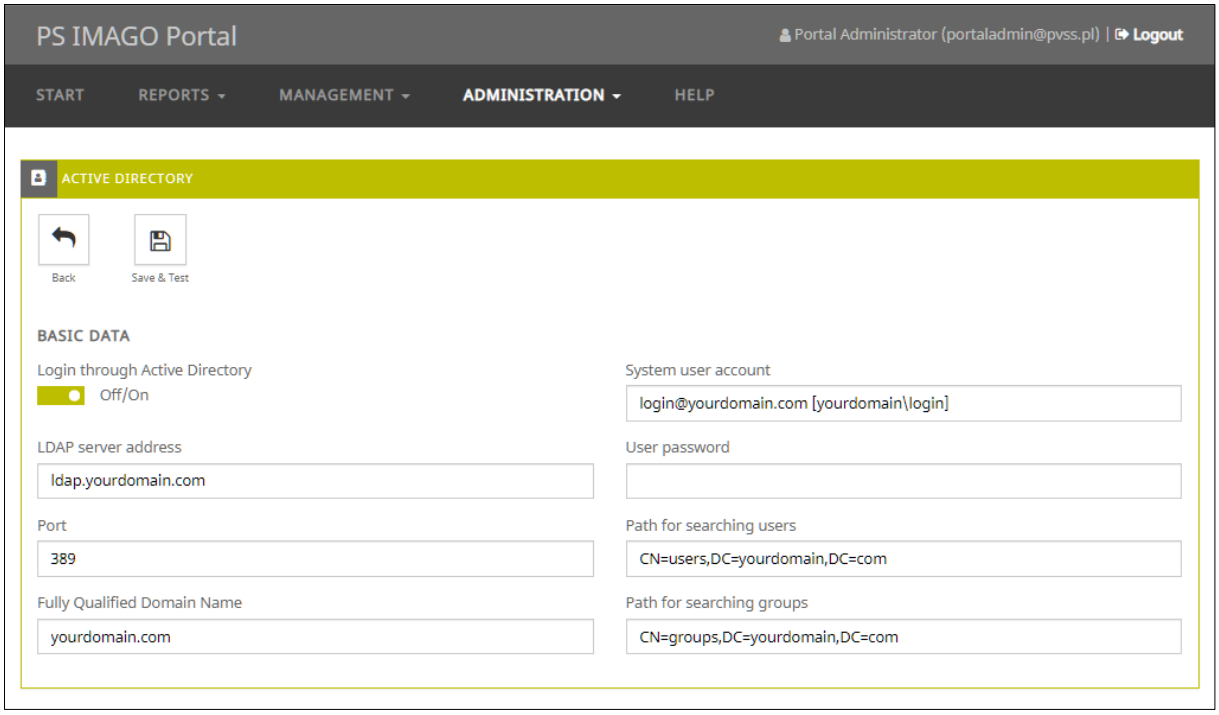


Figure 251. Configuration of integration with Active Directory

An administrator can test the configuration in the Active Directory configuration tab. After you click [Save & Test], the system sends a query to a LDAP server using credentials of the system user from the form. If the integration configuration is correct (or wrong), a relevant message is displayed.

6.7.4. How to configure Subscription

Page SUBSCRIPTION CONFIGURATION offers options to configure the e-mail report subscription mechanism. Report subscription is disabled by default. A Portal Administrator can enable the function (the [On/off] toggle switch), but for it to work, the system has to use an external outgoing-mail SMTP server. The PS IMAGO Portal does not have an integrated SMTP server.

To configure report subscription, enter necessary configuration data into the relevant form. Some of them are the IP address or SMTP server host name, port for the service, and information for account authorisation on the SMTP server used to send notification e-mails. Such a dedicated account should be created on the server in advance. Alternatively, an existing account can be used.

Additionally, a PS IMAGO Portal administrator can define the *Name of notification sender* and *E-mail address of sender* to sign notifications. They can also change the title and body of notification messages. With a right HTML editor, the administrator can draft an attractive message template, for example, with embedded images and text formatting. To ensure the appropriate appearance of diacritics in messages, the *Character encoding in e-mail* can be changed.

