Minimum Viable Product (MVP)

Phase	LGP Challenge
Due Date	@June 14, 2022

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Project Requirements

1. Actors

Actors	Description
User	Generic user that accesses the application
Strategic Planning Team	Users responsible for the business plan development
Portfolio Management Team	Users responsible for the project planning and portfolio simulation
Administrator	User responsible for managing the tool

2. User Stories

2.1 User

Identifier	Name	Priority	Description
US101	Microsoft Teams	High	As a User, I want to access the app through Microsoft Teams, so that I can be in the usual workspace.

2.2 Strategic Planning Team & Portfolio Management Team

Identifier	Name	Priority	Description
US201	Upload Data	High	As a St. Pl. & Port. Mgmnt. member, I want to upload data through Excel files, so I can simplify the data input.
US202	Edit Data	High	As a St. Pl. & Port. Mgmnt. member, I want to edit data, so I can override the values and test the tool on different scenarios.
US203	Restore Data	High	As a St. Pl. & Port. Mgmnt. member, I want to restore the changed data, so I can return to the real scenario after experimenting with different values.
US204	External Factors	High	As a St. Pl. & Port. Mgmnt. member, I want to add external factors to use relevant market statistics in the tool.
US205	Strategic Relevance	High	As a St. Pl. & Port. Mgmnt. member, I want to mark programs as strategic, so I can easily identify them for their importance.
US206	Ranking	High	As a St. Pl. & Port. Mgmnt. member, I want to view a program ranking, so I can easily identify their value to the company.
US207	Cost Graph	High	As a St. Pl. & Port. Mgmnt. member, I want to view a graph with each program’s cost, so I can identify where the company’s resources are being used.
US208	Impact vs Effort Matrix	High	As a St. Pl. & Port. Mgmnt. member, I want to view the prioritisation results on an impact vs effort matrix, so I can better discuss with the organisation which decision to take

Identifier	Name	Priority	Description
US209	Program Status	High	As a St. Pl. & Port. Mgmnt. member, I want to view the program status with its costs and hours, so I can analyse the company's resources.
US210	Program Timeline	High	As a St. Pl. & Port. Mgmnt. member, I want to view programs timelines with key milestones, so I can compare the state of different programs.
US211	Matrix Printable Version	Medium	As a St. Pl. & Port. Mgmnt. member, I want to save the impact vs effort matrix in a printable version, so I can send it or show it in a presentation.

2.3 Administrator

Identifier	Name	Priority	Description
US301	Manage Scoring Variables Weights	High	As an Administrator, I want to manage the scoring variables’ weights, so I can adapt calculations according to the relevant market environment.

3. Supplementary Requirements

3.1 Technical Requirements

Identifier	Name	Description
TR01	Usability	The system should be simple and easy to use
TR02	Performance	The system should have response times shorter than 2s to ensure the user's attention
TR03	Integration	The system should be able to run within the Microsoft Teams application
TR04	Database	The system should use a client-side database
TR05	Robustness	The system should be able to handle and recover from runtime errors
TR06	Documentation	The system should be documented.
TR07	Ethics	The system must respect the ethical principals in software development

