

Cross-Cutting Activities - Long-term needs and socio-economic research

Task 6 – Software Development KPI Tool – User Manual



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Document history

Version	Date	Description	Author
1.0	08.11.2019	First version of the KPI Tool User Manual; the user role Model Manager to be elaborated	DK
1.1	22.11.2019	Model Manager elaborated; further minor amendments	DK
1.2	02.12.2019	Feedback from Shift2Rail reflected (as from the telco of 25.11.2019)	DK
1.3	19.12.2019	User Roles explained, Maintenance described (based on feedback)	DK
1.4	10.01.2020	Minor changes as on feedback	DK
1.5	20.01.2020	Migration, deployment and training concept added	DK
2.0	19.10.2020	Updated User Manual for the final version of the KPI Tool	DK
2.1	04.12.2020	Feedback from Shift2Rail reflected	DK



1 Introduction

This document contains the User Manual of the KPI Tool, being developed within the project and its task T6. Specifically it relates to the final version of the KPI Tool, as presented in October 2020.

The KPI Tool, based on the underlying KPI Model, provides Shift2Rail with an integrated framework of Key Performance Indicators (KPIs) defined in the Regulation for the follow-up on its objectives, demonstrating the KPIs' utility, assessing technology developments defined in the Shift2Rail Programme.

2 Objective and methodology

2.1 Structure and objective of this document

Objective of this document is to allow the user using the KPI Tool in an easy and understandable way, considering all the user roles defined for it. The document describes therefore the overall structure of the KPI Tool and its intern logics, the menus and commands, user settings, login procedures and more.

The document is structured as follows:

- **Chapter 2** (the current one) summarizes the user requirements in the first place, and then, based on them, introduces the suggested workflow and recommended usage of the KPI Tool by each user role.
- **Chapter 3** defines the user roles of the KPI Tool, explains the general features of the user interface, and then describes in detail the functionalities of the KPI Tool for each user role.
- **Chapter 4** includes miscellaneous topics as governance and the system administration.

2.2 Methodology used

The KPI Tool is based on the underlying KPI Model, which is developed under the S2R project IMPACT-1 (730816) and IMPACT-2 (777513). The present KPI Tool presents the outputs of the model, including personalised scenario modelling.

2.3 User requirements summarized

The following section describes the software tool requirements from the user's point of view, as summarised upon consultations with Shift2Rail.

2.3.1 Presenting KPIs

This set of user requirements defines the required functionalities related to the tasks of viewing and presenting the KPIs.

- Primary dashboard view showing multiple charts, tables, and/or values
- Secondary dashboard(s) as defined by the Shift2Rail JU, with a "click-through" feature to switch between them
- Executive View with tiles for a quick access to various dashboard or charts, presenting also numeric values
- Presenting KPIs and results of the model in various chart types and/or table types, in coherence with the SPDs and IPs
- Implementing colour schemes or palettes to apply different colours to charts, dashboards and tiles
- Exporting the data in XLS and PNG formats appropriate for further processing



2.3.2 Handling the input data

This set of user requirements defines the required functionalities related to the tasks of managing input data.

- Importing the KPI data values in the structure defined by the model
- Exporting the data structures and/or KPI values
- Optional manual corrections of the data within the KPI Tool

2.3.3 Technology filter

This set of user requirements defines the required functionalities for manipulating input and output figures as to model the future possible scenarios.

- Creating scenario(s) based on the parameter groups activated or deactivated
- Comparing the baseline value, Shift2Rail value, and scenario value in different data series of a chart

2.3.4 Main features of the KPI Tool

This set of user requirements defines the required functionalities for modifying the presentation of the results of the KPI model, which allow later flexible changes

- Defining workspace for the KPI model – units, dimensions, categories and formats
- Defining each KPI
- Ability to define various attributes of the KPI – as name, data type, value range, data sources, update frequency etc.
- Ability to define and make changes in the KPI structure, and KPI parameters
- Ability to define and make changes in the KPI presentation – defining the structure of the dashboard(s), charts and collapse panels
- Allocation of the users roles

2.3.5 Data governance

This set of user requirements defines the required functionalities for a System Administrator.

- Data security – securing the KPI Tool access and restricting changes to the authorised users
- Authorising users for his or her tasks – viewing data (read only), modifying data (read-write), modifying the model (read-write structure)
- Password protection – password requirements to be defined, password or credentials for accessing the tool and its data to be required
- Data backup and recovery

2.3.6 User access

This set of requirements defines the required functionalities for a System Administrator related to the user management.

- Supporting the multi-user environment, allowing multiple parallel users to be logged in and working with the Tool
- Defining the user roles, access rights for each role, and assigning users to each role and to each user group
- Approving the user access and his or her roles

2.3.7 User roles

As stated previously, the KPI Tool supports in total five user roles for processing and viewing the KPIs in the charts and dashboards provided (including the System Administrator and anonymous user). Each user has to be **registered** in the system, i.e. introduced by the System Administrator, except the **anonymous user**, which has a limited access to the tool. The following five user roles are to be differentiated:

- **Anonymous user** – a public user accessing the KPI Tool via the public website of Shift2Rail, with a read-only access, i.e. restricted for the data viewing and analysing similarly to Data Viewer, however without any rights for the user-specific actions as saving scenarios
- **Data Viewer** – a registered user with a read-only access to the data, which is supported only with features for viewing the data, charts and dashboards, and for scenario modelling, complemented with the chart and dashboard exports; basically a Data Viewer is the end user (analyst) of the KPI data, reports and charts, who does not concern with the data preparation and data verification or with the model structure
- **Data Manager** – a registered user with a read-write access to the data, being supported with features for data management, i.e. import, export, and corrections (additionally to the features available for the Data Viewer); basically this means that the Data Manager is responsible for the data which are available in the KPI Tool; he or she is responsible for the data file, but not for the structure of the data and/or of the charts dashboards
- **Model Manager** – a registered power user with a read-write-structure access to the data, i.e. with authorization to define and change the model itself, including the KPI workspace, all the KPIs and their structure, correspondence with the Excel data files, and to define and change the dashboard and chart structures (again, additionally to the features available for the Data Manager and Data Viewer); the Model Manager is therefore a person with the top responsibility for the KPI Tool model itself, for the structure of the data, of the charts and dashboards; in the case of the joint user rights and joint responsibility, he or she may be responsible for the data management as well
- **System Administrator** – a special user with administrative privileges in the KPI Tool, i.e. with authorisation to add and edit user accounts and user groups, to view the event log, and possibly to perform other administrative tasks



The user privileges of each user role are described in the following table.

User role	Data Viewer	Anonym User	Data Manager	Model Manager	System Admin
Viewing data	√	√	√	√	√
Exporting charts and dashboards	√	√	√	√	√
Modelling scenarios - Technology filter	√	√	√	√	√
Saving and retrieving scenarios	√		√	√	√
Managing data files			√	√	√
Exporting and importing data			√	√	√
Editing data			√	√	√
Managing model				√	√
Editing workspace (units, data types etc.)				√	√
Creating possible new KPIs				√	√
Creating & editing charts, collapse panel, dashboards				√	√
Adding and editing user					√
Adding and editing user groups					√
Viewing event log					√
Other administrative tasks					√

Table 1: Various functional areas of the KPI Tool and the user role privileges

2.3.8 Hardware and software

This set of requirements shall define the required hardware and software environment. The final specification of the hardware and software environment will be suggested based on the requirements or policies set by the Shift2Rail JU.

- Multi-user access to the web-based service to be supported
- Development environment, testing environment, and production environment to be set separately
- User Interface defined in compliance with the Shift2Rail UI design manual (if applicable)
- Target hardware and software environment defined in compliance with the Shift2Rail HW&SW policy and/or standard environments (if applicable)
- Backup policy defined in compliance with the Shift2Rail backup policy (if applicable)
- Other system environment as required by the Shift2Rail policies (ADir/LDAP/Kerberos)

The underlined items are requested from the Shift2Rail JU to build the detailed specifications on.

2.4 Workflow and usage of the KPI Tool

The following section defines how the KPI Tool is to be used by each user role, and how these user roles match together to provide a complete and consistent process solution of monitoring the KPIs.

2.4.1 Usage pattern for each user role assumed

Based on the user roles specified in 2.3.7, the following workflow structure is assumed for using the KPI Tool. This logical structure defines tasks of each level or each process (excluding the System Administrator from the list, considering the specific nature of this user role):

1. The **Data Viewer** (including the possible anonymous user) is the ultimate user of the KPI Tool and of its outputs. This person can perform the KPI viewing, KPI presenting and exporting, and also using the technology filter.

The typical usage pattern of the Data Viewer lies therefore in a dashboard, drilling down the charts, and detailed data (where available).

The Data Viewer is also able to export the charts, and optionally the detailed data.

These tasks hold true generally for both registered user and anonymous user; the anonymous user has, however, a limited access to the Tool and therefore may not use the full set of functionalities, as described in more detail in 2.3.7 and also in 3.1.2.

2. The **Data Manager** takes care to update the data as structured by the input and output information in the KPI model, to maintain the data meaningful in their values and correcting the obvious inconsistencies. The Data Manager verifies therefore the KPI Excel Model for completeness and correctness, including the Improvement values, and calculations with their result. Then the Data Manager opens the Excel data file, stored on the server storage of the KPI Tool, and gets them imported into the KPI Tool. Now they are ready for the Data Viewer.

The typical usage pattern of the Data Manager is therefore seen in the KPI Excel Model, used for the calculations and the first visual checks, and in the UI for importing the data files.

The Data Manager may also export the model structure or its part, optionally including the existing data, to continue the processes of data collection.

3. The **Model Manager** is responsible for the fully functional and logically correct KPI Model implementation in the first place. This person translates the structure of the whole KPI Model, i.e. the KPI workspace (categories, frequencies, units, formats), structure of the KPI model, data sources and interdependencies, data types, data formats etc., which define the groundworks of the whole model. The Model Manager defines also **charts, collapse panels and dashboards**, and assigns them to the user groups.

The typical **usage pattern** of the Model Manager is unambiguously anchored to the UI handling the model, translating the whole model, the input KPIs, intermediate KPIs, and high-level strategic KPIs, and also defining the charts, collapse panels, dashboards and executive views with their structures, interdependencies and descriptions or tooltips. The Model Manager is responsible for the KPI Model being logically correct and structured, for being



based on correct assumptions and interdependencies, and for being in accordance with the charts and dashboards. Upon certain changes in the KPI model, as e.g. deleting a data column from an input data file, the dashboards and charts may become invalid; it is also one task of the Model Manager to check these interdependencies and correct them when necessary.

With respect to different usage by each user role, both the functionalities and the user interface differ between these. Should a specific user be assigned to multiple user roles, then all the relevant functionalities are available for him or her.

2.4.2 Recommended workflow for each user role assumed

The basic expected workflow of the KPI Tool is depicted on Figure 2. Below under the figure, the most characteristic usage patterns are described. These reflect then in the instructions for using the KPI Tool in Chapter 3, which defines the available actions for each person using the KPI Tool.

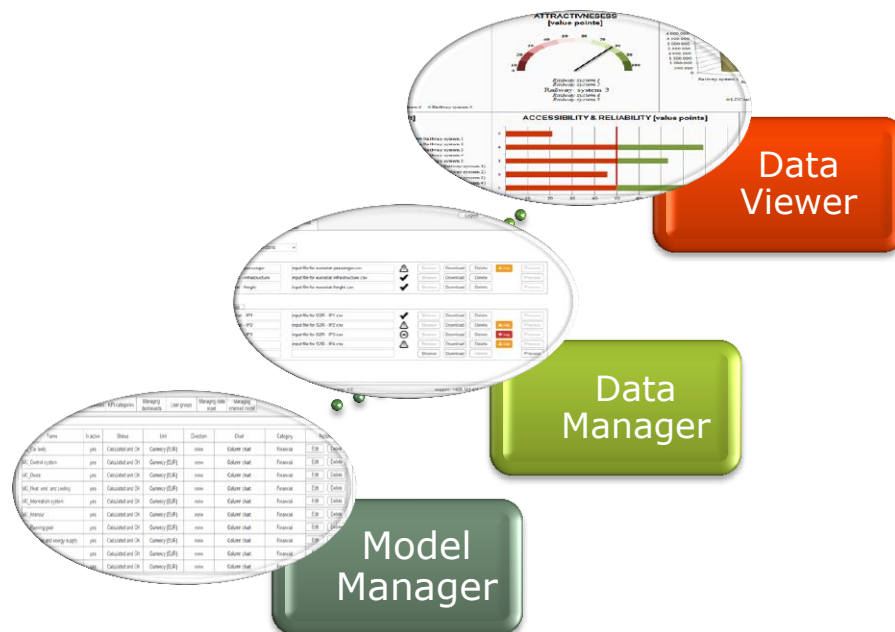


Figure 2: Workflow expected by the KPI Tool

Workflow recommended or foreseen for the **Model Manager** when building a brand new KPI model in the KPI Tool is as follows:

1. Defining the **KPI workspace**: defining dimensions, categories, units, and formats – delimitating the basic building blocks for the KPI model
2. Defining **input files** – a simple list of files which define logical grouping of the KPIs on File Columns into Data Files
3. Defining the **KPIs** themselves, in the bottom-up approach, according to the interdependencies and KPI attributes defined in the model

4. **Verifying** the KPI model, its completeness, validity, consistency; after this step, the KPI model is ready to be handed to the Data Manager for his or her tasks to be accomplished
5. Defining the **charts, collapse panels and dashboards** as necessary for the proper presentation of the KPI values

Workflow recommended or foreseen for the **Data Manager** when managing the data itself in the KPI Tool is as follows:

1. Opening the KPI Model as defined by the Model Manager.
2. Exporting the data file structure to get the framework for providing data
3. Collecting the input data or interface KPIs (sheet Improvement in the KPI Excel Model) according to the processes specified and according to the Shift2Rail project structures
4. Importing the XLS data file containing the KPI Excel Model
5. After possible correction of all the data and after a successful import, handing the data to the Data Viewer

DIMENSIONS				
YEAR	COUNTRY	...	VALUE	UNIT
2013			365	MEUR
2014			368	MEUR
2015			392	MEUR
2016			315	MEUR
2017			366	MEUR
2018				MEUR
...				

Figure 3: Generic data file (XLS format) with a dummy data example

For the **Data Viewer**, a more flexible workflow is assumed: he or she will launch the KPI Tool with the high-level charts and data tables, and will drill down to lower levels as needed. He or she may also employ the **Technology filter** and activate or deactivate the relevant parameter groups to model impacts of various measures. After showing the scenario values in the charts and dashboards, he or she may export the charts using the export feature.

2.4.3 Understanding Summary Sheets in the Excel model

The **IMPACT KPI Excel Model** stands at the core of the KPI calculations. Here all the business logics of the calculations and interdependencies are defined, together with all the formulas and conditional branches necessary to arrive at the desired results. To facilitate the data transfers and data transformations between the KPI Tool and the KPI Excel Model, the interface **summary sheets** are defined. They provide the input values and results of the Excel Model in an unambiguous and easily readable format. This way, the “feedback loop” for manipulating values needed for technology filter function.



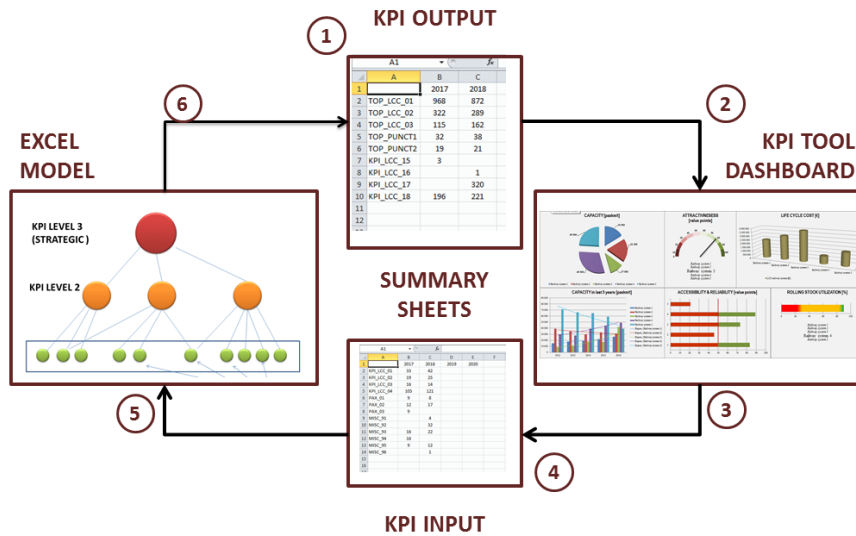


Figure 4: The Summary Sheets and feedback loop for scenario modelling

KPI Tool Input Sheet

The KPI Tool Input Sheet, by convention named "KPI_Tool_IN", summarizes basically all the input values (parameters) to be manipulated for the technology filter.

Param group	Param name	SPD	Cell	Low	High	Baseline	Scenario	S2R	Real
2	Vehicle Motion and Control	Brakes failures	SPD1	E71	0%	150%	100%		YES
3	Vehicle Motion and Control	Brakes failures	SPD2	F71	0%	150%	100%		YES
4	Vehicle Motion and Control	Brakes failures	SPD3	G71	0%	150%	100%		YES
5	Vehicle Motion and Control	Brakes Weight	SPD1	E101	0%	150%	100%		YES
6	Vehicle Motion and Control	Brakes Weight	SPD2	F101	0%	150%	100%		YES
7	Vehicle Motion and Control	Brakes Weight	SPD3	G101	0%	150%	100%		YES
8	Vehicle Motion and Control	Brakes Cost_Cap	SPD1	E10	0%	150%	100%		YES
9	Vehicle Motion and Control	Brakes Cost_Cap	SPD2	F10	0%	150%	100%		YES
10	Vehicle Motion and Control	Brakes Cost_Cap	SPD3	G10	0%	150%	100%		YES
11	Vehicle Motion and Control	Brakes Cost_Maint	SPD1	E19	0%	150%	100%		YES
12	Vehicle Motion and Control	Brakes Cost_Maint	SPD2	F19	0%	150%	100%		YES
13	Vehicle Motion and Control	Brakes Cost_Maint	SPD3	G19	0%	150%	100%		YES
14	Passenger Space and Ride Feeling	Running Gear failures	SPD1	E70	0%	150%	100%		YES
15	Passenger Space and Ride Feeling	Running Gear failures	SPD2	F70	0%	150%	100%		YES
16	Passenger Space and Ride Feeling	Running Gear failures	SPD3	G70	0%	150%	100%		YES
17	Passenger Space and Ride Feeling	Running Gear Weight	SPD1	E100	0%	150%	100%		YES
18	Passenger Space and Ride Feeling	Running Gear Weight	SPD2	F100	0%	150%	100%		YES
19	Passenger Space and Ride Feeling	Running Gear Weight	SPD3	G100	0%	150%	100%		YES
20	Passenger Space and Ride Feeling	Running Gear Cost_Cap	SPD1	E9	0%	150%	100%		YES
21	Passenger Space and Ride Feeling	Running Gear Cost_Cap	SPD2	F9	0%	150%	100%		YES
22	Passenger Space and Ride Feeling	Running Gear Cost_Cap	SPD3	G9	0%	150%	100%		YES
23	Passenger Space and Ride Feeling	Running Gear Cost_Maint	SPD1	E18	0%	150%	100%		YES
24	Passenger Space and Ride Feeling	Running Gear Cost_Maint	SPD2	F18	0%	150%	100%		YES
25	Passenger Space and Ride Feeling	Running Gear Cost_Maint	SPD3	G18	0%	150%	100%		YES
26	Vehicle Motion and Control	Traction failures	SPD1	E67	0%	150%	100%		YES
27	Vehicle Motion and Control	Traction failures	SPD2	F67	0%	150%	100%		YES
28	Vehicle Motion and Control	Traction failures	SPD3	G67	0%	150%	100%		YES
29	Vehicle Motion and Control	Traction Weight	SPD1	E97	0%	150%	100%		YES
30	Vehicle Motion and Control	Traction Weight	SPD2	F97	0%	150%	100%		YES
31	Vehicle Motion and Control	Traction Weight	SPD3	G97	0%	150%	100%		YES

Figure 5: An example KPI Tool Input Sheet

The Input Sheet defines, for each parameter, the following columns (attributes):

- **Param Group** – Assigns the parameter into a group which can be manipulated in a batch using the technology filter.
- **Param Name** – Parameter name as used in the Excel Model. For the KPI Dashboard Tool it is defined as an arbitrary string.



