Supplemental Online Material

A Multi Expert Decision Support Tool for the Evaluation of Advanced Wastewater Treatment Trains: A Novel Approach to Improve Urban Sustainability

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Figure S1: AQUAPOLO, Sao Paulo and its geographical location

Table S1: Information on AQUAPOLO Project and its water reuse application

General information	
Water reuse Purpose	Industrial application
destination of treated wastewater	Mainly cooling towers and process water.
region/city/area	Santo André and Mauá
Water user	Industries - CAPUAVA Petrochemical Complex
Capacity	1,000 $m^3.s^{-1}$ (design)
Information on the reclaimed water	
Wastewater treatment plant	ABC WWTP
Location	Santo André city
Level of treatment	Tertiary treatment
Volume of water entering the scheme	350 $L.s^{-1}$ - 650 $L.s^{-1}$
Technical characteristics	
Treatment technologies	ASP + MBR (anoxic + aerobic) + disinfection + RO (where necessary)
Infrastructure	From the secondary settling tank, treated wastewater is pumped to the MBR system passing through a battery of disc filter, from the MBR, according to effluent conductivity a specific fraction is treated in a reverse osmosis tray, reuse water is stored and finally pumped to the consumers
Monitoring system	Online (supervisory system)

Figure S2: Location map of Herakleion, Greece

Table S2: Influent characteristics and effluent requirements (NAMA, (2011))

		Summer	Winter
Influent characteristics			
Equivalent inhabitants		30,000	30,000
Average daily supply (design inflow)	m^3/d	6,000	6,000
Peak hourly supply	m^3/h	1,000	1,000
BOD_5	kg/d	2,100	2,100
SS	kg/d	1,950	1,950
TN	kg/d	300	300
	mg/l	50	50
VSS/SS	%	75	75
TP	kg/d	102	102
Effluent requirements			
BOD_5	mg/l	10	10
SS	mg/l	10	10
NH_4-N	mg/l	2	2
NO_3-N	mg/l	10	10
N org	mg/l	2	2
TP	mg/l	15	15
Total Coli	1/ml	< 100/100	< 100/100
Faecal coli	1/ml	< 50/100	< 50/50

S2. List of evaluation criteria considered in this study

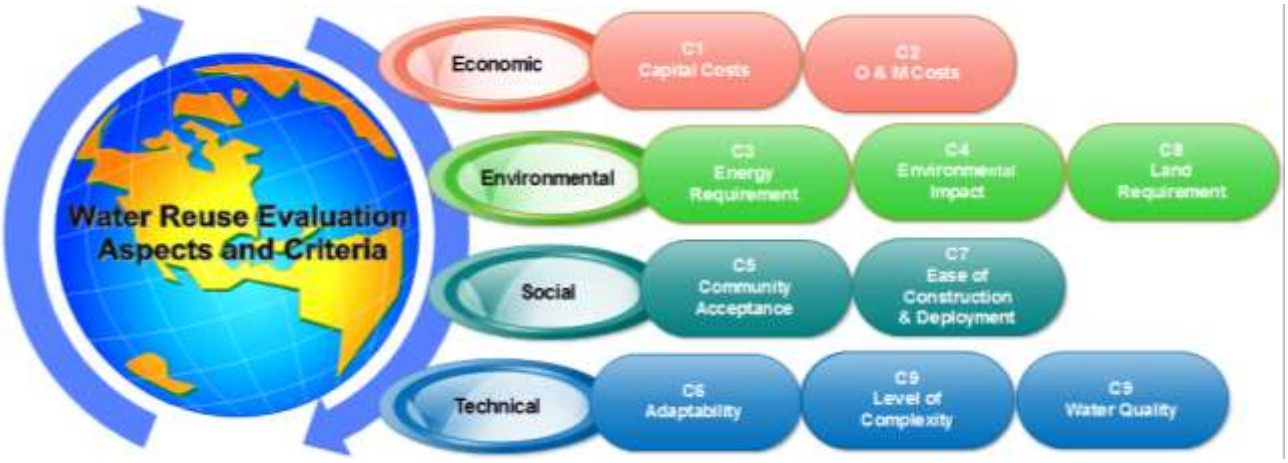

Figure S3: Water reuse criteria employed in this study

S3. Survey responses from water reuse experts – IMCMEDM tool: Water reuse scenario: Wastewater reuse through membrane assisted technologies for industrial water reuse; Case-Study of Sao Paolo, Brazil -AQUAPOLO Project

Table S3: Pair-wise comparison between the criteria (case study of Brazil – Scenario 1– Expert 1)

Criteria	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Capital cost (C1)	EI	MLI	MLI	EI	MMI	MLI	MLI	MLI	MLI	MLI
O & M Cost (C2)	MMI	EI	EI	EI	MMI	EI	MMI	MMI	MMI	MLI
Energy consumption (C3)	MMI	EI	EI	EI	MMI	EI	MMI	MMI	MMI	MLI
Impact on environment (C4)	EI	EI	EI	EI	MMI	MMI	MMI	MMI	MMI	EI
community acceptance (C5)	MLI	MLI	MLI	MMI	EI	MLI	MLI	EI	ELI	SLI
Adaptability (C6)	MMI	EI	EI	MLI	MMI	EI	EI	MMI	EI	WLI
Ease of construction and deployment (C7)	MMI	MLI	MLI	MLI	MMI	EI	EI	WMI	EI	WLI
Land requirement (C8)	MMI	MLI	MLI	MLI	EI	MLI	MLI	EI	MMI	EI
Level of complexity (C9)	MMI	MLI	MLI	MLI	EMI	EI	EI	MLI	EI	WLI
Water quality (C10)	MMI	MMI	MMI	EI	SMI	WMI	WMI	EI	WMI	EI

Table S4: Pair-wise comparison between the criteria (case study of Brazil – Scenario 1 – Expert 2)

Criteria	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Capital cost (C1)	EI	SLI	MLI	EI	SMI	MLI	MLI	SLI	MLI	SLI
O & M Cost (C2)	SMI	EI	EI	WMI	MMI	EI	MMI	MMI	MMI	MLI
Energy consumption (C3)	MMI	EI	EI	EI	MMI	EI	SMI	MMI	MMI	MLI
Impact on environment (C4)	EI	WLI	EI	EI	MMI	MMI	MMI	MMI	MMI	EI
community acceptance (C5)	SLI	MLI	MLI	MLI	EI	MLI	MLI	EI	ELI	SLI
Adaptability (C6)	MMI	EI	EI	MLI	MMI	EI	EI	MMI	EI	WLI
Ease of construction and deployment (C7)	MMI	MLI	SLI	MLI	MMI	EI	EI	WMI	EI	WLI
Land requirement (C8)	SMI	MLI	MLI	MLI	EI	MLI	WLI	EI	SMI	EI
Level of complexity (C9)	MMI	MLI	MLI	MLI	EMI	EI	EI	WLI	EI	WLI
Water quality (C10)	SMI	MMI	EI	EI	SMI	WMI	WMI	EI	WMI	EI

Table S5: Pair-wise comparison between the criteria (case study of Brazil – Scenario 1 – Expert 3)

Criteria	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Capital cost (C1)	EI	WLI	MLI	EI	WMI	MLI	MLI	WLI	MLI	WLI
O & M Cost (C2)	WMI	EI	EI	WLI	MMI	EI	MMI	MMI	MMI	MLI
Energy consumption (C3)	MMI	EI	EI	EI	MMI	EI	WMI	MMI	MMI	MLI
Impact on environment (C4)	EI	WMI	EI	EI	MMI	MMI	MMI	MMI	MMI	EI
community acceptance (C5)	WLI	MLI	MLI	MLI	EI	MLI	MLI	EI	ELI	SLI
Adaptability (C6)	MMI	EI	EI	MLI	MMI	EI	EI	MMI	EI	WLI
Ease of construction and deployment (C7)	MMI	MLI	WLI	MLI	MMI	EI	EI	WMI	EI	WLI
Land requirement (C8)	WMI	MLI	MLI	MLI	EI	MLI	WLI	EI	WMI	EI
Level of complexity (C9)	MMI	MLI	MLI	MLI	EMI	EI	EI	WLI	EI	WLI
Water quality (C10)	WMI	MMI	MMI	EI	SMI	WMI	WMI	EI	WMI	EI

