



This document is a manual for the Level 1 of the Decision Support Toolset developed by Centre for Research & Technology Hellas Hellenic Institute of Transport (CERTH/HIT), under European Project MOMENTUM. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 815069. In this manual, all the steps that need to be followed in order to test different scenarios, in Level 1 are described. Should you require any more information about the Decision Support Tool, please contact **Georgia Ayfantopoulou** ([gea@certh.gr](mailto:gea@certh.gr)), **Josep Maria Salanova Grau** ([jose@certh.gr](mailto:jose@certh.gr)) or **Evrpidis Magkos** ([emagkos@certh.gr](mailto:emagkos@certh.gr))

## Step 1

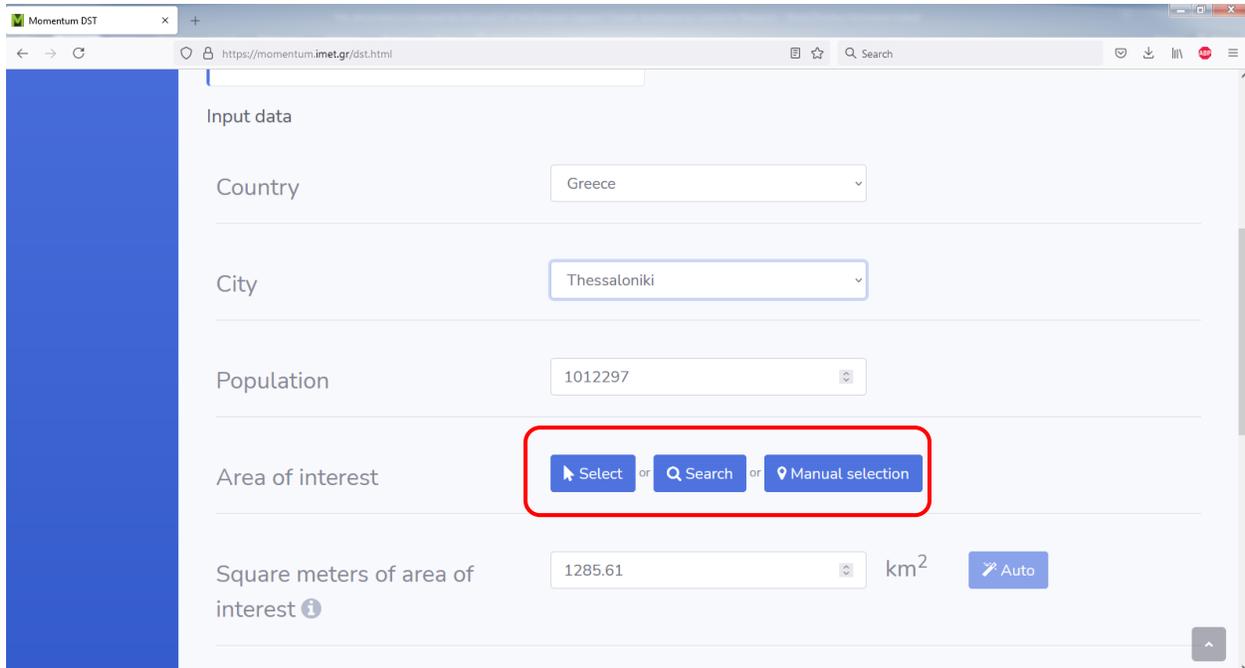
Choose the city you want to investigate. As a default options, the cities and the countries participating in the MOMENTUM project, are included in the dropdown list.

The screenshot shows the "LEVEL 1" interface of the Momentum DST tool. It features a blue sidebar on the left and a main content area with the following elements:

- A header "LEVEL 1" and a instruction box: "Please fill in the following input and click 'Calculate' to get your results."
- An "Input data" section with several fields:
  - "Country": A dropdown menu with "Select" as the current value.
  - "City": A dropdown menu with "Spain", "Greece", "Belgium", and "Germany" as options. "Greece" is highlighted in blue and enclosed in a red rectangular box.
  - "Population": A text input field.
  - "Area of interest": Three buttons labeled "Select", "Search", and "Manual selection".
  - "Square meters of area of": A text input field followed by "km<sup>2</sup>" and an "Auto" button.

## Step 2

Another option given by the Decision Support Tool is that a user can define the area they want to investigate.



The screenshot shows the Momentum DST web application interface. The browser address bar displays "https://momentum.imet.gr/dst.html". The page title is "Momentum DST". The interface is divided into several sections under the heading "Input data":

- Country:** A dropdown menu with "Greece" selected.
- City:** A dropdown menu with "Thessaloniki" selected.
- Population:** A text input field containing "1012297".
- Area of interest:** A section containing three buttons: "Select", "Search", and "Manual selection". These buttons are separated by "or" text. This entire section is highlighted with a red rectangular box.
- Square meters of area of interest:** A text input field containing "1285.61", followed by "km<sup>2</sup>" and an "Auto" button.