Architecture and Technologies

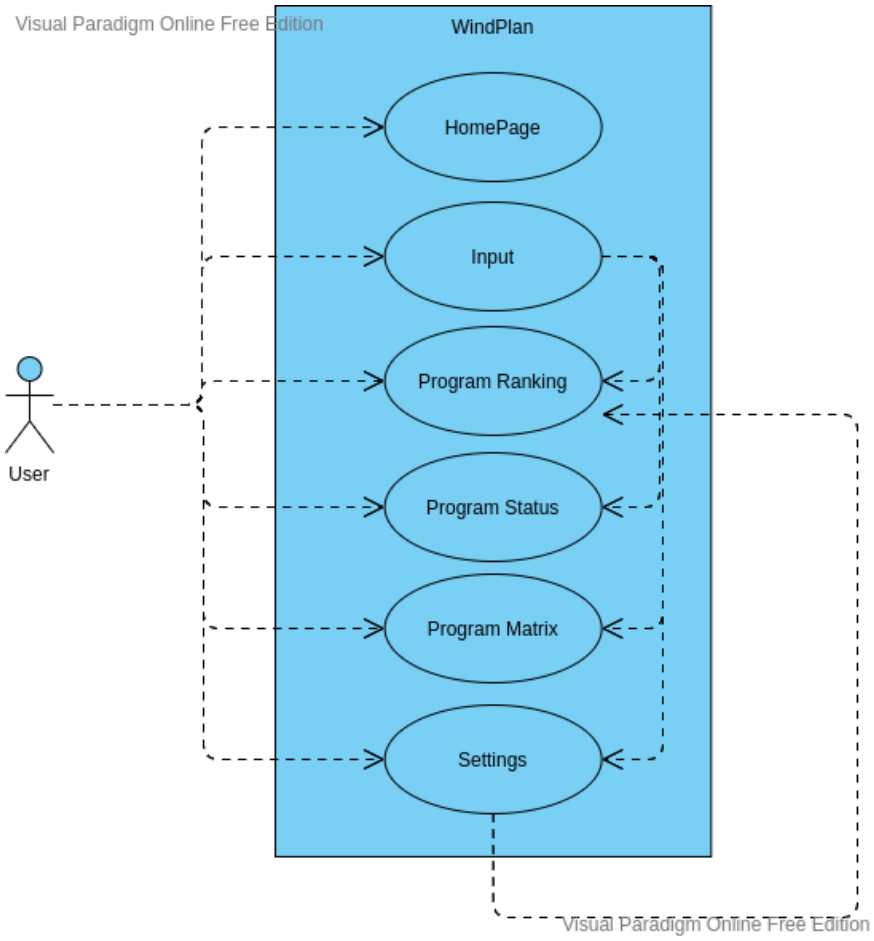
Technologies

The technologies used to develop our application were the following:

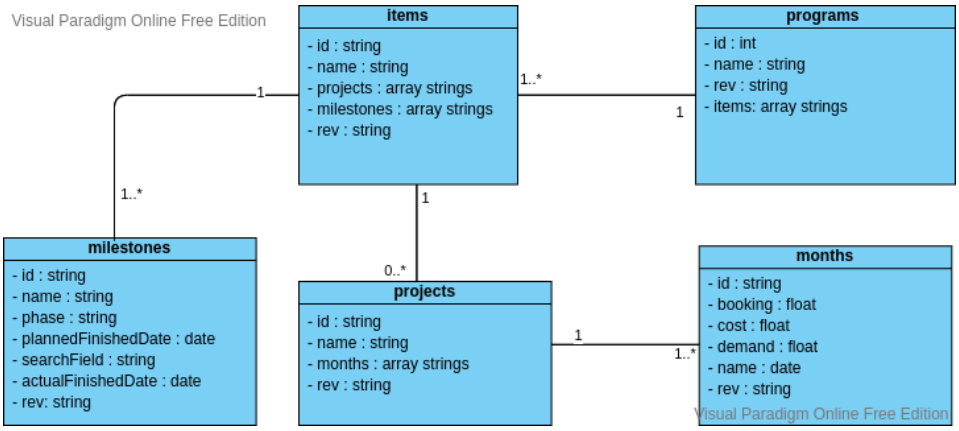
Database	PouchDB
Front-end	ReactJs HTML / CSS / JavaScript
Platform	MS Teams

Architecture

As for the architecture of our application, it is client-side only:



As for the relational schema of the database being used is the following :



Handover Process

Our customers expect to receive the entire product code, along with two documents:

- the user manual, with instructions for using the application;
- the documentation, containing a detailed description of the code in order to facilitate the process of continuing the product development.

In case there is still a problem, the team is willing to send a member to the Vestas company to help with this process.

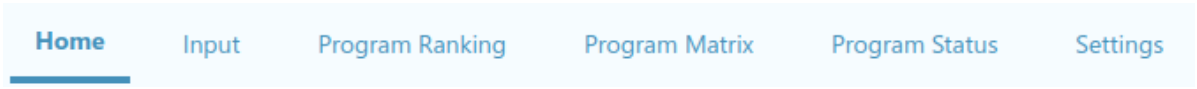
Administrator and User Manual

In this section, it is presented both the Administrator and the User manual with information regarding key aspects and features of the tools, clear instructions on how and when to use them and how to understand the application flow.

This manual includes:

1. Layout
2. Application Key Aspects and Features
3. Application Flow
4. User Manual
5. Administrator Manual

▼ 1. Layout

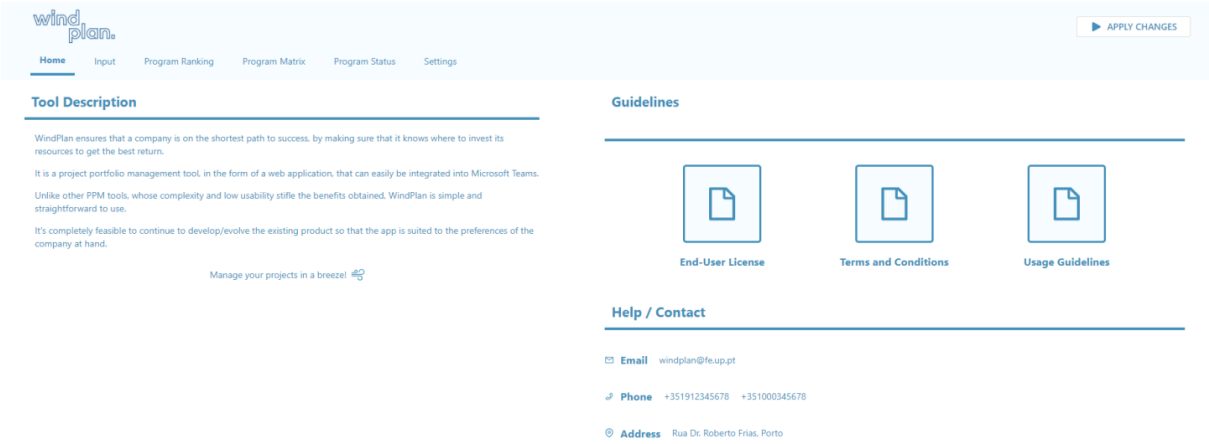


The tool is built of 6 different tabs:

- **Home:** Application landing tab
- **Input: I**nput and data handling
- **Program Ranking:** Program ranking
- **Program Matrix:** Effort / Value matrix
- **Program Status:** Program Information
- **Settings:** Tool settings

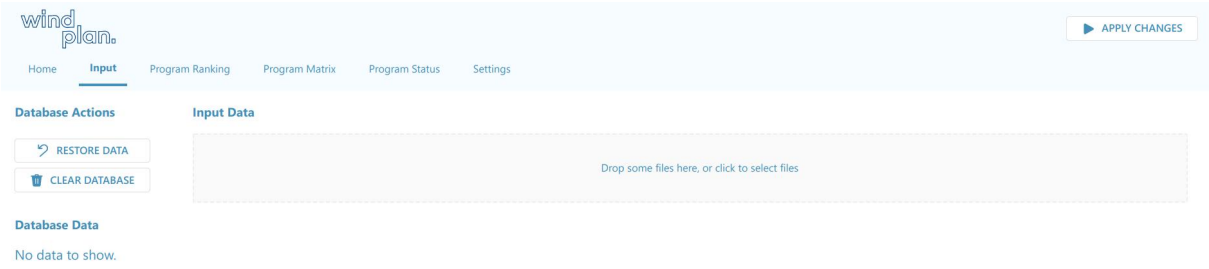
1.1 Home

Application landing tab, where you can see some information about the tool and the team who build it.



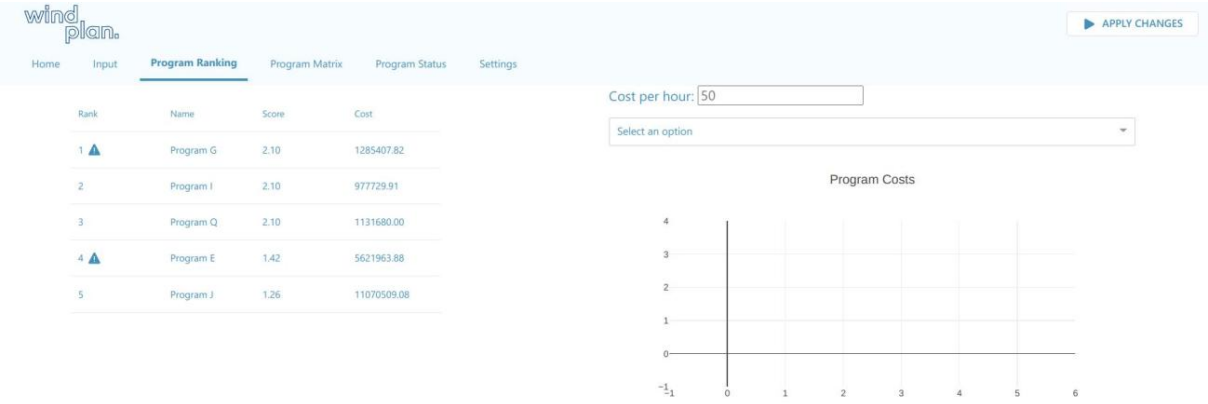
1.2 Input

This tab is responsible for input and handling of data. It is in this tab where the user is able to upload data files and edit, restore or even delete individual entries.



1.3 Program Ranking

Main tab of the application, where you can see a ranking of the programs by their score and some analytics.