S4. Survey responses from water reuse experts – IMCMEDM tool: Wastewater reuse through membrane assisted technologies for unrestricted agricultural irrigation in Herakleion of Crete, Greece

Table S6: Pair-wise comparison between the criteria (case study of Greece – Scenario 2 – Expert 1)

Criteria	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Capital cost (C1)	EI	WLI	WLI	MLI	SLI	WMI	EI	WLI	EI	SLI
O & M Cost (C2)	WMI	EI	EI	MLI	SLI	WMI	WMI	WLI	WMI	SLI
Energy consumption (C3)	WMI	EI	EI	MLI	SLI	WMI	WMI	WLI	WMI	MLI
Impact on environment (C4)	WMI	MMI	MMI	EI	EI	WMI	MMI	WMI	MMI	EI
community acceptance (C5)	WLI	SMI	SMI	EI	EI	MMI	SMI	WMI	MMI	EI
Adaptability (C6)	EI	WLI	WLI	WLI	MLI	EI	WLI	WLI	WLI	WLI
Ease of construction and deployment (C7)	WMI	WLI	WLI	MLI	SLI	WMI	EI	WLI	WLI	SLI
Land requirement (C8)	EI	WMI	WMI	WLI	WLI	WMI	WMI	EI	MMI	MLI
Level of complexity (C9)	SMI	WLI	WLI	MLI	MLI	WMI	WMI	MLI	EI	SLI
Water quality (C10)	SMI	SMI	MMI	EI	EI	WMI	SMI	MMI	SMI	EI

Table S7: Pair-wise comparison between the criteria (case study of Greece – Scenario 2 – Expert 2)

Criteria	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Capital cost (C1)	EI	WMI	WMI	SLI	MLI	MMI	EI	MLI	EI	SLI
O & M Cost (C2)	MLI	EI	EI	SLI	MLI	MMI	EI	MLI	EI	SLI
Energy consumption (C3)	MLI	EI	EI	MLI	MLI	MMI	EI	MLI	EI	SLI
Impact on environment (C4)	SMI	SMI	MMI	EI	EI	MMI	MMI	WMI	MMI	EI
community acceptance (C5)	MMI	MMI	MMI	EI	EI	SMI	SMI	WMI	MMI	WLI
Adaptability (C6)	MLI	MLI	MLI	MLI	SLI	EI	MLI	MLI	WLI	SLI
Ease of construction and deployment (C7)	EI	EI	EI	MLI	SLI	MMI	EI	WLI	EI	MLI
Land requirement (C8)	MMI	MMI	MMI	WLI	WLI	MMI	WMI	EI	MMI	WLI
Level of complexity (C9)	EI	EI	EI	MLI	MLI	WMI	EI	MLI	EI	SLI
Water quality (C10)	SMI	SMI	SMI	EI	WMI	SMI	MMI	WMI	SMI	EI

Table S8: Pair-wise comparison between the criteria (case study of Greece – Scenario 2 – Expert 3)

Criteria	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Capital cost (C1)	EI	WLI	WLI	MLI	MLI	WMI	EI	WMI	WMI	MLI
O & M Cost (C2)	WMI	EI	EI	MLI	MLI	WMI	WMI	WMI	WMI	MLI
Energy consumption (C3)	WMI	EI	EI	WLI	MLI	WMI	WMI	WMI	WMI	MLI
Impact on environment (C4)	MMI	MMI	WMI	EI	WLI	WMI	WMI	WMI	MMI	EI
community acceptance (C5)	MMI	MMI	MMI	WMI	EI	WMI	MMI	MMI	MMI	WLI
Adaptability (C6)	WLI	WLI	WLI	MMI	WLI	EI	WMI	WMI	WMI	MLI
Ease of construction and deployment (C7)	EI	WLI	WLI	WLI	MLI	WLI	EI	WLI	WLI	SLI
Land requirement (C8)	WLI	WLI	WLI	WLI	MLI	WLI	WMI	EI	WMI	MLI
Level of complexity (C9)	WLI	WLI	WLI	MLI	MLI	WLI	WMI	WLI	EI	SLI
Water quality (C10)	MMI	MMI	MMI	EI	MLI	MMI	SMI	MMI	SMI	EI

Table S9: Pair-wise comparison between the criteria (case study of Greece – Scenario 1 – Expert 4)

Criteria	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Capital cost (C1)	EI	WLI	WLI	MLI	WLI	WMI	EI	WMI	WMI	SLI
O & M Cost (C2)	WMI	EI	EI	WLI	WLI	WMI	MMI	WMI	WMI	SLI
Energy consumption (C3)	WMI	EI	EI	EI	WLI	WMI	MMI	WMI	WMI	MLI
Impact on environment (C4)	MMI	WMI	EI	EI	EI	WMI	MMI	MMI	MMI	EI
community acceptance (C5)	WMI	WMI	WMI	EI	EI	WMI	MMI	WMI	MMI	WLI
Adaptability (C6)	WLI	WLI	WLI	WLI	WLI	EI	WMI	WLI	WMI	MLI
Ease of construction and deployment (C7)	EI	MLI	MLI	MLI	MLI	WLI	EI	WLI	WLI	SLI
Land requirement (C8)	WLI	WLI	WLI	MLI	WLI	WMI	WMI	EI	WMI	SLI
Level of complexity (C9)	WLI	WLI	WLI	MLI	MLI	WLI	WMI	WLI	EI	SLI
Water quality (C10)	SMI	SMI	MMI	EI	WMI	WMI	SMI	SMI	SMI	EI

Table S10: The fuzzy ratings of the technologies (T1 to T10) under all criteria (C1 to C10) by four experts (E1, E2, E3 and E4) for Scenario 2

	C1				C2				C3				C4				C5			
	E1	E2	E3	E4	E1	E2	E3	E4	E1	E2	E3	E4	E1	E2	E3	E4	E1	E2	E3	E4
T1	M	M	MP	MG	M	P	M	M	MG	P	M	M	MG	M	M	VG	P	P	P	P
T2	MP	P	P	M	M	P	MP	MP	MG	P	MP	MP	G	M	M	VG	MP	MP	MP	MP
T3	MP	M	MP	MG	MP	M	M	MG	M	G	M	MG	MG	M	M	MG	VP	VP	P	VP
T4	P	M	P	MP	P	P	MP	MP	MP	P	MP	MP	MG	M	M	MG	P	P	MP	MP
T5	VP	M	VP	VP	VP	P	P	MP	P	P	P	P	MG	M	M	MG	MG	MG	G	G
T6	P	VG	MP	MG	MP	M	M	MG	MP	M	M	G	MG	M	M	G	VP	VP	P	VP
T7	P	VG	VP	P	VP	M	P	P	P	M	P	VP	G	M	M	VG	VG	VG	G	VG
T8	M	M	MP	MG	MP	P	M	MG	MP	M	M	M	M	M	MP	M	MP	G	P	P
T9	P	P	VP	P	P	P	P	P	VP	P	P	P	M	M	MP	M	MG	G	G	MG
T10	MP	P	VP	VP	VP	M	VP	P	VP	P	VP	VP	MG	M	MP	MG	G	VG	VG	G
	C6				C7				C8				C9				C10			
	E1	E2	E3	E4	E1	E2	E3	E4	E1	E2	E3	E4	E1	E2	E3	E4	E1	E2	E3	E4
T1	MG	M	MG	MG	M	M	MG	M	M	VG	M	G	MP	M	M	MG	MP	VP	VP	VP
T2	MG	M	P	MG	MG	M	P	MG	M	VG	MP	MG	P	M	MP	M	M	MP	MP	MP
T3	MP	M	MG	MP	G	M	M	G	M	VG	VG	MG	P	M	MG	G	P	VP	VP	VP
T4	MP	M	P	MP	G	M	P	MG	M	VG	MP	P	P	P	MP	M	MP	MP	P	P
T5	MP	M	VP	MP	G	M	P	M	M	VG	P	VP	VP	VP	P	MP	MG	VG	G	G
T6	MP	VG	MG	MG	G	G	M	G	M	VG	VG	MG	P	G	MG	MG	MP	VP	VP	VP
T7	G	MG	M	G	M	G	MP	M	MP	VG	M	M	MG	MP	MP	M	VG	VG	G	VG
T8	G	M	G	MG	M	VG	G	M	MP	VG	G	MG	G	MP	G	MG	M	MP	P	P
T9	G	M	MP	MG	M	VG	P	M	P	VG	MP	M	MG	VP	MP	M	VG	G	G	G
T10	G	VG	VP	MG	M	VG	VP	MP	P	VG	VP	M	MG	VP	VP	MP	VG	G	VG	VG