For that purpose, a user can choose between the given options:

- 1) Select the area from defaults given areas of the city inserted in the previous step
- 2) Search the area
- 3) Manually select the area they want to investigate

**Info:** Once you choose the Country and the City from Step1 & Step2, you can choose from the areas available the one you want to investigate. The areas in the dropdown list are located in the city you selected before.

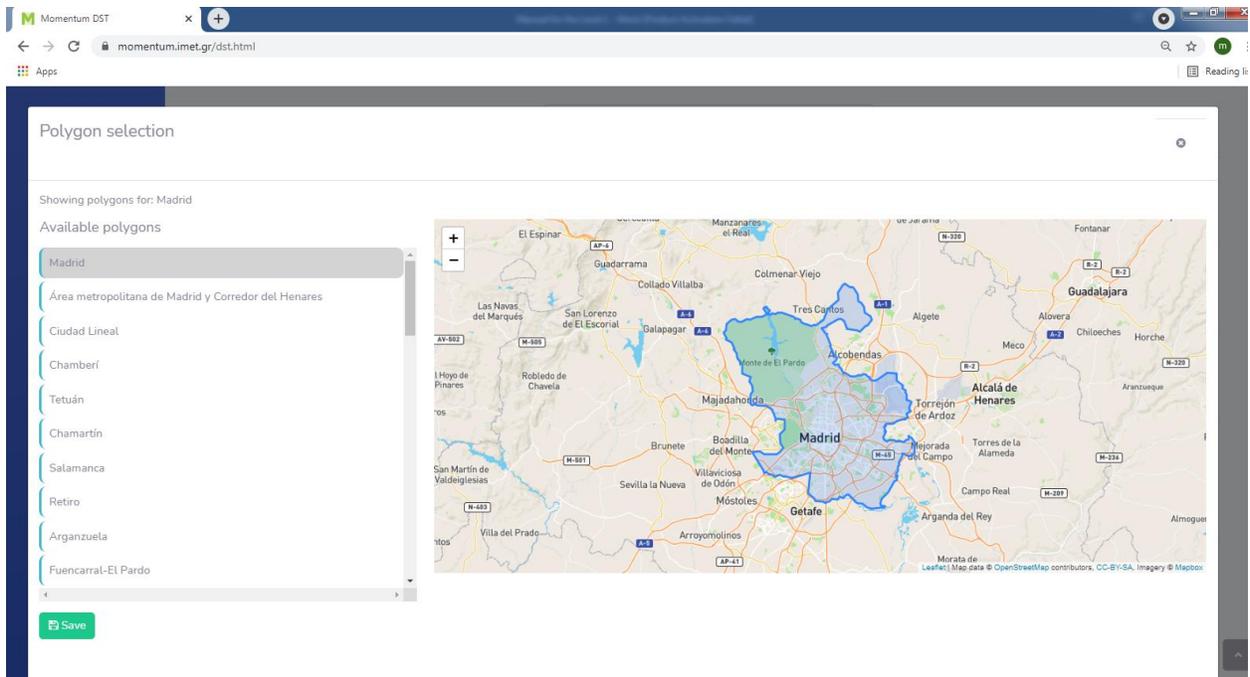


Figure 1: Available option 1