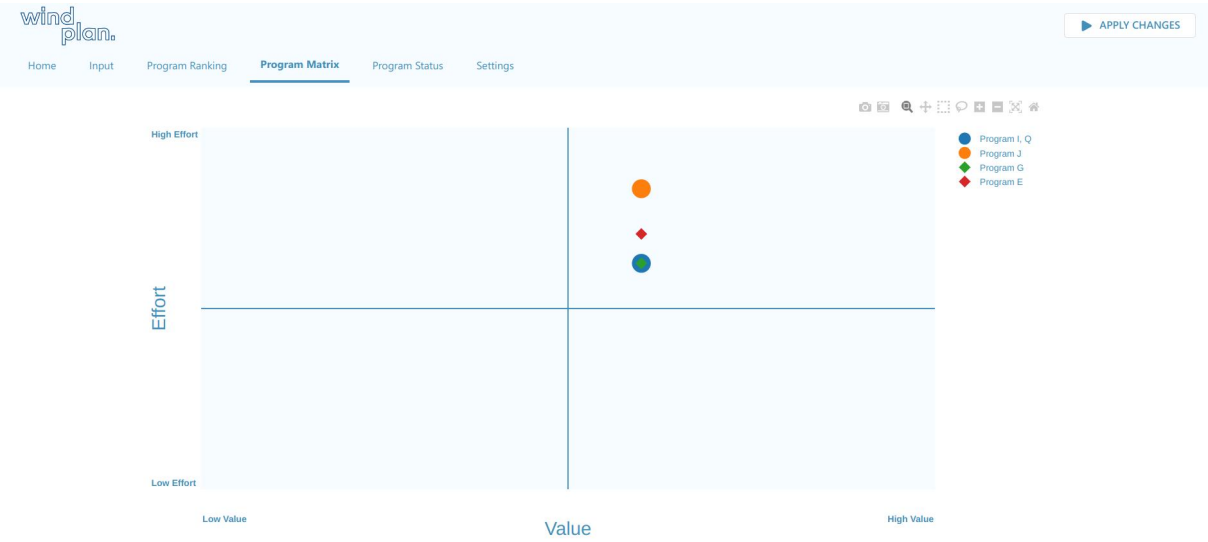


1.4 Program Matrix

Effort / Value matrix where you can see more visually the positioning of the individual programs.

If a program is strategically relevant its marker symbol is a diamond. If it’s a normal program, the marker symbol is a circle.

If two different programs have the same effort and value, they are grouped under the same marker.

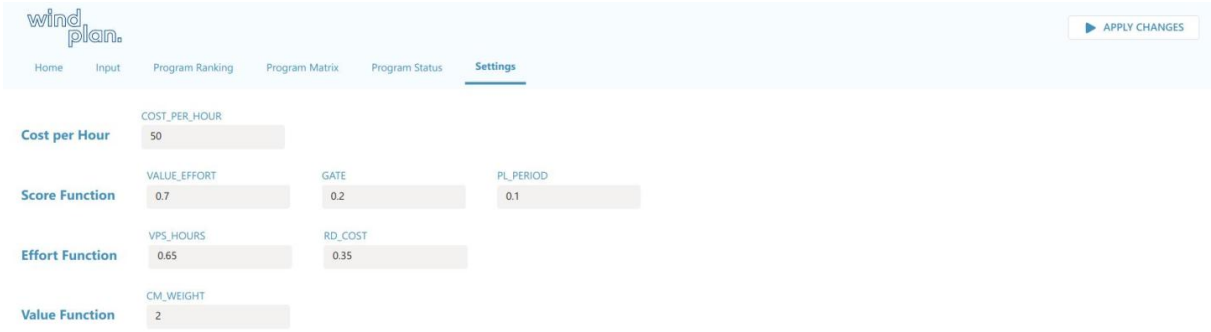


1.5 Program Status

Tab to see analytics information about programs more in depth. In this tab is also possible to see a program timeline and compare it with other ones.

1.6 Settings

This tab is responsible for managing application variables. It should be used by administrators, since it has impact on the functioning of the tool itself.



▼ 2. Application Key Aspects and Features

Edit Data

This application is built so that the user can try and test different scenarios of their company. With this in mind, one key feature is the ability to edit the data. The user can change any field of any program, item, project, etc… and see the results of these changes reflected on the tool.

There is also the ability to add **External Factors** to the programs, in order to use outside market variables for the calculations.

The possibility of restoring data to the initial state is also one important feature, so that the user can return to the base scenario.

Program Ranking

With this tool, the user is able to see a program ranking, where the programs are sorted by their score. This score is a calculated with a **Score Function**, which emphasizes different aspects of the program in order to give them a quantifiable score to sort them from best to worst.

Some programs can be marked with **Strategic Relevance** due to its strategic nature. Those programs will be marked on the ranking for the user to be aware.

Score Function

The score function used to rank the programs is the following:

$$score = VALUE\_EFFORT * (\frac{value}{effort}) + GATE * (gate) + PL\_PERIOD * (pl\_period)$$

where:

- *VALUE_EFFORT* is the weight of the value effort ratio
- *GATE* is the weight of the gate rating
- *gate* is the rating retrieved from the latest program finished gate.
- *PL_PERIOD* is the weight of the profit/loss period rating
- *pl_period* is the rating retrieved from the number of years necessary for the program to become profitable.

The *value* is calculated with the following formula:

$$value = yearVolume * (CM\_WEIGHT * (cmNew + cmUpside))$$

where:

- *yearVolume* is the rating retrieved from the yearly program volume
- *CM_WEIGHT* is the weight of the contribution margin

- *cmNew* is the rating retrieved from the program's new contribution margin
- *cmUpside* is the rating retrieved from program's upside contribution margin

The *effort* is calculated with the following formula:

$$effort = VPS\_HOURS * (hours) + RD\_COST * (cost)$$

where:

- *VPS_HOURS* is the weight of the program's booked/demanded hours
- hours is the rating retrieved from the program's booked/demanded hours
- *RD_COST* is the weight of the program's research and development cost
- *cost* is the rating retrieved from the program's total cost

Cost Graph

The cost for each program to be used on the program ranking is calculated as follows:

$$cost\_value = COST\_PER\_HOUR * (demand) + cost$$

where:

- demand is the amount of hours necessary for the program
- *COST_PER_HOUR* is the cost of an hour of program development
- cost is the total base cost of the program

This graph allows to see and compare the costs of the different programs in a specific year.