Linguistic variables	Code
Very poor	VP
Poor	P
Medium poor	MP
Medium	M
Medium good	MG
Good	G
Very good	VG

S6. The final criteria weights used for each scenario

Table S11: The weights used for each scenario after incorporating the experts' ratings (estimation in real numbers)

Criteria	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	SUM
Weights in Scenario 1	0.070	0.119	0.119	0.124	0.056	0.110	0.094	0.086	0.094	0.128	1.000
Weights in Scenario 2	0.084	0.091	0.094	0.128	0.130	0.078	0.075	0.098	0.078	0.143	1.000

S7. The Details on the sensitivity analysis

Table S12: The details on the sensitivity analysis conducted in this study focusing on changes in closeness coefficients in Scenario 1 to a two-at-a-time alteration of criteria weights (by +20%); each raw presents the highest increase of closeness coefficient

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
C1 & C2	0.0053	0.0031	0.0900	0.0235	0.0238	0.0940	0.0145	0.0809	0.0144	0.0101
C1 & C3	0.0135	0.0023	0.0846	0.0120	0.0128	0.0877	0.0152	0.0632	0.0112	0.0156
C1 & C4	0.0502	0.0029	0.0737	0.0122	0.0082	0.0219	0.0347	0.0173	0.0123	0.0002
C1 & C5	0.0002	0.0037	0.1319	0.0253	0.0256	0.0093	0.0400	0.1689	0.0323	0.0498
C1 & C6	0.0045	0.0035	0.1056	0.0056	0.0514	0.0352	0.0206	0.0487	0.0178	0.0072
C1 & C7	0.0465	0.0290	0.1040	0.0573	0.0158	0.1091	0.0192	0.0310	0.0134	0.0187
C1 & C8	0.0941	0.0004	0.0569	0.0087	0.0115	0.0747	0.0474	0.0076	0.0125	0.0119
C1 & C9	0.0035	0.0031	0.1026	0.0162	0.0064	0.0730	0.0021	0.0345	0.0035	0.0047
C1 & C10	0.0677	0.0078	0.0615	0.0150	0.0832	0.0477	0.0569	0.0286	0.0957	0.0743
C2 & C3	0.0323	0.0017	0.0390	0.0420	0.0054	0.1498	0.0180	0.1280	0.0133	0.0107
C2 & C4	0.0936	0.0126	0.0242	0.0057	0.0056	0.0332	0.0365	0.0492	0.0147	0.0063
C2 & C5	0.0000	0.0126	0.1392	0.0552	0.0572	0.0296	0.0394	0.1980	0.0471	0.0893
C2 & C6	0.0013	0.0008	0.0755	0.0078	0.1004	0.0654	0.0111	0.1127	0.0285	0.0298
C2 & C7	0.0790	0.0461	0.0834	0.0890	0.0006	0.1680	0.0116	0.0724	0.0094	0.0060
C2 & C8	0.1381	0.0056	0.0180	0.0000	0.0000	0.1134	0.0508	0.0054	0.0052	0.0015
C2 & C9	0.0202	0.0157	0.0640	0.0544	0.0392	0.1352	0.0106	0.0984	0.0090	0.0050
C2 & C10	0.0320	0.0036	0.0261	0.0369	0.1349	0.0203	0.0689	0.0242	0.1395	0.1247
C3 & C4	0.1013	0.0056	0.0012	0.0060	0.0140	0.0146	0.0366	0.0064	0.0120	0.0077
C3 & C5	0.0085	0.0060	0.1380	0.0408	0.0161	0.0110	0.0394	0.2489	0.0558	0.0790
C3 & C6	0.0010	0.0022	0.0708	0.0015	0.0615	0.0474	0.0110	0.0732	0.0380	0.0173
C3 & C7	0.0850	0.0436	0.0807	0.0863	0.0100	0.1626	0.0116	0.0400	0.0069	0.0095
C3 & C8	0.1443	0.0015	0.0029	0.0000	0.0054	0.1035	0.0512	0.0000	0.0029	0.0063

C3 & C9	0.0441	0.0075	0.0540	0.0286	0.0098	0.1226	0.0114	0.0531	0.0068	0.0094
C3 & C10	0.0291	0.0049	0.0244	0.0217	0.1082	0.0193	0.0698	0.0111	0.1506	0.1176
C4 & C5	0.0723	0.0132	0.1332	0.0228	0.0252	0.0086	0.1182	0.1848	0.0597	0.1154
C4 & C6	0.0677	0.0006	0.0642	0.0095	0.0785	0.0135	0.1090	0.0094	0.0416	0.0594
C4 & C7	0.1327	0.0478	0.0770	0.0717	0.0033	0.0982	0.0000	0.0102	0.0056	0.0000
C4 & C8	0.1707	0.0060	0.0014	0.0036	0.0000	0.0360	0.1106	0.0058	0.0015	0.0000
C4 & C9	0.1230	0.0167	0.0452	0.0091	0.0058	0.0134	0.0596	0.0102	0.0072	0.0080
C4 & C10	0.0240	0.0028	0.0242	0.0079	0.1213	0.0321	0.1302	0.0215	0.1544	0.1481
C5 & C6	0.0060	0.0042	0.0906	0.0091	0.0416	0.0090	0.0464	0.1517	0.0515	0.0673
C5 & C7	0.0279	0.0222	0.0919	0.0486	0.0199	0.0427	0.0248	0.1293	0.0152	0.0221
C5 & C8	0.0652	0.0041	0.0603	0.0144	0.0186	0.0151	0.0574	0.0898	0.0169	0.0157
C5 & C9	0.0001	0.0077	0.0888	0.0269	0.0181	0.0005	0.0295	0.1473	0.0347	0.0529
C5 & C10	0.0791	0.0084	0.0756	0.0240	0.0590	0.0524	0.0607	0.1118	0.0884	0.0916
C6 & C7	0.0638	0.0402	0.1081	0.0733	0.0017	0.1075	0.0028	0.0097	0.0014	0.0023
C6 & C8	0.1237	0.0027	0.0346	0.0040	0.0000	0.0447	0.0931	0.0000	0.0000	0.0000
C6 & C9	0.0038	0.0026	0.1071	0.0046	0.1026	0.0095	0.0268	0.0001	0.0560	0.0348
C6 & C10	0.0421	0.0071	0.0292	0.0099	0.1623	0.0309	0.1120	0.0144	0.1626	0.1492
C7 & C8	0.1313	0.0289	0.0481	0.0068	0.0193	0.1192	0.0216	0.0041	0.0140	0.0173
C7 & C9	0.0814	0.0502	0.0933	0.0923	0.0142	0.1359	0.0175	0.0012	0.0102	0.0142
C7 & C10	0.0500	0.0223	0.0411	0.0679	0.0673	0.0359	0.0341	0.0205	0.1068	0.0763
C8 & C9	0.1324	0.0065	0.0243	0.0098	0.0145	0.0619	0.0564	0.0109	0.0129	0.0115
C8 & C10	0.0636	0.0064	0.0487	0.0068	0.0543	0.0385	0.0976	0.0345	0.0852	0.0712
C9 & C10	0.0493	0.0056	0.0405	0.0265	0.1131	0.0333	0.0770	0.0208	0.1419	0.1172