**Info:** you need to type the City and the Country you want to investigate

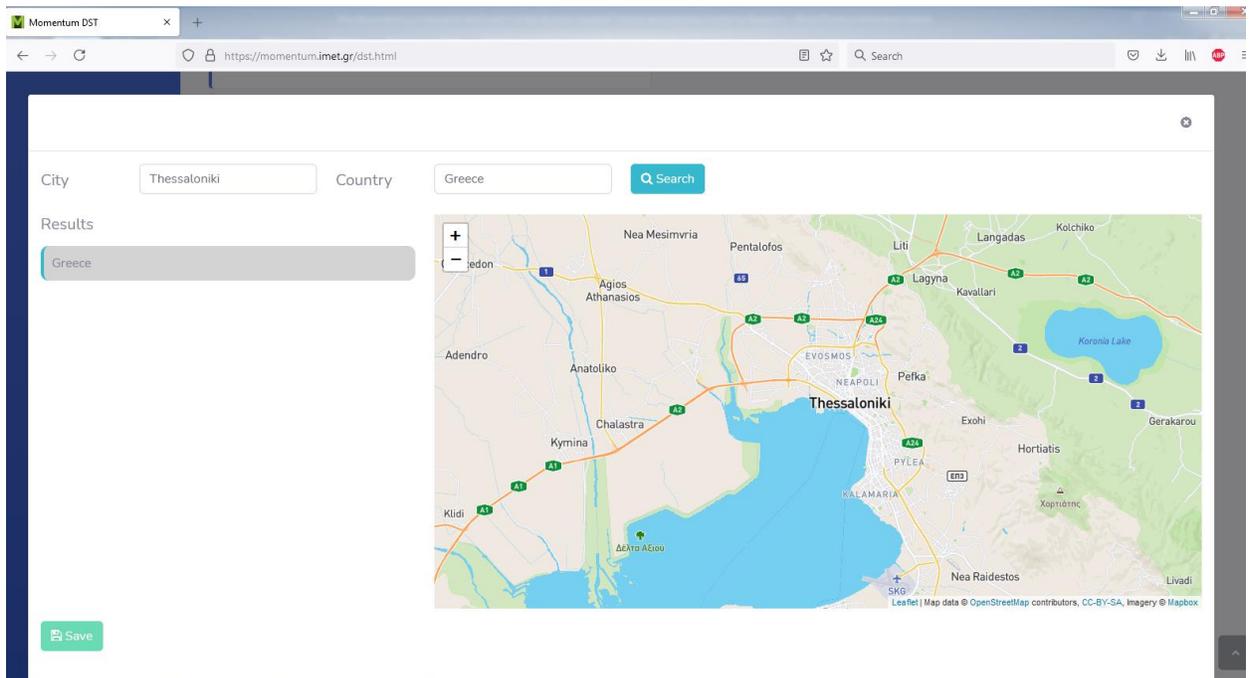


Figure 2: Available option 2

**Info:** First you user should draw the area they want, click on **DONE** button, then **SAVE** button and close the window. If you need to draw again the polygon, you need to press the **CLEAR POLYGON** button and follows the steps described above.

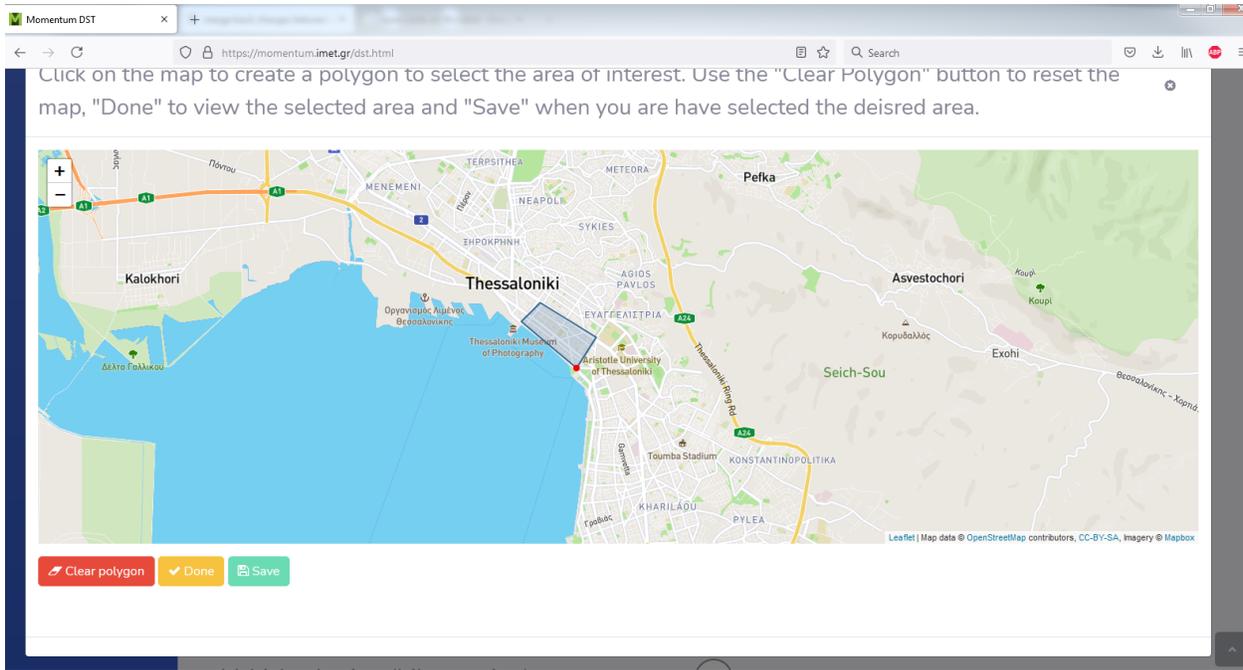


Figure 3: Available option 3

Once user perform the above steps, they will receive the square meters of the area selected, by clicking the button **AUTO**, as it can be seen in the figure below.