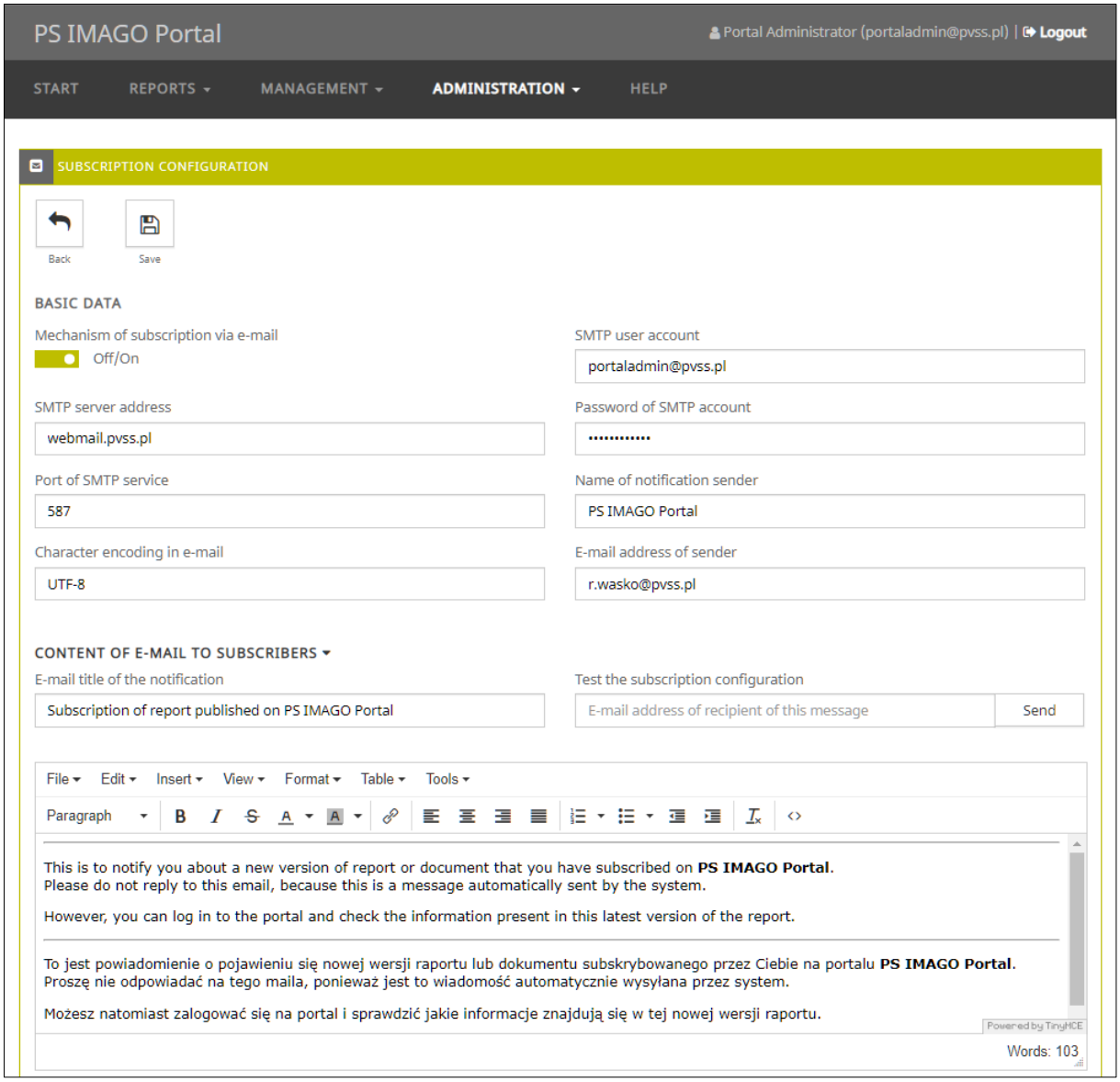


Figure 252. Configuration of the subscription mechanism

The subscription configuration tab can be used to test the notification mechanism. After you enter an e-mail address of the recipient of the test message in *Test the subscription configuration* and click [Send], the system sends a message with contents and title specified in the configuration to the e-mail address. This way, all SMTP server settings and message formatting are tested.

6.7.5. Language

The interface of the PS IMAGO Portal and PS IMAGO Portal Cloud uses terms stored in a dictionary in the repository. This way, any labels and phrases used in the interface can be flexibly modified and the repository language can be easily changed. After you click LANGUAGE, you can add a name of a new language or edit an existing one. If a Portal Administrator clicks [Add], a form is opened for data of a new language: *Name* and *Shortcut* (such as Deutsch, DE). By clicking [Save], the administrator returns

to the LANGUAGE configuration page where the new item is displayed on the list of available interface languages.

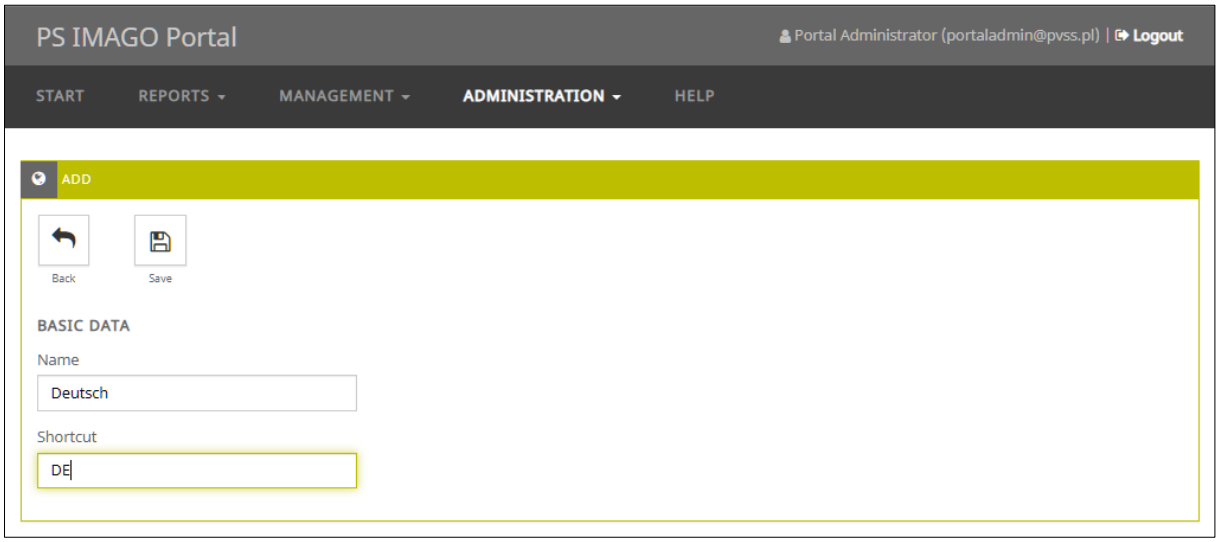


Figure 253. Adding a new interface language

Note that the dictionary of any new language contains terms in English by default. For the new language to have actual functional value, its dictionary has to be edited. Interface phrases can be edited by clicking the pencil icon of the language of interest in the *Dictionary* column. Page EDIT DICTIONARY has a table with column *Expression (EN)* on the left-hand side with terms in English, and column *Expression (XX)* (where XX is the code of the language) on the right-hand side has editable fields where an administrator enters phrases in the new language. The number of table rows shown on one screen can be changed in menu ADMINISTRATION → APPEARANCE→ *Number of rows in tables*.

Changes made for items shown on the screen need to be confirmed with [Save]. Only then can you proceed to the next page with phrases. As there are many phrases that need to be edited, consider using navigational aids such as the *Filter* field and the automatic phrase filtration bar that narrows the displayed phrases to those that start with a specified letter.