Table S13: The details on the sensitivity analysis conducted in this study focusing on changes in closeness coefficients in Scenario 1 to a two-at-a-time alteration of criteria weights (by -20%); each raw presents the highest reduction of closeness coefficient

	T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**	**T9**	**T10**
C1 & C2	-0.0017	-0.0036	-0.0112	-0.0068	-0.0056	-0.0203	-0.0501	-0.0213	-0.0765	-0.0734
C1 & C3	-0.0035	-0.0126	-0.0072	-0.0021	-0.0427	-0.0158	-0.0510	-0.0115	-0.0710	-0.0858
C1 & C4	-0.0194	-0.0038	-0.0041	-0.0298	-0.0217	-0.0315	-0.0131	-0.0284	-0.0684	-0.0465
C1 & C5	-0.0152	-0.0029	-0.0057	-0.0005	-0.0005	-0.0385	0.0000	-0.0029	-0.0066	0.0000
C1 & C6	-0.0261	-0.0201	-0.0123	-0.0268	-0.0103	-0.0131	-0.0042	-0.0040	-0.0221	-0.0398
C1 & C7	-0.0077	-0.0060	-0.0152	-0.0118	-0.0784	-0.0189	-0.0873	-0.0022	-0.0897	-0.1064
C1 & C8	-0.0133	-0.0048	-0.0056	-0.0610	-0.0875	-0.0073	-0.0052	-0.0545	-0.1025	-0.1002
C1 & C9	-0.0004	-0.0051	-0.0081	-0.0015	-0.0019	-0.0048	-0.0235	-0.0025	-0.0582	-0.0715
C1 & C10	-0.0917	-0.0155	-0.0598	-0.0071	-0.0507	-0.0606	-0.0312	-0.0380	-0.0850	-0.0651
C2 & C3	-0.0028	-0.0083	-0.0046	-0.0057	-0.0694	-0.0188	-0.1410	-0.0187	-0.1262	-0.1019
C2 & C4	-0.0119	-0.0022	-0.0031	-0.0430	-0.0331	-0.0492	-0.0349	-0.0344	-0.1210	-0.0334
C2 & C5	-0.0215	-0.0008	0.0000	-0.0036	-0.0029	-0.0527	-0.0319	0.0000	-0.0249	0.0000
C2 & C6	-0.0459	-0.0260	-0.0058	-0.0387	-0.0069	-0.0173	-0.0623	-0.0146	-0.0461	-0.0223
C2 & C7	-0.0017	-0.0015	-0.0044	-0.0054	-0.1127	-0.0132	-0.1623	-0.0140	-0.1425	-0.1313

C2 & C8	0.0000	-0.0012	-0.0045	-0.0773	-0.1200	-0.0121	-0.0115	-0.0644	-0.1530	-0.1169
C2 & C9	-0.0011	-0.0011	-0.0039	-0.0048	-0.0040	-0.0126	-0.1225	-0.0141	-0.1130	-0.0776
C2 & C10	-0.1375	-0.0156	-0.1171	-0.0090	-0.0308	-0.0882	-0.0149	-0.0469	-0.0370	-0.0289
C3 & C4	-0.0128	-0.0043	-0.0085	-0.0538	-0.1112	-0.0598	-0.0365	-0.0541	-0.1127	-0.0644
C3 & C5	-0.0183	-0.0038	0.0000	0.0000	-0.0509	-0.0632	-0.0334	0.0000	-0.0081	0.0000
C3 & C6	-0.0429	-0.0348	-0.0028	-0.0523	-0.0193	-0.0281	-0.0648	-0.0072	-0.0294	-0.0557
C3 & C7	-0.0029	-0.0001	-0.0013	-0.0016	-0.1602	-0.0097	-0.1673	-0.0067	-0.1377	-0.1571
C3 & C8	0.0000	-0.0054	-0.0023	-0.0838	-0.1614	-0.0085	-0.0125	-0.0771	-0.1492	-0.1415
C3 & C9	-0.0027	-0.0071	-0.0009	-0.0013	-0.1114	-0.0094	-0.1289	-0.0078	-0.1014	-0.1192
C3 & C10	-0.1391	-0.0205	-0.1280	-0.0049	-0.0219	-0.0998	-0.0136	-0.0608	-0.0344	-0.0263
C4 & C5	-0.0222	-0.0010	0.0000	-0.0244	-0.0170	-0.1489	-0.0064	0.0000	-0.0040	0.0000
C4 & C6	-0.0136	-0.0272	-0.0015	-0.0916	-0.0019	-0.1374	-0.0099	-0.0665	-0.0250	-0.0035
C4 & C7	-0.0130	-0.0004	0.0000	0.0000	-0.1378	0.0000	-0.1119	-0.0556	-0.1335	-0.1190
C4 & C8	-0.0065	-0.0014	-0.0094	-0.0991	-0.1421	-0.0249	-0.0067	-0.1154	-0.1456	-0.1047
C4 & C9	-0.0144	-0.0013	0.0000	-0.0559	-0.0639	-0.0876	-0.0100	-0.1089	-0.0961	-0.0239
C4 & C10	-0.1149	-0.0156	-0.1325	-0.0248	-0.0197	-0.1636	-0.0234	-0.1069	-0.0298	-0.0278
C5 & C6	-0.0244	-0.0079	-0.0130	-0.0109	-0.0134	-0.0598	-0.0067	-0.0136	-0.0084	-0.0082
C5 & C7	-0.0097	-0.0076	-0.0162	-0.0149	-0.0505	-0.0214	-0.0513	-0.0116	-0.0336	-0.0385
C5 & C8	-0.0211	-0.0005	-0.0044	-0.0408	-0.0592	-0.0188	-0.0098	-0.0035	-0.0494	-0.0365
C5 & C9	-0.0115	-0.0010	-0.0077	-0.0024	-0.0003	-0.0423	-0.0002	-0.0091	-0.0004	-0.0012
C5 & C10	-0.0615	-0.0065	-0.0315	-0.0091	-0.0576	-0.0778	-0.0373	0.0000	-0.1019	-0.0765
C6 & C7	-0.0009	-0.0007	-0.0069	-0.0015	-0.0958	-0.0022	-0.1178	-0.0014	-0.0868	-0.1082
C6 & C8	0.0000	-0.0145	-0.0057	-0.1010	-0.1044	0.0000	-0.0031	-0.0842	-0.1074	-0.0960
C6 & C9	-0.0556	-0.0285	-0.0059	-0.0496	-0.0085	-0.0471	-0.0194	-0.0256	-0.0046	-0.0138
C6 & C10	-0.1525	-0.0317	-0.1107	-0.0181	-0.0395	-0.1412	-0.0225	-0.0686	-0.0510	-0.0390
C7 & C8	-0.0126	-0.0056	-0.0082	-0.0523	-0.1577	-0.0154	-0.0554	-0.0727	-0.1421	-0.1433
C7 & C9	-0.0069	-0.0056	-0.0096	-0.0106	-0.1293	-0.0143	-0.1419	-0.0220	-0.1133	-0.1319
C7 & C10	-0.0969	-0.0043	-0.0815	-0.0179	-0.0404	-0.0600	-0.0466	-0.0581	-0.0612	-0.0481
C8 & C9	-0.0166	-0.0006	-0.0018	-0.0758	-0.1264	-0.0058	-0.0052	-0.0920	-0.1223	-0.1087
C8 & C10	-0.0600	-0.0119	-0.0893	-0.0532	-0.0493	-0.0719	-0.0360	-0.0947	-0.0735	-0.0561
C9 & C10	-0.1244	-0.0145	-0.1049	-0.0065	-0.0375	-0.1008	-0.0244	-0.0776	-0.0601	-0.0458