- **SPD** – A specific SPD for this parameter – constituting a dimension of the parameter values. Actually the parameter name together with the SPD value and optionally other dimension values define unambiguously one parameter.
- **Cell** – Reference to the Excel cell in the sheet “Improvement”. May be used for internal purposes in the Excel Model.
- **Low** – The lowest acceptable value of the parameter.
- **High** – The highest acceptable value of the parameter.
Note: the columns “Low” and “High” in the file “KPI Model Example.xlsx” are set to arbitrary default values. They are to be replaced by the proper limit values as needed.
- **Baseline** – The baseline value of the parameter to be processed and rendered.
- **Scenario** – The parameter value to be processed and rendered, as set by the currently modelled scenario. This value is to be modified by the KPI Tool: generally the Scenario value will be set either to the Baseline value (when the parameter group is “ticked off” i.e. inactive), or the S2R Improvement value (when the parameter group is “ticked on” i.e. active).
Note: In the 2nd phase the full-fledged scenario modelling is foreseen. The user will be able then to manipulate the parameter values arbitrarily (not only “tick on x tick off”), based on the parameter list specified (will be provided by JU and WA, based on each user group).
- **S2R** – The currently valid Shift2Rail Improvement parameter value. It can be considered fixed until the next update on the Improvement parameters and the KPI Tool should not overwrite these values.
- **Real** – Specifies whether the real Shift2Rail Improvement values are to be involved in the KPI calculations (Real=YES), or the baseline values of 0% (Real=NO). Currently this column is seen as obsolete.
- **Show** – Specifies whether the parameter is to be shown in the KPI Dashboard Tool (YES/NO).
Note: Parameters with Show=NO may be used e.g. for internal purposes or calculations.

The **KPI Tool Input Sheet** (“KPI_Tool_IN”) serves for the scenario modelling, as mentioned before. It is fully flexible, in the sense that it remains functional even upon adding a new parameter or new parameter group.

Column A in the KPI Tool Input Sheet may **not contain any empty cells**, otherwise the calculation will halt and will arrive to confused results.

KPI Tool Output Sheet

The KPI Tool Output Sheet, by convention named “KPI_Tool_OUT”, summarizes all the resulting output values of the Excel Model and its calculations onto one sheet, to be processed and rendered in the KPI Dashboard Tool. It contains the values of all the KPIs defined for the KPI Tool, for all the dimensions values. This way it implements the function “sample and hold”.

This Excel sheet must specify all the values, which are to be rendered in the charts and/or further processed by the KPI Tool.



Year	SPD	IP	LCC_Baseline	Punctuality_Baseline	Capacity_Baseline	LCC_Scenari	Punctuality_Scenari	Capacity_Scenari	LCC_S2R	Punctuality_S2R	Capacity_S2R	Capacity_dev_Sc	Capacity_dev_Pax_Sc	Capacity_dev_S2R	Capacity_dev_Pax_S2R
1.1.2019	SPD1	All	0,00%	0,00%	0,00%	-14,8%	29,6%	68,7%	-14,8%	29,6%	68,7%			38,58%	21,77%
1.1.2019	SPD1	IP1	0,00%	0,00%	0,00%	-2,76%	8,32%	21,77%	-2,8%	8,3%	21,8%				
1.1.2019	SPD1	IP2	0,00%	0,00%	0,00%	-2,18%	0,92%	38,00%	-2,2%	0,9%	38,0%				
1.1.2019	SPD1	IP3	0,00%	0,00%	0,00%	-7,96%	13,45%	0,42%	-8,0%	13,5%	0,4%				
1.1.2019	SPD1	IP5													
1.1.2019	SPD2	All	0,00%	0,00%	0,00%	-21,0%	50,9%	57,1%	-21,0%	50,9%	57,1%			30,55%	20,38%
1.1.2019	SPD2	IP1	0,00%	0,00%	0,00%	-3,63%	5,11%	20,38%	-3,6%	5,1%	20,4%				
1.1.2019	SPD2	IP2	0,00%	0,00%	0,00%	-4,07%	1,01%	30,00%	-4,1%	1,0%	30,0%				
1.1.2019	SPD2	IP3	0,00%	0,00%	0,00%	-11,95%	40,32%	0,42%	-11,9%	40,3%	0,4%				
1.1.2019	SPD2	IP5													
1.1.2019	SPD3	All	0,00%	0,00%	0,00%	-16,2%		22,9%	-16,2%		22,9%			20,50%	2,00%
1.1.2019	SPD3	IP1	0,00%	0,00%	0,00%	-1,56%		2,00%	-1,6%		2,0%				
1.1.2019	SPD3	IP2	0,00%	0,00%	0,00%	-9,45%		20,00%	-9,5%		20,0%				
1.1.2019	SPD3	IP3	0,00%	0,00%	0,00%	-5,07%		0,42%	-5,1%		0,4%				
1.1.2019	SPD3	IP5													
1.1.2019	SPD4	All	0,00%	0,00%	0,00%	-38,9%	77,6%	113,6%	-38,9%	77,6%	113,6%			20,00%	109,03%
1.1.2019	SPD4	IP1													
1.1.2019	SPD4	IP2	0,00%	0,00%	0,00%	-10,99%	9,45%	51,69%	-11,0%	9,5%	51,7%				
1.1.2019	SPD4	IP3	0,00%	0,00%	0,00%	-4,23%	2,11%	7,15%	-4,2%	2,1%	7,1%				
1.1.2019	SPD4	IP5	0,00%	0,00%	0,00%	-25,04%	72,98%	33,48%	-25,0%	73,0%	33,5%				

Figure 6: An example KPI Tool Output Sheet

The generic structure of the Output Sheet has been described above. For the Shift2Rail model, it contains the following columns, to show three values of each KPI (baseline, scenario, Shift2Rail):

- **SPD** – A dimension defining the specific SPD for each row.
- **IP** – A dimension defining the specific IP for each row.
- **LCC, Punctuality, Capacity** – The top-level KPI values for the specific SPD and specific IP:
 - **LCC Baseline, Punctuality Baseline, Capacity Baseline** – the baseline values of each KPI; as the other values are shown as the percentage relatively to the baseline, the baseline itself must show always 0%
 - **LCC Scenario, Punctuality Scenario, Capacity Scenario** – the KPI values for the currently modelled scenario via the technology filter
 - **LCC S2R, Punctuality S2R, Capacity S2R** – the KPI values calculated for the currently valid set of “Improvement” parameters defined by the Shift2Rail JU members
 - **Capacity_deviation_train_Sc, Capacity_deviation_pax_Sc, Capacity_deviation_train_S2R, Capacity_deviation_pax_S2R** – additional capacity KPI values for rendering the bubble charts of capacity. The capacity chart was turned into a bar chart for better understanding of basic users.

These values are to be transferred from the “Overview” sheet in the Excel Model. For the “feedback loop” and scenario modelling using the Technology filter, an automated mechanism is defined.

Establishing the Summary Sheets

The Summary Sheets are a necessary prerequisite for the KPI Tool to work. They need to be defined therefore also for each new version of the Excel model. The simplest way to establish the Summary Sheets is to **transfer** them (Copy/Paste) from an existing KPI Excel Model; their structure is defined in this way, and their values are then calculated automatically by the Technology filter feature of the KPI Tool.

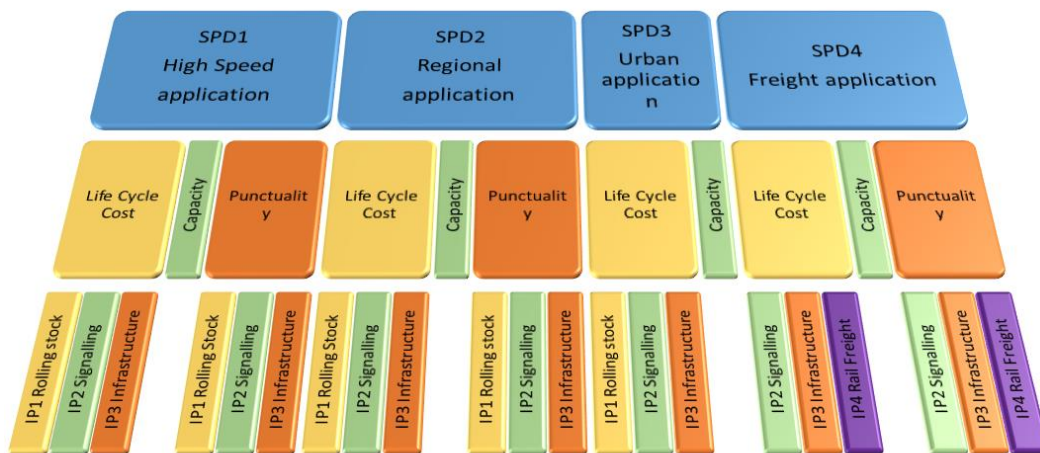


Figure 7: Shift2Rail KPI dimensions and key values

2.4.4 Typical Use Cases of the KPI Tool

For a better understanding of the KPI Tool and its usage patterns, this section describes the most typical Use Cases, i.e. the most typical situations which are handled by the authorised users of the KPI Tool.

1. **Data Viewing and presenting.** This is a typical basic task of the **Data Viewer** and of the **anonymous user**. The task involves using the charts and dashboards, analysing the data, and exporting outputs (when available). Neither data modifications nor model structure modifications are necessary.
2. **New data values from the TDs.** Changing data is a typical basic task of the **Data Manager**, as described above in this section 2.4. The Data Manager needs the updated the KPI Model when there is an update in the model. IMPACT members needs to provide the new data from the TDs (or eventually from other sources, as specified in the relevant internal processes of Shift2Rail), incorporates these into the KPI Excel Model (generally on the Improvement tab). After that, the Data Manager **imports** the data into the KPI Tool. To import the data, it is necessary to include the Summary Sheets into the KPI Excel Model, as described in Section 2.4.3 in more detail. This way, the data get ready for any Data Viewer for their usage and analysis. After the import, the Data Manager checks whether the values are equal in both, the received Excel model and the presented values in the KPI tool.
3. **Changing the model or charts and dashboards.** Any changes in the KPI Model (should these be e.g. correcting an incorrect chart rendering, changing chart types, colours, or data series, etc.) lie in the responsibility of the **Model Manager**. Based on the relevant user privileges, he or she may change the structure of the KPI model, e.g. units, formats and categories, change the rendered chart structures (charts, collapse panels, dashboards and executive



views), and also change visibility of the charts and dashboards for the corresponding user groups. Tasks pertinent to the Model Manager are described in more detail in Section 3.3.

- 4. Changing model interface.** As soon as any changes in the **model interface** are involved, the application code needs to be changed and adapted. This means any changes on the Summary Sheets and their structure, as described in Section 2.4.3, i.e. adding new KPI calculated by the Excel model (which means new columns in the sheet KPI Tool OUT), or changing the Improvement logics described in Section 2.4.3. All these changes lie outside the responsibility of the Shift2Rail users, and have to be implemented by ABIRAIL as the supplier of the KPI Tool. **Note:** minor changes, which do not involve any structural changes of the Summary Sheets, are not subject to this implementation schema, and may be covered by the Model Manager (e.g. adding SPD/IP category, or adding and/or redefining a Parameter Group in the sheet KPI Tool IN).
- 5. Error or bug in the KPI Excel Model.** Any errors or bugs in the Excel model calculations belong to the responsibility of the IMPACT team, and are to be handled in this way. This includes any internal calculation bugs, incorrect values of various calculation parameters or formulae, or also updates of the calculation formulae and calculation methods.
- 6. Error or bug in the KPI Tool.** In the case of any bug in the KPI Tool software itself, ABIRAIL as the supplier of the KPI Tool is responsible for the fix. These include any malfunctions which cannot be overcome with a model structure setting, i.e. by functionalities available for the Model Manager, any unexpected error messages which are apparently not pertinent to any error or deficiency in the data, or any inconsistency which apparently results from the KPI Tool handlings. This however does not include errors in the data structures, e.g. showing an incorrect data column in a chart or dashboard, showing incorrect units or values, or even showing an incorrect chart type; all of these example issues may be easily solved by the Model Manager and the relevant functionalities.

3 Using the KPI Tool

The following section elaborates each of the aforementioned components in more detail, based on the suggested methodology.

3.1 General features

3.1.1 User Roles in the KPI Tool

Each of the five user roles, specified in 2.3.7 together with its most important tasks, is related to the specific mission:

- **Anonymous User**
- **Data Viewer**
- **Data Manager**
- **Model Manager**
- **System Administrator**

The user rights (authorization to use the corresponding features) are based on **nesting principle**, i.e. each user possesses all the user rights of the previous (more restrictive) roles, and adds its unique features to the mix. The sections below describe these tasks and features in more detail for each user role.

3.1.2 Anonymous user mode

The KPI Tool supports also an **anonymous user mode**, which does not require providing any username and password, and which is intended for a broader public user. This user mode is basically equivalent (in the sense of the user privileges or allowed functionalities) to the Data Viewer. For more details see section 2.3.7

3.1.3 Characteristics of the user interface

The KPI Tool is designed as a **web-based application**, with the obvious advantages of a well-known and universally accepted look and feel, and with zero installation for the end user, as the only prerequisite for using the tool is to have a suitable web browser of a supported/compatible version.

The user interface is differentiated by the user roles, as these imply the functionalities to be accessible for the specific user. Each user role has therefore a different menu structure and UI structure.

The user interface architecture reflects directly the expected workflow of using the KPI Tool as defined in Section 2.4. Due to strongly different usage by each user role, also the user interface differs between these. Should a specific user be assigned to



multiple user roles, then he or she may enjoy an extended user interface including the functionalities of each.

Note: the illustrative screenshots in this user manual are based on Windows 8, web browser Firefox 70.0.1. However, the KPI Tool is intended to work universally under any web browser and operating system. The examples are also based on the user role of the **Model Manager**, with the widest menu options and with the highest permissions in the system. Therefore for the other roles, some parts of the menus may be irrelevant.

3.1.4 General functionalities

The following list summarizes the general functionalities available for any user working with the KPI Tool.

For all user roles

- **Login into the KPI tool**
 - Login of a user
 - Change password
- **E-mail service**
 - Send e-mail with information, warnings or errors for users of the KPI tool (planned for the 2nd iteration)
- **Miscellaneous**

Logging in into the KPI Tool

Upon invoking the URL as provided by the consortium, the KPI Tool will start in the **anonymous mode**, intended for the public user. The anonymous mode equals basically the access rights of the Data Viewer; however some user-related options are restricted. Using the User Groups feature (see 3.5.3), specific data areas may be hidden for the anonymous user.

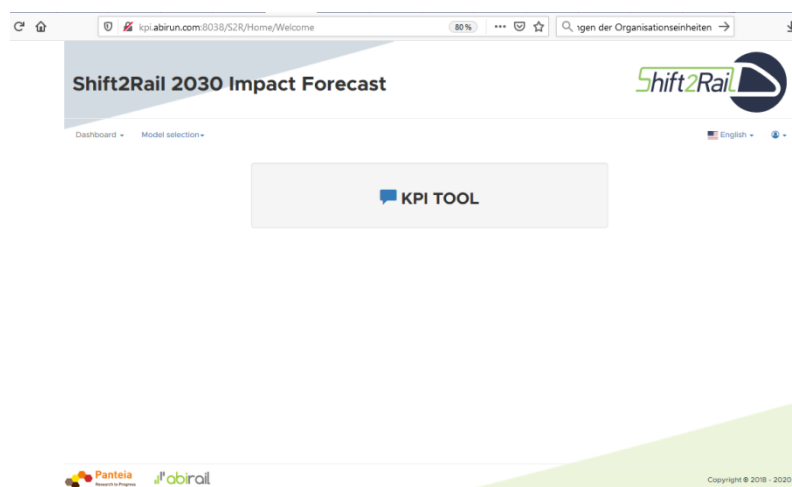


Figure 8: Opening screen of the KPI Tool after the default anonymous login

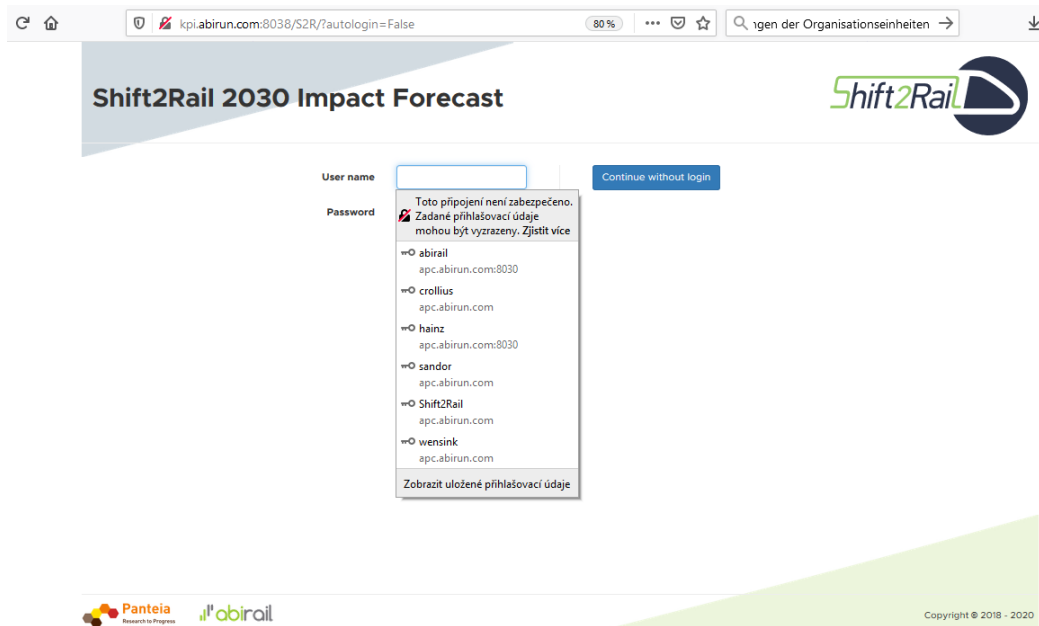


Figure 9: Login screen of the KPI Tool

After clicking the **Change User** feature (in the upper right corner under the user icon), the login screen appears, as depicted in Figure 9. Here the user provides his or her username and password, and clicks on the button **Login**. The application KPI Tool appears, with the main dashboard pre-selected.

Selecting the button **Continue without login** brings the user in the anonymous mode as described previously; here neither a username nor a password is provided.

Main dashboard

After launching the KPI Tool, the main dashboard is shown (see Figure 10), independently on the user role of the currently logged user. Here the user may invoke various charts and dashboards, analyse the scenario modelling, or access the other functionalities, if he or she possesses the appropriate user rights (Data Manager or Model Manager).



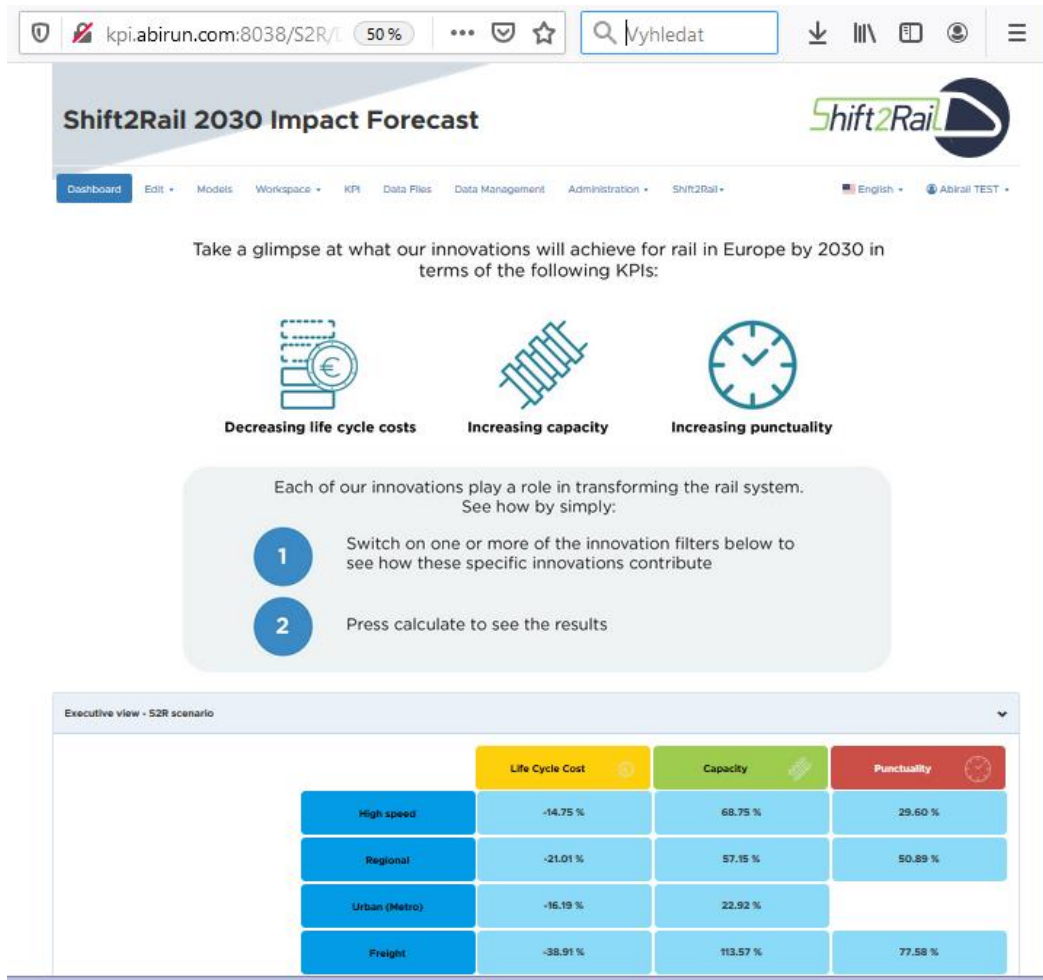


Figure 10: Main dashboard shown after launching the KPI Tool

The dashboard starts with the **introductory information** or “splash screen”, which is contained in a separate collapse panel and this way it can be hidden (collapsed) or expanded at any time.