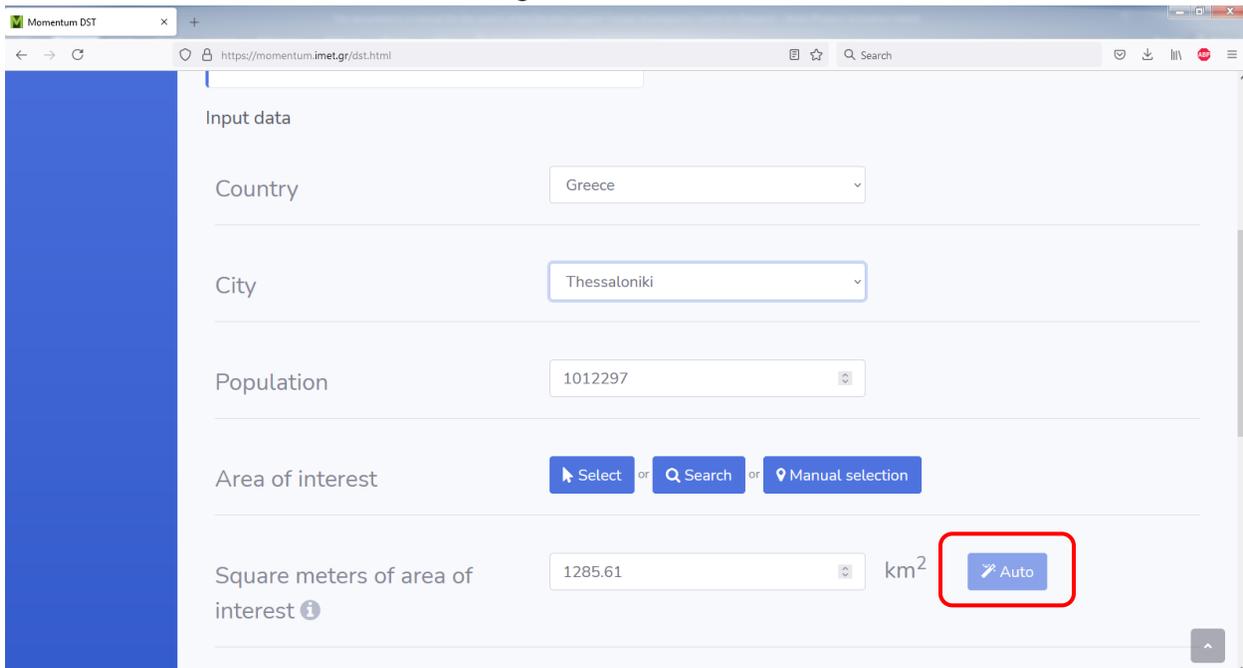
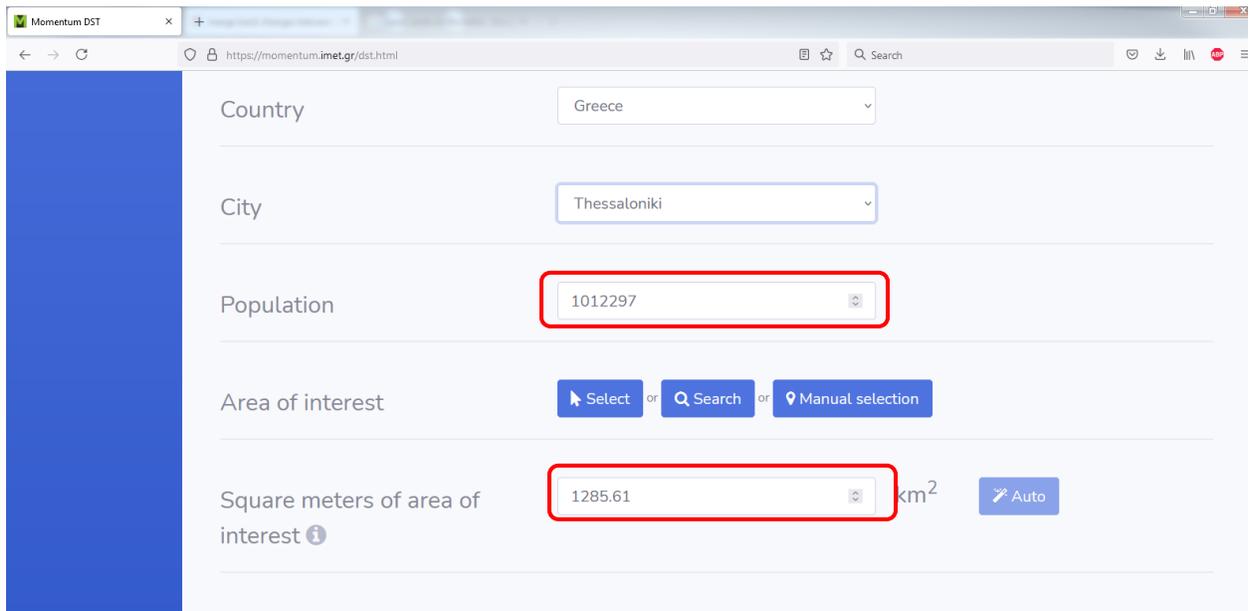


Figure 4: Available option 3 - square meters

## Step 3

For each city selected, values about the parameters needed (population, square meters), are automatically filled in the sections below. Data derived from information stored in MOMENTUM's repository, about the cities. It is important to mention that all values can be modified manually.