Table S14: The details on the sensitivity analysis conducted in this study focusing on changes in closeness coefficients in Scenario 2 to a two-at-a-time alteration of criteria weights (by +20%); each raw presents the highest increase of closeness coefficient

	T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**	**T9**	**T10**
C1 & C2	0.1559	0.0299	0.2409	0.0816	0.0391	0.0611	0.0171	0.1137	0.0237	0.0025
C1 & C3	0.1659	0.0082	0.2507	0.1283	0.0120	0.1084	0.0238	0.1189	0.0269	0.0130
C1 & C4	0.1898	0.0408	0.2154	0.0858	0.0698	0.0415	0.0113	0.0822	0.0221	0.0075
C1 & C5	0.0792	0.0258	0.0969	0.0701	0.0634	0.0513	0.0147	0.0544	0.0084	0.0196
C1 & C6	0.1987	0.0146	0.2037	0.0412	0.0394	0.0503	0.0128	0.1150	0.0219	0.0086

C1 & C7	0.1695	0.0040	0.2293	0.0647	0.0242	0.0499	0.0124	0.0999	0.0222	0.0042
C1 & C8	0.1995	0.0631	0.2371	0.1001	0.0255	0.0720	0.0137	0.1105	0.0247	0.0106
C1 & C9	0.1731	0.0056	0.2166	0.0473	0.0526	0.0932	0.0126	0.1173	0.0217	0.0071
C1 & C10	0.1189	0.0392	0.1001	0.0502	0.0805	0.0178	0.0132	0.0501	0.0065	0.0212
C2 & C3	0.0185	0.0023	0.2168	0.1314	0.0133	0.1558	0.0136	0.1180	0.0054	0.0102
C2 & C4	0.0244	0.0382	0.1451	0.0113	0.0012	0.0922	0.0045	0.0465	0.0025	0.0086
C2 & C5	0.0423	0.0226	0.0431	0.0188	0.0167	0.0490	0.0392	0.0162	0.0381	0.0187
C2 & C6	0.0833	0.0003	0.1341	0.0010	0.0031	0.0996	0.0057	0.1105	0.0024	0.0045
C2 & C7	0.0021	0.0002	0.1730	0.0001	0.0029	0.1034	0.0055	0.0806	0.0023	0.0024
C2 & C8	0.0728	0.0733	0.1885	0.0574	0.0071	0.1289	0.0065	0.1013	0.0043	0.0105
C2 & C9	0.0057	0.0005	0.1533	0.0007	0.0029	0.1448	0.0056	0.1148	0.0023	0.0026
C2 & C10	0.0190	0.0365	0.0628	0.0381	0.0448	0.0274	0.0380	0.0397	0.0624	0.0208
C3 & C4	0.0516	0.0200	0.1925	0.1610	0.0142	0.1577	0.0111	0.0768	0.0052	0.0063
C3 & C5	0.0380	0.0267	0.0483	0.1129	0.0103	0.0497	0.0249	0.0408	0.0313	0.0382
C3 & C6	0.0967	0.0036	0.1784	0.0837	0.0159	0.1563	0.0121	0.1266	0.0049	0.0329
C3 & C7	0.0251	0.0035	0.2140	0.1234	0.0158	0.1632	0.0121	0.1045	0.0049	0.0307
C3 & C8	0.0880	0.0562	0.2259	0.1783	0.0206	0.1801	0.0131	0.1208	0.0069	0.0069
C3 & C9	0.0377	0.0036	0.1961	0.0936	0.0158	0.1894	0.0120	0.1303	0.0049	0.0321
C3 & C10	0.0175	0.0271	0.0651	0.0566	0.0144	0.0829	0.0237	0.0408	0.0550	0.0400
C4 & C5	0.0186	0.0105	0.0191	0.0255	0.0435	0.0222	0.0841	0.0103	0.0609	0.0249
C4 & C6	0.1634	0.0199	0.0304	0.0000	0.0000	0.0776	0.0000	0.0849	0.0000	0.0076
C4 & C7	0.0532	0.0000	0.1134	0.0000	0.0000	0.0809	0.0028	0.0115	0.0000	0.0075
C4 & C8	0.1620	0.1465	0.1573	0.0942	0.0000	0.1303	0.0000	0.0602	0.0000	0.0038
C4 & C9	0.0757	0.0000	0.0679	0.0000	0.0010	0.1589	0.0000	0.0918	0.0000	0.0075
C4 & C10	0.0091	0.0698	0.0317	0.0221	0.0834	0.0077	0.0837	0.0259	0.0967	0.0279
C5 & C6	0.0520	0.0228	0.0441	0.0000	0.0103	0.0562	0.0614	0.0564	0.0490	0.0467
C5 & C7	0.0452	0.0207	0.0500	0.0045	0.0000	0.0586	0.0773	0.0149	0.0302	0.0455
C5 & C8	0.0368	0.0456	0.0504	0.0734	0.0000	0.0434	0.0692	0.0339	0.0385	0.0000
C5 & C9	0.0455	0.0208	0.0463	0.0000	0.0247	0.0630	0.0698	0.0608	0.0556	0.0463
C5 & C10	0.0498	0.0199	0.0744	0.0212	0.0748	0.0545	0.1077	0.0349	0.0989	0.0513
C6 & C7	0.0856	0.0027	0.0557	0.0053	0.0033	0.0619	0.0012	0.0745	0.0017	0.0206
C6 & C8	0.1307	0.0496	0.0802	0.0217	0.0077	0.0851	0.0024	0.0902	0.0035	0.0106
C6 & C9	0.0940	0.0030	0.0381	0.0066	0.0023	0.1018	0.0014	0.1015	0.0009	0.0223
C6 & C10	0.0437	0.0252	0.0604	0.0496	0.0373	0.0189	0.0427	0.0470	0.0550	0.0311
C7 & C8	0.0596	0.0403	0.1164	0.0324	0.0096	0.0824	0.0017	0.0441	0.0051	0.0114
C7 & C9	0.0010	0.0046	0.0000	0.0042	0.0045	0.0018	0.0008	0.0014	0.0031	0.0000
C7 & C10	0.0192	0.0196	0.0688	0.0464	0.0286	0.0191	0.0430	0.0419	0.0457	0.0268
C8 & C9	0.1087	0.0399	0.1503	0.0039	0.0059	0.1687	0.0013	0.1152	0.0028	0.0108
C8 & C10	0.0362	0.0840	0.0549	0.0377	0.0410	0.0410	0.0586	0.0349	0.0675	0.0055
C9 & C10	0.0194	0.0214	0.0636	0.0484	0.0418	0.0595	0.0442	0.0479	0.0564	0.0299

Table S15: The details on the sensitivity analysis conducted in this study focusing on changes in closeness coefficients in Scenario 2 to a two-at-a-time alteration of criteria weights (by -20%); each raw presents the highest reduction of closeness coefficient