Changing password

To change password, you can click on the menu denoted by your username in the top-right part of the screen, and select the option **Change password** (see Figure 11). The dialog box Change password appears, as shown in Figure 12. Similarly to the usual method, you provide here your existing password, your new password, and the same new password for confirmation. Clicking on **Save** confirms the change.

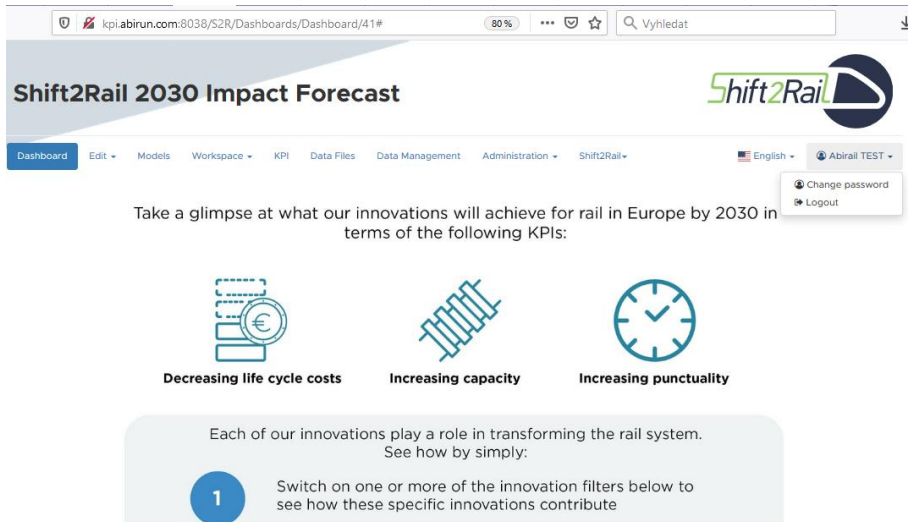


Figure 11: Invoking the password change feature

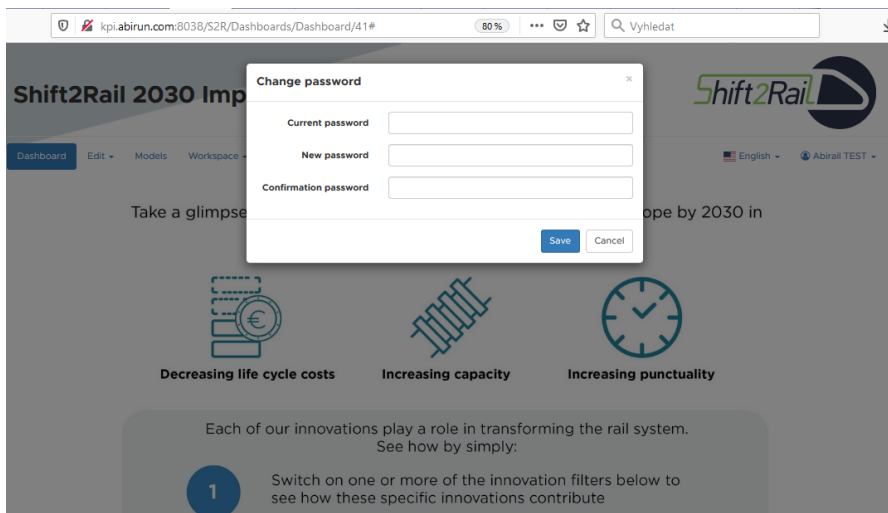


Figure 12: Password change feature

Under the menu denoted by your username (Figure 11) you can see also the option **Logout**. Upon clicking, this option simply logs you out of the system.

3.1.5 Dashboard structures and chart types

To understand the data presentation in the KPI Tool, the **dashboard and chart structures** are to be explained in the first place. The data presentation is based on a **hierarchic model** (described bottom-up) and is composed of:

- **Chart** shows the lowest level of detail (i.e. the most detailed). It includes the x-axis and y-axis, and one or more **data series**, similarly to the charts in Microsoft Excel or similar software. The data series of the chart are connected with the source data file.



- **Collapse panel** is a set (container) of one or more charts, arranged together for an easier manipulation and navigation. Using the button with an arrow in its top-right corner, each collapse panel may be collapsed (hidden save its heading, and so taking less space on the screen), or expanded (shown with all its charts and controls), as shown in Figure 13.
- **Dashboard** presents the high-level collection of the KPIs and their charts; technically it is a set of one or more collapse panels, each of which can be collapsed or expanded again.

Within a specific collapse panel, the charts may be moved around by dragging with mouse. Initially the chart layout set and saved by the Model Manager is used, and then it may be arbitrarily changed by the user. The current layout is stored in the local cookies and is therefore available only for that user. However the charts cannot be moved outside their collapse panel.

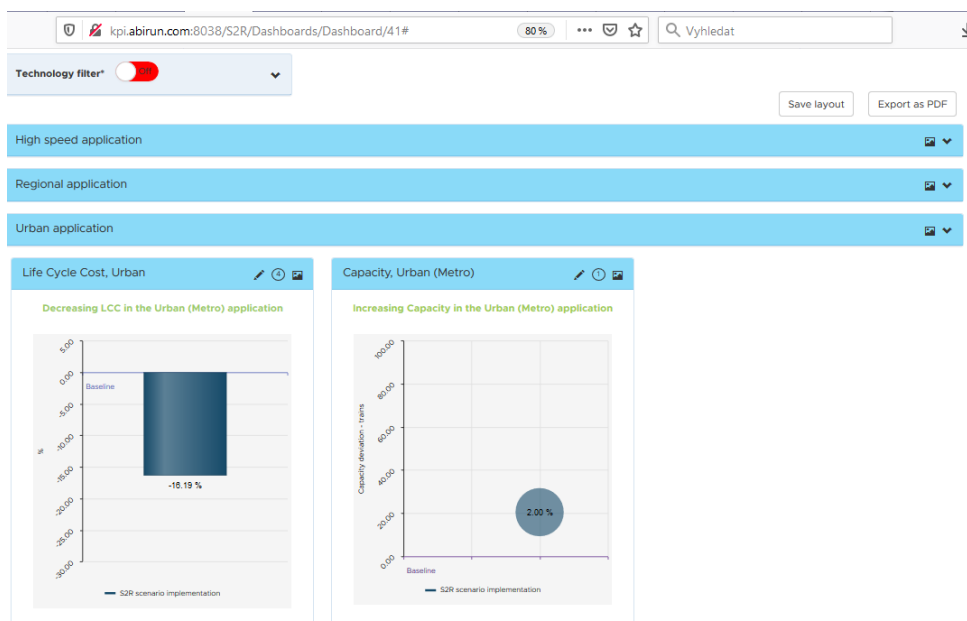


Figure 13: Collapse panels: two collapsed (High Speed, Regional), third expanded

The application uses two special types of collapse panels:

- **Executive View** with shortcut tiles leading to detailed dashboards and charts with a predefined structure of the major KPIs and SPDs or IPs (see Figure 14); the inside buttons bear always the most recent value of the corresponding chart
- **Technology Filters or Scenario modelling** with switches (option buttons) for activating and deactivating the parameter groups (see Figure 15); this special collapse panel bears also the "always on top" feature, i.e. it is, when expanded, flowing over the other panels and charts, stays at the same place, and is therefore always visible and accessible

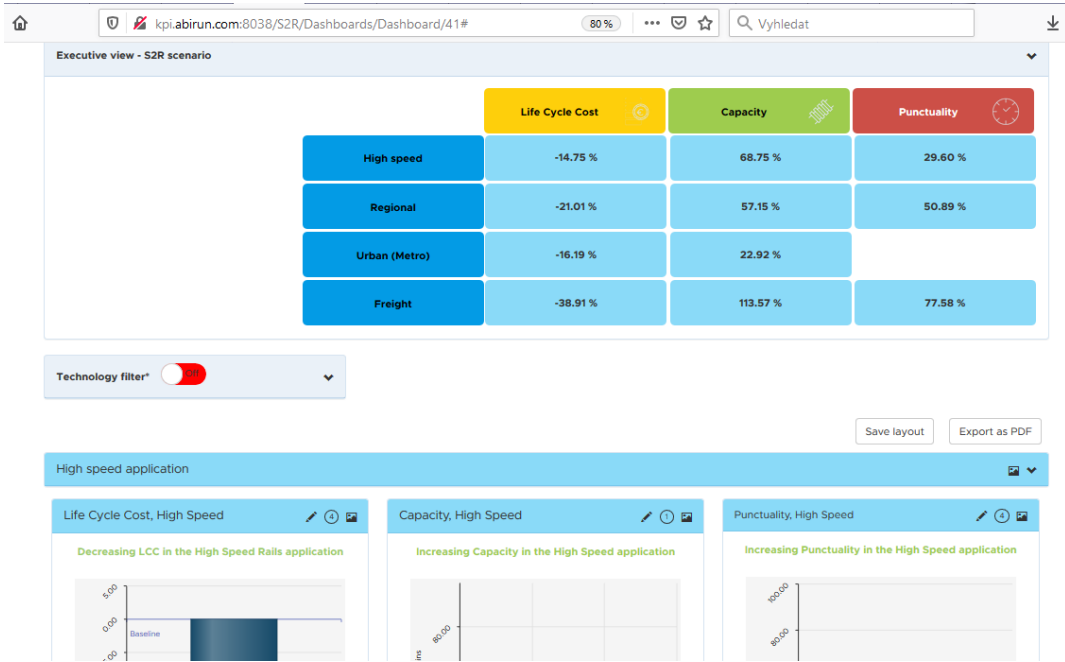


Figure 14: Executive view with tiles and figures

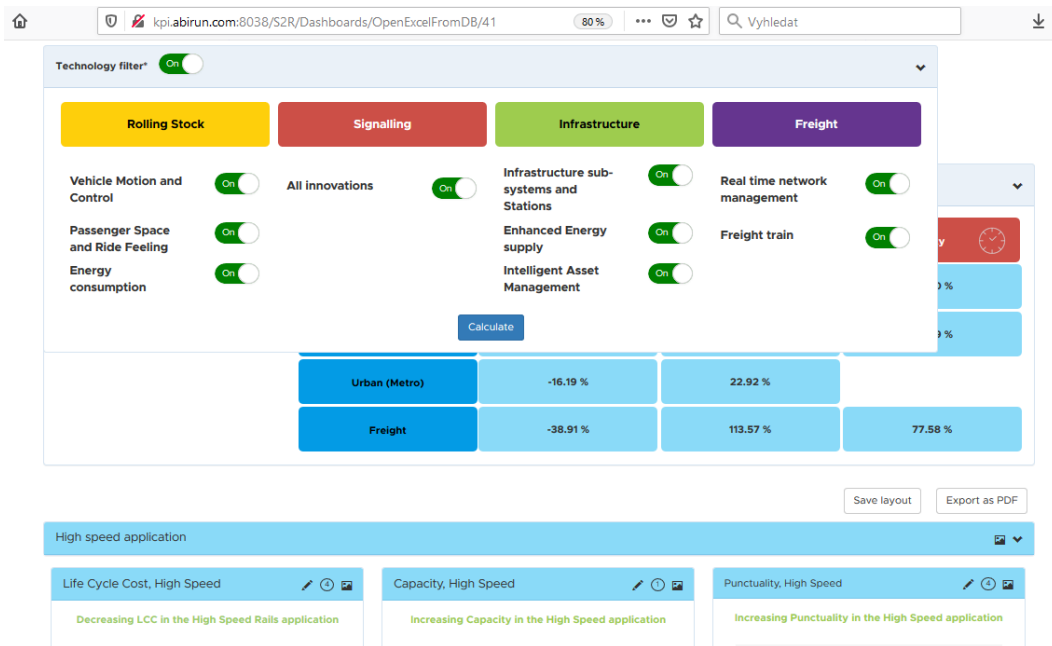


Figure 15: Scenario modelling with its initial settings of the Technology Filters

Both these special collapse panels can be collapsed and expanded in the same way as the collapse panels on the dashboards; however, their functionalities are quite different (see below).



3.1.6 Chart controls

Each chart features a set of common **controls** in its upper-right corner. These are rather straightforward in their meaning (as shown in Figure 16):

- **Edit** – the pencil icon opens an edit window for changing the chart properties and settings; is available only for Model Manager
- **Graph count** – the figure in a circle shows the number of charts shown on the child level, i.e. on the dashboard accessible by clicking-through this chart; when the figure is missing, then the chart is a leaf chart and no clicking-through is possible
- **Export** – the image icon invokes a standard Windows dialog box for saving a file and allows exporting the corresponding chart(s) into the PNG format for further processing and use

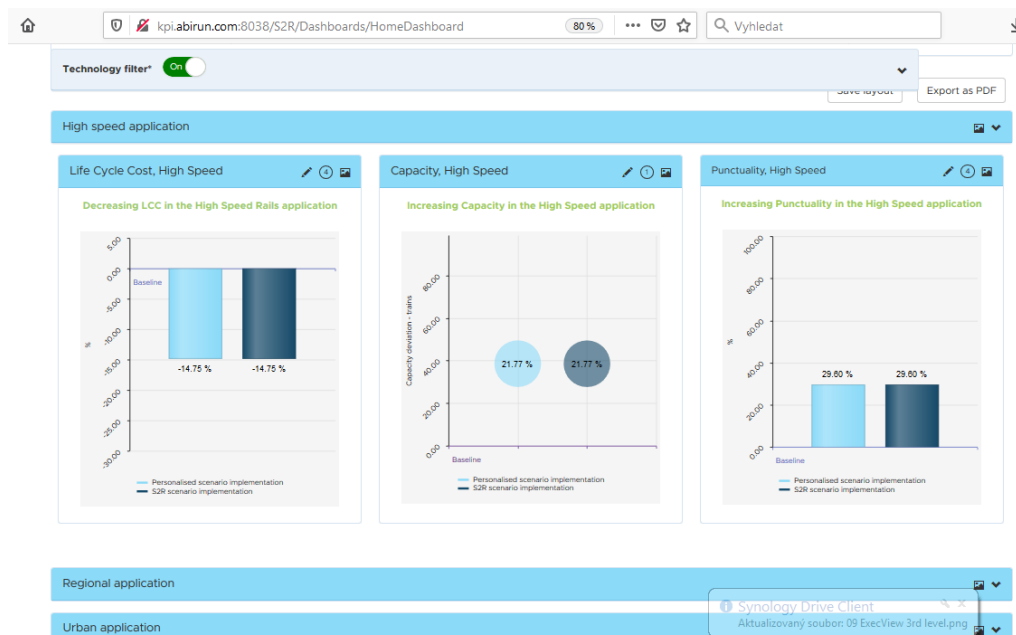


Figure 16: Chart controls and indications

3.2 Functional description

Having explained the general functionalities and features of the KPI Tool, this section details the individual menus and commands, arranged by the corresponding user roles.

3.2.1 User role: Data viewer

A user with the user role of the **Data Viewer** (including the Anonymous user) performs the KPI viewing, KPI presenting and exporting, and also the forecasting and scenario modelling. This constitutes the primary output and primary task of the KPI Tool, and he or she is the **end user** of the results.

The Data Viewer does not use any functionality for importing or modifying the input data, nor for modifying the KPI model. The user has only the right to **select a model**,

show a dashboard, and to **switch between dashboards** and charts. The following functional description holds true for both registered Data Viewer and Anonymous user.

Switching between dashboards

Within the selected model, one or more **dashboards** are defined, each containing one or more collapse panels, and one or more charts (as described in 3.1.5). The dashboards are selected by clicking on the corresponding chart.

This way the dashboards, collapse panels and charts constitute a hierarchic structure. However, from the user's point of view, they may be browser in a rather arbitrary manner. To facilitate the chart browsing, the Model Manager defines the shortcuts or "jumps" between the dashboards. When the user sees the mouse icon with a hand over a button (tile) or a chart, he or she may use the so-called **click-through feature** to jump onto a different dashboard or chart.

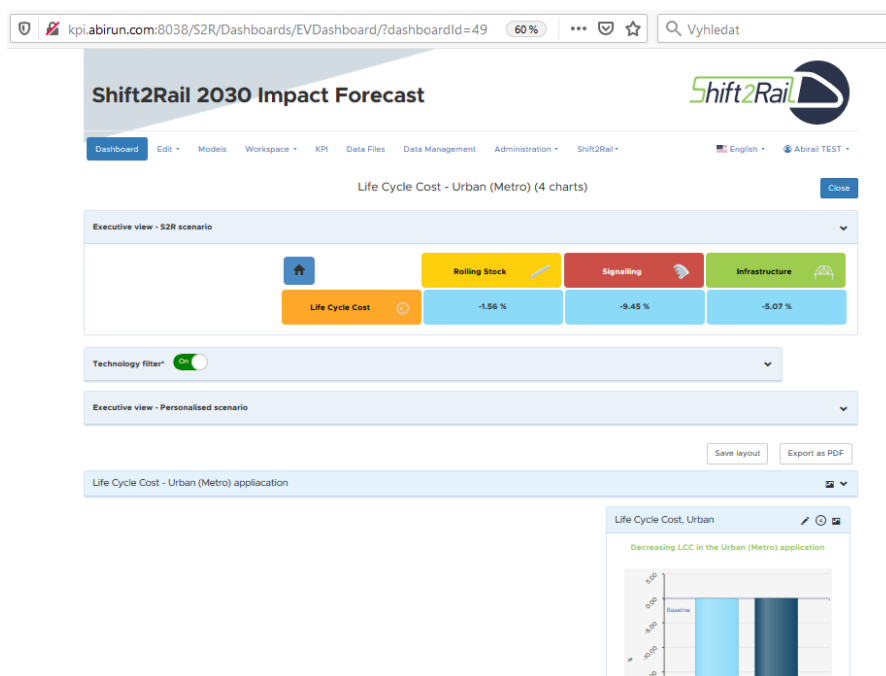


Figure 17: Navigating between dashboards: EV tiles and the "Home" icon in the 3rd level KPI dashboard

Clicking a tile or chart opens often a **lower level dashboard** (i.e. a dashboard with a more detailed level of granularity).

To return one level higher from this dashboard, you can click the button **Close** in the upper right corner.

To return to the top-level main dashboard, you can click the button with the **Home** icon, similarly to the standard web browsers. These features are depicted on Figure 17, which shows the 3rd level KPI dashboard for LCC (Life Cycle Costs) in SPD1 (High Speed Application).



3.2.2 User role: Data manager

A user with the user role of the Data Manager will be handling the data themselves. This means basically importing the data, verifying them, and the KPI calculation itself after the successful verification.

The necessary functionalities are contained under the menu **Data Management**. This menu has no further options; clicking on the menu item simply opens the screen depicted on Figure 18.

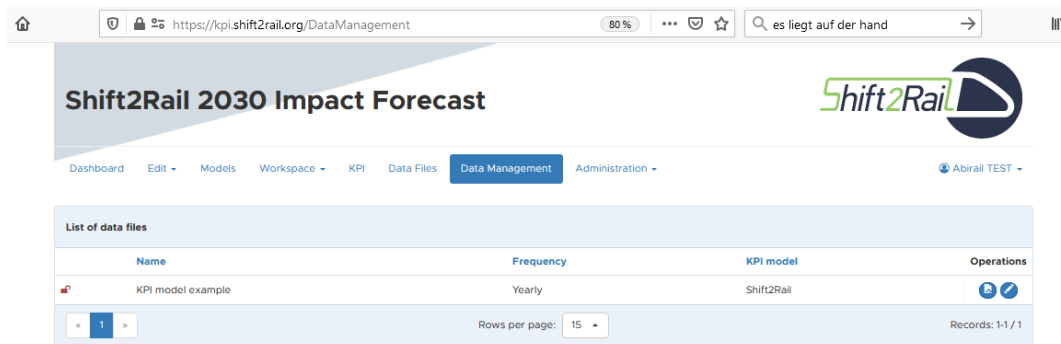


Figure 18: Opening the menu Data Management

Each data file in the list shows its name, update frequency, and assigned KPI model. On the right-hand side a set of **icons** appears, to launch various operations on the selected data file:

- **Import scenario** – opens a standard Windows dialog box for selecting a file, and then imports the selected data file in the structure defined in the model. For the Shift2Rail KPI Model, the Excel model must contain the summary sheets "KPI_Tool_IN" and "KPI_Tool_OUT" to facilitate the KPI Tool working (see the description below).
- **Edit** – opens the screen for editing the data file; see below

Editing the data file

Upon clicking the pencil icon on the data file row, the data file editing screen appears. It is a rather complex tool containing many options, therefore it is divided into multiple parts and figures in this user manual.