The screenshot shows a web browser window with the URL <https://momentum.imet.gr/dst.html>. The page contains a form with the following fields and options:

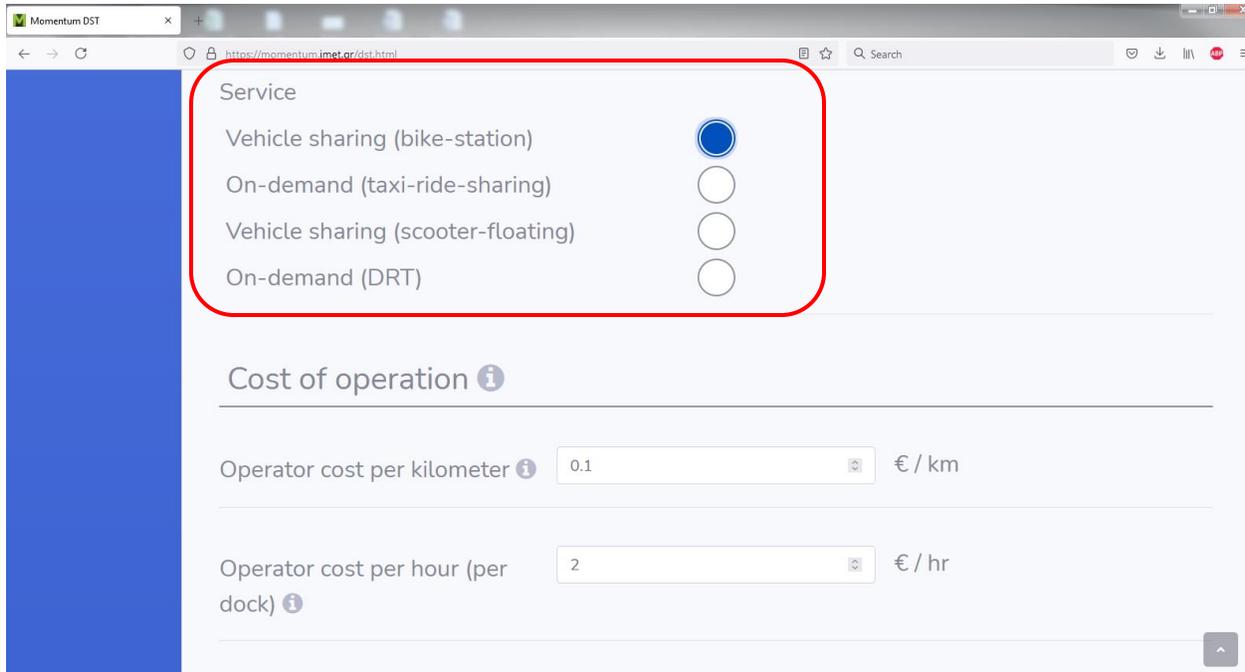
- Country:** A dropdown menu with "Greece" selected.
- City:** A dropdown menu with "Thessaloniki" selected.
- Population:** A text input field containing the value "1012297".
- Area of interest:** Three buttons: "Select", "Search", and "Manual selection".
- Square meters of area of interest:** A text input field containing the value "1285.61", followed by the unit "km<sup>2</sup>". There is also an "Auto" button next to the field.

The "Population" and "Square meters of area of interest" fields are highlighted with red boxes in the image.

## Step 4

Once area and population of the examined area is defined, user need to choose the service they want to examine. Services analyzed under the MOMENTUM project can be seen in the figure below and are

- Vehicle sharing (bike sharing system)
- On demand (taxi-ride sharing)
- Vehicle sharing (scooter – floating)
- On demand (DRT services)



The screenshot shows a web browser window with the URL <https://momentum.imet.or/dst.html>. The page features a blue sidebar on the left. The main content area is titled "Service" and contains a list of four options, each with a radio button. The first option, "Vehicle sharing (bike-station)", is selected, indicated by a blue radio button. The other three options, "On-demand (taxi-ride-sharing)", "Vehicle sharing (scooter-floating)", and "On-demand (DRT)", have unselected white radio buttons. A red rounded rectangle highlights this entire "Service" section. Below the service selection, there is a section titled "Cost of operation" with an information icon. It contains two input fields: "Operator cost per kilometer" with a value of 0.1 and a unit of €/ km, and "Operator cost per hour (per dock)" with a value of 2 and a unit of €/ hr. Both input fields have information icons.