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
C1 & C2	-0.0203	-0.0033	-0.0313	-0.0092	-0.0093	-0.0067	-0.1266	-0.0136	-0.1515	-0.0262
C1 & C3	-0.0246	-0.0203	-0.0394	-0.0221	-0.0711	-0.0150	-0.1358	-0.0177	-0.1497	-0.0013
C1 & C4	-0.0285	-0.0092	-0.0246	-0.0100	-0.0077	-0.0055	-0.1069	-0.0049	-0.1464	-0.0269
C1 & C5	-0.0325	-0.0414	-0.0325	-0.0189	-0.0152	-0.0869	-0.0521	-0.0030	-0.0916	-0.0088
C1 & C6	-0.0244	-0.0118	-0.0237	-0.0304	-0.0072	-0.0040	-0.1108	-0.0119	-0.1414	-0.0009
C1 & C7	-0.0217	-0.0324	-0.0242	-0.0085	-0.0280	-0.0036	-0.1106	-0.0104	-0.1556	-0.0037
C1 & C8	-0.0295	-0.0090	-0.0324	-0.0132	-0.0264	-0.0098	-0.1139	-0.0138	-0.1532	-0.0612
C1 & C9	-0.0222	-0.0289	-0.0242	-0.0224	-0.0055	-0.0058	-0.1094	-0.0118	-0.1405	-0.0019
C1 & C10	-0.0094	-0.0265	-0.0296	-0.0361	-0.0368	-0.0158	-0.0538	-0.0288	-0.0777	-0.0138
C2 & C3	-0.0094	-0.0358	-0.0204	-0.0105	-0.1201	-0.0138	-0.1269	-0.0097	-0.0741	-0.0163
C2 & C4	-0.0136	-0.0060	-0.0100	-0.0012	-0.0407	-0.0068	-0.0749	-0.0119	-0.0447	-0.0575
C2 & C5	-0.1163	-0.0574	-0.0843	-0.0071	-0.0118	-0.0992	-0.0218	-0.0214	-0.0155	-0.0093
C2 & C6	-0.0010	-0.0268	-0.0092	-0.0763	-0.0682	-0.0050	-0.0843	-0.0049	-0.0484	-0.0230
C2 & C7	-0.0469	-0.0552	-0.0091	-0.0398	-0.0876	-0.0046	-0.0819	-0.0042	-0.0737	-0.0299
C2 & C8	-0.0052	-0.0054	-0.0158	-0.0038	-0.0866	-0.0100	-0.0873	-0.0071	-0.0663	-0.0847
C2 & C9	-0.0247	-0.0500	-0.0094	-0.0679	-0.0552	-0.0056	-0.0812	-0.0048	-0.0438	-0.0253
C2 & C10	-0.0531	-0.0205	-0.0820	-0.0707	-0.0281	-0.0165	-0.0320	-0.0539	-0.0378	-0.0153
C3 & C4	-0.0075	-0.0230	-0.0178	-0.0162	-0.1187	-0.0162	-0.1105	-0.0039	-0.0661	-0.0256
C3 & C5	-0.0967	-0.0714	-0.0666	-0.0253	-0.0771	-0.0753	-0.0420	-0.0131	-0.0156	-0.0098
C3 & C6	-0.0030	-0.0576	-0.0168	-0.0253	-0.1325	-0.0140	-0.1158	-0.0086	-0.0666	-0.0017
C3 & C7	-0.0024	-0.0762	-0.0169	-0.0153	-0.1456	-0.0140	-0.1157	-0.0084	-0.0875	-0.0017
C3 & C8	-0.0074	-0.0041	-0.0232	-0.0185	-0.1453	-0.0192	-0.1203	-0.0111	-0.0820	-0.0663
C3 & C9	-0.0024	-0.0725	-0.0169	-0.0169	-0.1254	-0.0142	-0.1139	-0.0085	-0.0634	-0.0017
C3 & C10	-0.0271	-0.0218	-0.0644	-0.0349	-0.0575	-0.0040	-0.0434	-0.0445	-0.0381	-0.0149
C4 & C5	-0.1295	-0.0672	-0.1610	-0.0041	-0.0053	-0.1503	-0.0105	-0.0646	-0.0072	-0.0062
C4 & C6	0.0000	-0.0289	-0.0001	-0.1145	-0.0493	0.0000	-0.0310	0.0000	-0.0244	-0.0332
C4 & C7	-0.0065	-0.0718	0.0000	-0.0660	-0.1456	0.0000	-0.0118	-0.0377	-0.0757	-0.0453
C4 & C8	-0.0036	-0.0040	0.0000	-0.0001	-0.0862	-0.0008	-0.0281	0.0000	-0.0607	-0.1225
C4 & C9	-0.0048	-0.0634	0.0000	-0.1045	-0.0189	0.0000	-0.0189	0.0000	-0.0129	-0.0372
C4 & C10	-0.0048	-0.0634	0.0000	-0.1044	-0.0188	0.0000	-0.0189	0.0000	-0.0129	-0.0371
C5 & C6	-0.0364	-0.0170	-0.1600	-0.0935	-0.0168	-0.0371	-0.0169	-0.1060	-0.0209	-0.0070
C5 & C7	-0.0666	-0.0851	-0.1475	-0.0750	-0.0289	-0.1174	-0.0229	-0.0039	-0.0170	-0.0078
C5 & C8	-0.1483	-0.1005	-0.1118	-0.0344	-0.0589	-0.1287	-0.0229	-0.0345	-0.0294	-0.0086
C5 & C9	-0.0802	-0.0335	-0.0809	-0.0049	-0.0582	-0.0904	-0.0174	-0.0183	-0.0166	-0.0710
C5 & C10	-0.1219	-0.0302	-0.2158	-0.0720	-0.0233	-0.1343	-0.0366	-0.0839	-0.0373	-0.0162
C6 & C7	-0.0053	-0.0608	-0.0020	-0.0991	-0.0687	-0.0028	-0.0267	-0.0041	-0.0429	-0.0009
C6 & C8	-0.0129	-0.0065	-0.0093	-0.0420	-0.0675	-0.0092	-0.0319	-0.0076	-0.0359	-0.0579
C6 & C9	-0.0059	-0.0575	-0.0017	-0.1113	-0.0419	-0.0059	-0.0285	-0.0061	-0.0186	-0.0011
C6 & C10	-0.0101	-0.0249	-0.0917	-0.1022	-0.0317	-0.0174	-0.0314	-0.0423	-0.0406	-0.0155
C7 & C8	-0.0078	-0.0074	-0.0120	-0.0051	-0.0846	-0.0092	-0.0196	-0.0047	-0.0625	-0.0568

C7 & C9	-0.0003	0.0000	-0.0043	-0.0001	0.0000	-0.0057	0.0000	-0.0031	0.0000	-0.0008
C7 & C10	-0.0296	-0.0297	-0.0764	-0.0771	-0.0366	-0.0174	-0.0311	-0.0503	-0.0463	-0.0154
C8 & C9	-0.0073	-0.0314	-0.0087	-0.0588	-0.0825	-0.0069	-0.0354	-0.0036	-0.0505	-0.0751
C8 & C10	-0.0186	-0.0271	-0.0960	-0.0659	-0.0269	-0.0140	-0.0253	-0.0617	-0.0345	-0.0427
C9 & C10	-0.0252	-0.0281	-0.0862	-0.0965	-0.0294	-0.0022	-0.0307	-0.0415	-0.0405	-0.0154