Impact / Effort Matrix

The tool allows the user to see the Programs on an Impact / Effort matrix to get a more visual representation of the score function and the program ranking. For the Impact axis, the $value$ is used and for the Effort, the $effort$ is used. This matrix shows a clear distinction between strategic and non-strategic programs, and even lets the user export its content in a PDF or PNG format.

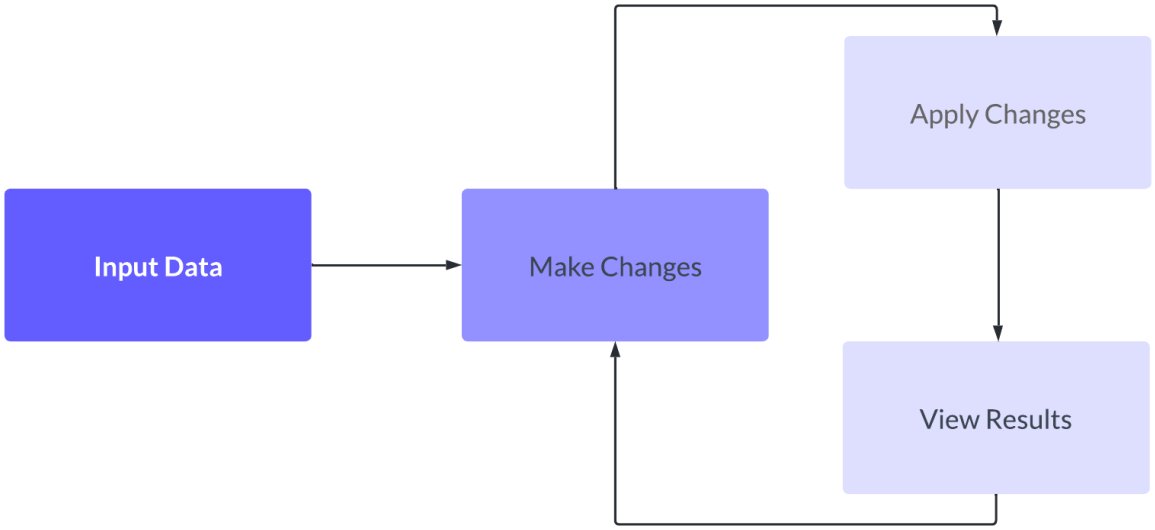
Program Cost / Capacity Overview

This tool can be used to verify the total base cost of a program and its demanded hours (capacity) in a simple and organised manner.

Timelines

The timelines present an intuitive display of each program's timespan across the development. They can be scrolled horizontally to change the date and zoomed in for detail. This also gives the ability to compare different programs' timelines, as it is possible to select multiple ones at the same time.

▼ 3. Application Flow



The application should be used iteratively with 4 key steps:

1. **Input Data:** The first step to start using the application is to populate the database with the information needed to make the calculations, by uploading the necessary data files.
2. **Make Changes:** At this step, the user can edit the information currently in the database in order to test different scenarios. There are some functionalities such as restoring that were implemented as recovery to return to the base scenario.
3. **Apply Changes:** After all changes have been made, the user **MUST** click the **Apply Changes** button on the navigation bar so they can take effect. This button runs the algorithm that updates the current program scores and information based on the current database state.
4. **View Results:** With the changes applied, the only thing left is to analyse the results and take conclusions based on them. After viewing and exporting the results, the user can return to the **Make Changes** phase in order to continue testing.

▼ 4. User Manual

Input Data

In order to input the necessary data to the application some rules must be followed. To input some files, the user must navigate to the `Input` tab, and click/drop files on the box at the top. All files must be in the Excel format (**.xlsx**). There are 2 files required for the tool to work properly, and 2 other files can be uploaded but there are currently no use for them. They should be uploaded in the following order:

1. **Project Demand/Booking/Cost:** This file must be the first one to be uploaded. It must contain the following columns: `Program Name`, `Item Name`, `Item Number`, `Project Name`, `Project Number`, `Demand`, `Booking`, `Year Month` and `Cost`.