Figure 5: Available services

## Step 5

When examined service is selected, default values for each input data needed are provided. The aim is to give to the user an indicator of the range of the values that will be needed. Input data are divided into two categories associated with the cost of the operation and socio-economic and functional variables

Cost of operation ⓘ

Operator cost per kilometer ⓘ  € / km

Operator cost per hour (per car) ⓘ  € / hr

User costs weight ⓘ

Figure 6: Input data - Cost of operation

Socio-economic and functional variables ⓘ

Value of time of users ⓘ  € / hr

Vehicle speed ⓘ  km / hr

Mean demand of the area ⓘ  trips / hr

Figure 7: Input data - Socio-economic and functional variables

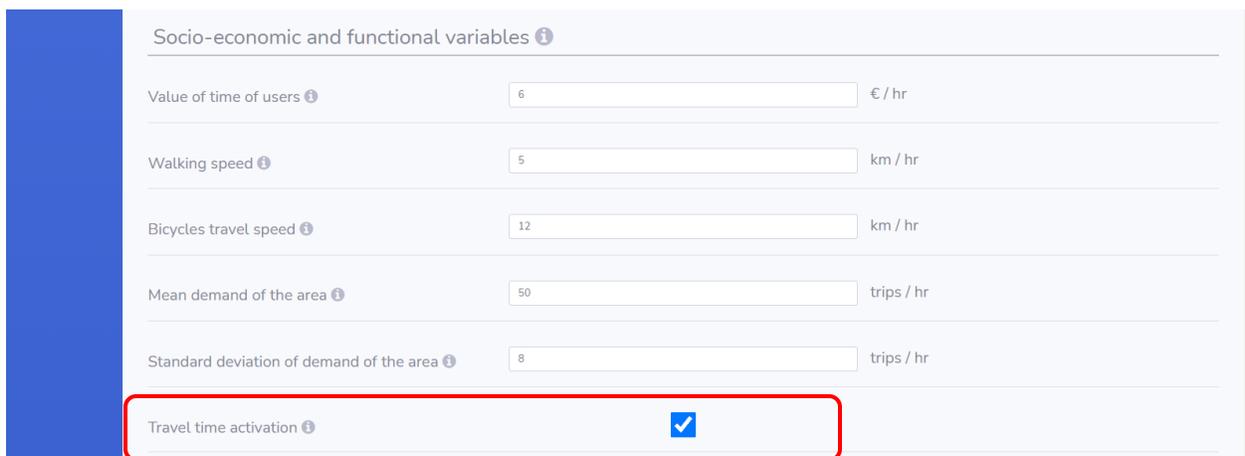
## Step 6

Once input data are imported in the tool, user can add constrains and decision variables to tool in order to add a more concrete investigation of the service examined



The screenshot shows a section titled "Cost of operation" with three input fields. The first field is "Operator cost per kilometer" with a value of 0.5 and unit €/ km. The second field is "Operator cost per hour (per car)" with a value of 15 and unit €/ hr. The third field, "User costs weight", has a value of 0.5 and is highlighted with a red rectangular box. Each field has an information icon (i) to its right.

Figure 8: User cost weight



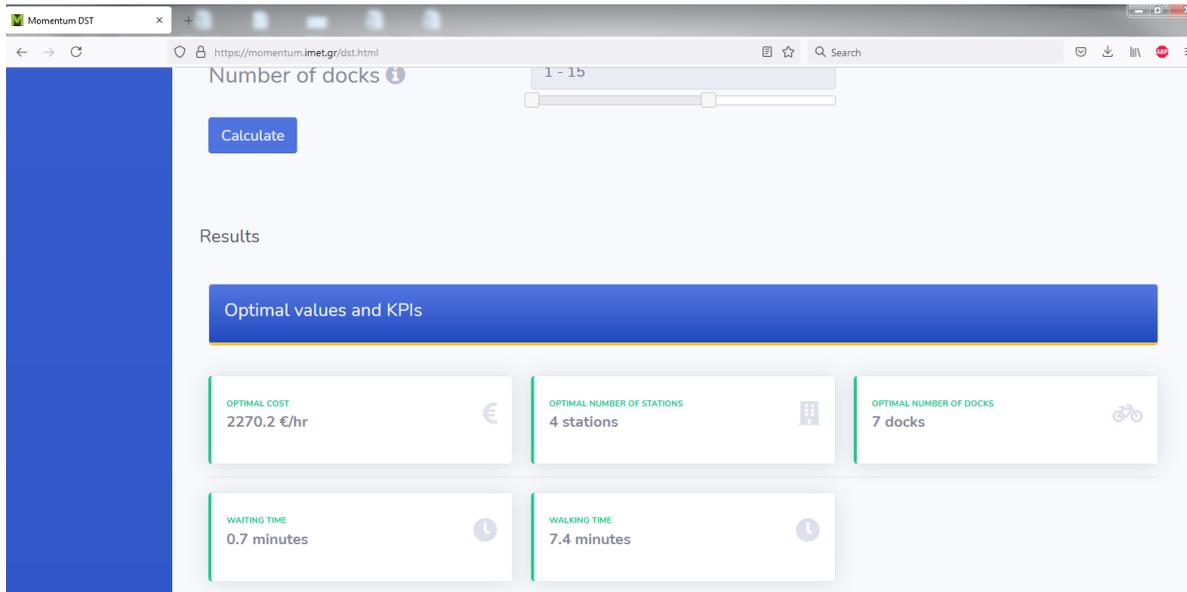
The screenshot shows a section titled "Socio-economic and functional variables" with five input fields and one checkbox. The first field is "Value of time of users" with a value of 6 and unit €/ hr. The second field is "Walking speed" with a value of 5 and unit km / hr. The third field is "Bicycles travel speed" with a value of 12 and unit km / hr. The fourth field is "Mean demand of the area" with a value of 50 and unit trips / hr. The fifth field is "Standard deviation of demand of the area" with a value of 8 and unit trips / hr. The sixth field, "Travel time activation", is a checkbox that is checked and highlighted with a red rectangular box. Each field has an information icon (i) to its right.

