

SUPPLEMENTARY MATERIAL

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Structuring Problems for Multi-Criteria Decision Analysis in Practice: a Literature Review of Method Combinations

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Table S-1. Search words used in the literature searches. SCOPUS advanced search: regular published journal articles from 2000–2015 (17.9.2015).

Method	Search words	Number of documents found (17.9.2015)
Stakeholder Analysis	<i>TITLE-ABS-KEY-AUTH ((“stakeholder analysis” OR “social multi-criteria evaluation”) AND (AHP or ANP or MCDA or MCA or MCE or MAVT or MAUT or MAUA or MAVA or PROMETHEE or TOPSIS or ELECTRE or multi-criteria or multi-attribute)) AND PUBYEAR > 1999 AND PUBYEAR < 2016 AND (LIMIT-TO (DOCTYPE,“ar”) OR LIMIT-TO (DOCTYPE,“re”))</i>	32
SWOT	<i>TITLE-ABS-KEY-AUTH (SWOT AND (AHP or ANP or MCDA or MCA or MCE or MAVT or MAUT or MAUA or MAVA or PROMETHEE or TOPSIS or ELECTRE or multi-criteria or multi-attribute)) AND PUBYEAR > 1999 AND PUBYEAR < 2016 AND (LIMIT-TO (DOCTYPE,“ar”) OR LIMIT-TO(DOCTYPE,“re”))</i>	135
DPSIR	<i>TITLE-ABS-KEY-AUTH ((DPSIR OR (PSR)) AND (AHP or ANP or MCDA or MCA or MCE or MAVT or MAUT or MAUA or MAVA or PROMETHEE or TOPSIS or ELECTRE or multi-criteria or multi-attribute)) AND PUBYEAR > 1999 AND PUBYEAR < 2016 AND (LIMIT-TO(DOCTYPE,“ar”) OR LIMIT-TO (DOCTYPE,“re”))</i>	60
Cognitive Map and Causal Maps	<i>TITLE-ABS-KEY-AUTH ((DPSIR OR (PSR)) AND (AHP or ANP or MCDA or MCA or MCE or MAVT or MAUT or MAUA or MAVA or PROMETHEE or TOPSIS or ELECTRE or multi-criteria or multi-attribute)) AND PUBYEAR > 1999 AND PUBYEAR < 2016 AND (LIMIT-TO(DOCTYPE,“ar”) OR LIMIT-TO (DOCTYPE,“re”))</i>	19
SSM, SODA and SCA	<i>TITLE-ABS-KEY-AUTH ((“Soft Systems Methodology” OR (SSM) OR “Strategic Options Development and Analysis” OR (SODA) or “Strategic Choice Approach”) AND (AHP or ANP or MCDA or MCA or MCE or MAVT or MAUT or MAUA or MAVA or PROMETHEE or TOPSIS or ELECTRE or multi-criteria or multi-Attribute)) AND PUBYEAR > 1999 AND PUBYEAR < 2016 AND (LIMIT-TO(DOCTYPE,“ar”) OR LIMIT-TO (DOCTYPE,“re”))</i>	17
Scenario Planning and Scenario Analysis	<i>TITLE-ABS-KEY-AUTH ((“Scenario planning” OR “Scenario Analysis” OR “scenario building”) AND (AHP or ANP or MCDA or MCA or MCE or MAVT or MAUT or MAUA or MAVA or PROMETHEE or TOPSIS or ELECTRE or multi-criteria or multi-attribute)) AND PUBYEAR > 1999 AND PUBYEAR < 2016 AND (LIMIT-TO(DOCTYPE,“ar”) OR LIMIT-TO (DOCTYPE,“re”))</i>	94

Table S-2. Distribution of the articles combining MCDA with PSMs in terms of most common application areas, first authors' country and journals publishing most articles.

Application area	Stakeholder Analysis	Cognitive/ Group Map	DPSIR	SWOT	Scenario planning	SAST, SCA, SODA, SSM	TOTAL	Proportion %
Environmental	4	0	29	10	16	0	59	17.7
Energy	7	1	2	17	13	3	43	12.9
Hydrology and Water Management	5	1	17	6	7	1	37	11.1
Business and marketing	0	2	0	15	3	5	25	7.5
Forestry	1	4	1	13	2	0	21	6.3
Transport and traffic	3	1	0	5	4	2	15	4.5
Agriculture	2	0	1	9	3	0	15	4.5
Industry	0	0	0	7	3	0	10	3.0
Infrastrucuture	1	1	0	1	6	0	9	2.7
Information and communication technology	0	0	0	7	0	1	8	2.4
Tourism	0	0	0	6	2	0	8	2.4
Other topics	7	8	3	37	27	2	83	75.1
TOTAL	30	18	53	132	86	14	333	100