The first part, depicted in Figure 19, shows the header parameters of the data file, and its file columns for reading data into the KPI Tool database. The header parameters and file columns cannot be edited, as these are defined by the Model Manager on the menu Data Files.

Shift2Rail 2030 Impact Forecast

Dashboard Edit Models Workspace KPI Data Files **Data Management** Administration Shift2Rail English Abirail TEST

Import scenario Export data Export structure

Edit data file

Name KPI model example ✓
 State
 Description
 Frequency Yearly
 KPI model Shift2Rail
 KPI model description

List of file columns

Name	Type	Dimension Name	KPI					
			Name	Unit	First period	Min	Max	Overwrite
Year	Period							
SPD	Dimension	SPD						
IP	Dimension	IP						
LCC_Baseline	Value		LCC_Baseline	Percentage	2019			<input checked="" type="checkbox"/>
Punctualitv_Baseline	Value		Punctualitv_Baseline	Percentaee	2019			<input type="checkbox"/>

Figure 19: Editing data file: header parameters and file columns

Editing data items

Scrolling down the screen reveals the middle section of the screen (see Figure 20), where the user in the user role of the Data Manager may also **manually edit** the available data. This is useful e.g. in case of various minor changes in the data, or upon finding an error in data, or in case that some data is not available, or for rudimentary scenario modelling feature (besides the full-fledged scenario modelling).

To edit the data, select first the dimension values (as Year, SPD and IP in the screenshot), or leave the default value of "(all)" to show all the values for edit. Then click the button **Edit** with the pencil icon to invoke the manual editing feature.



The screenshot shows a web application interface for editing data files. The top section displays a table with columns for file name, date, user name, state, and operations. Below this is a 'Select values' section with dropdown menus for Year, SPD, and IP. The bottom section shows a list of imported files with their respective dates and users.

File name	Date	User name	State	Operations
KPI_model_statusNovember2019_Panteia_debugged_updated.xlsx	6/29/2020 3:26:20 PM	Abirail TEST	✓	[Icons]
KPI_model_statusNovember2019_Panteia_debugged.xlsx	6/11/2020 4:18:54 PM	Abirail TEST	✓	[Icons]
KPI_model_statusNovember2019_Panteia_Punctu.xlsx	6/3/2020 5:14:50 PM	Abirail TEST	⚠	[Icons]
KPI_model_statusOktober2019_Panteia_TMP.xlsx	6/3/2020 5:00:20 PM	Abirail TEST	⚠	[Icons]
KPI_model_statusNovember2019_Panteia_Punctu.xlsx	5/15/2020 1:47:23 PM	Abirail TEST	✓	[Icons]
5_15_2020_9_55_17 AM_KPI_model_statusNovember2019_Panteia_Punctu.xlsx	5/15/2020 12:54:21 PM	Abirail TEST	✗	[Icons]

Figure 20: Editing data file: the middle section of the screen to edit data values

The manual editing feature regards the select dataset in the tabular format, as seen in Figure 21. Here the user can **manually change** any of the presented values in the corresponding text field, or also clear all the data items using the button **Clear data**. After finishing the data edits, the user clicks the button **Save** to preserve the new values, or the button **Cancel** to cancel them and to return to the state before editing.

The screenshot shows a web application interface for editing data in a tabular format. The interface includes a header for 'Shift2Rail 2030 Impact Forecast' and a navigation menu. Below the menu is a table with columns for Year, SPD, IP, LCC_Baseline, Punctuality_Baseline, Capacity_Baseline, LCC_Scenario, Punctuality_Scenario, Capacity_Scenario, LCC_S2R, Punctuality_S2R, and Capacity_S2. The table contains data for various scenarios and years, with input fields for editing values.

Year	SPD	IP	LCC_Baseline [Percentage]	Punctuality_Baseline [Percentage]	Capacity_Baseline [Percentage]	LCC_Scenario [Percentage]	Punctuality_Scenario [Percentage]	Capacity_Scenario [Percentage]	LCC_S2R [Percentage]	Punctuality_S2R [Percentage]	Capacity_S2 [Percentage]
2019	SPD1	All	0	0	0	-0.147520	0.2959743970971	0.68745208451	-0.147520	0.295974397	0.6874520
2019	SPD1	IP1	0	0	0	-0.027564	0.0832104275560	0.21767105882	-0.02756	0.083210427	0.2176710
2019	SPD1	IP2	0	0	0	-0.0217810	0.0091605457360	0.38	-0.021781	0.009160545	0.38
2019	SPD1	IP3	0	0	0	-0.079630	0.13453890255191	0.004205	-0.07963	0.134538902	0.004205
2019	SPD1	IP5	0	0	1						
2019	SPD2	All	0	0	0	-0.210090	0.508854540039	0.57148660224	-0.210090	0.508854540	0.5714866
2019	SPD2	IP1	0	0	0	-0.036310	0.0510878606560	0.20377397830	-0.036310	0.051087860	0.2037739
2019	SPD2	IP2	0	0	0	-0.040747	0.0101374747625	0.3	-0.04074	0.010137474	0.3

Figure 21: Tabular format of the data file ready for editing



3.3 Structure of the KPI Model and its definition process

To allow the Data Manager importing data and to allow the Data Viewer viewing the data in charts and dashboards, the **KPI Model** has to be established in the first place. This means defining the groundworks or “workspace”, defining all the KPIs with their interdependencies, defining the data columns and data files, and defining the charts and dashboards. All the necessary structures and logics are further explained in the following sections.

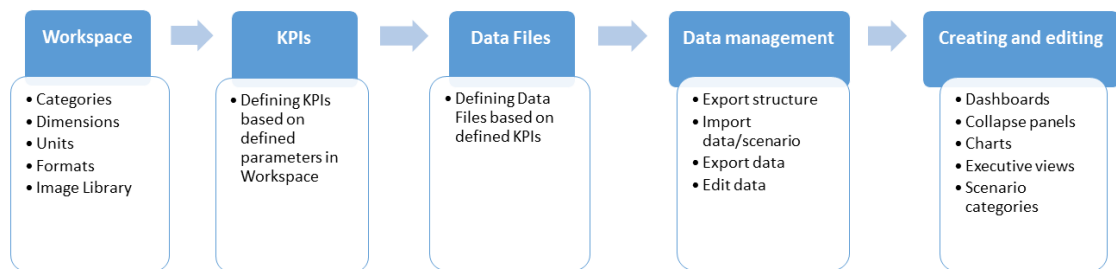


Figure 22: Process of designing a KPI model

For the Shift2Rail IMPACT Model, the KPI Model with its workspace and KPI structures has been already created by the Panteia Consortium, and this section can be therefore considered rather informative. The principles and information described in this section may be however useful for introducing various minor changes into the KPI model definition.

3.3.1 Understanding the model structure

As described already in the introductory Chapter 2, the KPI Tool assumes a specific structure of the KPI Model, and consequently also a specific workflow methodology and a specific definition order of the model components. These components include (in the correct order of their definition):

- **Workspace** and its components defining the basic building blocks for the model (i.e. units, categories, dimensions, and formats, and the Image Library)
- **KPIs** and their attributes to be used in the charts and dashboards (as period, category, dimensions, etc.)
- **Data columns and data files** to be assigned to the corresponding KPIs and to define the matching columns in the KPI input file; for the Shift2Rail IMPACT model, the columns are to be found in the summary sheet “KPI_Tool_OUT”
- **Charts, collapse panels and dashboards** to render the structured data in a graphical form for viewing, exporting and analysing
- **Executive views** (EVs, optional) as an additional clickable element allowing the “click-through” feature to provide a shortcut to the lower-level detailed views on the data, and at the same time to provide the overall high-level values shown on the charts

All these features are to be explained in more detail in the following sections.



3.3.2 Model workspace

The **KPI Model** consists of units, categories, dimensions, and formats, and the Image Library. Each of these has a different structural meaning:

- **Units** and **categories** are arbitrarily chosen to specify the KPIs defined later. A unit assigned to the KPI is shown aside its values; categories allow sorting and separating the KPI classes for different user groups.
- **Dimensions** define the independent variables in the input value file; these can be e.g. time (years, months, weeks), region, customer category and similar. A Cartesian product of all the dimensions defines the KPI value space; each single KPI value position is then assigned to a specific n -tuple of the dimension values.
- **Formats** describe value modifications for presenting values. A numeric value in the input file may be any real number; therefore the value is 1) shifted to left or right (as typically by multiple units like GWh, Mt, mm, kg, μm etc., or percent; where 5 000 000 Wh is shown as 5 MWh, or 0,95 as 95 %), and 2) rounded or truncated to a specific number of decimal places (so 5,325 MWh is shown only as 5 MWh, or 0,95322 as only 95 %).
- **Image Library** contains images used in various parts of the KPI Tool application, especially as the introductory information ("splash screens") and the EV icons.

Only after defining all the workspace components (except the Image Library), the KPIs themselves can be defined properly.

3.3.3 KPIs and their attributes

A **KPI** represents THE value to be presented by the KPI Tool. Each KPI is defined together with its attributes which are partly derived from the workspace. This means effectively that a KPI:

- Has its unit, category and format
- Has its name and description
- Has its dimensions and periods
- Can have other optional attributes as overwrite behaviour or target value.

This way the KPI is related to its model and is dependent on its workspace. Each KPI is matched (associated) with a data column, and subsequently is rendered in a chart contained in a dashboard.

3.3.4 Data columns and data files

The **data columns** and **data files** define the matching relation between the KPIs and the real-world values contained on your disc file. Any data file has a name and text description, and further comprises of a list of data columns.

Each data column can specify:

- **Period** – specifying the time dimension of the KPI value position effectively, as defined in the workspace
- **Dimension** – specifying the dimension value of the KPI value position, as defined in the workspace

- **Value** – specifying the KPI value position itself.

A data column is then associated with the matching KPI; this way, a correspondence between the KPIs and columns of the data file is given.

3.3.5 Charts, collapse panels and dashboards

Based on the defined KPIs and their associated data columns and data files, **charts, collapse panels and dashboards** are to be created. These elements constitute the structured graphical features for rendering the values on the screen. These graphical features follow a **hierarchic model**:

- **Chart** shows the lowest level of detail, includes the x-axis and y-axis, and one or more data series.
- **Collapse panel** is a set (container) of one or more charts, arranged together for an easier manipulation and navigation.
- **Dashboard** defines the high-level collection of KPIs and charts; technically it is a set of one or more collapse panels.

The aforementioned hierarchic features are described in more detail earlier in this document, in Section 3.1.5.

3.3.6 Executive views

An **executive view** or shortly EV is a tabular-like button-based schema of the created dashboard which it is associated with. The EV is defined by its "large" outer horizontal and vertical buttons (tiles), while its "small" inner buttons (tiles) are generated on the fly, based on the "large" buttons and based on the dashboard structure.

Each of the "large" outer buttons bears a name, an icon, and a collapse panel and dashboard for the clicking-through feature. The "small" inner buttons are generated as the intersection of the collapse panels associated with the corresponding horizontal and vertical buttons.

3.4 User role: Model manager

A user with the user role of the Model Manager has an important task to define the structure of the whole KPI Model, i.e. to define the structure of the KPI model, to define the KPI categories, frequencies, units etc. He or she will manage the user groups and their assigned dashboards as well.

3.4.1 Menu Models

The very first step in establishing a KPI model with its data structures is creating the KPI model itself. Clicking the menu **Models** in the left part of the menu bar opens the list of KPI models, as seen in Figure 23.



Name	Description	Active	Actions
Shift2Rail		✓	👍👎🔄🗑️
Shift2Rail_2		✓	👍👎🔄🗑️
Shift2Rail_3		✓	👍👎🔄🗑️

Figure 23: List of the KPI Models

For the purposes of Shift2Rail KPI Model presentation, only one KPI model with the name “Shift2Rail” is defined. Generally, however, multiple models can be defined, processing and presenting data from various sources, in various views, or for various uses, users and purposes.

The available **Actions** on the very right in the corresponding row of the KPI Model are denoted by the coloured icons:

- **Current KPI Model (green)** – when selected (active), then this model is the current one; for the Shift2Rail KPI Tool the “Shift2Rail” model is always selected as default
- **Edit (blue)** – edits the text description and basic properties of the KPI model
- **Delete (red)** – deletes the selected KPI model

Using the button **Add KPI model**, a new KPI model can be created. After creating the model, it needs to be selected as the active one, and then the workspace and other properties and data structures can be defined (see below).

3.4.2 Menu Workspace

As described in the introductory Chapter 2, for any KPI Model its **workspace** is to be defined in the first place. This means defining the dimensions, categories, units, and formats, which together delimitate the basic building blocks for the KPI model.

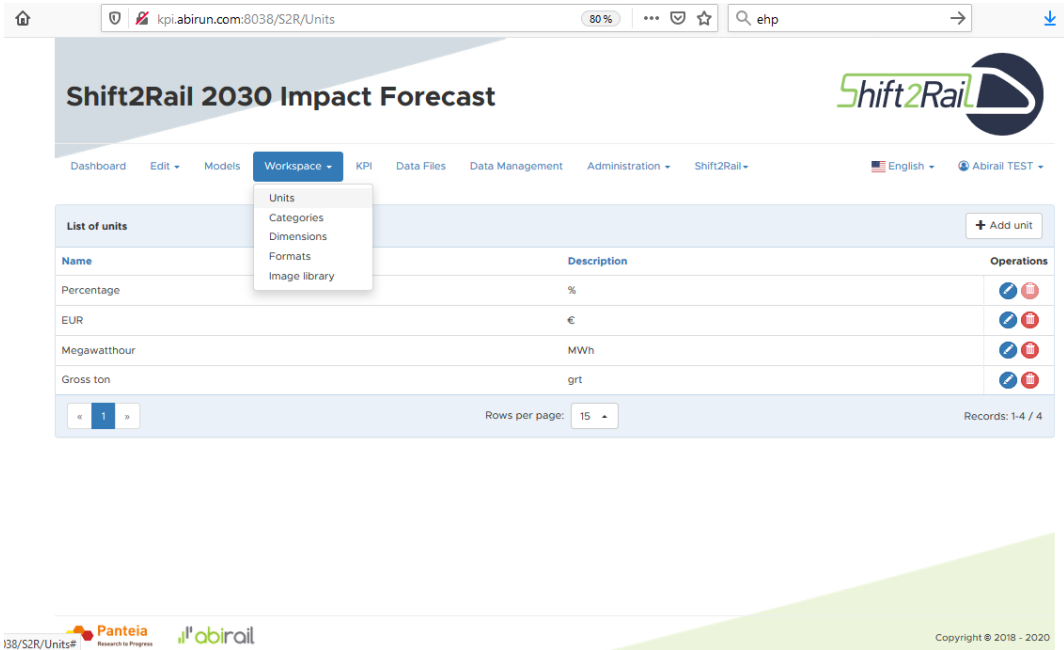


Figure 24: List of units in the KPI Model

Upon clicking the menu **Workspace** and upon selecting the item **Units**, the list of units appears (see Figure 24). Each unit bears a text-based name and description. The units are a descriptive attribute of a data item or KPI. The standard icons on the very right in the unit row allow editing the unit and deleting the unit.

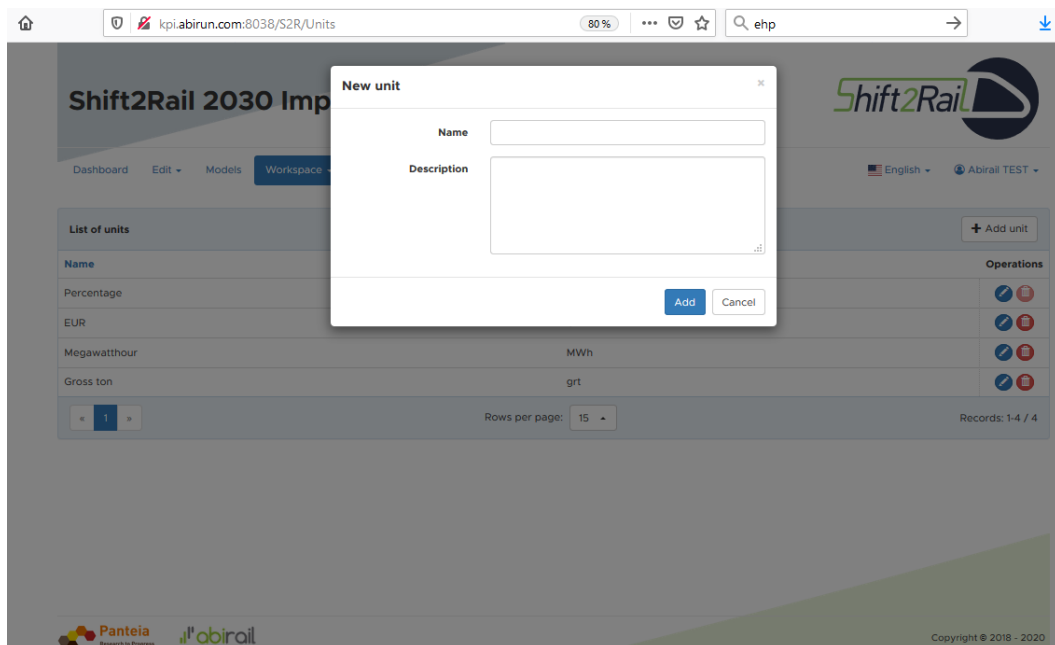


Figure 25: Defining a new unit for the KPI Model

To define a new unit, click on the command **Add unit** (see Figure 24 on top right). A simple dialog box appears (see Figure 25), where you can specify the name of the unit and its description. These can be e.g. various physical measurement units (kg, t,



km, m, s, hour...), monetary units (EUR, thousands or millions of EUR...), and more. The units are descriptive in their nature, which means that they affect the presentation of the displayed data values, but not the values itself, nor the calculations based on them. After editing the unit, click on the **Add** button to save the unit, or click **Cancel** to discard the changes.

Clicking the menu **Workspace** and selecting the command **Categories** opens the list of KPI categories (see Figure 26). Each category is defined similarly to a unit, i.e. with its name and text-based description. The categories are then assigned to the KPIs in the model.

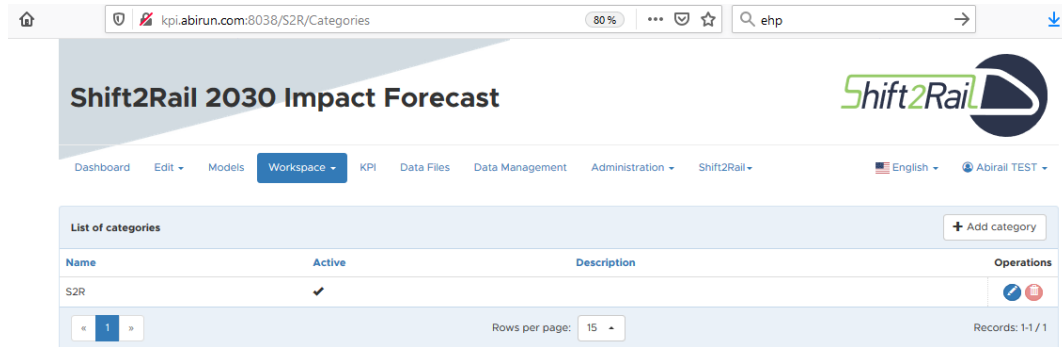


Figure 26: List of KPI categories in the KPI Model

The command **Dimensions** from the menu **Workspace** opens the screen **Dimensions** (see Figure 27). The dimensions are important to define the KPI data space, as they delimitate the data cube. Each single KPI value is assigned to a specific tuple of dimension values; the whole data file is therefore made up of a Cartesian product of the dimension values. For example, in the Shift2Rail KPI Model, based on 4 different SPDs (i.e. SPD dimension values) and on 5 different IPs (i.e. IP dimension values), each KPI must be defined for $4 \times 5 = 20$ different positions.

