

Contents

Preface	xv
About the Authors	xvii
Introduction	xix
1 SMART Method	1
1.1 Introduction	1
1.2 Description of SMART Method	2
1.2.1 Rating the Attributes	2
1.2.2 The Effective Weights of Alternatives	2
1.2.3 The Normalized Weights	3
1.2.4 The Final Ranking of Alternatives	3
1.3 Case Study	4
1.4 Conclusion	6
2 REGIME Method	9
2.1 Introduction	9
2.2 Description of REGIME Method	10
2.2.1 Superiority Index	10
2.2.2 Superiority Identifier	10
2.2.3 Impacts Matrix	10
2.2.4 REGIME Matrix	10
2.2.5 The Guide Index	11
2.2.6 The Final Ranking of Alternatives	11
2.3 Case Study	11
2.4 Conclusion	14
3 ORESTE Method	17
3.1 Introduction	17
3.2 Description of ORESTE Method	18
3.2.1 The Position Matrix	18
3.2.2 The Block Distance	18

	3.2.3	The Block Distance Matrix	18
	3.2.4	The Final Ranking of Alternatives	18
	3.3	Case Study	19
	3.4	Conclusion	21
4	VIKOR Method	23
	4.1	Introduction	23
	4.2	Description of LP-Metric	24
	4.3	Description of VIKOR Method	24
	4.3.1	The f^* and f^- Indexes	24
	4.3.2	The S and R Indexes	25
	4.3.3	The VIKOR Index	25
	4.3.4	The Final Ranking of Alternatives	25
	4.4	Case Study	25
	4.5	Conclusion	27
5	PROMETHEE I-II-III Methods	29
	5.1	Introduction	29
	5.2	Description of PROMETHEE Methods	30
	5.2.1	The Preference Function	30
	5.2.2	The Preference Index	32
	5.2.3	The Leaving and Entering Flows	32
	5.2.4	The Net Flow	32
	5.2.5	Final Ranking of Alternatives (PROMETHEE I Method)	33
	5.2.6	Final Ranking of Alternatives (PROMETHEE II Method)	33
	5.2.7	Final Ranking of Alternatives (PROMETHEE III Method)	34
	5.3	Case Study	34
	5.4	Conclusion	38
6	QUALIFLEX Method	41
	6.1	Introduction	41
	6.2	Description of QUALIFLEX Method	42
	6.2.1	The Initial Permutation of Alternatives	42
	6.2.2	The Initial Ranking of Alternatives	42
	6.2.3	The Dominant and Dominated Values	42
	6.2.4	The Permutation Values of Attributes	43
	6.2.5	The Permutation Values of Alternatives	43
	6.2.6	The Final Ranking of Alternatives	43
	6.3	Case Study	43
	6.4	Conclusion	46

7	SIR Method	47
7.1	Introduction	47
7.2	Description of SIR Method	48
7.2.1	Comparing the Alternatives	48
7.2.2	The Preference Function	48
7.2.3	The (S) and (I) Indexes and (S) and (I) Matrices	50
7.2.4	The Flow Matrix	51
7.2.5	The (n) and (r) Flows	51
7.2.6	Final Ranking of Alternatives (SIR-SAW Method)	52
7.2.7	Final Ranking of Alternatives (SIR-PROMETHEE I Method)	52
7.2.8	Final Ranking of Alternatives (SIR-PROMETHEE II Method)	52
7.3	Case Study	52
7.4	Conclusion	58
8	EVAMIX Method	59
8.1	Introduction	59
8.2	Description of EVAMIX Method	60
8.2.1	The Superiority Rate of Alternatives	60
8.2.2	The Differential Matrix in the Ordinal Attributes	61
8.2.3	The Differential Matrix in the Cardinal Attributes	61
8.2.4	The Total Dominance	61
8.2.5	The Final Ranking of Alternatives	62
8.3	Case Study	62
8.4	Conclusion	65
9	ARAS Method	67
9.1	Introduction	67
9.2	Description of ARAS Method	68
9.2.1	The Normalized Decision Matrix	68
9.2.2	The Weighted Normalized Decision Matrix	68
9.2.3	The Optimality Function	68
9.2.4	The Utility Degree	69
9.2.5	The Final Ranking of Alternatives	69
9.3	Case Study	69
9.4	Conclusion	71
10	Taxonomy Method	73
10.1	Introduction	73
10.2	Description of Taxonomy Method	74
10.2.1	The Mean and Standard Deviation of Attributes	74
10.2.2	The Standard Matrix	74
10.2.3	The Composite Distance Matrix	74
10.2.4	Homogenizing the Alternatives	75