2. **Timelines:** This file must be uploaded after the previous one. It must contain the following columns: `Program Name`, `Item Name`, `Item Number`, `Phase`, `Milestone Name`, `Milestone Search Field`, `Current Planned Finish Date` and `Actual Finish Date`.
3. **RBS Availability:** This file has no uses in the tool. In order to be uploaded, it must contain the following columns: `Department Structure - RBS2`, `Department Structure - RBS3`, `Department Structure - RBS4`, `Department Structure - RBS5`, `Availability` and `Year Month`.
4. **RBS Demand/Booking:** This file has no uses in the tool. In order to be uploaded, it must contain the following columns: `Department Structure - RBS2`, `Department Structure - RBS3`, `Department Structure - RBS4`, `Department Structure - RBS5`, `Department Structure - RBS6`, `Department Structure - RBS7`, `Department Structure - RBS8`, `Program Name`, `Item Name`, `Item Number`, `Project Name`, `Project Number`, `Demand`, `Booking` and `Year Month`.

Edit Data

In order to edit data, you must navigate to the `Input` tab and select the program, or its sub-component that you desire to edit. After selecting the component, please click the `EDIT` button under its actions which will show a form. On this form, you are able to remove fields (clicking on the Trash icon on the left of the input field), or change its value, by changing the value inside the input field. After the desired changes, you must click on the `CONFIRM` button to save the data into the database.

Add External Fields

External Fields can only be added to Programs themselves, and not their components. When you select a program in the `Input` tab, and click the `EDIT` button, you have a form at the end that lets you add additional fields. You have some buttons that automatically crates the most used external fields, but if you want to add more you can fill in the field name and select the field type to add it to the program.

Mark as Strategic

In order to mark a program as Strategic, please navigate to the `Input` tab and select the desired program. After that, click on the `EDIT` button to edit the program's properties. When the editing form appears, click `MARK AS STRATEGIC` followed by the `CONFIRM` button to save the changes.

Restore Data

In order to restore data to the default values uploaded in the files you have two options. After navigating to the `Input` tab, you can see a `RESTRORE DATABASE` button under the Database Actions, that restores every entry to its default. On the other hand, if you just want to restore specific entries, you can select the entry you want and click the button `RESTORE` under its actions.

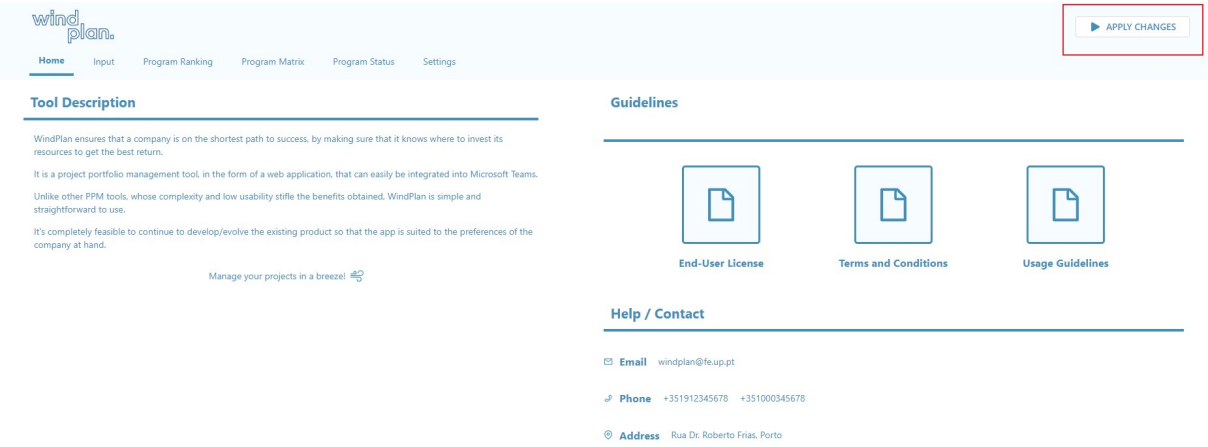
Remove Data

In order to remove data from the database you have two options. After navigating to the `Input` tab, you can see a `CLEAR DATABASE` button under the Database Actions, that resets the database (it is necessary

to re-upload the files to keep using the tool). On the other hand, if you just want to remove specific entries, you can select the entry you want and click the button `REMOVE` under its actions.

Apply Changes

In order to apply the changes and run the tool algorithm, you must click the `APPLY CHANGES` button on the top-right corner of the screen (see below) and wait for it to finish loading.