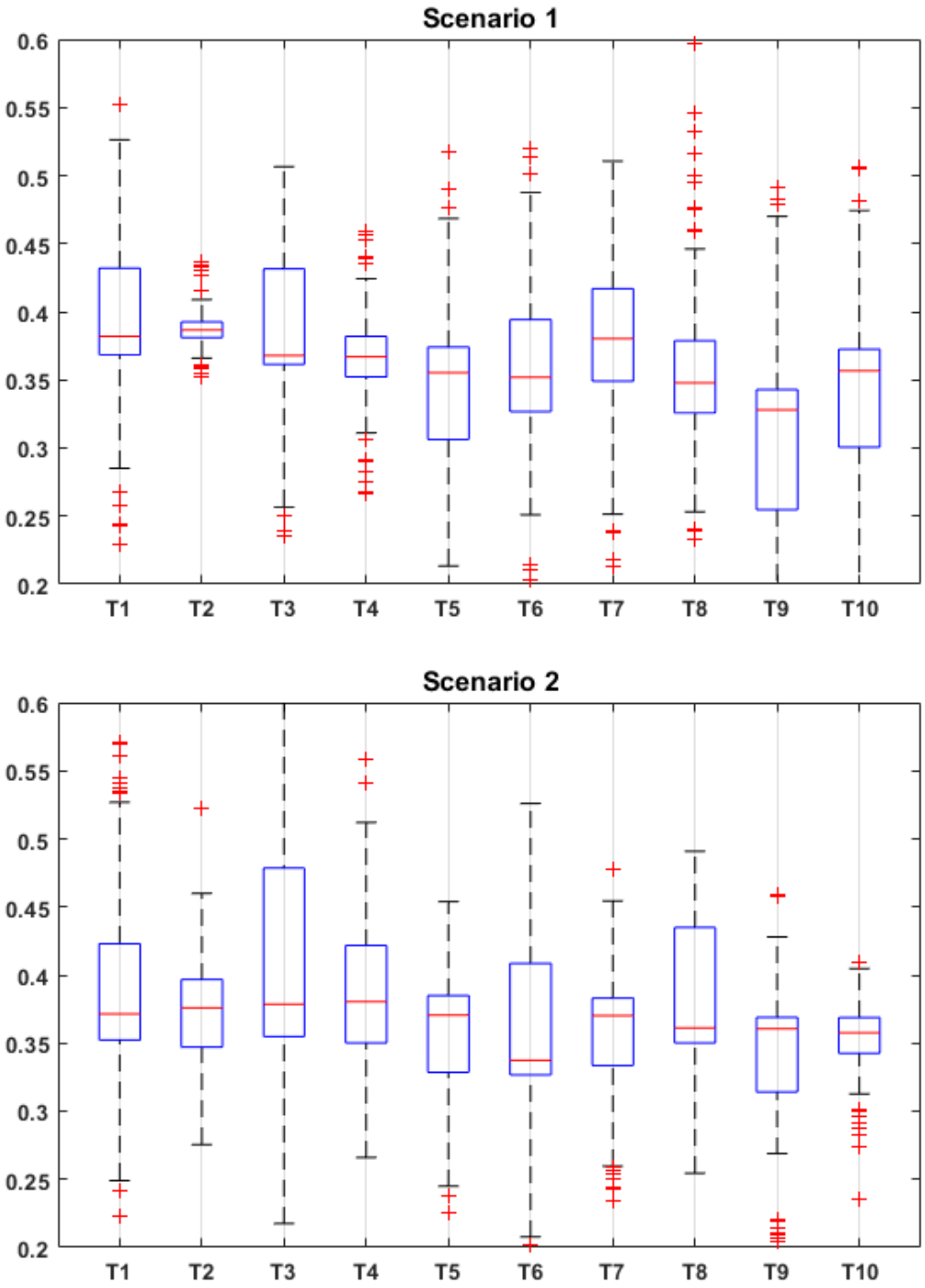

Figure S4: Sensitivity of closeness coefficients in each scenario to a two-at-a-time alteration of criteria weights (by ±20%) for the wastewater treatment trains evaluated in this study

S8. The user-interface of the IMCMEDM tool

The user-interface of the IMCMEDM tool is as illustrated in the following figures. By default, the tool is launched with four options (**Figure S5**):

1. Data entering: where the data is can be input and surveys can be undertaken.
2. Run: which is employed after 'Data entering' to run the model in each scenario, and illustrates different tables and graphs of each simulation.
3. Display', which includes the schematic representation of each water reuse technologies.
4. Instruction: which guides the user through the process of undertaking a survey and includes some information about technologies, criteria, and the model.

By selecting the option 'data entering', the next step is to select a scenario to which the data are referred (**Figure S6**). After selecting a scenario, there are consecutive 11 tables which should be filled in. the first of these 11 is the pair-wise comparison between criteria (**Figure S7**) by which weight of each criterion can be can calculated. The next ten tables represent rating the technologies with respect to each criterion (C1 to C10) (**Figure S8**). After completing the data entering stage, the model can be run for each scenario and various figures and tables show the results of each scenario (**Figure S9**).