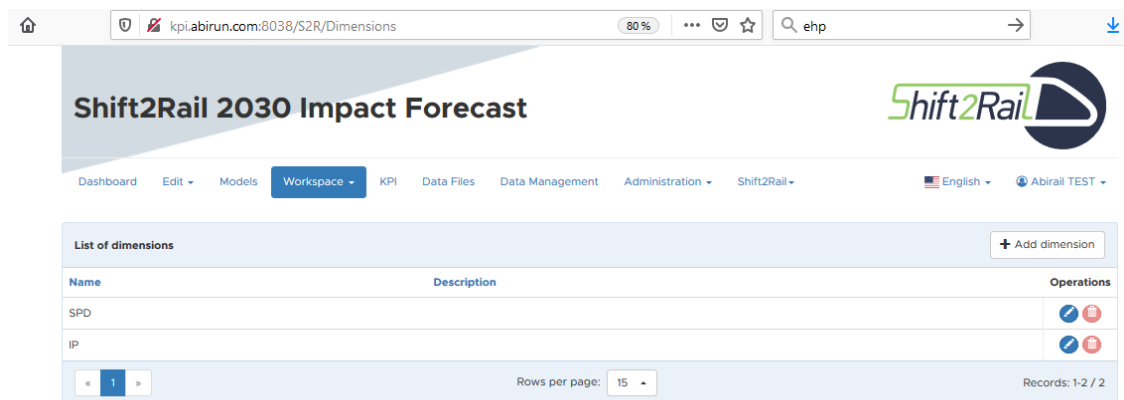


Figure 27: List of KPI dimensions in the KPI Model



Each **dimension** is defined by its name, description, and a set of **values**. Upon clicking the blue pencil icon on the very right, the **Dimension edit** screen appears (as shown in Figure 28). In this list, the name, description, and the individual dimension values can be edited. Upon clicking the blue pencil icon on the very right, a dialog box **Edit dimension value** appears and allows editing the value item. Clicking the button **Add dimension value** brings the dialog box **New dimension value**, which allows specifying the name of a new dimension value.

After editing the dimension, do not forget to click on the **Save** button right below to save the whole dimension, or click **Cancel** to discard the changes.

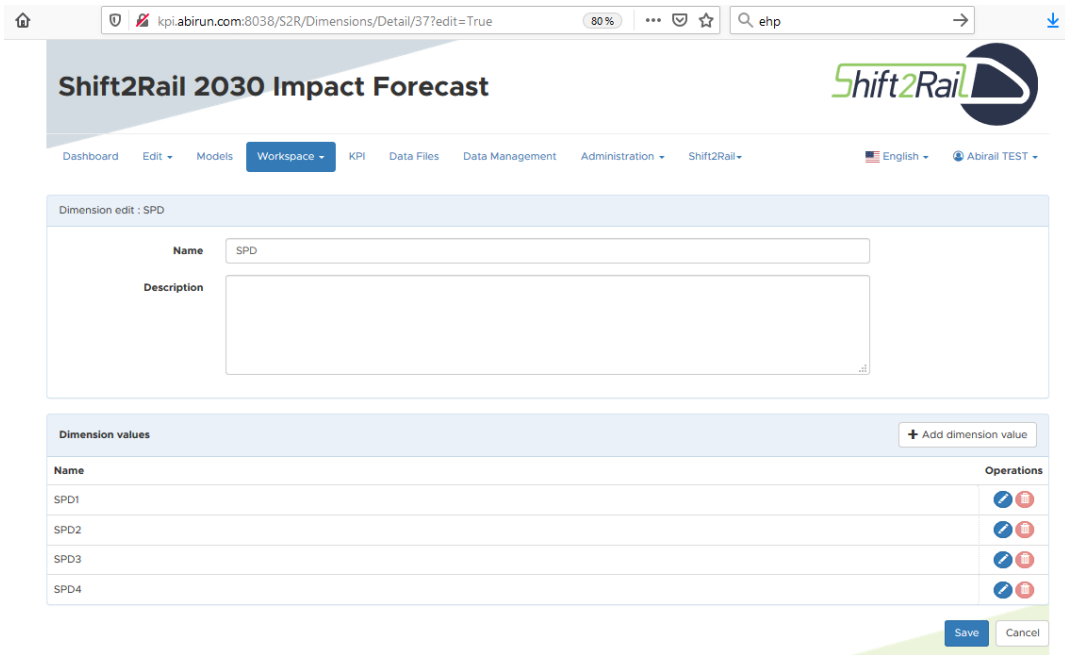


Figure 28: Editing a dimension in the KPI Model: defining the dimension values

Clicking on the command **Formats** in the menu **Workspace** opens the **List of formats** (see Figure 29). The formats defined in the list modify the presentation of the KPI values: **Shift** means shifting the decimal point of the value (i.e. in the figure 2 means displaying the value of 0.35 as "35%"), **Decimal** specifies the number of decimal places (i.e. "35.00%" in the previous example), and the **Suffix** appends a symbol or text string to the presented value (as "35.00%" instead of the simple figure "35.00").



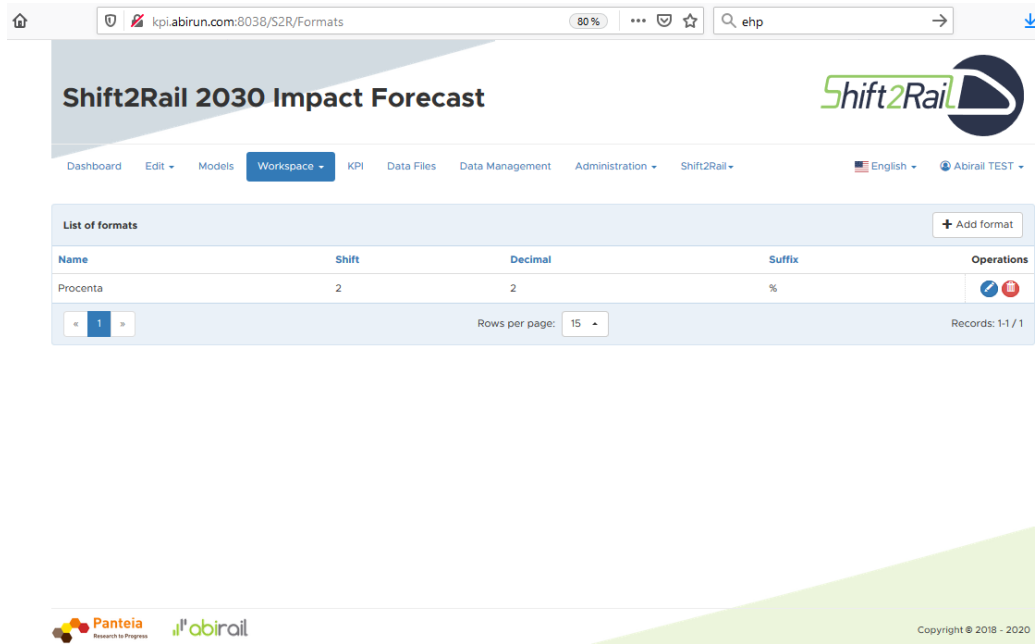


Figure 29: List of KPI formats defined in the KPI Model

The usual icons on the very right serve to **Edit** the corresponding format (the blue one), to **Delete** a format (the red one), and to **Add format** (button with the “+” sign above the table on top right).

The formats are used to transform the values solely for their presentation; the data values stored in the database of the KPI Tool are not changed in any way.

3.4.3 Menu KPIs

The **KPIs** constitute the most important part of the KPI model. They define the data structures, attributes, interdependencies, and calculations, whose results can be afterwards presented in the charts and dashboards.

Type	Name	State	Direction	Unit	Category	Frequency	First period	Dimensions	Active	Actions
Value	Capacity_Baseline	0	None	Percentage	S2R	Yearly	1/1/2019	2	✓	✎ 🗑️
Value	Capacity_deviation_pax_S2R	0	None	Percentage	S2R	Yearly	1/1/2019	2	✓	✎ 🗑️
Value	Capacity_deviation_pax_Sc	0	None	Percentage	S2R	Yearly	1/1/2019	2	✓	✎ 🗑️
Value	Capacity_deviation_train_S2R	0	None	Percentage	S2R	Yearly	1/1/2019	2	✓	✎ 🗑️
Value	Capacity_deviation_train_Sc	0	None	Percentage	S2R	Yearly	1/1/2019	2	✓	✎ 🗑️
Value	Capacity_S2R	0	None	Percentage	S2R	Yearly	1/1/2019	2	✓	✎ 🗑️
Value	Capacity_Scenario	0	None	Percentage	S2R	Yearly	1/1/2019	2	✓	✎ 🗑️
Value	LCC_Baseline	0	None	Percentage	S2R	Yearly	1/1/2019	2	✓	✎ 🗑️
Value	LCC_S2R	0	None	Percentage	S2R	Yearly	1/1/2019	2	✓	✎ 🗑️
Value	LCC_Scenario	0	None	Percentage	S2R	Yearly	1/1/2019	2	✓	✎ 🗑️
Value	Punctuality_Baseline	0	None	Percentage	S2R	Yearly	1/1/2019	2	✓	✎ 🗑️
Value	Punctuality_S2R	0	None	Percentage	S2R	Yearly	1/1/2019	2	✓	✎ 🗑️
Value	Punctuality_Scenario	0	None	Percentage	S2R	Yearly	1/1/2019	2	✓	✎ 🗑️

Figure 30: List of KPIs in the KPI Model

Upon clicking the menu **KPIs**, the KPI list appears. In each row, the table shows the following attributes for the corresponding KPI:

- **Type** – type of the KPI, may be either Value (as shown by the cube icon), or Computed
- **Name** – arbitrarily defined text-based name of the KPI
- **State** – defines state of the KPI (currently not used)
- **Direction** – defines whether the KPI is increasing (Up) or decreasing (Down) in the expected timeline; optional
- **Unit** – KPI unit selected from the unit list; the unit is shown both in the data tables and in charts and dashboards
- **Category** – the KPI category selected from the category list; it is useful to categorize the KPIs in groups
- **Frequency** – the update frequency for the timeline-based KPIs (may assume the setting Yearly, Quarterly, Monthly, Weekly, Daily)
- **First period** – starting period for defining the timeline values (mandatory); the timeline continues then in the multiplies of the specified Frequency
- **Dimensions** – shows number of dimensions on which this KPI is dependant
- **Active** – indicates that the KPI is active (may be used in the charts and dashboards) or not
- **Actions** – usual icons for Edit KPI (blue pencil) and Delete KPI (red bin)



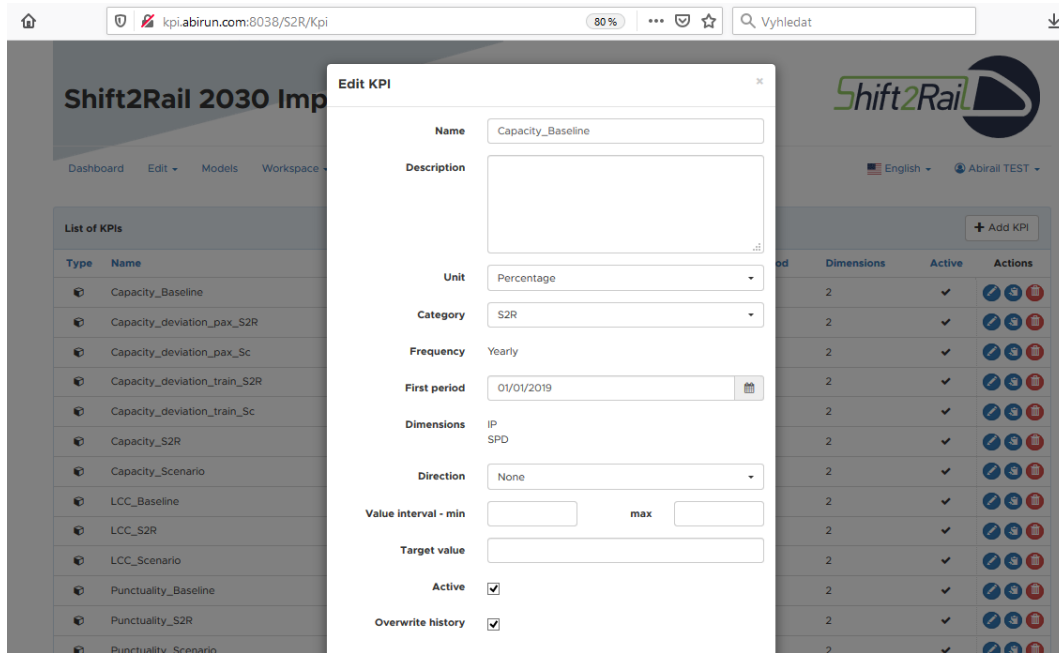


Figure 31: Editing a KPI with its attributes

Upon clicking the blue pencil icon (**Edit**), the dialog box **Edit KPI** appears. Here you can edit all the KPI attributes mentioned above, plus several other attributes as the value intervals, target value, and Overwrite history behaviour (on import). The recent attributes are optional. Meaning of all these attributes is self-explanatory and follows the scheme specified above in the table description.

3.4.4 Menu Data Files

In the menu **Data Files**, the structure of the input data files with the KPI values is defined. Specifically a **mapping** between the KPIs defined above and the data columns in the input Excel file is specified. For the Shift2Rail KPI Model, this structure is given and constitutes one data file, complete with the calculation sheets. For the definition of a data file, however, plain data sheets in the Excel workbook are relevant, i.e. the Summary Sheet(s) in the Shift2Rail KPI Model.

To show and/or edit the data file(s) and their columns, click on the menu **Data Files** in the menu bar. The **List of data files** opens, as seen in Figure 32.

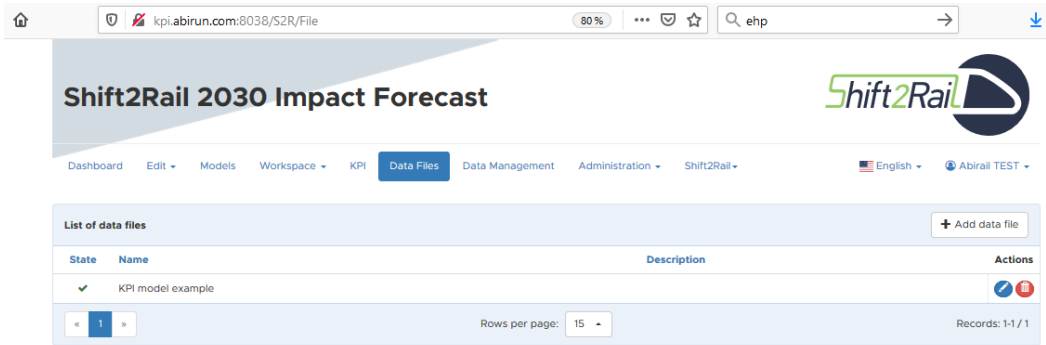


Figure 32: Menu Data Files

Here each data file is characterised by its usual name and text-based description. Two action buttons on the very right allow editing and deleting the data file. To add a new data file, click the button **Add data file** on top right.

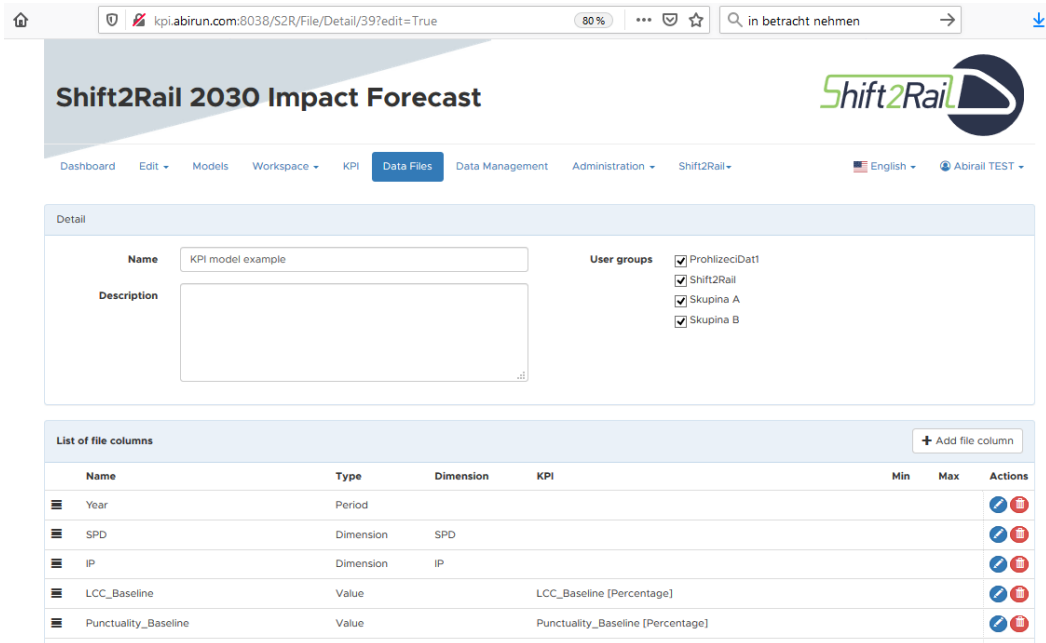


Figure 33: Menu Data Files: data file detail

Upon clicking the blue pencil button **Edit**, a data file detail screen appears (see **Figure 33**), with a **List of file columns**. In the header, you can edit the name and text description of the data file. Underneath, the list of file columns *including their order* in the Excel sheet is given. Each file column is characterised by its name, description (not shown in the list), then type, and Dimension or KPI, of applicable. The buttons on very right allow again editing and deleting a data file column.



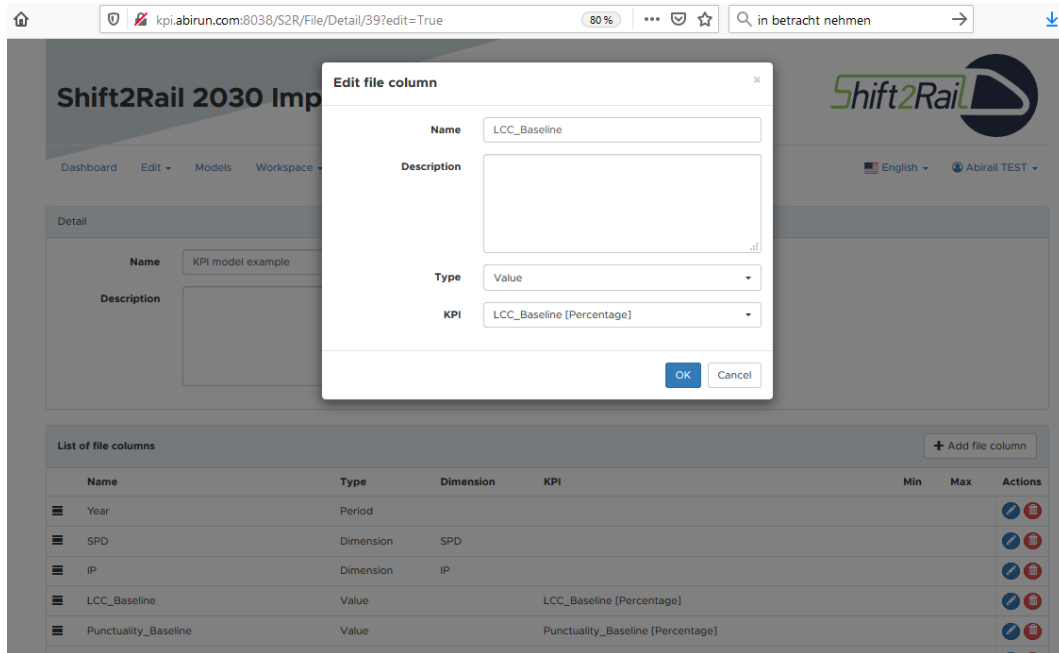


Figure 34: Menu Data Files: editing data column

Clicking the blue pencil icon, the dialog box **Edit file column** is opened, as shown in Figure 34. Here you can edit the data column attributes, and possibly also its type and its assignment to the relevant KPI:

- **Name** – a unique name identifying the data file column
- **Description** – an arbitrary text-based description of the data file column
- **Type** – defines type (category) of the data file column:
 - **Period** – this data column contains a timeline dimension, containing the years, months, or another time value
 - **Dimension** – this data column contains a dimension specified in the drop-down list **Dimension**; these values create the Cartesian product as described in 3.4.2
 - **Value** – this data column contains a single data position, matched with the KPI specified in the drop-down list **KPI**; this way the data file structure is imported into the KPI Tool

3.4.5 Menu Edit

The menu **Edit** facilitates defining the data presentation. The KPI presentation is composed of **dashboards**, **collapse panels**, and **charts**. These components of the presentation can be defined in an arbitrary order (i.e. it is possible to define charts and then to assign them into dashboards, as well as to define dashboards and then assign charts to them), however the top-down approach seems to be the most logical one. Therefore the description below is also based on this approach.

The hierarchic structure of the dashboards and charts has been described in 3.1.5 (for a Data Viewer); for the Model Manager, the identical structure hold true of course.