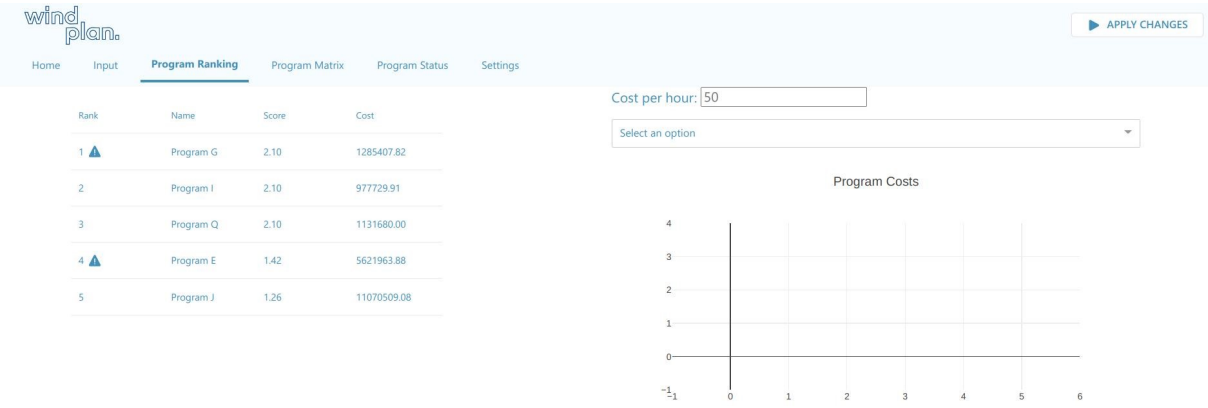


See Program Ranking

In order to see the program ranking (after all data has been upload and changes have been applied) please navigate to the `Program Ranking` tab. On the left side of your screen you can see the program ranking, with a row for each program containing its rank, a marker in case of strategic programs, its name, its score and its total cost (R&D Cost + Hours * Cost per hour).

See Program Costs

In order to see the program costs (after all data has been upload and changes have been applied) please navigate to the `Program Ranking` tab. You will see a page similar to the one below:



Using the drop down on the right, *Select an option*, select the desired program and the plot will automatically display the costs.

Export Program Costs

In order to export the program costs **you must first execute the steps from the item above (See Program Costs)**. Afterwards, you can use the plot tool bar as seen below.

Plot Tool bar

The first button (counting from the left) exports the plot to JPEG. The second one exports the plot to PDF.
If data has not been input or if the changes have not been applied, it won't be possible to export the graph.

See Impact / Effort Matrix

In order to see the program cost / capacity overview (after all data has been upload and changes have been applied) please navigate to the `Program Matrix` tab. The matrix will appear automatically.

In case the matrix does not appear, **please verify if the data has been input correctly and all changes been applied**.

Export Impact / Effort Matrix

In order to export the matrix, **you must first execute the steps from the item above (See Impact/Effort Matrix)**.

Afterwards, and similarly to **Export Program Costs**, use the plot toolbar as seen below.

Plot Toolbar

The first button (counting from the left) exports the matrix to JPEG. The second one exports the matrix to PDF.
If data has not been input or if the changes have not been applied, it won't be possible to export the matrix.

See Program Cost / Capacity Overview

In order to see the program cost / capacity overview (after all data has been upload and changes have been applied) please navigate to the `Program Status` tab. In this tab, select the desired program at the

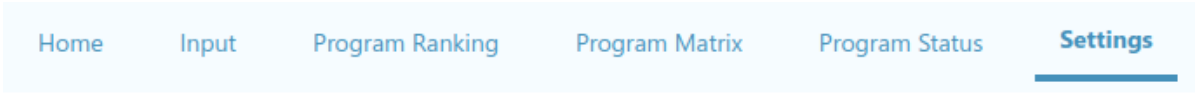
top, and you are able to see the cost and the number of hours (capacity) for each project of that program.

See & Compare Timelines

In order to see and compare program timelines you need to navigate to the `Program Status` tab. After that, under the Timeline divider, you can select the Program you wish to see the timeline, or multiple programs, if you wish to compare them. At the time of the selection, the timeline will update with a row for each project associated to the selected program and with its milestones on the timeline.

You can see the timeline on an yearly basis or on a monthly basis. By default, the timeline starts in the yearly basis. To zoom into the month, you can click the specific month on the top of the timeline. To zoom back to the year, you can click at the very top of the timeline. You are also able to scroll by clicking and dragging the mouse on the timeline.