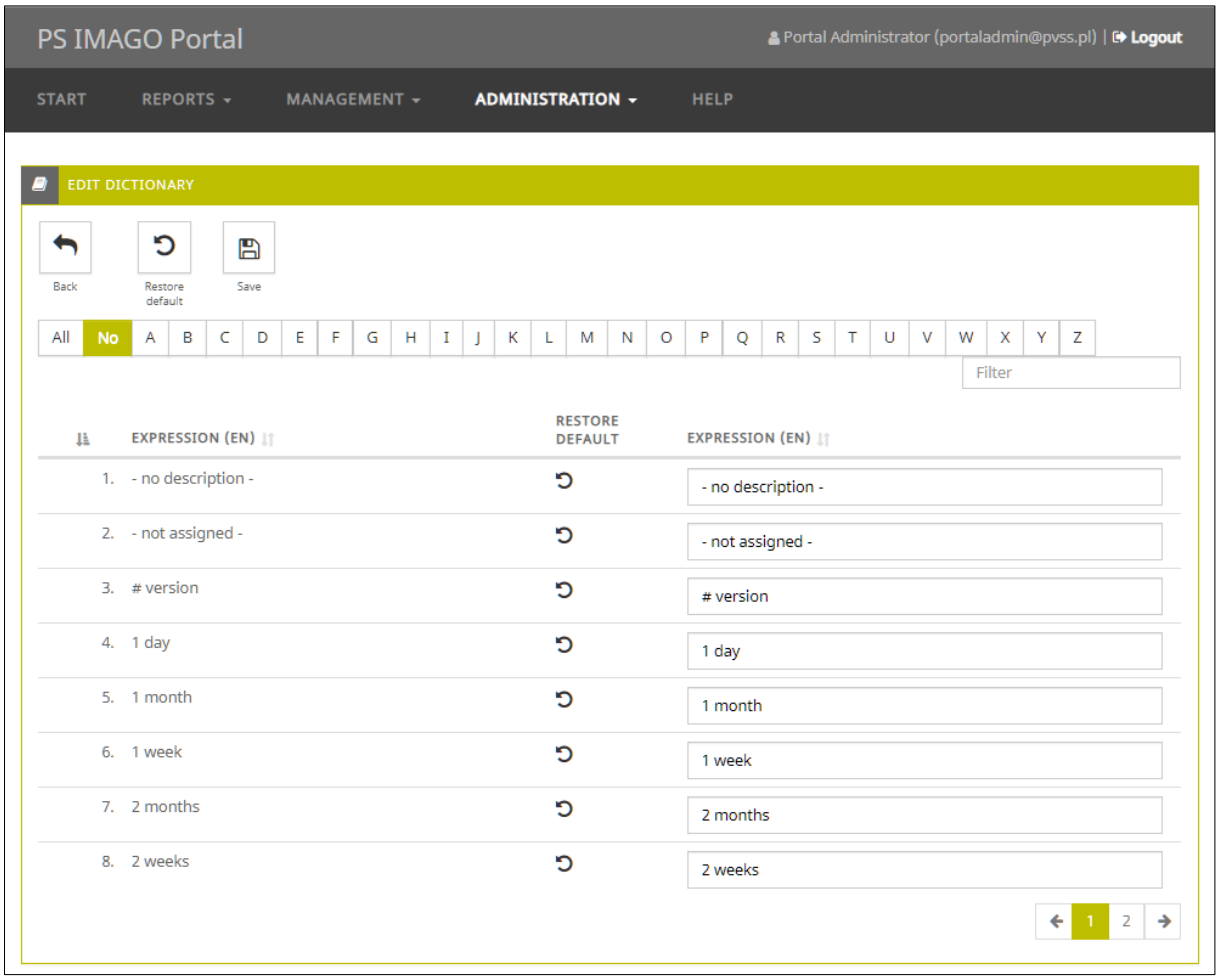


Figure 254. Editing the interface dictionary for a specific language

You can also restore default values of selected phrases using icons in column *Restore default*. With the button bearing the same label, you can restore default values of all terms but use it carefully.

To change the default language, an administrator should select a language in column *Default*, and then confirm changes with [Save].

On the LANGUAGE page, you can change the default language of the PS IMAGO Portal displayed to all newly added users as they sign in for the first time. Each user can change language settings (unless locked by an administrator) after signing in. Go to account settings (click the account name in the upper right corner) and select a LANGUAGE from a drop-down list.

Users with *Guest* roles cannot change system interface language. Their personal settings can be changed by a manager or administrator only in: MANAGEMENT → USERS → EDIT (column *Options*) → LANGUAGE.

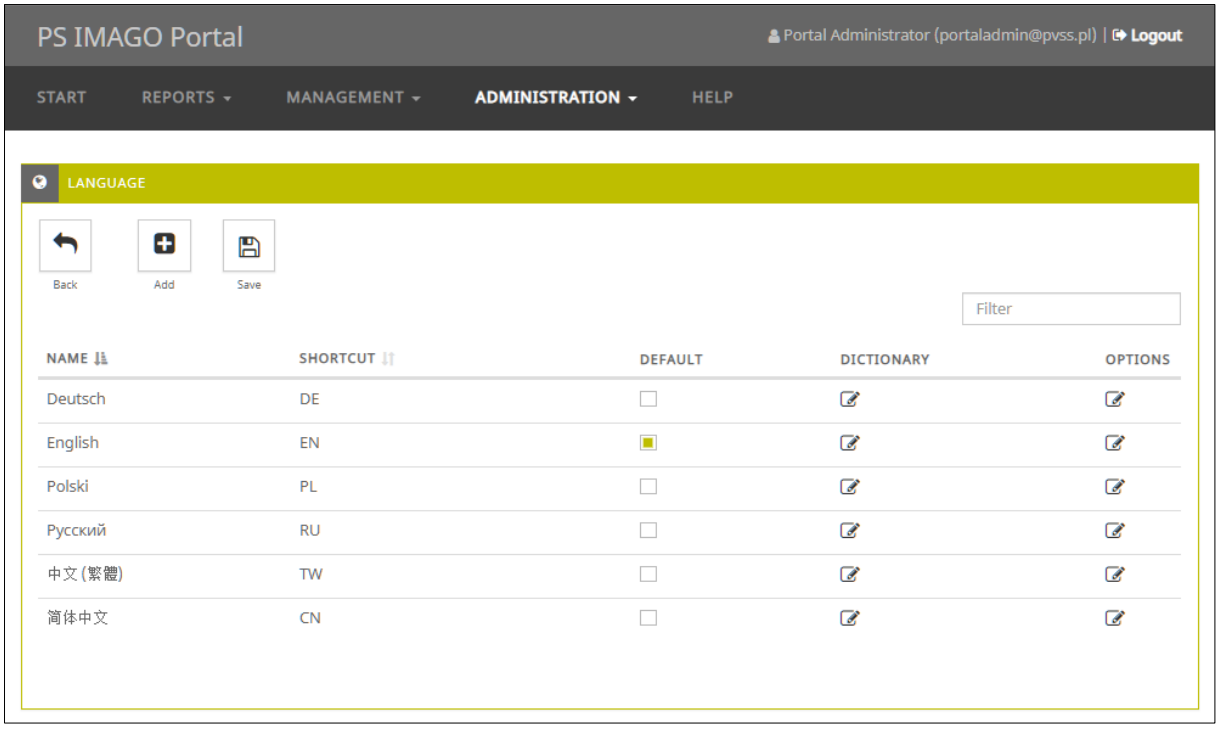


Figure 255. List of system languages with the default one

Every language can be locked or deleted, apart from the current default language. A locked language is unavailable to users as an interface language. It can be unlocked to restore the possibility to use it in the Portal. Languages are deleted permanently. To lock or delete a language, an administrator should go to EDIT LANGUAGE using a pencil icon (✎) in column *Options*, and then use: [Lock] or [Remove]. You can also change the language name there.

6.7.6. Sections

A single installation of the PS IMAGO Portal can handle numerous separate, independent sections. Sections can reflect functional subdivision of your organization, its regional branches, or any other circumstances where structures and contents of the repository or databases of users need to be kept apart, for example. In the case of the PS IMAGO Portal Cloud, a single license covers only one section of the Portal.

Each section covered by a single installation of the PS IMAGO Portal has the following features independent of other sections:

- repository folder structure;
- repository content;
- database of registered users;
- bin for removed items;
- administrative messages;

- PS IMAGO Portal appearance settings.

The following configuration settings are common to all sections:

- connection to Active Directory;
- subscription configuration;
- language settings;
- security settings (password and session parameters);
- registered file types.