Clicking the menu **Edit** and the command **Dashboards**, a list of dashboards appears, as depicted in Figure 35. Here a name identifies each dashboard. The column **Main**

denotes the main dashboard (only one, denoted with a tick mark); the columns **Collapses count** and **Group of users count** show, in how many collapse panels and for how many user groups the dashboard is available (after defining the complete structure). After establishing the dashboards as empty, both these columns may show 0 (zero).

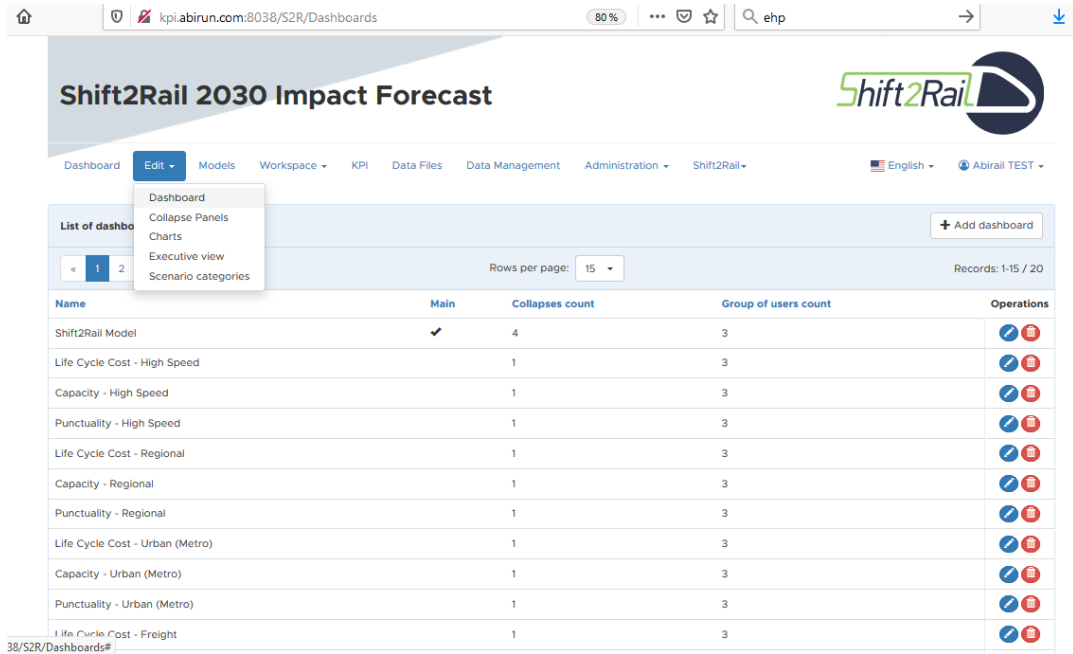


Figure 35: Menu Edit with a list of dashboards

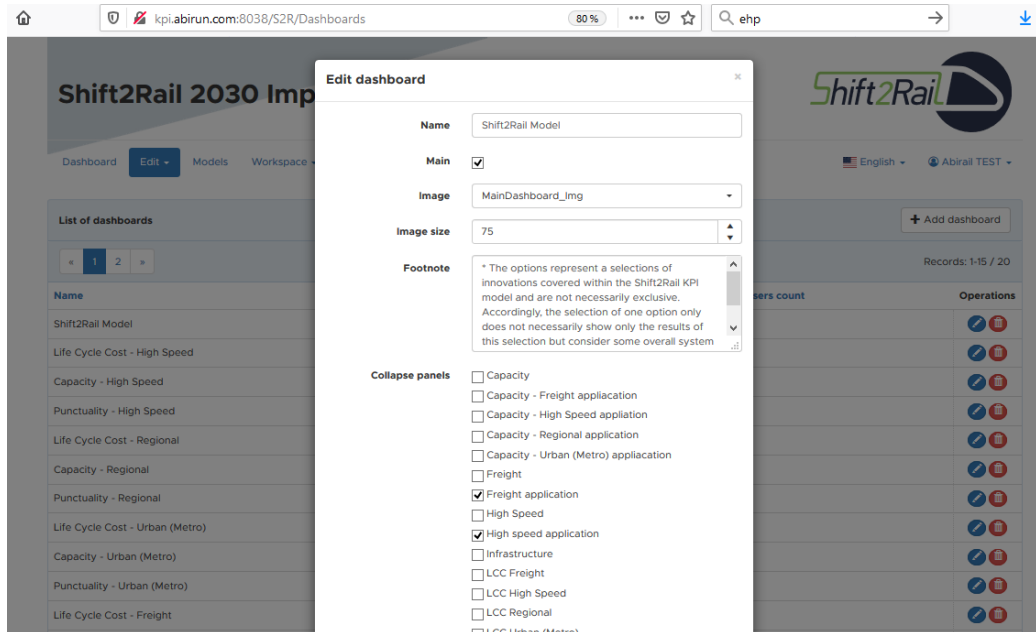


Figure 36: Editing a dashboard – specifying the intro image, footnote, and assigning to the collapse panels



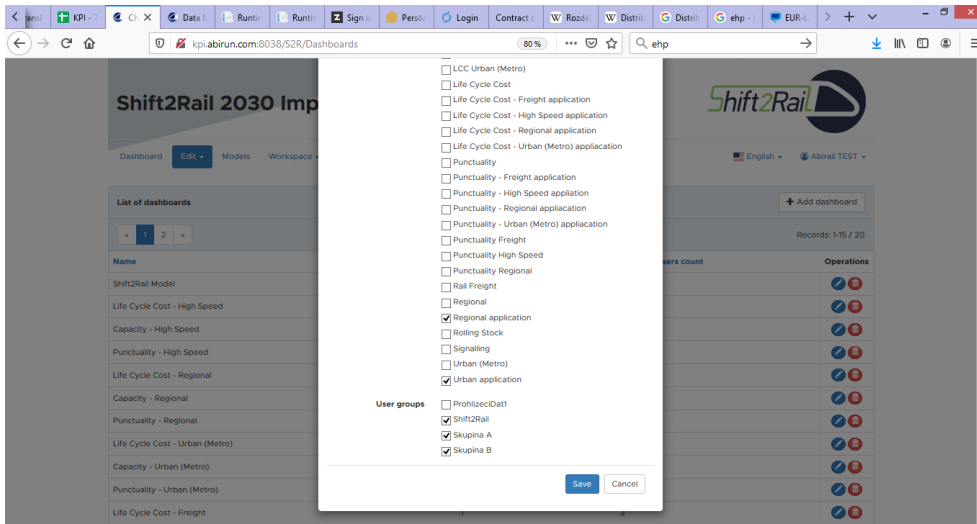


Figure 37: Editing a dashboard – assigning to the user groups

Clicking on the blue pencil icon, the screen **Edit dashboard** appears (as in Figure 36). Here you can define the dashboard name, the Main property, and to assign collapse panels to it (when defined already). A dashboard footnote and intro image (splash screen) may be then specified. The dashboard can be also assigned also to various **user groups**, for which it becomes visible; these settings are available in the bottom part of the dialog box (see Figure 37). Do not forget to click on the button **Save** to make the changes in the dashboard definition permanent, or to click on the button **Cancel** to discard them.

Collapse panel is a set (container) of one or more charts, arranged together. To edit the collapse panels, click the command **Collapse panels** in the menu **Edit** to invoke the screen **List of collapses** (see Figure 38). This list works similarly to the list of dashboards, as described above: a name identifies each collapse panel, and together with the background colour, the count of assigned dashboards, charts, and user groups is shown. On very right, each row contains the usual icons **Edit** and **Delete**.

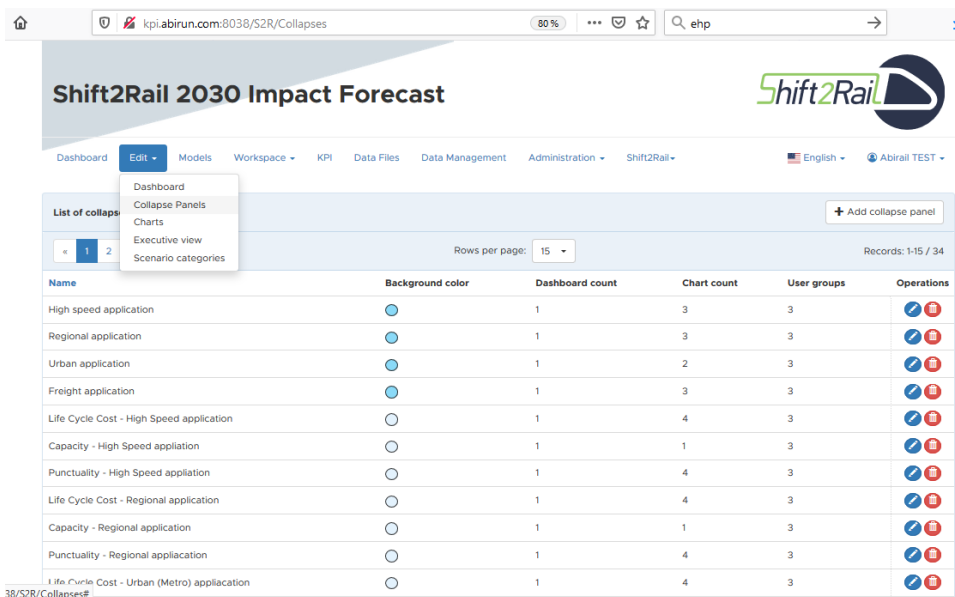


Figure 38: Menu Edit with a list of collapse panels

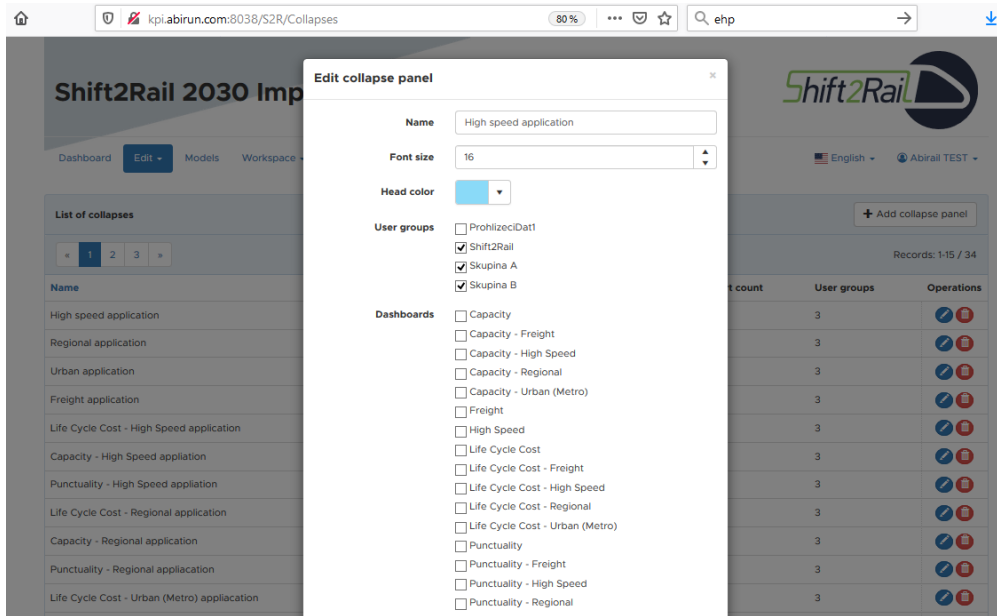


Figure 39: Editing a collapse panel – assigning to user groups and dashboards

Clicking the blue pencil icon (**Edit**) brings you to the dialog box **Edit collapse panel** (see Figure 39), which allows defining the rendering attributes of the collapse panel (font and font size, head colour), and allows assigning the collapse panel to user groups and dashboards, and assigning charts to the collapse panel (this part on bottom is not visible in Figure 39).

After defining the collapse panel, you may add the individual charts to it. Upon clicking the command **Charts** in the menu **Edit**, the screen **List of charts** appears, as shown on Figure 40. The **Name** identifies the chart; the **Collapses count** has the obvious meaning of the count of collapse panels where the chart appears.

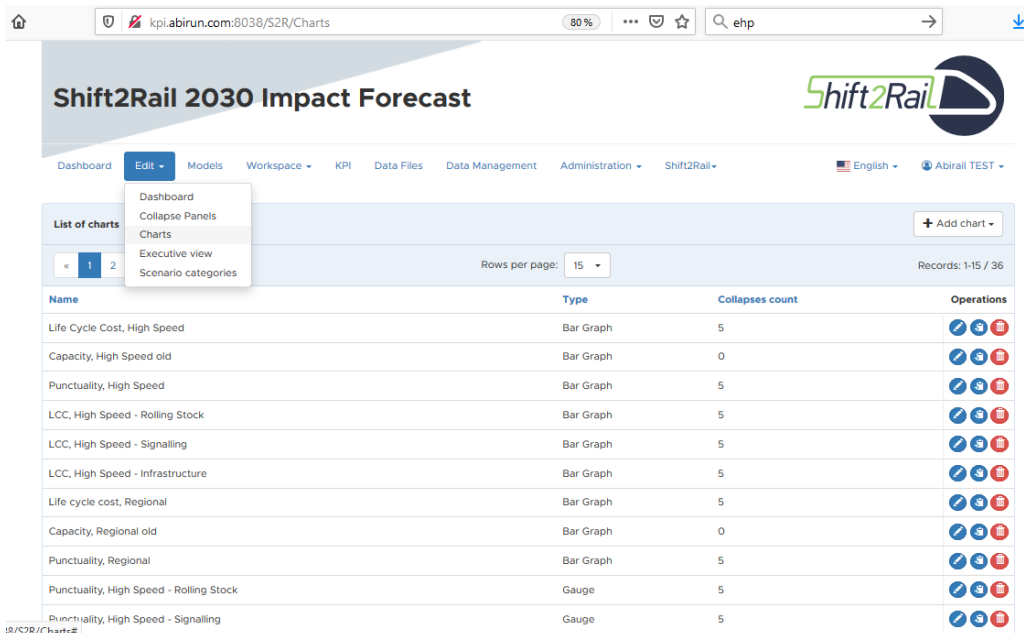


Figure 40: Menu Edit with a list of charts



The **Type** of a chart cannot be changed using the edit feature; the chart type is set upon its creation, where after clicking the button **Add chart**, a specific chart type is to be selected from the drop-down menu (Column chart, Bubble chart, Pie chart, Gauge chart, and Treemap). Each chart type involves different set of parameters to be set on the screen **New chart**.

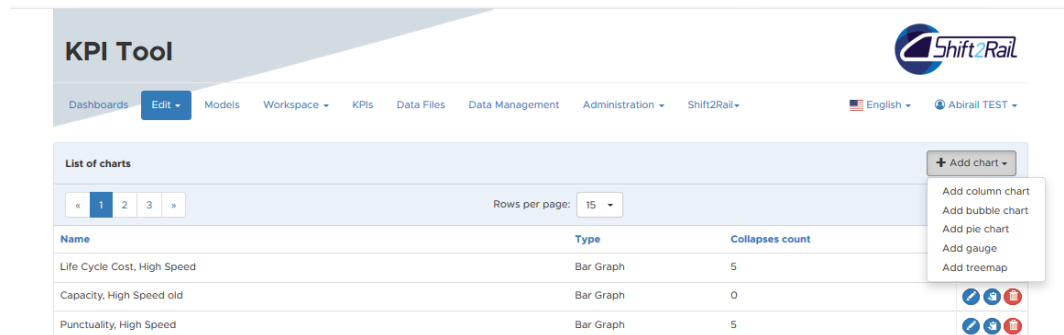


Figure 41: Adding a new chart – selecting type

The screen for adding a new chart shows all the chart properties to be defined, and is similar to the screen for editing a chart, which is shown on the following figures:

- **Figure 42** shows the opening part of the screen, where the general chart parameters are defined, i.e. rendering parameters (chart name and description, font and font size for rendering its name and axes, and chart colour), collapse panels in which the chart is to be contained, and the next level dashboard for the click-through feature
- **Figure 43** shows the chart and axis settings; the checkboxes **Values visible** and **Units visible** specify rendering the values and units on the chart itself; when not checked, a tooltip is shown when hovering with the mouse over the chart; the axis setting define the rendering parameters (grid lines and colours) and allow also manual setting of the axis values
- **Figure 44** shows the data series rendered in the chart; each data series is distinguished by its colour, which is to be selected from a palette; in the bottom part, parameters of the optional right axis are shown
- **Figure 45** shows the dialog box for editing parameters of a data series, including its name, tooltip text, colour, and the specific KPI and dimension values to which it is assigned

The screenshot shows the 'Edit chart' interface for a chart titled 'Life Cycle Cost, High Speed'. The interface is divided into several sections:

- Main settings:**
 - Name:** Life Cycle Cost, High Speed
 - Name font size:** 16
 - Description:** Decreasing LCC in the High Speed Rails application
 - Description font size:** 14
 - Color:** Green
 - From:** 01/01/2019
 - To:** 01/11/2019
 - Size X:** 1
 - Size Y:** 1
 - Label font size:** 10
 - Next level dashboard:** Life Cycle Cost - High Speed
- Collapse panels:** A list of checkboxes for various data series, including Capacity, Freight, High Speed, LCC High Speed, and Life Cycle Cost - High Speed application (checked).

Figure 42: Editing chart 1 – general part

The screenshot shows the 'Edit chart' interface for a chart titled 'Life Cycle Cost, High Speed', focusing on chart and axes settings:

- Displayed values:**
 - Display tooltip:**
 - Display units:**
 - Display labels:**
- Other settings:**
 - Chart legend position:** Bottom
 - Background color:** Light gray
 - Legend offset X:** 0
 - Legend offset Y:** 0
 - Column stack:**
- Value axis settings:**
 - Axis type:** Numeric
 - Title:** %
 - Title position:** Center
 - Format:** Procenta
 - Axis crossing value:** 0
 - Labels rotation:** -45
 - Axis color:** Black
 - Line visible:**
 - Major grid lines visible:**
 - Manual setting from:**
 - Manual setting to:**
 - From:** -30.00
 - To:** 5.00
- Value axis series:** A table with columns for Name, Type, Color, KPIName, and Operations. An '+ Add a series' button is present.

Figure 43: Editing chart 2 – chart and axes settings



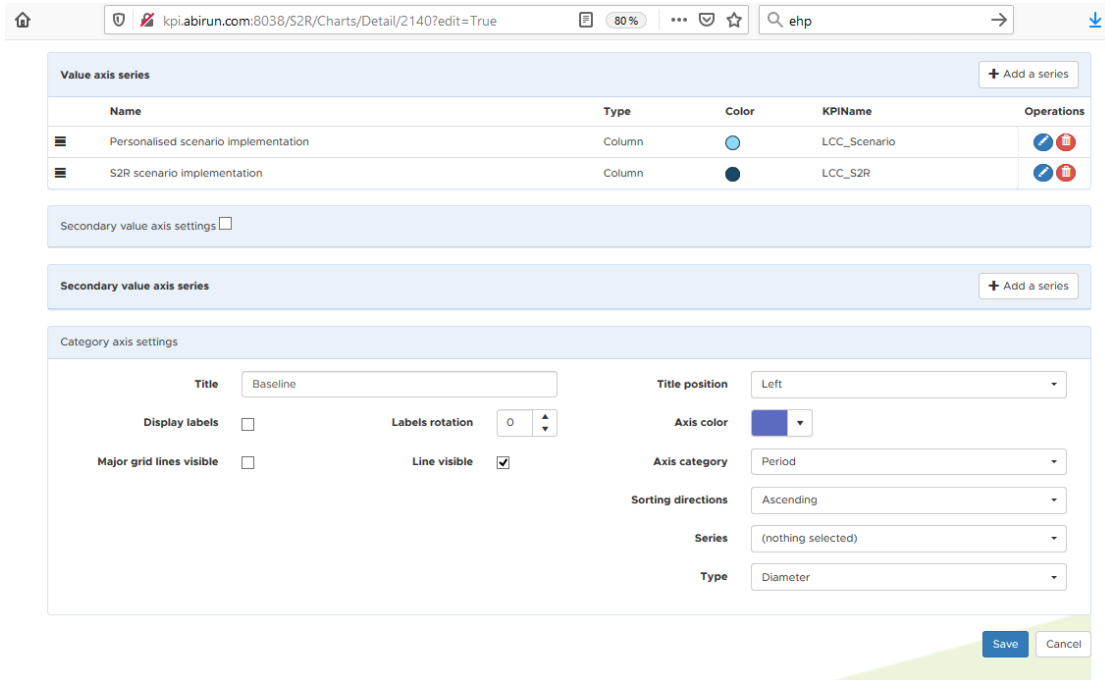


Figure 44: Editing chart 3 – defining data series

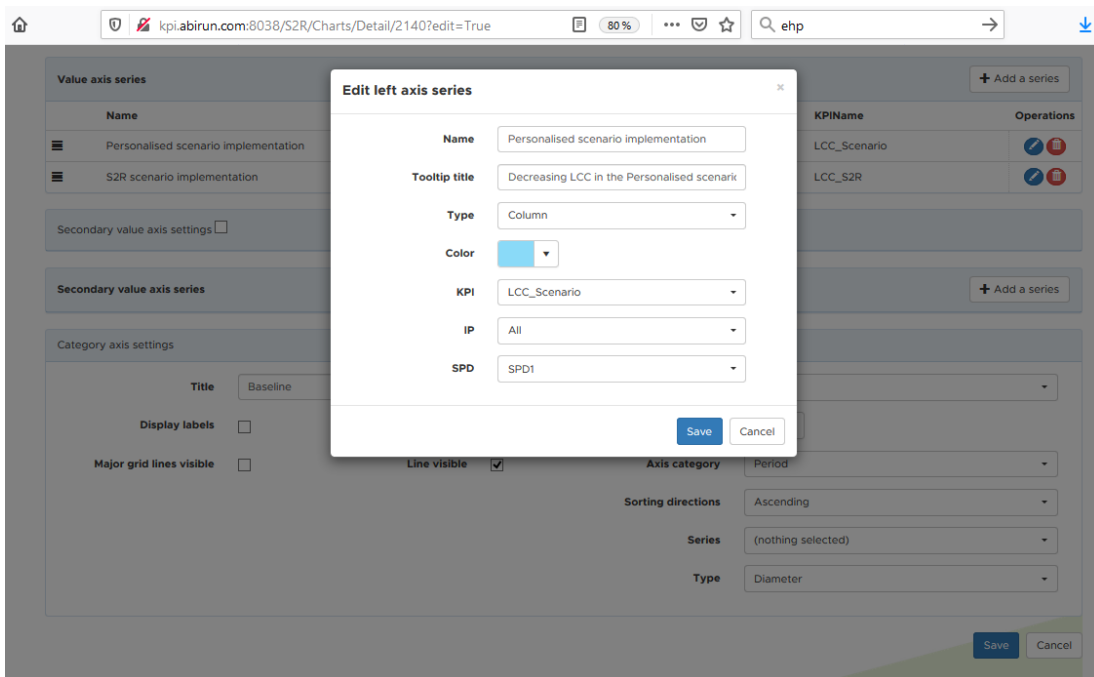


Figure 45: Editing chart 4 – editing a left axis data series

After defining the dashboards, collapse panels and charts, the charts can be assigned to the **collapse panels**, and the collapse panels can be afterwards assigned to the **dashboards**. This way the structure of the rendered KPI Model is defined for the user role of the Data Viewer. Assigning charts to collapse panels and dashboards is described earlier in this section.

