

# Integrating Scenarios in Multi-Criteria Decision Module for “Risk-CHANGES” platform

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## Introduction

Multi-Criteria Decision Analysis (MCDA) offers the chance for a better decision on the future so it deserves consideration and attention. Combining MCA and future outcomes will improve the quality of the decision, avoid conflicts and save time



MCDA is defined based on different indicators As a result of changing risk under different scenarios and future years such as land use changes, climate changes or population growth, the indicator values will change. This leads to different results under different scenarios. Application of this study is to facilitate for decision makers the necessary parameters like values and weights using software support. The results of Cost Benefit Analysis and Risk Analysis under different scenarios for different future years will be automatically added to the indicator matrix for Multi-Criteria evaluation and comparison.



## Tools



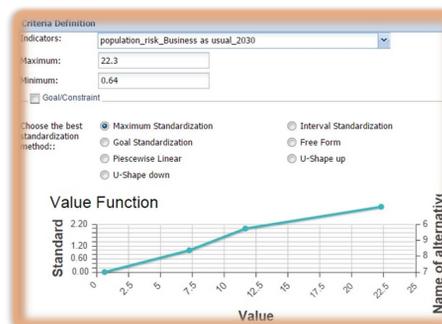
## Alternatives

## Inputs:

Indicatorname	-5	-7	-8	-9
economic_risk_Business as usual_2020	690560.06	140296.93	291284	942702.235
economic_risk_Business as usual_2030	927675.52	161184.44	209494.33	1276305.805
economic_risk_Business as usual_2040	1383314.295	181397.825	426077.175	1610912.39
population_risk_Business as usual_2020	18.585	0.245	5.89	9.35
population_risk_Business as usual_2030	22.3	0.64	7.275	11.66
population_risk_Business as usual_2040	28.24	0.92	9.445	14.735

Indicators and alternatives matrix under different scenarios and future year:

Current situation:6, Alternative 1: 7, Alternative 2:8, Alternative 3: 9

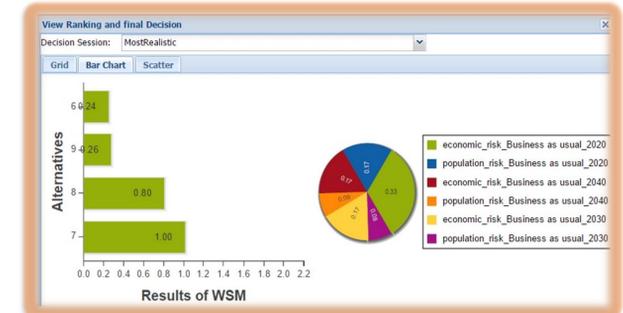


Standardization

Name	Weight	Normalized Weight
groupindicator: system		
economic_risk_Most realistic_2020	4	0.33
population_risk_Most realistic_2020	2	0.17
economic_risk_Most realistic_2030	2	0.17
population_risk_Most realistic_2030	1	0.08
economic_risk_Most realistic_2040	2	0.17
population_risk_Most realistic_2040	1	0.08

Prioritize Normalized weights

## Results



MCE based on Risk system indicators under different future years. Alternative 7 called as Engineering solution ranked as the best.



MCE based on Risk and Cost system indicators under different future years. Cost prioritized as the most important indicator (70%) Alternative 9 called as Relocation and Alternative 7 called as Engineering Solution ranked as the best.

## Conclusion

This work shows the effect of Multi Criteria Evaluation for analyzing changing risk over the time for different future scenarios and by comparing the results by means of a numerical and graphical view within the system. We believe that Scenario combined with MCDA helps decision-makers to achieve better solutions by expressing their preferences for strategies within and across future scenarios comparison.

<http://changes.itc.utwente.nl/CHANGES-SDSS>

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