Users, Managers, and Section Administrators can use their accounts only in the sections they were created in. Only Portal Administrators can change the section they want to manage.

The system has one section by default. To add a new section, a Portal Administrator goes to: ADMINISTRATION → SECTIONS, and clicks [Add].

In the window where a new section is added, they fill in the *Name* field. The new section is added by clicking [Save].

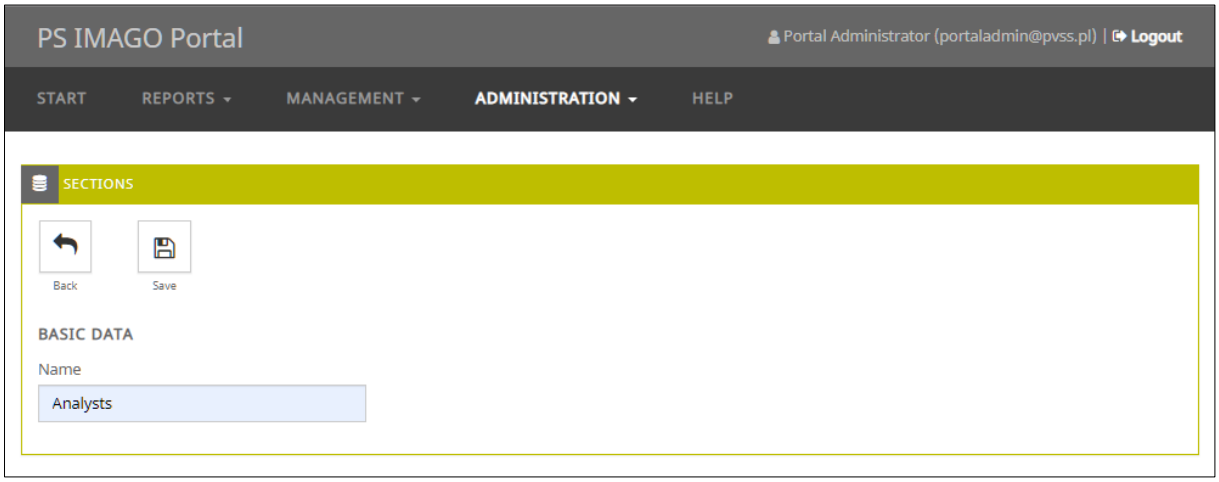


Figure 256. Adding a new portal section

Having returned to ADMINISTRATION → SECTIONS, the Portal Administrator sees a list of all sections of this installation of PS IMAGO Portal. Apart from the section name, the list shows basic section details such as

- *Number of users*, who have accounts in the section;
- *Number of folders* in the part of repository assigned to the section;
- *Number of objects* stored for the section.

Additionally, the *Directory (on disk)* is displayed where files relevant to the section are stored. The currently active section is marked in column *Current section*.

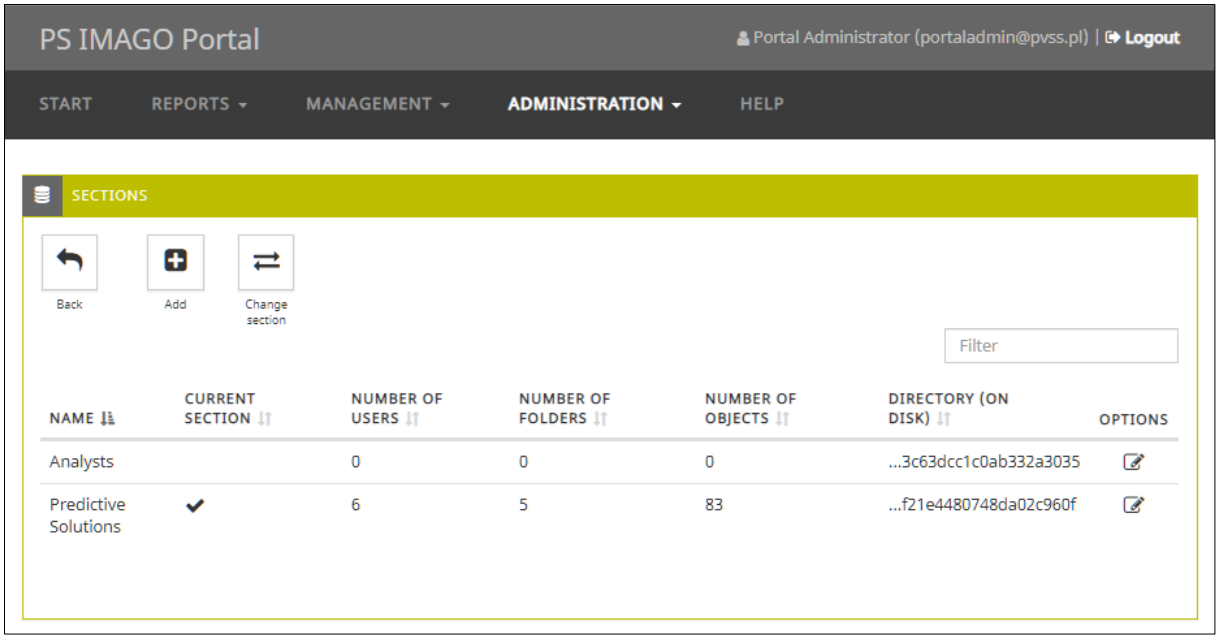


Figure 257. The section list view with basic section data

To change the active section, an administrator uses the [Change section] button on page SECTIONS. When on the section change page, choose the one you want to manage from the *Section* drop-down list. The active section is changed immediately.