Another feature of the dashboards is the **Executive view (EV)**, which facilitates an easy access to the most important dashboards and charts. An executive view is defined by a matrix structure of buttons and their chart or dashboard assignment.

After clicking the menu **Edit**, command **Executive view**, the screen **List of executive views** appears, as seen in Figure 46. An executive view is defined by its name, and facilitates the usual buttons for editing and deleting the executive view.

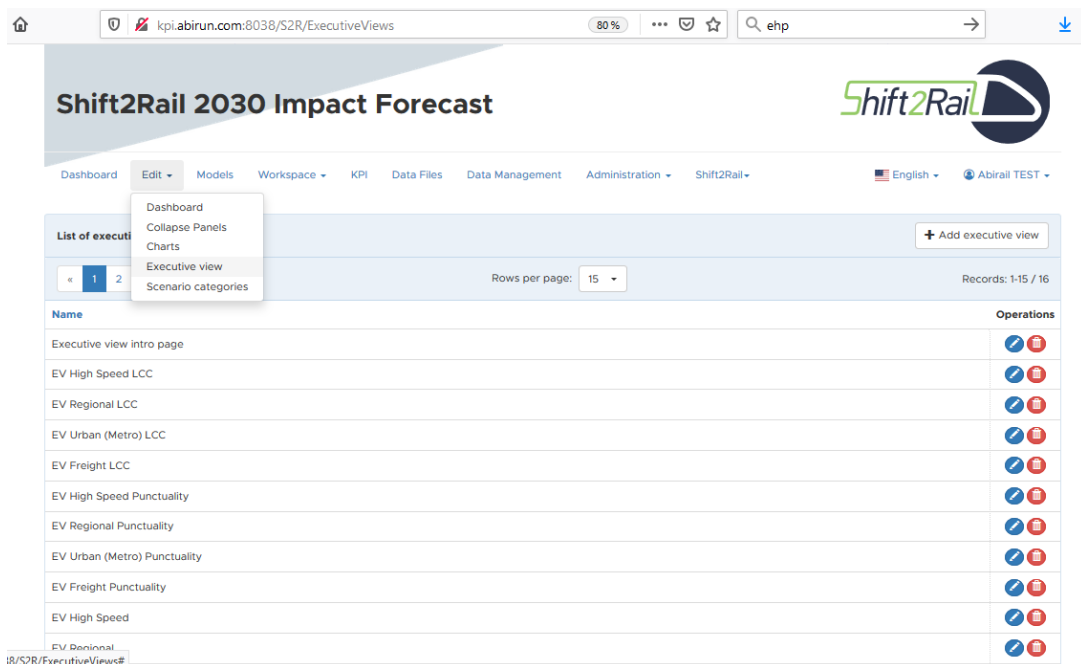


Figure 46: Menu Edit with a list of Executive views

After clicking the blue pencil button **Edit**, the screen **Executive view** opens, as shown in Figure 47. Here you can edit the general EV parameters (as in which dashboards it should be shown), and also the set of buttons to be shown on the EV itself. Each button can be then edited individually using the pencil button **Edit**.



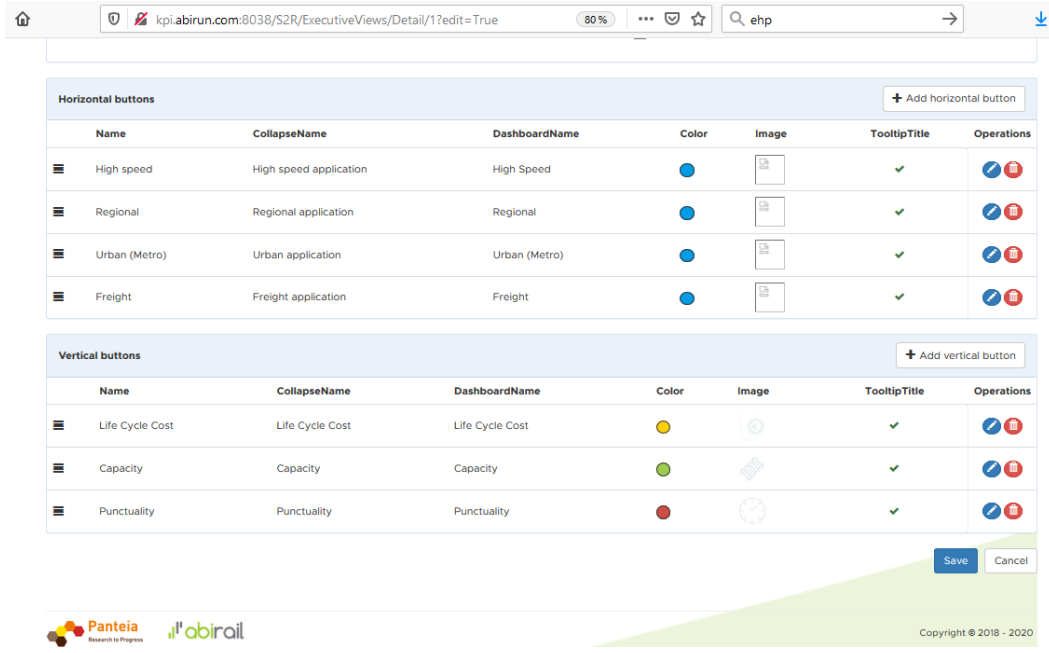


Figure 47: Editing an Executive view

The dialog box **Edit horizontal / vertical button** (see Figure 48) allows specifying the collapse panel to be rendered after clicking the button, and also specifying the colour of the button and its icon image. The colour setting is selected using a drop-down palette, as shown in Figure 48.

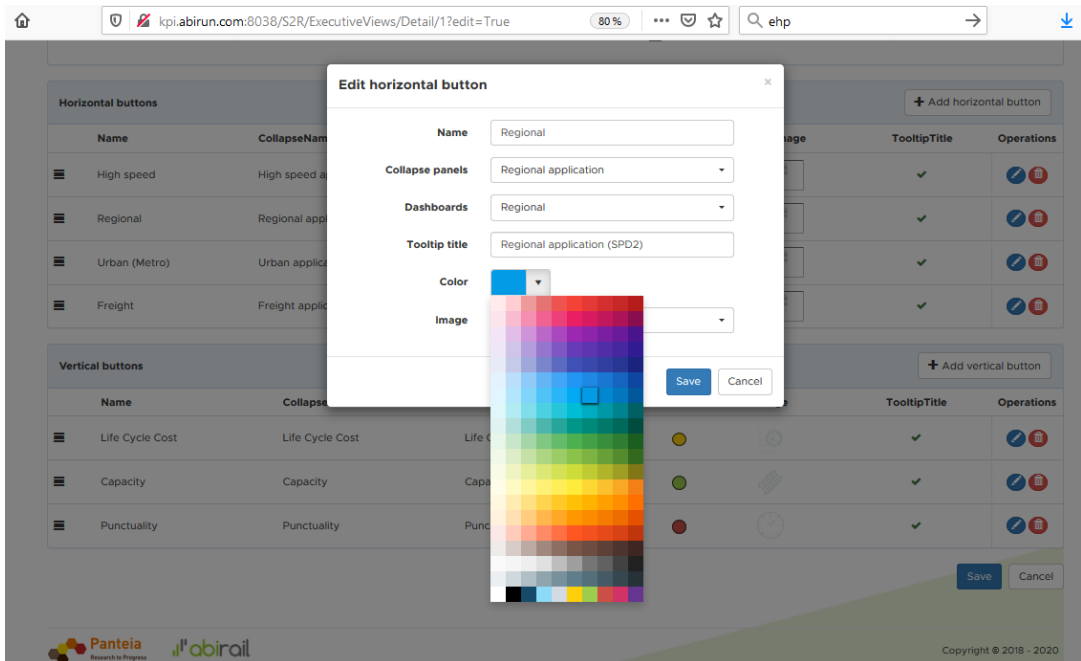


Figure 48: Editing a button in the Executive view, selecting colour

3.4.6 Image Library

The **Image Library** defines image files with images used as icons in the EV buttons and/or as intro images (splash screens) on the dashboards. The Image Library belongs to the KPI Model Workspace, and therefore its options are accessible via menu Workspace as well.

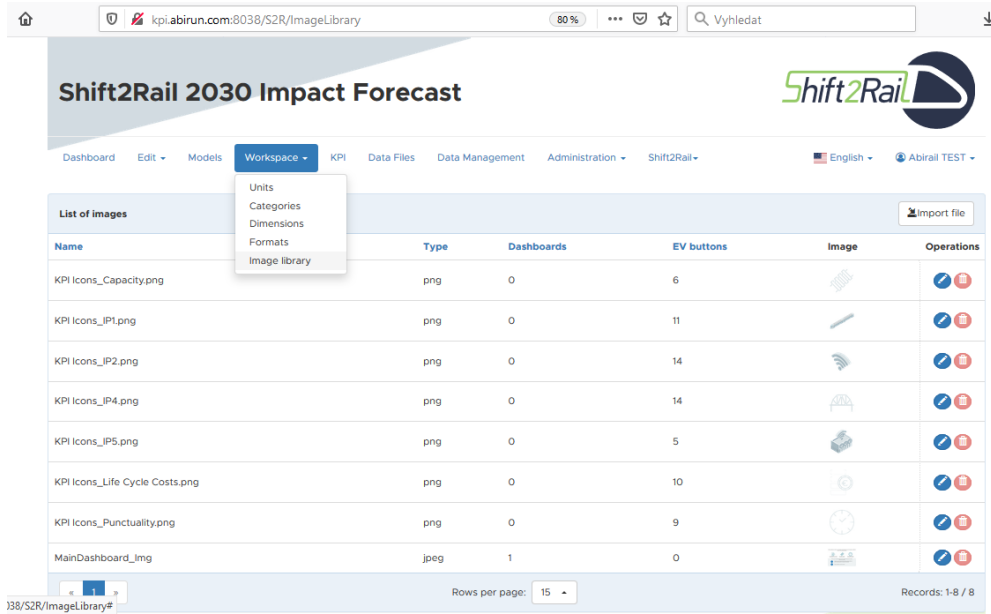


Figure 49: List of image files in the Image Library

Upon clicking the item Image Library in the menu Workspace, the list of images opens (see Figure 49). Each image features simply a name, a type, an image preview, and an information on the number of dashboards and/or EV buttons where it is used. If the specific image is used in any of these places, it may not be deleted.

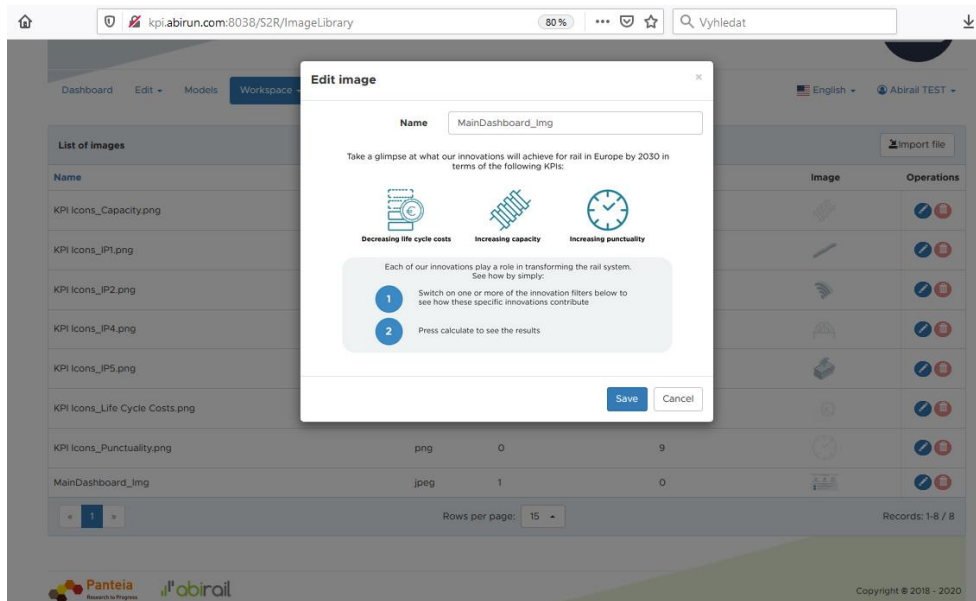


Figure 50: Creating a new image in the Image Library



Figure 50 shows adding a new image into the Image Library. The process begins by clicking the button **Import File** (top-right in the image list), which opens the standard Windows dialog box Open File to select a graphical file. After clicking OK, the image is imported in the KPI Tool. Here it can be renamed if necessary, and later it can be assigned to a dashboard and/or EV button in the corresponding options of the Edit menu.

3.5 User role: System administrator

A user with the user role of the System Administrator fulfils the usual tasks of user account management, user roles management, checking the event log, and database backup and recovery (in the 2nd iteration). The functionalities supporting his or her tasks are found in the menu **Administration** on the very right.

3.5.1 User management

Upon clicking the command **Users** from the menu **Administration**, the user management screen appears, as seen in Figure 51. Here the most important parameters of each user are shown: name and surname, username, and assigned roles (as defined in 2.3.7). Each user may be active or not (shown by the tick in the column **Active**).

Name	Surname	User name	Roles	Active	Actions
System	ADMINISTRATOR	systemAdministrator	System administrator	✓	
anonym	anonym	anonym	Data viewer	✓	
Svenja	Hainz	hainz	Data viewer	✓	
Data	Manager	datamanager	Data manager	✓	
Michael	Meyer zu Hoerste	MeyerzuHoerste	Model manager, Data manager, Data viewer	✓	
Jan	Novotný	novotny	Data manager	✓	
Adriaan	Roest Crolius	crolius	Data viewer	✓	
Judit	SANDOR	SANDOR	Model manager, Data manager, Data viewer	✓	
Shift2Rail	Shift2Rail	Shift2Rail	Data viewer	✓	
Abirail	TEST	abirail	System administrator, Model manager, Data manager, Data viewer	✓	
Chris	Wensink	wensink	Model manager, Data manager	✓	

Figure 51: User management screen

The user list may be filtered using the Filter feature, invoked by clicking the button **Set filter** on top right. The **Filter** dialog box appears (see Figure 52), where the user list may be filtered by any parameter (First name, Surname, Username, User roles, Active) or their combination.

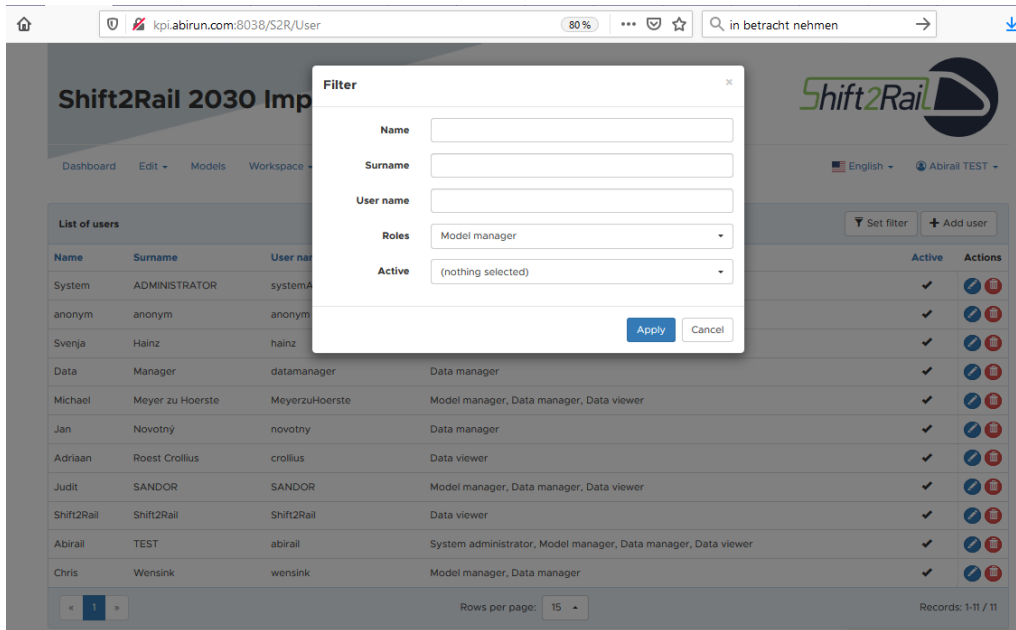


Figure 52: Filtering user list

After clicking the button **Apply**, the filter is applied on the list. Next to the button **Set filter**, an icon “Default” with a red cross appears (see Figure 53 on top right); clicking this button resets the filtering feature into its default state, when no filter is applied and when all the users are shown in the list.

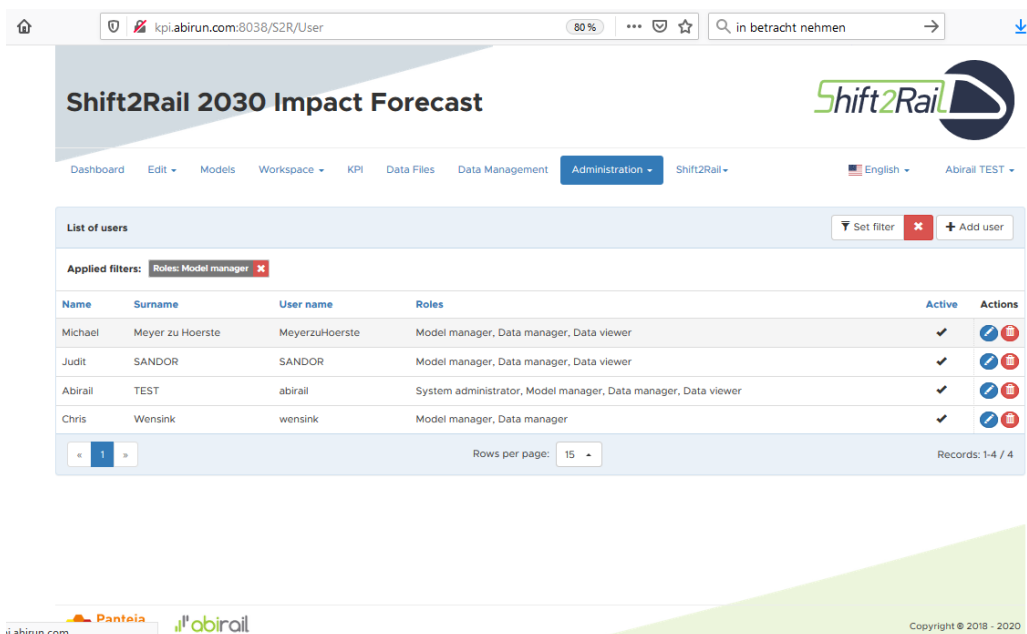


Figure 53: Filtered user list



3.5.2 Adding, editing and deleting a user

To add a new user, simply click on the button **Add user** with a plus icon on the top right. To edit an existing user, click on the blue pencil icon **Edit** on the user's row. This way, the dialog box **New user** (or Edit user) appears, where the parameters of the new user are to be specified (first name, surname, username, password, user roles, e-mail, and active flag).