Figure 9: Travel time activation

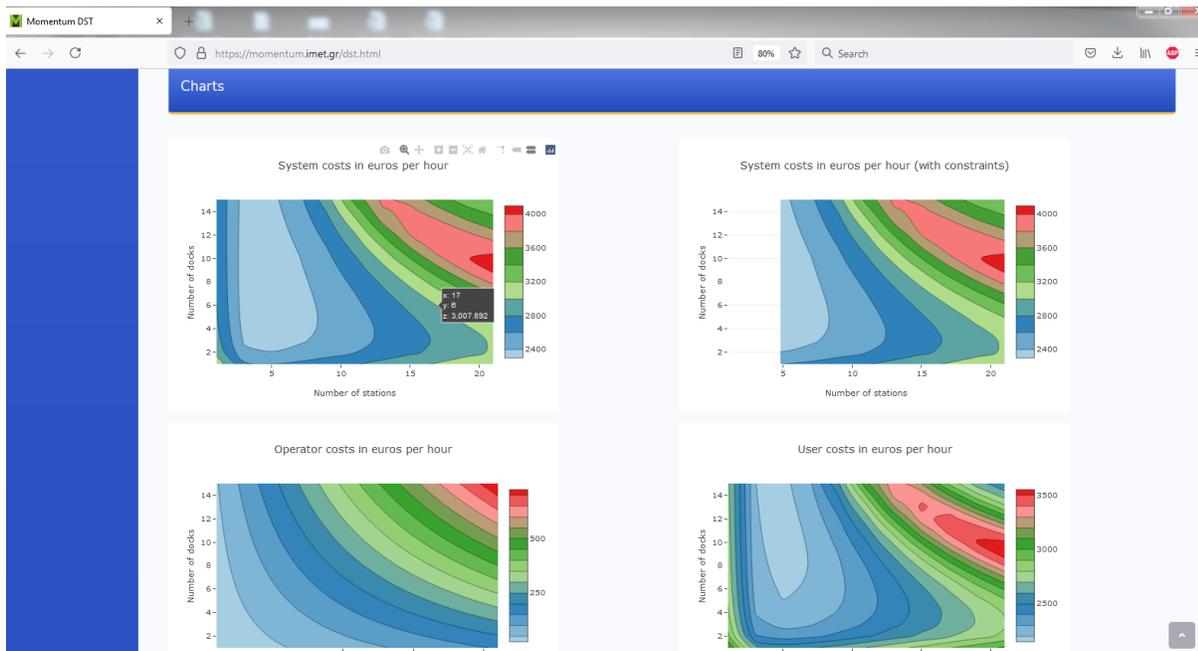
## Step 7

Once all parameters are filled, then user need to press the calculate button. Then results of the tool will be available. Result are divided in two sections: "Optimal values and KPIs" and "Charts"

In the section optimal values and KPIs, optimal solution of the values are presented, as it can be seen in the figure below.



In the section Charts, user can find charts produced based on the results of the Level 1 tool.