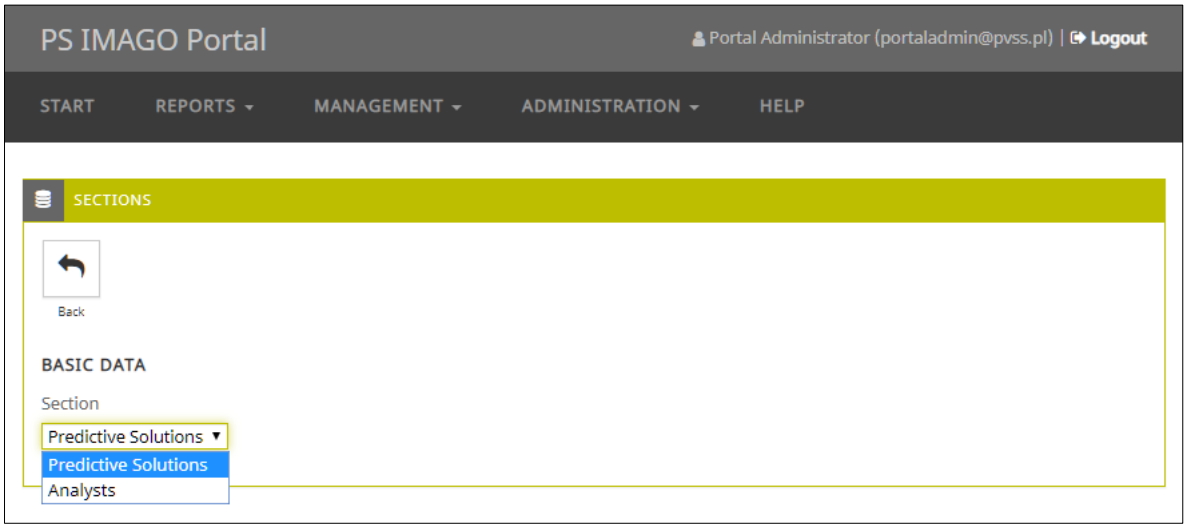


Figure 258. Switching between sections

The existing section can be managed by a Portal Administrator using the pencil icon ( ) in column *Options*. Its name can be changed, it can be locked (Lock), or deleted (Remove). A currently active section cannot be locked.

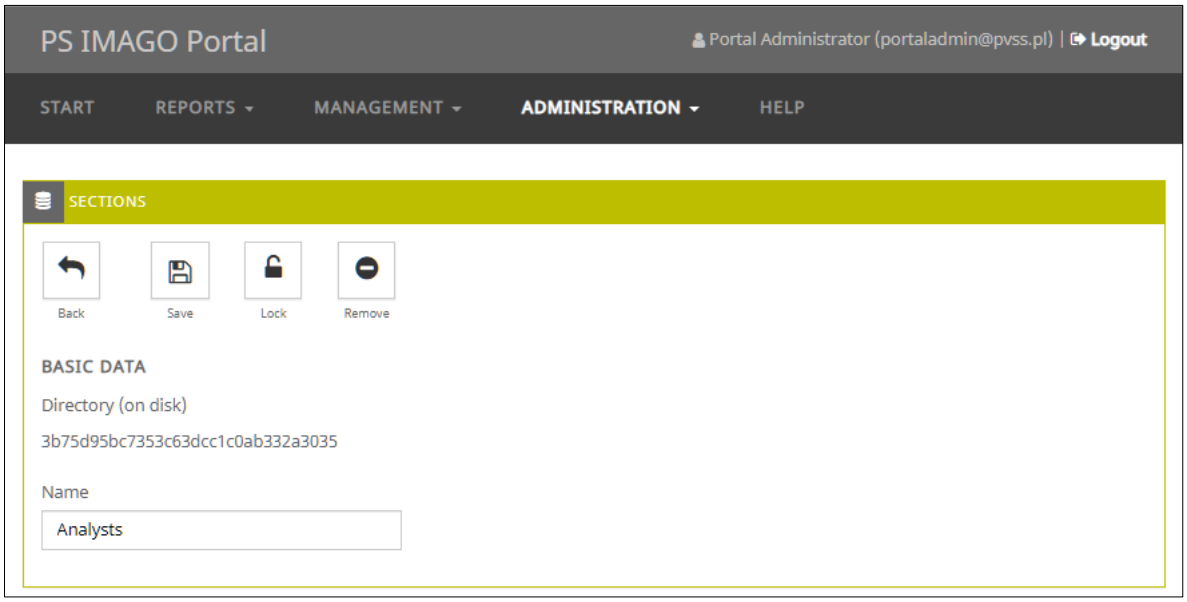


Figure 259. Switching between sections

6.7.7. Security

Security settings are available in ADMINISTRATION → SECURITY. They specify user password requirements and the duration of a single user section with the PS IMAGO Portal. Predefined settings are enabled by default. To change the settings, switch the *Security rules* toggle switch to on. With this option active, a Portal Administrator can change the following rules regarding password complexity:

- the minimum password length;
- the maximum password length;
- the minimum number of capital letters;
- the minimum number of small letters;
- the minimum number of digits;
- the minimum number of special characters.

The following options can be additionally changed:

- the number of incorrect passwords before the account is locked specifies the maximum number of failed sign-in attempts after which the account is automatically locked (can be unlocked by a relevant Manager, Portal Administrator, or Section Administrator) and the user sees a relevant message at the next attempt;
- session duration in minutes specifies the maximum number of minutes without user activity before the user is signed out.

If you enter 0 (zero) in any field, the system ignores the rule. A Portal Administrator can specify a set of phrases or any string that cannot be used as a password in *Forbidden passwords*.