Figure S5: The IMCMEDM tool user interface; first page

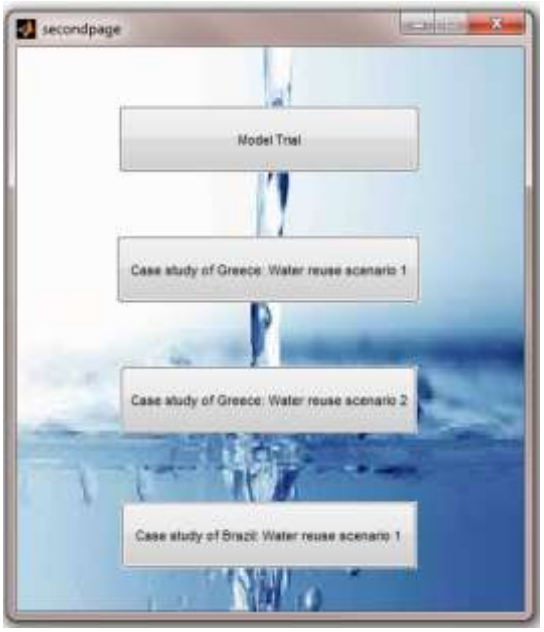

Figure S6: The IMCMEDM tool user interface; second page

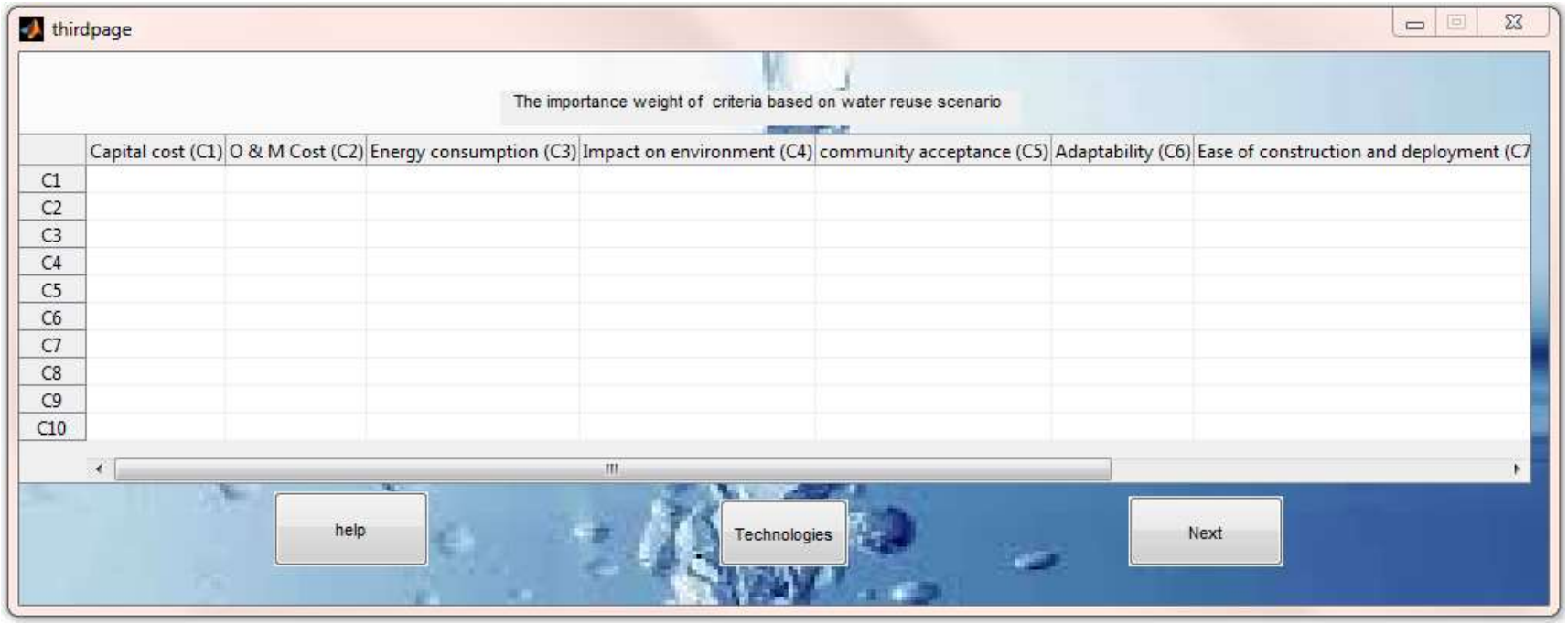

Figure S7: The IMCMEDM tool user interface; pair-wise comparison of the criteria

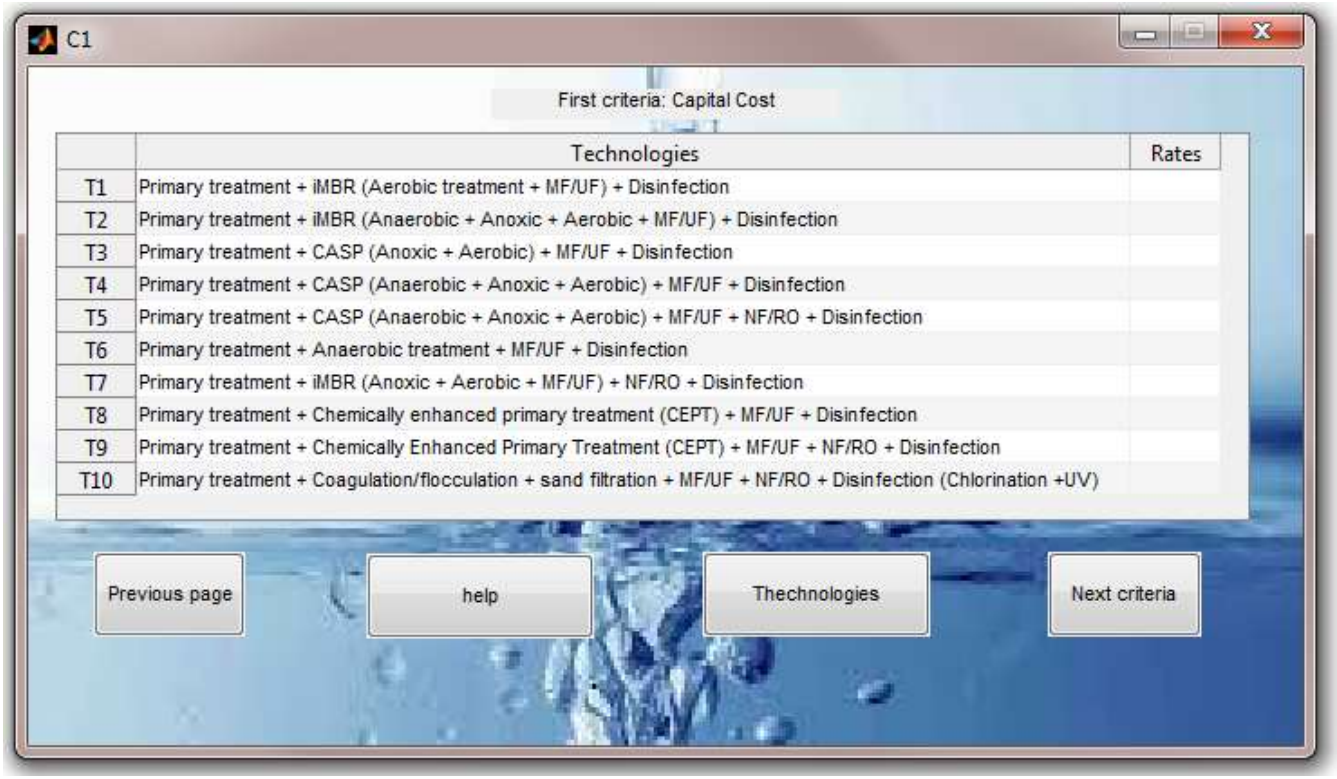

Figure S8: The IMCMEDM tool user interface; the page of rating the technologies with respect to a criterion

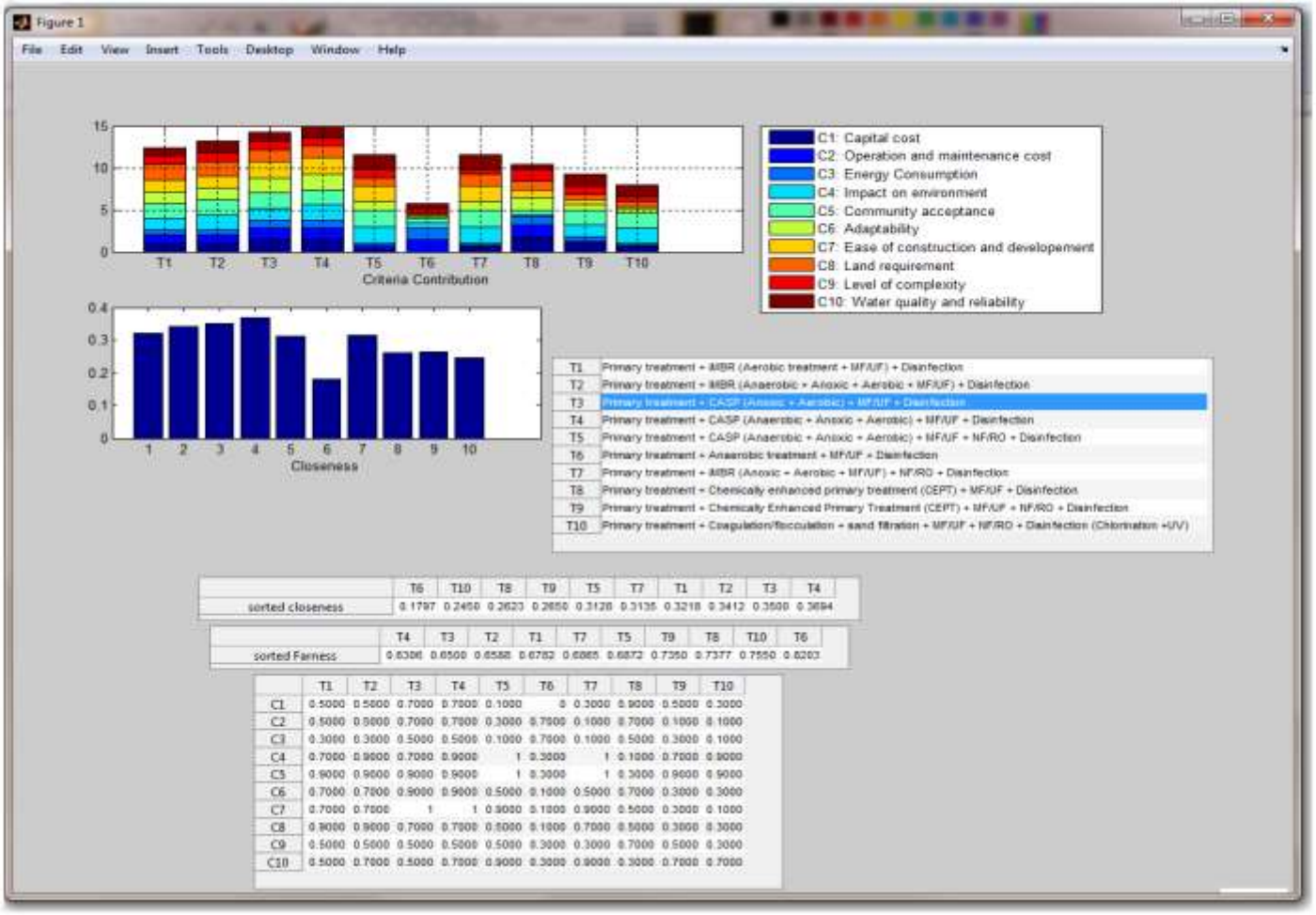

Figure S9: The IMCMEDM tool user interface; result page