10.2.5	The Development Pattern	76
10.2.6	The Final Ranking of Alternatives	76
10.3	Case Study	76
10.4	Conclusion	79
11	MOORA Method	81
11.1	Introduction	81
11.2	Description of MOORA Method	82
11.2.1	The Normalized Decision Matrix	82
11.2.2	The Reference Points	82
11.2.3	The Assessment Values	82
11.2.4	The Final Ranking of Alternatives	82
11.3	Case Study	83
11.4	Conclusion	85
12	COPRAS Method	87
12.1	Introduction	87
12.2	Description of COPRAS Method	88
12.2.1	The Normalized Decision Matrix	88
12.2.2	The Weighted Normalized Decision Matrix	88
12.2.3	The Maximizing and Minimizing Indexes	88
12.2.4	The Relative Significance Value	89
12.2.5	The Final Ranking of Alternatives	89
12.3	Case Study	89
12.4	Conclusion	91
13	WASPAS Method	93
13.1	Introduction	93
13.2	Description of WASPAS Method	94
13.2.1	The Normalized Decision Matrix	94
13.2.2	The Additive Relative Importance	94
13.2.3	The Multiplicative Relative Importance	94
13.2.4	The Joint Generalized Criterion (Q)	95
13.2.5	The Final Ranking of Alternatives	95
13.3	Case Study	95
13.4	Conclusion	98
14	SWARA Method	99
14.1	Introduction	99
14.2	Description of SWARA Method	99
14.2.1	The Initial Prioritization of Attributes	99
14.2.2	The Coefficient (K)	100
14.2.3	The Initial Weight	100
14.2.4	The Relative Weight	100
14.2.5	The Final Ranking of Attributes	100

14.3	Case Study	100
14.4	Conclusion	102
15	DEMATEL Method	103
15.1	Introduction	103
15.2	Description of DEMATEL Method	104
15.2.1	The Normalized Direct Relation Matrix	104
15.2.2	The Total Relation Matrix	104
15.2.3	The Cause and Effect Values	104
15.2.4	The Threshold Value (α)	105
15.2.5	The Interrelationship Map	105
15.2.6	The Final Ranking of Attributes	105
15.3	Case Study	106
15.4	Conclusion	108
16	MACBETH Method	109
16.1	Introduction	109
16.2	Description of MACBETH Method	110
16.2.1	Converting of Semantic Scale into Numerical Scale	110
16.2.2	The Reference Levels	110
16.2.3	The MACBETH Score (V)	110
16.2.4	The Overall Score	111
16.2.5	The Final Ranking of Alternatives	111
16.3	Case Study	111
16.4	Conclusion	113
17	ANP Method	115
17.1	Introduction	115
17.2	Description of ANP Method	116
17.2.1	The Priority Vectors	116
17.2.2	The Super Matrix	117
17.2.3	The Cluster Matrix	117
17.2.4	The Weighted Super Matrix	117
17.2.5	The Limit Super Matrix	117
17.2.6	The Utility Index	118
17.2.7	The Final Ranking of Alternatives	118
17.3	Case Study	118
17.4	Conclusion	124
18	MAUT Method	127
18.1	Introduction	127
18.2	Description of MAUT Method	128
18.2.1	The Normalized Decision Matrix	128
18.2.2	The Marginal Utility Score	128