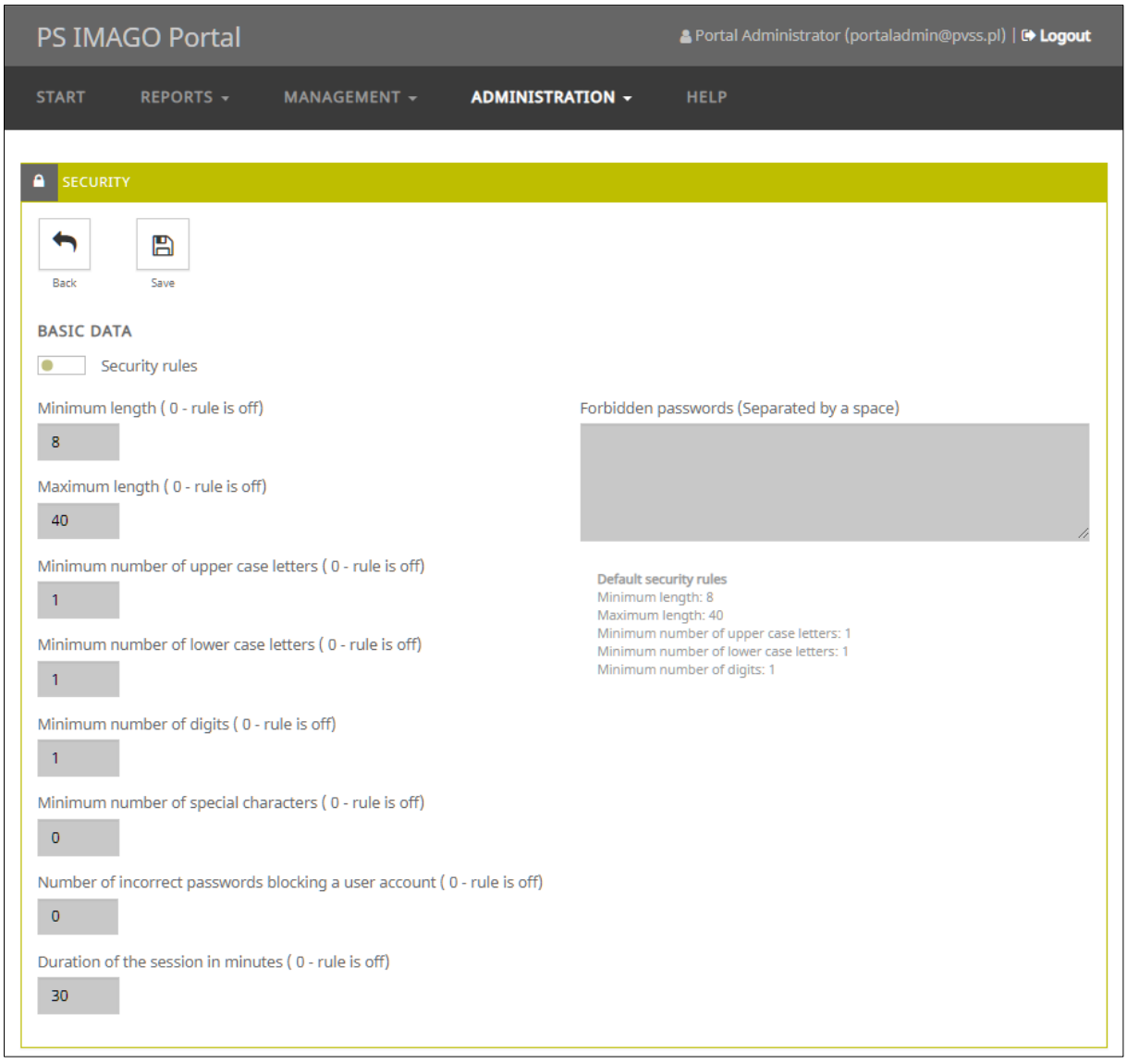


Figure 260. Configuration of security settings

6.7.8. File types

The PS IMAGO Portal (PS IMAGO Portal Cloud) recognizes files added to the system using their extensions. For the system to take the right actions on a file (such as displaying it), its MIME

(Multipurpose Internet Mail Extensions) type must be defined. Note that many popular file types are registered already upon installation. If the type of file added to the repository is not on the list of registered types, an administrator should add a relevant record to the system. It is done in ADMINISTRATION → FILE TYPES.

On the FILE TYPES page, the administrator sees the list of registered file types and relevant information.

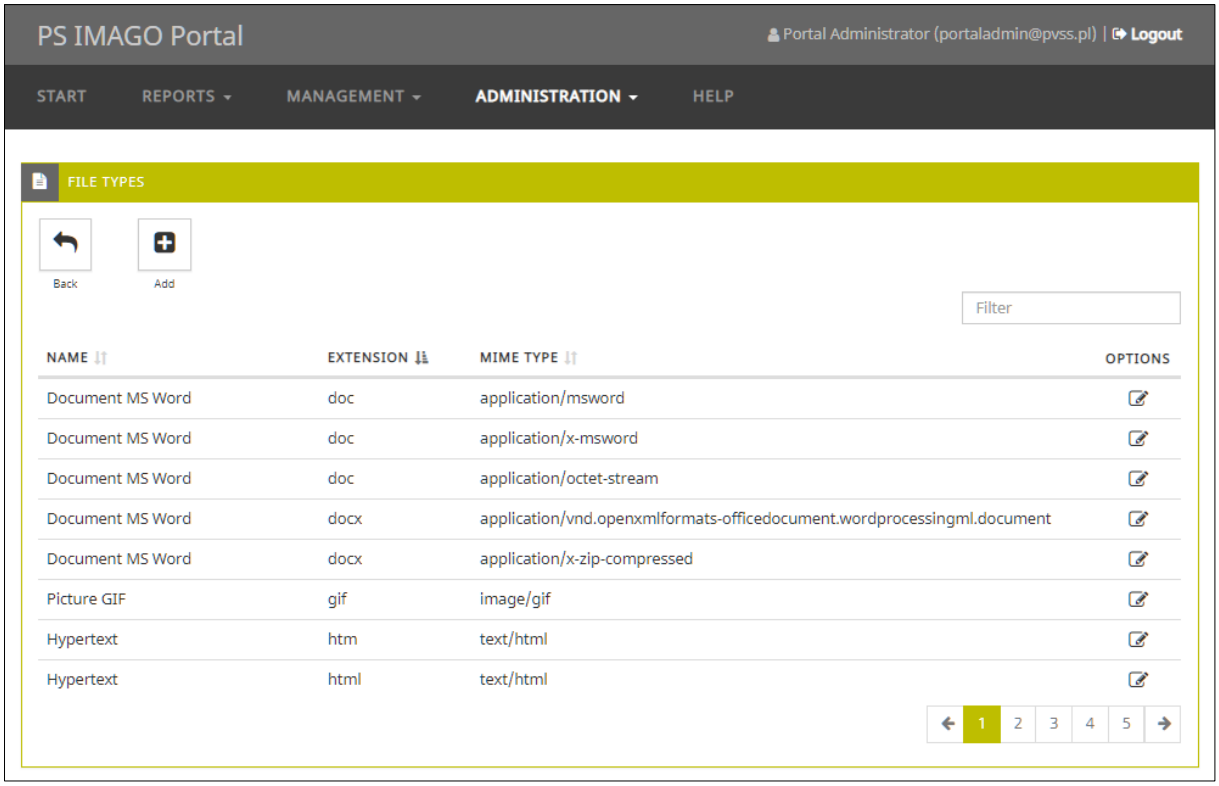


Figure 261. A list of file types registered in the system

To add a new file type to the system, the administrator clicks [Add] and completes the form with fields *Name*, *Extension*, and *MIME type*. The new type is added to the list after clicking [Save].