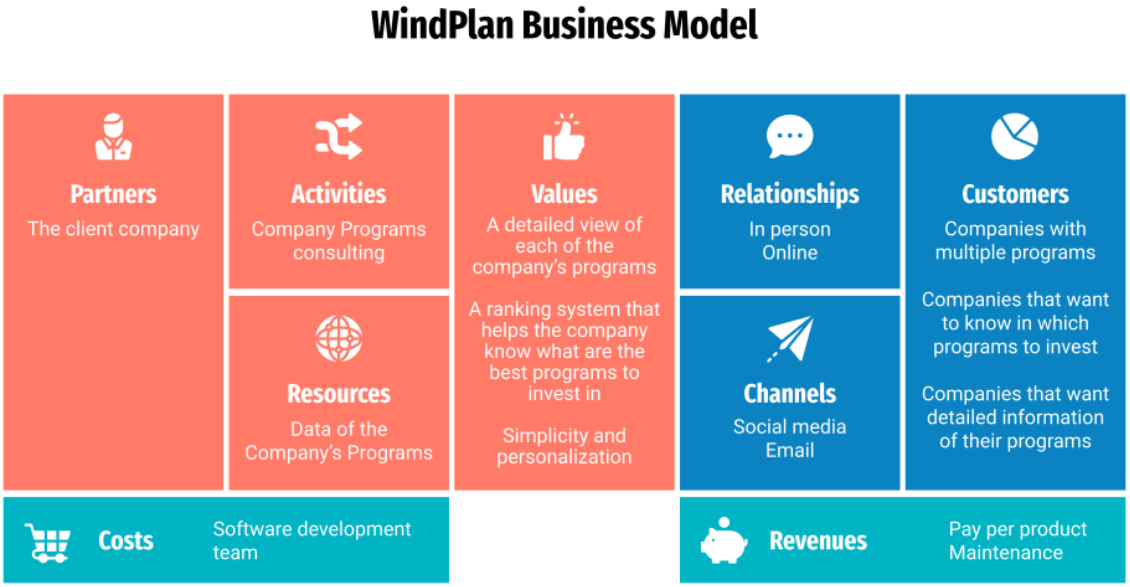
▼ 5. Administrator Manual



The tool administrator focus should be on the Settings tab. This tab is responsible for managing both the scoring variables and other key variables on the tool. The following variables are customizable:

- **Cost per Hour:** Cost per hour of work booked to a program.
- **Score Function:** As stated in **Application Key Aspects and Features**, the score function is composed of three parts (*VALUE_EFFORT*, *GATE*, *PL_PERIOD*) and whose weights are modifiable in this section.
- **Effort Function:** The effort calculations are based on two parts (*VPS_HOURS*, *RD_COST*), whose weights are adjustable in this section.
- **Value Function:** The value calculation, as referred in the **Application Key Aspects and Features,** has a weight for the Contribution Margin (*CM_WEIGHT*) which is also customizable.

Business Model



Findings and Metrics from the Build-Measure-Learn Phase

Due to the NDA's delay, our build-measure-learn phase was quite short, focusing on the last three weeks (when we had access to customer data). However, it proved to be quite productive, due to the team's commitment, as we managed to obtain the Minimum Viable Product (MVP) we desired.

This section describes our actions in each of the stages of this phase.

- **Build**

  Due to the reason explained above, the product development had to be very intensive during a short period of time. The best method we discovered for accomplishing this was to split the implementation of each of our application's pages and distribute duties among the group's members. In the last week, the team met to put all these modules together, resolve conflicts and make the latest changes to the product, with the aim of getting it ready for launch on the day of the LGP Challenge.

  In a nutshell, the team was pleased with its performance and impressed by the accomplishments achieved in such a short period of time.

- **Measure**

  It is also necessary to measure the results obtained in the previous step. For this, we hired a service from the ***MESG Agency***, which would be responsible for doing usability tests on our program. In order to request the service in a timely manner, and since we had not yet started product development at

that time, we asked that these tests be carried out on the mock-ups we obtained in the previous phases.

The study involved five users, of different ages and occupations, which were asked to do seven main tasks in the prototypes. The results were gathered in tables, showing, for each user, and in each task:

- the task success, represented by the time each user took to complete it
- number of errors made, i.e. unnecessary actions
- perceived degree of difficulty

The usability tests can be found in the file **UsabilityTests.pdf** under the Build-Measure-Learn folder in our Teams channel.

In addition, another measure we used was the continuous feedback from our customers, with whom we scheduled weekly meetings.

- **Learn**

  Given the measurements' results, the team had to learn by improving the product's quality.

  Regarding usability tests, the main criticisms and corresponding responses from the team were as follows:

  - Non-explanatory main page name (named *Dashboard* in the mock-ups)
    - We renamed this page *Home*, as it would be the first page to be opened once the program starts. Despite the suggestions to remove this page from our application, we decided to keep it, as it would contain the description of the application, along with user manuals and team contacts, aspects required by our customers.
  - Input page criticism
    - The name of this page (*Input*) was criticized, but we decided to keep it, as it was the name suggested by our clients, who will be the future users of the program. Some design suggestions for this page were also mentioned, which we ended up discarding due to the fact that it has undergone major changes, with a big difference between its mock-up and its real implementation.
  - Program Ranking page suggestions
    - We followed some suggestions regarding this page, adding a legend to the graph, which demonstrates the program for each colour. Some users suggested the possibility of seeing a side-by-side comparison of two programs, but this comparison was later implemented by us on the Program Status page.
  - Timeline Updating
    - Finally, the possibility of dragging a program on the timeline was suggested, without having to change the days in the calendar. This was already one of our clients' initial requirements, however, due to time constraints, we agreed with them that this functionality would not be part of the MVP to be developed, although it would be an interesting future idea.

Regarding the continuous feedback from our customers, we always tried to comply with their requests, and it was very important to agree with them on the features to be developed for the MVP as soon as we received access to the company's data. Fortunately, they were always very understanding and cooperative with our team.

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