

Axial Distance-based Aggregated Measurement (ADAM) method: Application manual



ADAM method is developed as a representative of a new group of MCDM methods, namely geometric methods. It is based on establishing alternatives ranking according to the comparisons of the complex polyhedra volumes corresponding to the defined alternatives. Its introduction to the community and theoretical background are presented in the article ([Krstić et al. 2023](#)). This document provides an user guide for the developed ADAM MCDM software (<http://adam-mcdm.com>).

After launching the application, it usually takes several seconds for the main interface to arrive. The interface looks like this:

The screenshot shows the main interface of the ADAM MCDM method application. The window title is "ADAM MCDM method". The interface is divided into several sections:

- CHOOSE SAVING LOCATION**: A button at the top left.
- LOAD INPUT DATA**: A button below "CHOOSE SAVING LOCATION".
- EVALUATE THE ALTERNATIVES**: A button below "LOAD INPUT DATA".
- MANUAL INPUT**: A button at the bottom left.
- ALTERNATIVES SHEET NAME**: A text input field containing "alternatives".
- CRITERIA SHEET NAME**: A text input field containing "criteria".
- DISPLAY OPTIONS**: A section on the right containing a "SHOW INPUT DATA" button.
- Number of Alternatives**: A text input field containing "1".
- Number of Criteria**: A text input field containing "1".
- manual criteria order**: A checkbox that is currently unchecked.

The first step necessary to perform is to choose the saving location of the outputs. By clicking the button "CHOOSE SAVING LOCATION" a popup emerges where the user can select the desired saving location. There are two possibilities for the input of initial data:

- loading from an excel file;
- inserting data manually through the application interface.

The loading of data from an .xlsx file is performed by clicking on the "LOAD INPUT DATA" button and navigating to the desired input file. It is necessary to fill the fields "ALTERNATIVES SHEET NAME" and "CRITERIA SHEET NAME" with the corresponding sheet names where the information about criteria and evaluation of alternatives according to those criteria is stored. It is necessary to provide the .xlsx file in an appropriate format to be ingested by the application. The criteria sheet should contain the following columns:

- Criteria – Contains the names or abbreviations of the criteria used in the analysis;
- Type – Explains the nature of the criteria: min or max;

- Weight – Contains the weight coefficients of criteria;
- Preferred Order – This column is filled with numeric values if a specific order of criteria is preferred regardless of their weight coefficient. The criteria are then sorted ascendingly according to the provided values. The purpose of this column is to enable sensitivity analyses and experimentation with different data configurations. This column should remain blank if the criteria rankings are to be performed according to their weight coefficients.

The criteria sheet should look something like this:

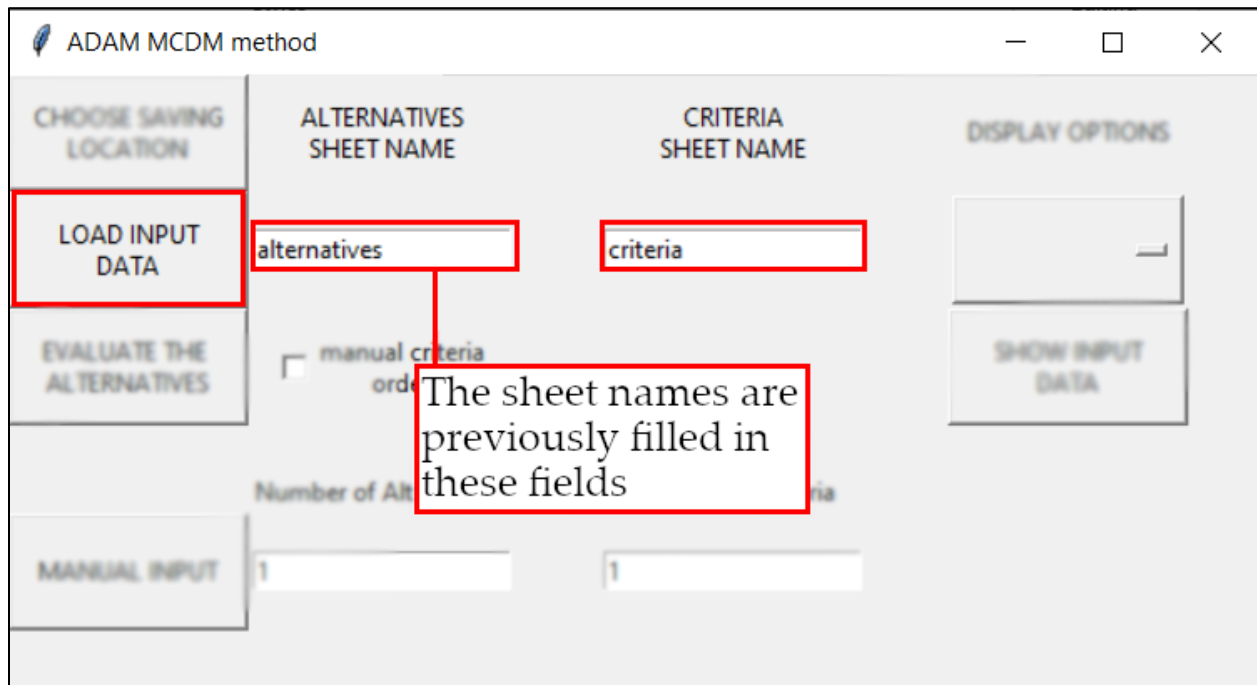
	A	B	C	D
1	Criteria	Type	Weight	Preferred Order
2	C1	min	0.086	
3	C2	max	0.115	
4	C3	min	0.173	
5	C4	max	0.268	
6	C5	max	0.193	
7	C6	max	0.058	
8	C7	max	0.069	
9	C8	max	0.038	
10				
		alternatives	criteria	