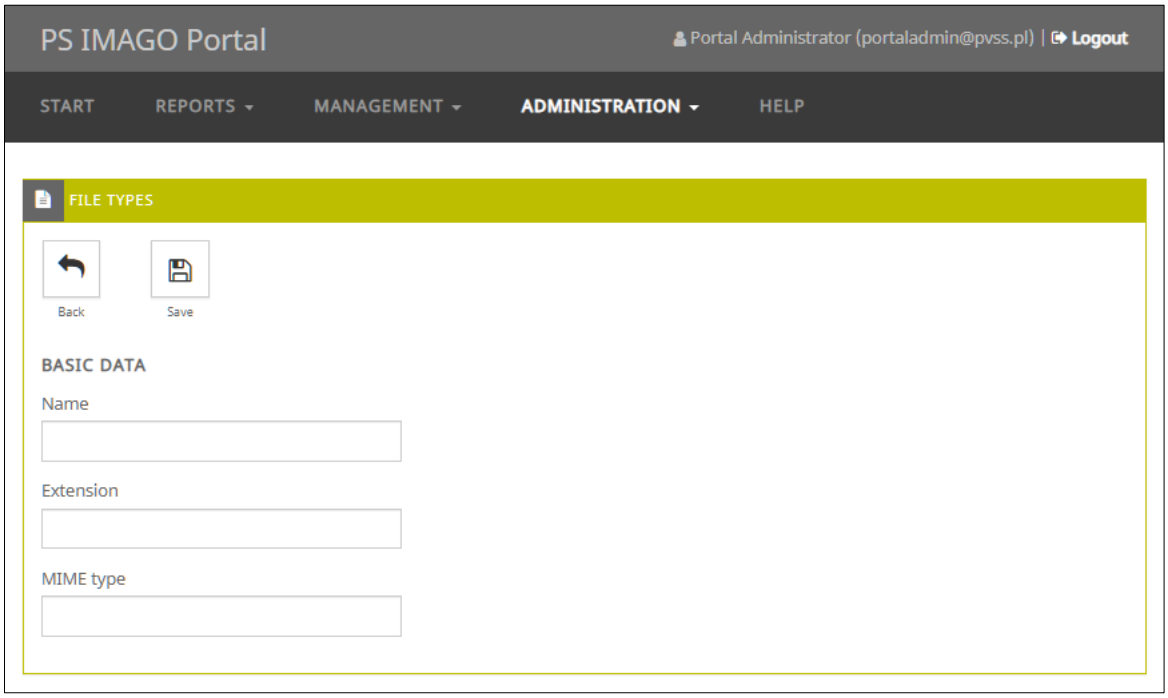


Figure 262. Adding a new file type

You can also edit or delete file type records using the pencil icon (✎) in column *Options* of the file type list.

7. PS IMAGO Process

PS IMAGO Process is a tool for creating schedules of recurrent tasks. It is particularly useful for automation of management report generation. The application has a comprehensive mechanism for defining the scope of changes and frequency of updates. This way, you can select elements to be updated and precisely set the frequency such as every last Friday of a month at 9:00 am.

It is opened with the [AUTOMATION] button in the main window of PS Desktop.

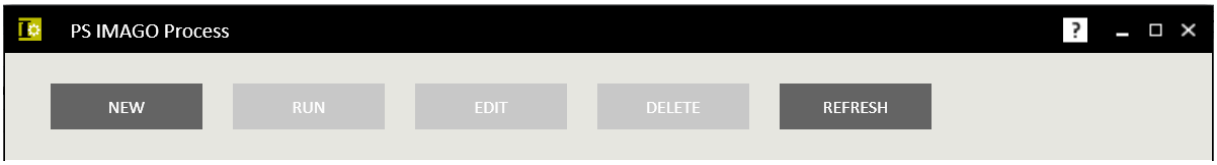


Figure 263. The main window of PS IMAGO Process Function buttons

The upper beam of the program has the following buttons:

- NEW – adds a new automation task;
- RUN – manual activation of tasks (also those with an active schedule);
- EDIT – edits existing tasks;
- DELETE – deletes tasks from the list (active and inactive ones);
- REFRESH – manual refreshment of a table window.

The lower part of the window has a table recording statuses of tasks (run both in automatic and manual mode). It shows a list with task names, dates of next execution, frequencies, and completion statuses.

Name	Next run	Trigger	Last status
New task		Ad hoc	
NPS report in regions	4/30/2019 4:40:00 PM	Monthly	4/4/2019 4:40:00 PM PS IMAGO Process invoked

Figure 264. A table with user-defined tasks

7.1. New task

With the [NEW] button, you can run a dedicated recurrent task wizard. A slider in the upper part of the window sets the scope of the update.

Figure 265. An update procedure with six-stage change scope

A starting and target point is always required. It can be modified as necessary. The maximum approach is the complete process starting with an SPS command file, a PSIR report template, to publication in the PS IMAGO Portal or Portal Cloud.

The update must cover items marked with an asterisk*. Other fields are not required.

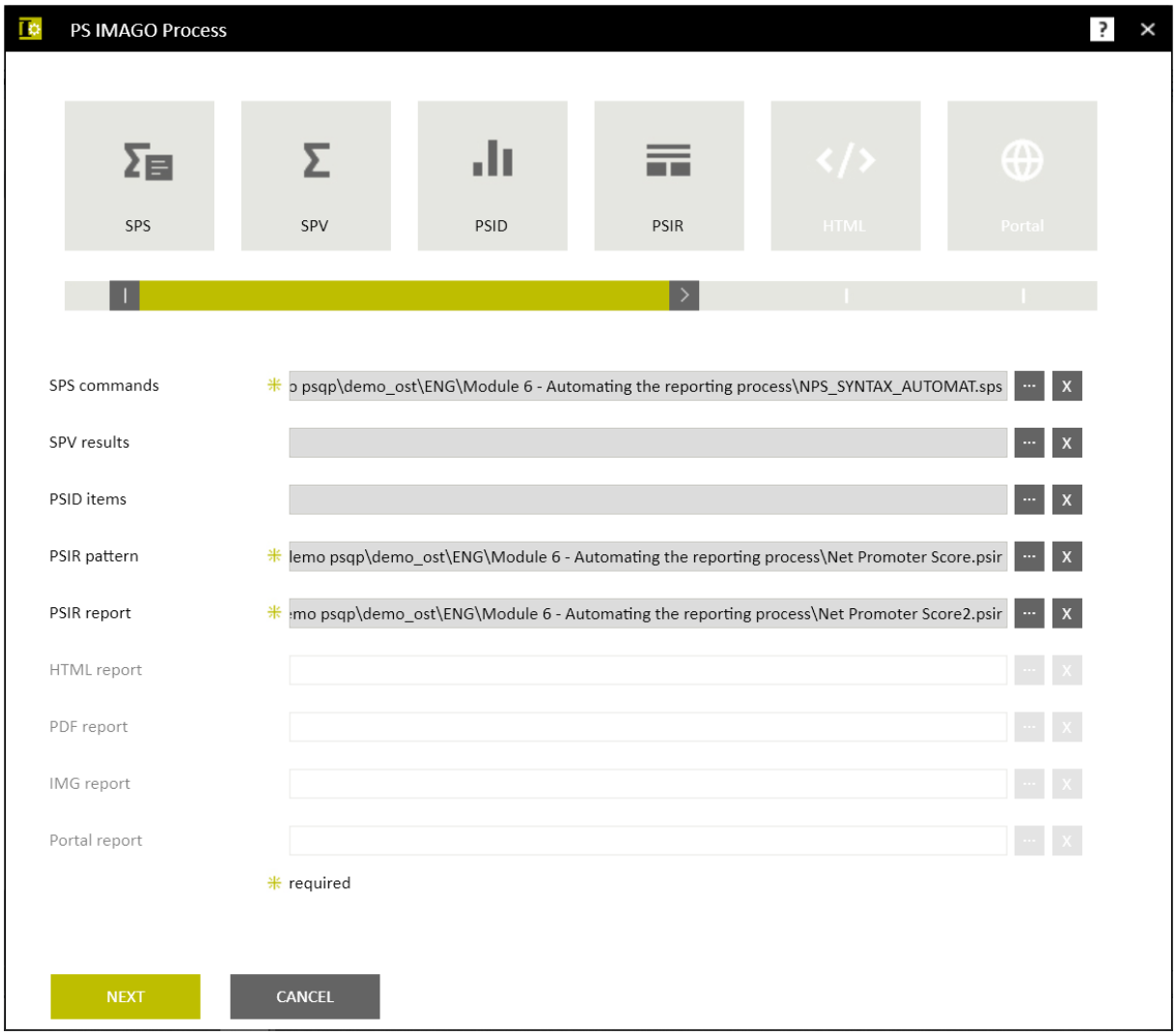


Figure 266. A report update procedure resulting in a new version of a PSIR file

Active items are grey, inactive, white.