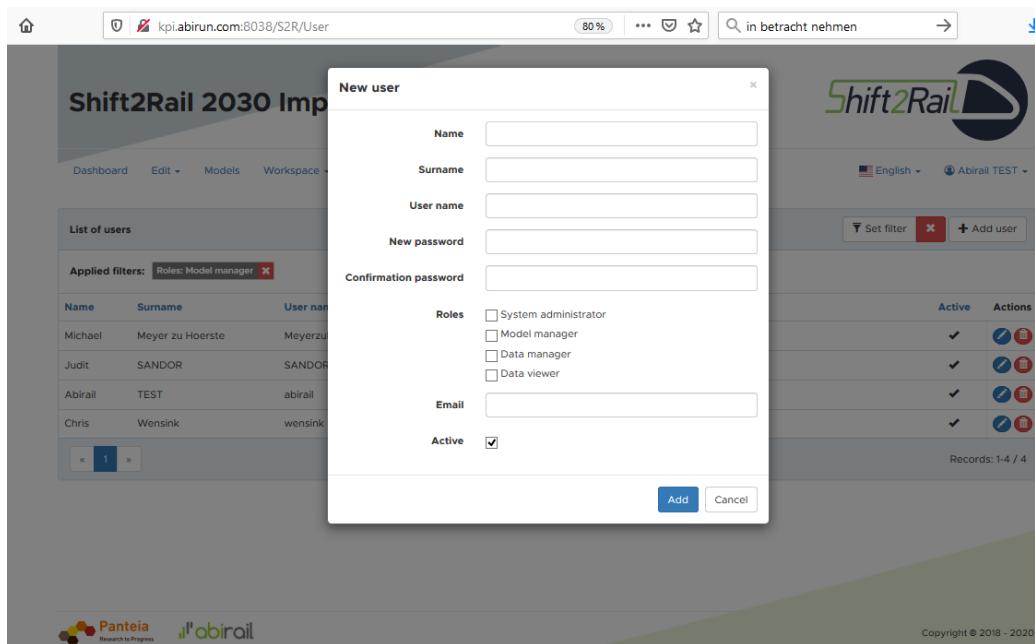


Figure 54: Adding a new user

The dialog box for editing an existing user is similar to adding a new one; only the user parameters are pre-filled to be edited by the desired values.

To delete a user from the system, click on the red icon **Delete** with the recycle bin on the user's row. After confirming, the user is removed from the KPI Tool.

3.5.3 User groups

To facilitate the KPI Dashboards and charts rendering, **user groups** are defined. While the user roles specify **functionalities** available for each user, the user groups restrict **visibility** of the dashboards and charts. And while the user roles are pre-defined (Data Viewer, Data Manager, Model Manager, and System Administrator), the User Groups are defined arbitrarily (and can include user categories as Financial, Sales, Management, Production etc.).

Any number of user groups may be defined using the command **User groups** in the menu **Administration**.

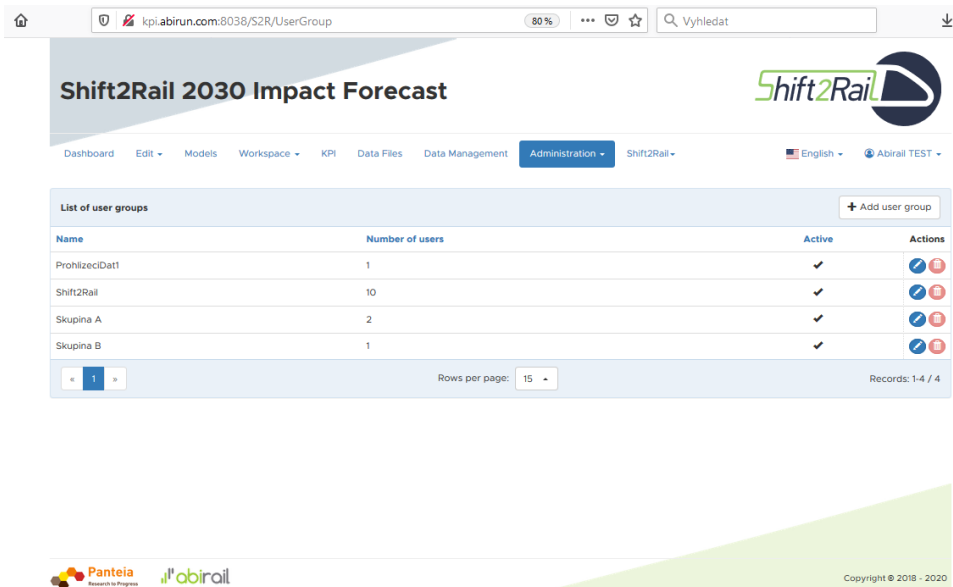


Figure 55: List of the user groups

After clicking the command **User groups**, the list of the user groups appears (see Figure 55). Then after clicking on Add User Group, you can specify (see Figure 56) the name of the new user group, and by simple clicking on the checkbox by each username, you can assign or unassign each user to this user group. Editing a user group works similarly – by clicking the blue pencil icon on the very right of the user group list. To delete a user group, click on the red icon **Delete** with the recycle bin in the user group's row.

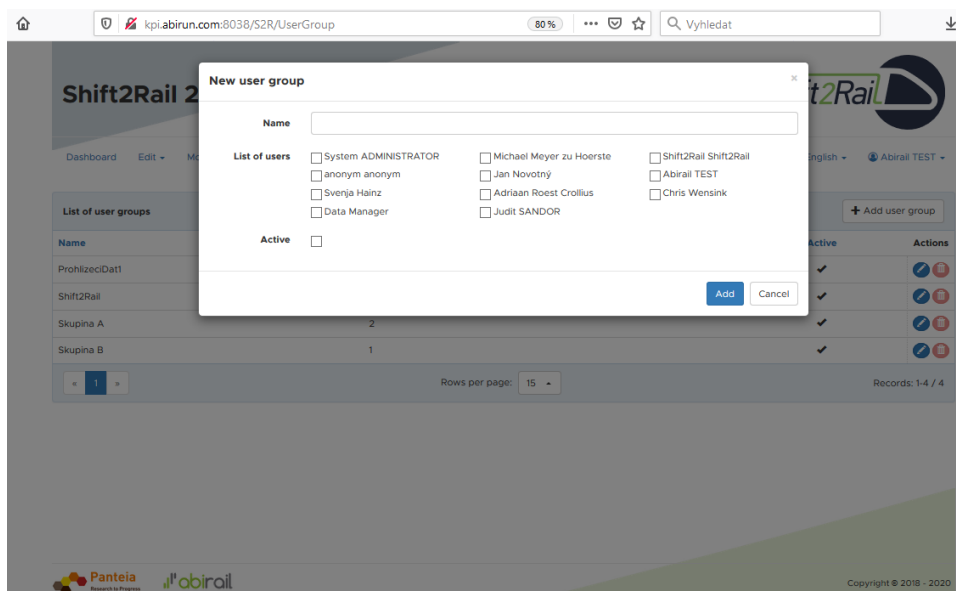


Figure 56: Creating a new user group



4 Hardware and software

The following chapter describes miscellaneous topics, which are not directly pertinent to using the KPI Tool, but which define the framework for its successful operation, specifically: hardware and software environment, governance, maintenance, and training.

4.1 Hardware and software environment

4.1.1 KPI Tool architecture

The KPI Tool is a web-based application with three-tier architecture. Presumably it should be operated on the Shift2Rail ICT infrastructure, i.e. on a specified Shift2Rail server(s). The high-level schema of the KPI Tool architecture is shown on Figure 57:

- Web tier of the KPI Tool is installed on the KPI Tool server (presumably `kpi.shift2rail.org` or similar) by ABIRAIL as the supplier
- Windows service of the KPI Tool is installed on the KPI Tool server by ABIRAIL as the supplier
- Database storage is installed on the KPI Tool server, or possibly on another database server, by ABIRAIL as the supplier (in case of a standalone database), or by Shift2Rail (in case of an existing database server)

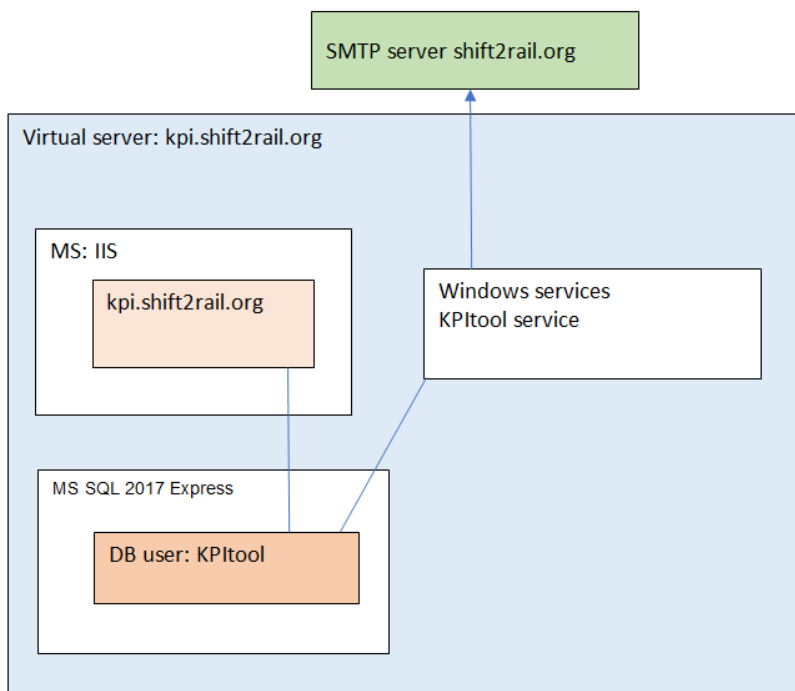


Figure 57: Schematic chart of the KPI Tool architecture

The KPI Tool is based on ASP.NET MVC, bootstrap. All the components are to be run on the same virtual server (`kpi.shift2rail.org`).

4.1.2 KPI Tool installation and deployment

The KPI Tool is installed using the **remote access** onto the machine(s) specified by Shift2Rail (generally installed by ABIRAIL as the supplier, as stated before).

The server will be accessed using the **Remote Desktop**, TeamViewer, or another remote tool; alternatively it can be accessed using a VPN with a temporarily granted administrator rights.

The **database** may be installed on the same machine as the web tier of the KPI Tool, or may be separated (i.e. run on an existing database server of Shift2Rail, in its own instance). The database engine MS SQL is to be used.

Within its **operation**, the web application is exchanging data with the database, and generates the web pages with calculated KPIs and charts for the client side by the end users. Data file placement:

- The Excel model will be stored on the hard disc C: of the KPI Tool server.
- The database will be stored either on the KPI Tool server, or on the Shift2Rail database server.
- The model(s) are stored in the database of the KPI Tool in a structured form where they are invoked upon the user's actions.

4.1.3 Required system parameters

The detailed required system parameters or prerequisites for the KPI Tool installation include especially:

- Hardware:
 - 8 GB RAM
 - 100 GB HDD
 - dedicated hardware for the KPI Tool software (physical or virtual server)
 - four (4) vCores are necessary for the KPI Tool
- Software:
 - Windows Server 2016 or higher
 - MS SQL Server 2017 Express or higher
- Domain: separate 3rd level domain, e.g. "kpi.shift2rail.org", needs to be established
- A static (permanent) IP address for the virtual server is necessary
- A DNS record for kpi.shift2rail.org is necessary to be established – for the IP address of the KPI Tool server
- SMTP (notifications on specific events and/or failures):
 - An IP address and port number of the SMTP server is to be provided, to send the emails from the application
 - The email address is to be provided, under which the KPI Tool will send the emails
- For a limited period, administrator access rights on the server are necessary (VPN, RSA, or other technologies according to the standards used in the Shift2Rail environment)
- A HTTPS certificate is needed; either <https://letsencrypt.org> or similar service may be used, or Shift2rail.org purchases its own certificate



4.1.4 Installation, migration and deployment concept

This section describes the necessary steps to migrate the KPI Tool from one server to another one:

1. **Preparing the target system environment** – as described in the previous section 4.1.3 (Shift2Rail), including the operating system (in English locale), database engine, remote access, and registered domain name (e.g. kpi.shift2rail.org) and HTTPS certificate
2. **Installing other system and runtime components** – .NET components, IIS configuration, software components for KPI Tool etc.
3. **Installing application**, migrating the model and data from the testing environment, providing the current version of the KPI Excel Model (from the IMPACT team), deployment of the application and quick functional tests
4. Creating the basic **user accounts** and roles
5. **Submitting to user**, providing the access data (as the IP address and port number, usernames and passwords)

Save the point No. 1, the necessary steps are to be implemented by the Panteia Consortium and by its IT development team.

For the further developments and future releases of the KPI Tool, a separate testing environment is to be established by the Panteia Consortium, as not to affect the deployed production version. The testing environment serves as a sandbox, where the new release of the KPI Tool is to be tested until its acceptance by Shift2Rail.

Estimated time to deploy is 5 working days after finishing point No. 1.

4.1.5 Integrating into Shift2Rail web environment

For the deployment of the KPI Tool, integrating into Shift2Rail web environment is suggested. There are basically two options for this:

1. In the existing web page www.Shift2Rail.org, a link is created to the new domain kpi.Shift2Rail.org – i.e. for the user this means opening a new browser tab for the KPI Tool.
2. Or integrate into the web pages using iFrames; necessary is to reflect the minimum size (minimum width) of the KPI Tool window, and also merge the graphical look and feel

The specific means of integration are to be implemented in the 2nd iteration of the KPI Tool.

5 Training

Task of the training is to provide simply user training and user support for the tool and other results of this project, as needed by Shift2Rail.

5.1 Training concept

The **training** itself starts with setting the training plan, agreed with Shift2Rail; this plan will include the training structure, training schedule, number of trained staff, and also preparation of the necessary training materials (as especially training PPT, user examples, user training documentation, presence forms, training tests, and training certificate).

The training is to be split according to the **user roles** (Data Viewer, Data Manager, Model Manager, System Administrator), as each fulfils different duties in the KPI monitoring processes, and has a different scope of functionalities available in the KPI Tool itself.

5.2 Training structure

Every user designated by Shift2Rail is to undergo a training session according to the following assumed scheme:

- 1. Introduction** – the KPI monitoring and its meaning for Shift2Rail; general concepts of data collection and data processing
- 2. Understanding the background** – explaining theoretical concepts and structures of the KPI Tool and its corresponding options and features
- 3. Demonstrating the KPI Tool application** – usage of the Tool, its functionality; basic principles of usage of the Tool; understanding the features for the corresponding user role; using basic and sophisticated functions; learning by examples on sample data
- 4. Hands-on exercise** – testing the knowledge and testing the tool usage on real-world examples; troubleshooting

5.3 Training scope

For a **Data Viewer** and for a **System Administrator**, a training session of 2 hours is assumed. For a **Model Manager**, a half-day training session is assumed (4 hours). The training shall be performed at the end of the development (or during its final phases).

5.4 Training form

We suggest organising the training in one or two **webinar-based workshops**, separately for the users in each of the different roles. The webinar shall be based on suitable remote communication tool as WebEx or GoToMeeting, with interactive features, screen sharing, and an option to give a feedback for the users.



5.5 Training materials

The training materials were elaborated by the Panteia Consortium and agreed with Shift2Rail before the training sessions themselves. They are based on the User Manual and the application concept as presented before.

The training materials for each user role include a PPT presentation for leading the training session, and suggested examples to conduct the KPI Tool demonstration and the hands-on exercise.

5.6 Training schedule

The specific training schedule (i.e. the date and time schedule) is to be agreed with Shift2Rail. To achieve necessary efficiency, the training sessions for the different user roles are to be held on consecutive days.

Within the training schedule, the following is to be specified:

- No of training sessions for each user role
- Date and time schedule – including the specific training place and room
- No of users trained – differentiating each user role
- Specific lecturer name(s), contact persons and responsibility

6 Maintenance and change management

For the duration of the contract (until the mid January of 2021), the Panteia Consortium will deliver **maintenance and support** for the KPI Tool. The suggested maintenance efforts rely on a specified contact person on the side of both the Consortium and Shift2Rail. This way, communication between Shift2Rail and the technical support is simplified and unified, and user comfort is improved.

6.1 Maintenance services

For the KPI Tool the following services are assumed (within the specified scope):

- Receiving requests via e-mail in sense of the specified Change Management Process (see below)
- Providing Shift2Rail with the issue resolution information, upon request
- Implementing software changes, fixing software bugs, monitoring the application, and adjusting the KPI Model and charts and dashboards
- Monthly report on the maintenance services provided

6.2 Maintenance categories

The maintenance services are to be categorized based on the necessary change or intervention:

1. **Adjusting the dashboard layout** – order of the charts. Fully adjustable by any user, including the Data Viewer and the anonymous user, therefore NOT involved in the maintenance services.
2. **Changes in the charts and dashboards settings** – as the chart types, data series, chart axes, chart colours, structures of collapse panels and dashboards etc. Fully adjustable by the Model Manager – during the Maintenance period resolved by the Panteia Consortium, within 3 (three) working days from submitting the request.
3. **Changes in the Excel Model calculations** – i.e. changes in the business logics implanted into the KPI Excel Model. These changes are fully in charge of the IMPACT team and therefore are NOT involved in the maintenance services.
4. **Changes involving the Summary Sheets** – as adding a new KPI defined by a new column in a Summary Sheet, or changing the column order and meaning. Any changes in the Summary Sheet imply changing the interface between the KPI Excel Model and the KPI Tool, and therefore are resulting in changes in the KPI Tool application (in its macro scripts), and are to be resolved by the Panteia Consortium, within 10 (ten) working days from submitting the request.
5. **Application bug fixes** – an application malfunction, failure, leading e.g. to an incorrect rendering, incorrect data manipulation, data corruption, or even an application crash. Any reported application bugs are to be resolved by the Panteia Consortium within 5 (five) working days from rising by Shift2Rail.
6. **Requested changes in the KPI Tool application** – to be implemented by the Panteia Consortium using the change management process as specified below.



No.	Maintenance category	Done by	Example
1.	Adjusting the dashboard layout	Any end user	Order of the charts as rendered for the end user.
2.	Changes in the charts and dashboards	Shift2Rail Model Manager	Adjusting/modifying chart types, data series, chart axes, chart colours, structures of collapse panels and dashboards etc.
3.	Changes in the Excel Model	IMPACT	Changes in the business logics in the KPI Excel Model, in the calculations; updating calc formulae, changing methodology etc.
4.	Changes involving the Summary Sheets	ABIRAIL (includes modifying application code)	Changes in the Summary Sheet mean changing the interface between KPI Excel Model and KPI Tool – as e.g. adding a new high-level KPI defined by a new column in a Summary Sheet.
5.	Application bug fixes	ABIRAIL (warranty maintenance)	Application malfunction, failure, incorrect rendering, incorrect data manipulation, data corruption, or an application crash.
6.	Requested changes in the KPI Tool application	ABIRAIL (modification on demand)	Establishing a new, so far unsupported chart type. New UI features.

6.3 Change Management Process

To request and implement changes in the KPI Tool, a periodic **Change Management Process** is suggested as a part of the KPI Tool maintenance (as mentioned in the last bullet in the list). Using this process, Shift2Rail may raise a more significant request for a software change or extension to the consortium; it means the following cycle:

- **Change request** – Shift2Rail proposes a change in the application, in the Excel model, in the interface, or in the charts and dashboards
- **Change assessment** – Panteia Consortium will assess the feasibility of the requested change and the effort necessary to implement (within the available 15 man-days per year), with possible re-shaping of the request when necessary to maintain the business logics of the KPI Tool application
- **Approving change** – Shift2Rail approves the suggested scope and effort to implement the change

- **Implementing the change** – Panteia Consortium implements the requested change, with the necessary changes of the User Manual or other project documentation, and with testing the changes
- **Releasing new version** – Panteia Consortium issues a new version of the KPI Tool application
- **Checking the new version, feedback** – Shift2Rail tests the new version of the application, and gives a feedback on the implementation

This cycle is assumed to run **once a month** for each release of the KPI Tool; all the requested changes are submitted to Panteia Consortium via the approved contact persons.