## Step 8

In this section, user need to insert the values to Run the sensitivity module for the demand

Constraints ⓘ

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Maximum waiting time ⓘ  min

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Maximum walking time ⓘ  min

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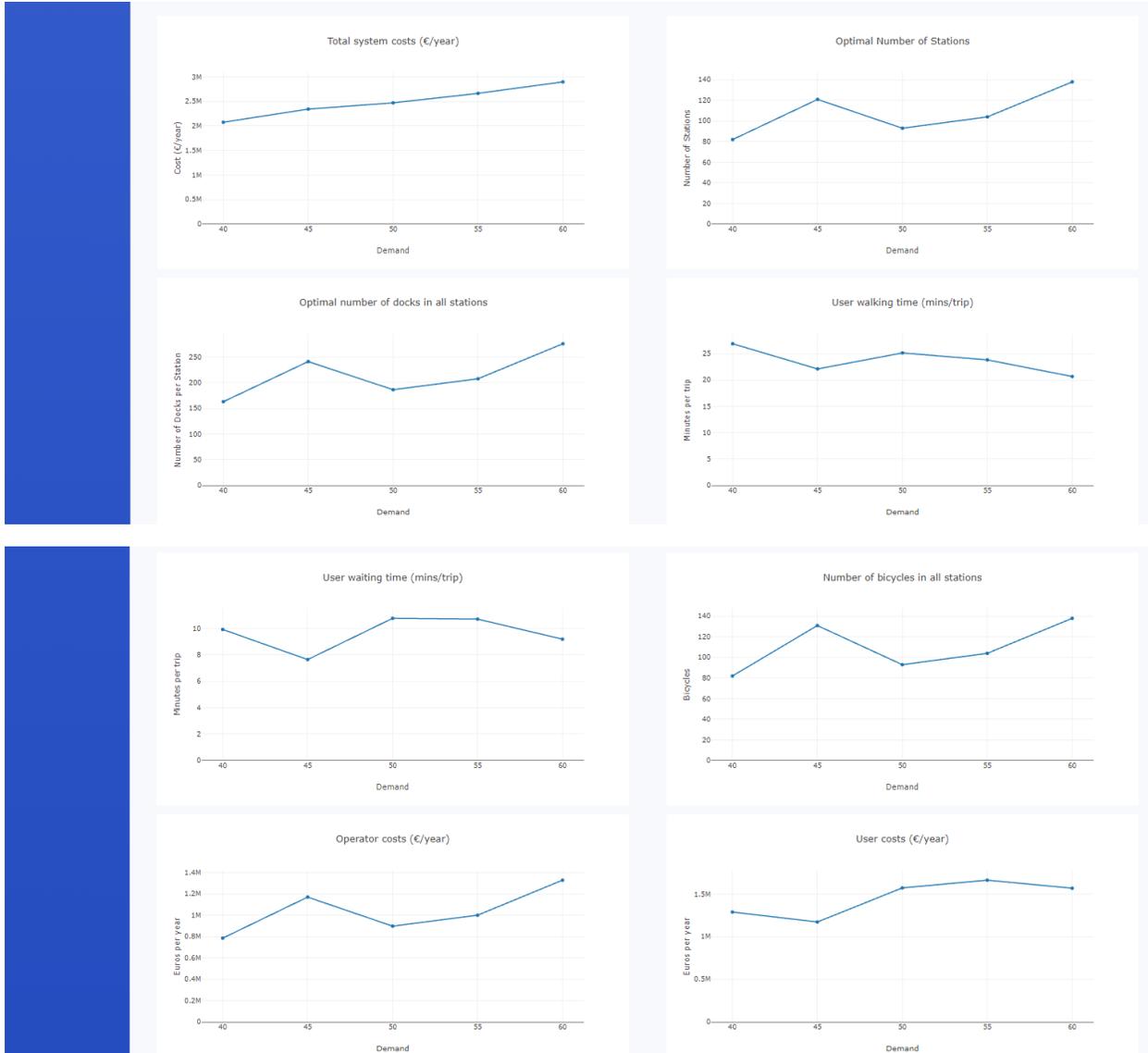
Run the sensitivity module for the demand

Demand range around the one declared above (%)

Figure 10: Sensitivity module for demand

## Step 9

In this section. Charts presented are produced based on the values of “Run the sensitivity module for the demand” constrain, user selected in previous steps.



## Step 10

Once the testing on the DST is finished, by clicking the button **SAVE AS PDF**, users can extract a PDF file, which contains all parameters, results and charts examined in Level 1.

The screenshot displays a web application interface with two charts under the heading 'waiting time'. The left chart is a contour plot with 'Number of docks' on the y-axis (ranging from 2 to 14) and 'Number of stations' on the x-axis (ranging from 5 to 20). A color scale on the right indicates values from 40 (blue) to 240 (red). The right chart is a line graph with 'Walking time of users (minutes)' on the y-axis (ranging from 0 to 14) and 'Number of stations' on the x-axis (ranging from 0 to 20). The data points show a decreasing trend from approximately 14.5 minutes at 1 station to about 3.5 minutes at 20 stations. A blue button labeled 'Save as PDF' is highlighted with a red rectangular box. Below the charts, there is a European Union flag and text stating: 'This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 815069.' The footer includes 'Copyright © Momentum Project 2021' and a small upward arrow icon.