The next step is to use the [Next] button to go to the schedule window and set the execution frequency. [CANCEL] closes the window and returns to the main menu without saving any changes.

The Settings section has to following scheduling options:

- *Ad Hoc* – does not require a trigger rule. The task can be run manually from the main window using the [RUN] button;
- *Once* – sets a single execution date for the update procedure;
- *Daily* – sets a daily mode down to one second;
- *Weekly* – sets a weekly mode for any set of days down to one second;

- *Monthly* – sets a monthly mode for any set of months and days of the week down to one second;
- *Monthly at* – the same as above with an additional option to set the number of the day such as the last Friday in a quarter.

All these options, except Ad Hoc, have the Active button, which is enabled by default. When it is disabled, the task is inactive (but not removed). This means that the schedule is not executed until the task is activated.

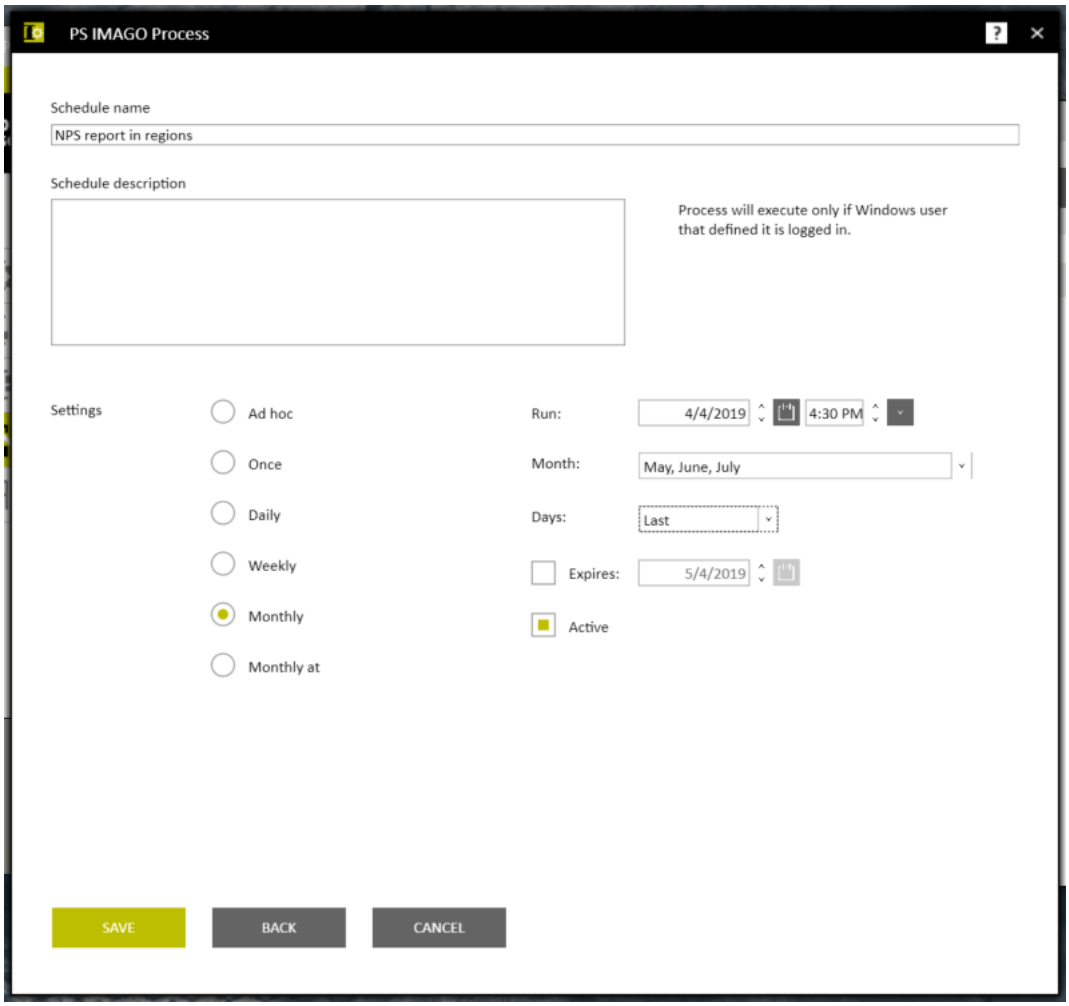


Figure 267. A schedule builder window

When creating a task, the name of the schedule is compulsory and the description is optional. [BACK] goes back to the previous window of the wizard and [SAVE] confirms task creation.

7.2. How to edit tasks

Each task on the list can be edited. The [EDIT] button and the other ones, [RUN] and [DELETE] are active after a task is selected (you can select only one item on the list at a time).

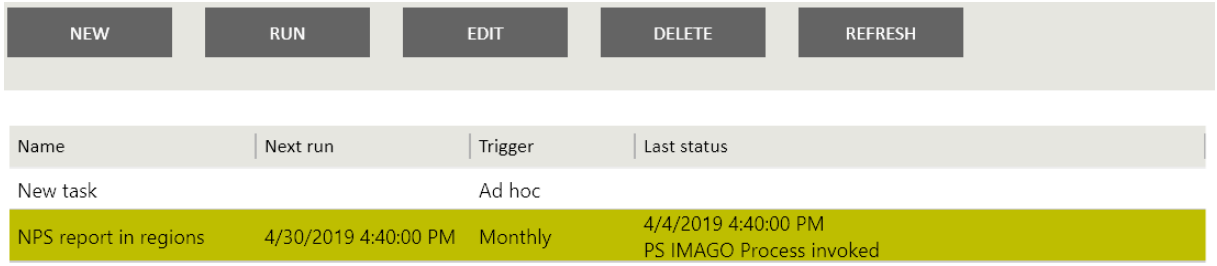


Figure 268. A schedule builder window with a task selected for editing

The scope of task edition can involve items identical to those configured for a new task except for name modification.

The [RUN] button executes a task on the list once, even if it is inactive or has no schedule. If you use a network license, make sure you have at least one such license available. Otherwise, a task run by a schedule that uses IBM SPSS Statistics will not be executed correctly.