18.2.3	The Final Utility Score	128
18.2.4	The Final Ranking of Alternatives	129
18.3	Case Study	129
18.4	Conclusion	131
19	IDOCRIW Method	133
19.1	Introduction	133
19.2	Description of IDOCRIW Method	134
19.2.1	The Normalized Decision Matrix	134
19.2.2	The Degree of Entropy	134
19.2.3	The Entropy Weight (W)	134
19.2.4	The Square Matrix	134
19.2.5	The Relative Impact Loss Matrix	135
19.2.6	The Weight System Matrix	135
19.2.7	The Criterion Impact Loss Weight (Q)	136
19.2.8	The Aggregate Weight (ω)	136
19.2.9	The Final Ranking of Attributes	136
19.3	Case Study	136
19.4	Conclusion	140
20	TODIM Method	143
20.1	Introduction	143
20.2	Description of TODIM Method	144
20.2.1	The Normalized Decision Matrix	144
20.2.2	The Relative Weight	144
20.2.3	The Dominance Degree	144
20.2.4	The Overall Dominance Degree	145
20.2.5	The Final Ranking of Alternatives	145
20.3	Case Study	145
20.4	Conclusion	148
21	EDAS Method	149
21.1	Introduction	149
21.2	Description of EDAS Method	150
21.2.1	The Average Solution	150
21.2.2	The Positive and Negative Distances from Average Solution	150
21.2.3	The Weighted PDA and NDA	150
21.2.4	Weighted Normalized PDA and NDA	151
21.2.5	The Appraisal Score	151
21.2.6	The Final Ranking of Alternatives	151
21.3	Case Study	151
21.4	Conclusion	155

22	PAMSSEM I & II	157
22.1	Introduction	157
22.2	Description of PAMSSEM Methods	158
22.2.1	The Local Outranking Index	158
22.2.2	The Concordance Index	158
22.2.3	The Local Discordance Index	159
22.2.4	The Outranking Degree	159
22.2.5	The Entering and Leaving Flows	160
22.2.6	The Net Flow	160
22.2.7	The Final Ranking of Alternatives (PAMSSEM I Method)	160
22.2.8	The Final Ranking of Alternatives (PAMSSEM II Method)	160
22.3	Case Study	161
22.4	Conclusion	164
23	ELECTRE I-II-III Methods	167
23.1	Introduction	167
23.2	Description of ELECTRE Methods	168
23.2.1	The Normalized Decision Matrix	168
23.2.2	The Weighted Normalized Decision Matrix	168
23.2.3	The Dominant Matrix	168
23.2.4	The Dominated Matrix	168
23.2.5	The Concordance Matrix	169
23.2.6	The Discordance Matrix	169
23.2.7	The Aggregate Dominant Matrix	170
23.2.8	The Final Ranking of Alternatives (ELECTRE I Method)	170
23.2.9	The Final Ranking of Alternatives (ELECTRE II Method)	170
23.2.10	The Final Ranking of Alternatives (ELECTRE III Method)	171
23.3	Case Study	172
23.4	Conclusion	179
24	EXPROM I & II Method	181
24.1	Introduction	181
24.2	Description of EXPROM Methods	182
24.2.1	The Weak Preference Function	182
24.2.2	The Weak Preference Index	182
24.2.3	The Strict Preference Function	184
24.2.4	The Strict Preference Index	185
24.2.5	The Entering and Leaving Flows	185
24.2.6	The Net Flow	185

24.2.7	The Final Ranking of Alternatives (EXPROM I Method)	186
24.2.8	The Final Ranking of Alternatives (EXPROM II Method)	186
24.3	Case Study	187
24.4	Conclusion	191
25	MABAC Method	193
25.1	Introduction	193
25.2	Description of MABAC Method	194
25.2.1	The Normalized Decision Matrix	194
25.2.2	The Weighted Normalized Decision Matrix	194
25.2.3	The Border Approximation Area Matrix	194
25.2.4	The Distance from the Border Approximation Area	195
25.2.5	The Total Distances from the Border Approximate Area	195
25.2.6	The Final Ranking of Alternatives	195
25.3	Case Study	195
25.4	Conclusion	197
26	CRITIC Method	199
26.1	Introduction	199
26.2	Description of CRITIC Method	200
26.2.1	The Normalized Decision Matrix	200
26.2.2	The Correlation Coefficient	200
26.2.3	The Index (C)	200
26.2.4	The Weight of Attributes	201
26.2.5	The Final Ranking of Attributes	201
26.3	Case Study	201
26.4	Conclusion	203
27	KEMIRA Method	205
27.1	Introduction	205
27.2	Description of KEMIRA Method	206
27.2.1	The Normalized Decision Matrix	206
27.2.2	The Median Matrix	206
27.2.3	The Set of Attribute Weights	207
27.2.4	The Final Weight of Attributes	207
27.2.5	The Final Value of Alternatives	207
27.2.6	The Final Ranking of Alternatives	208
27.3	Case Study	208
27.4	Conclusion	215
	References	217
	Index	231