The alternatives sheet should contain the following columns:

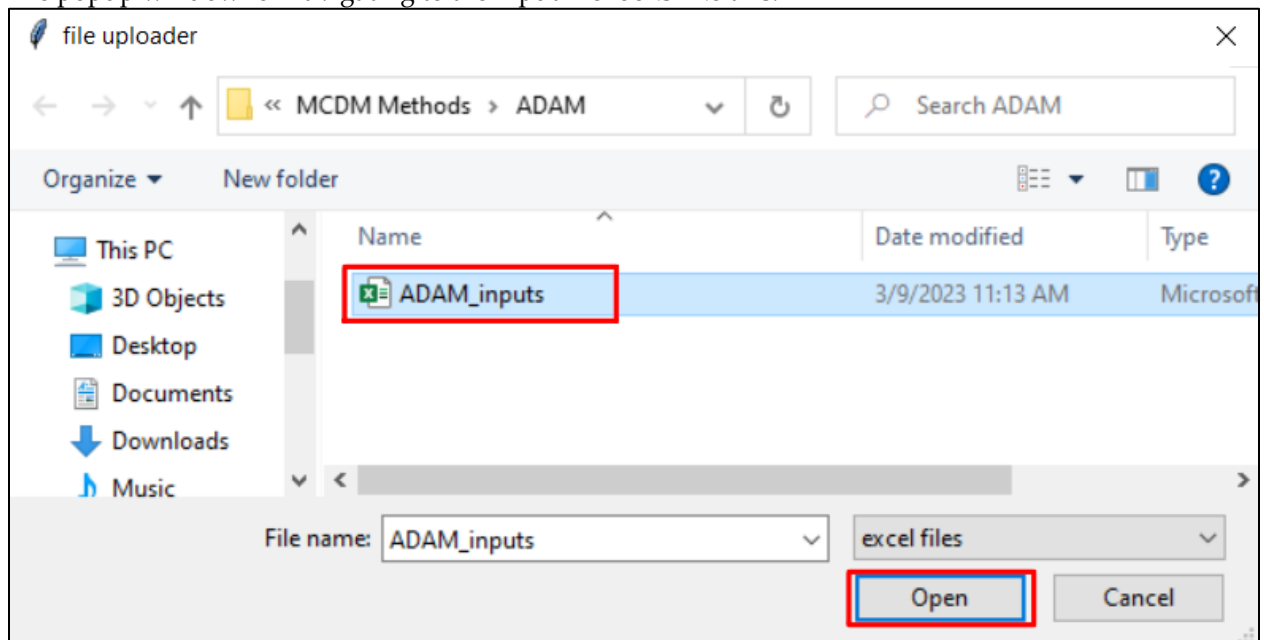
- Alternatives – Contains the names or abbreviations of the alternatives considered for the evaluation;
- A column for every criterion defined in the criteria sheet should be present.

The remainder of the table is filled with numeric values that correspond to the evaluation of alternatives according to the criteria. An alternatives sheet should look something like this:

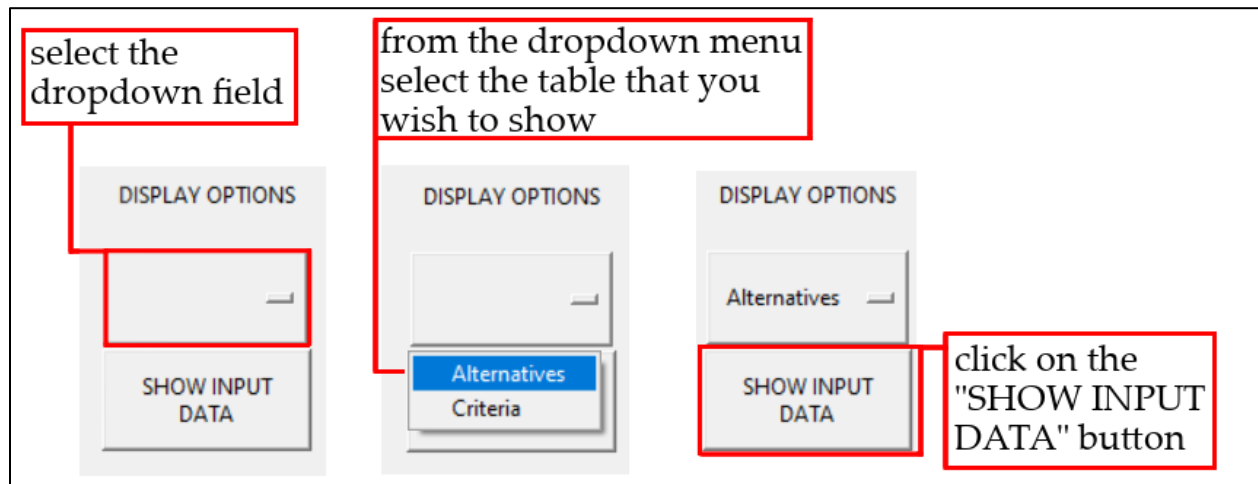
	A	B	C	D	E	F	G	H	I
1	Alternatives	C1	C2	C3	C4	C5	C6	C7	C8
2	BM1	0.600	0.900	0.656	0.900	0.700	0.500	0.400	1.000
3	BM2	0.200	0.700	0.544	0.300	0.600	0.800	1.000	0.700
4	BM3	0.500	0.700	0.322	0.800	1.000	1.000	0.900	0.900
5	BM4	0.400	0.200	0.211	0.200	0.800	0.500	0.800	0.200
6	BM5	0.900	0.900	0.322	1.000	0.300	0.400	0.200	0.600
7	BM6	0.100	0.400	0.322	0.600	0.700	0.900	0.900	0.300
8	BM7	0.600	0.400	0.100	0.600	1.000	0.800	0.800	0.300
9	BM8	0.700	1.000	0.544	1.000	0.600	0.300	0.300	0.900
10	BM9	0.800	0.600	0.878	0.800	0.600	0.400	0.300	0.700
11									
		alternatives	criteria						



The popup window for navigating to the input file looks like this:



Left clicking on the file and then on “Open” loads the file in the application. The loaded data could be displayed and double-checked in the application by selecting which data to show (alternatives or criteria table) in the dropdown menu:



Then the selected input table is displayed in a popup window:

Input data: Alternatives									
	Alternative	C1	C2	C3	C4	C5	C6	C7	C8
1	BM1	0.6	0.9	0.66	0.9	0.7	0.5	0.4	1.00
2	BM2	0.2	0.7	0.54	0.3	0.6	0.8	1.00	0.7
3	BM3	0.5	0.7	0.32	0.8	1.00	1.00	0.9	0.9
4	BM4	0.4	0.2	0.21	0.2	0.8	0.5	0.8	0.2
5	BM5	0.9	0.9	0.32	1.00	0.3	0.4	0.2	0.6
6	BM6	0.1	0.4	0.32	0.6	0.7	0.9	0.9	0.3
7	BM7	0.6	0.4	0.1	0.6	1.00	0.8	0.8	0.3
8	BM8	0.7	1.00	0.54	1.00	0.6	0.3	0.3	0.9
9	BM9	0.8	0.6	0.88	0.8	0.6	0.4	0.3	0.7

In this view, the data could be manually altered. Simply double left click on a cell, input the desired value and press the enter key. The modified data are automatically saved after every change confirmed by the enter key. After finishing all necessary adjustments, the window should be closed by clicking the „X” button in the top right corner of the popup window.

In the case of the manual input of the data, the number of alternatives and criteria should be specified in advance, and those values should be provided in the fields “Number of Alternatives” and “Number of Criteria”. The values in these fields do not interfere if the data is loaded from an .xlsx file.

ADAM MCDM method

CHOOSE SAVING LOCATION

LOAD INPUT DATA

EVALUATE THE ALTERNATIVES

ALTERNATIVES SHEET NAME

CRITERIA SHEET NAME

DISPLAY OPTIONS

Alternatives

SHOW INPUT DATA

MANUAL INPUT

Number of Alternatives

Number of Criteria

The desired number of alternatives and criteria are defined in these fields

press the "MANUAL INPUT" button

After clicking the “MANUAL INPUT” button, two windows pop up: one for the input of alternatives and their values according to the criteria, and another for the input of the information about the criteria.

Input data: Alternatives

	Alternative	C1	C2	C3	C4
1	A1				
2	A2				
3	A3				

Input data: Criteria

	Criteria	Type	Weight	Preferred
1	C1			
2	C2			
3	C3			
4	C4			

Double left click on a cell, input the desired value and then press enter. Keep in mind that invoking the manual input overrides any previous data input in the application.

After the input data are loaded/set, simply by clicking the “EVALUATE THE ALTERNATIVES” button triggers the ADAM MCDM algorithm and saves the results into two files:

- ADAM – results.xlsx – This file contains the volumes and rankings of alternatives;
- polyhedra_figures.html – This file contains the visual representations of alternatives polyhedra.