First author's country	Stakeholder Analysis	Cognitive/ Group Map	DPSIR	SWOT	Scenario planning	SAST, SCA, SODA, SSM	TOTAL	Proportion %
China	0	0	32	20	5	0	57	17.1
Iran	1	0	2	26	2	0	31	9.3
USA	1	3	1	11	13	1	30	9.0
Italy	9	2	6	3	4	3	27	8.1
Turkey	0	2	0	15	3	0	20	6.0
UK	1	1	1	3	12	1	19	5.7
Spain	6	0	1	2	5	0	14	4.2
Portugal	1	1	0	1	2	7	12	3.6
Finland	0	1	0	8	1	0	10	3.0
Switzerland	1	0	0	0	6	0	7	2.1
Belgium	3	0	0	2	2	0	7	2.1
Taiwan	0	0	1	5	1	0	7	2.1
Brazil	0	3	0	3	0	1	7	2.1
South Korea	0	1	4	1	1	0	7	2.1
Germany	0	0	2	1	4	0	7	2.1
Other countries	7	4	3	31	25	1	71	21.3
TOTAL	30	18	53	132	86	14	333	100

Journal	Stakeholder Analysis	Cognitive/ Group Map	DPSIR	SWOT	Scenario planning	SAST, SCA, SODA, SSM	TOTAL	Proportion %
Energy Policy	3	0	1	5	2	0	11	3.3
Journal of Environmental Management	2	0	4	3	1	0	10	3.0
Forest Policy and Economics	1	0	0	6	2	0	9	2.7
Ecological Economics	6	0	0	0	2	0	8	2.4
European Journal of Operational Research	1	1	0	1	4	1	8	2.4
Shengtai Xuebao/Acta Ecologica Sinica	0	0	7	0	0	0	7	2.1
Ecological Indicators	0	1	3	0	1	0	5	1.5
Environmental Modelling and Software	0	0	2	0	3	0	5	1.5
Expert Systems with Applications	0	0	0	3	2	0	5	1.5
Other journals	17	16	36	114	69	13	265	79.6
TOTAL	30	18	53	132	86	14	333	100

Table S-3a. Articles which combine Stakeholder Analysis and MCDA.

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Bendjenna et al.	Using multi-criteria analysis to prioritize stakeholders	Journal of Systems and Information Technology	2012	Algeria	Case	Traffic	Stakeholders were prioritized using MCDA	MCDA	Fuzzy Choquet integral
Antunes et al.	Participatory multi-criteria analysis of irrigation management alternatives: The case of the Caia irrigation district, Portugal	International Journal of Agricultural Sustainability	2011	Portugal	Case	Hydrology and Water Management	Institutional analysis	SMCE ¹ , AHP	
Borzoni et al.	Geothermal power in Italy: A social multi-criteria evaluation	Renewable Energy	2014	Italy	Case	Energy	Institutional analysis	SMCE (NAIADE)	Sensitivity analysis
Brown et al.	Trade-off analysis for marine protected area management	Ecological Economics	2001	UK	Method, case	Marine	Stakeholder Analysis	MCA	
Domènech et al.	Degrowth initiatives in the urban water sector? A social multi-criteria evaluation of non-conventional water alternatives in Metropolitan Barcelona	Journal of Cleaner Production	2013	Spain	Case	Hydrology and Water Management	Stakeholder Analysis	SMCE	
Gamboa and Munda	The problem of windfarm location: A social multi-criteria evaluation framework	Energy Policy	2006	Spain	Case	Energy	Stakeholder Analysis	SMCE (NAIADE)	Sensitivity analysis
Gamboa	Social multi-criteria evaluation of different development scenarios of the Aysén region, Chile	Ecological Economics	2006	Spain	Case	Environmental	Stakeholder Analysis	SMCE	
Garmendia et al.	Social multi-criteria evaluation as a decision support tool for integrated coastal zone management	Ocean and Coastal Management	2010	Spain	Case	Marine	Stakeholder Analysis	SMCE	Sensitivity analysis
Geneletti	Combining Stakeholder Analysis and spatial multicriteria	Waste Management	2010	Italy	Case	Waste management	Stakeholder Analysis	MCDA	Sensitivity analysis

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
	evaluation to select and rank inert landfill sites								(DEFINITE)
Ghojdy et al.	Prioritizing stakeholders of integrated land use management in Arasbaran, Iran	Austrian Journal of Forest Science	2009	Iran	Case	Land use	Stakeholder Analysis	AHP	
Gómez-Ramos	Contribution of a bioenergetic production model applied at local scale to rural development. The case of Odra-Pisuerga area (Burgos)	Ager	2013	Spain	Case	Energy	Stakeholder Analysis	AHP	
Halog and Manic	Advancing integrated systems modelling framework for life cycle sustainability assessment	Sustainability	2011	USA	Method	Energy	Stakeholder Analysis	MCDA	Data Envelopment Analysis
Ianni and Geneletti	Applying the ecosystem approach to select priority areas for forest landscape restoration in the Yungas, northwestern Argentina	Environmental Management	2010	Italy	Case	Environmental	Stakeholder analysis	MCA	
Kolinjivadi et al.	Capabilities as justice: Analysing the acceptability of payments for ecosystem services (PES) through 'social multi-criteria evaluation'	Ecological Economics	2015	Canada	Case	Hydrology and Water Management	Institutional analysis	SMCE	
Lienert et al.	Stakeholder Analysis combined with social network analysis provides fine-grained insights into water infrastructure planning processes	Journal of Environmental Management	2013	Switzerland	Case	Infrastructure	Stakeholder Analysis	MAVT	
Lennox et al.	Structuring stakeholder participation in New Zealand's water resource governance	Ecological Economics	2011	New Zealand	Case	Hydrology and Water Management	Citizen's Jury process	MCDA	
Macharis et al.	The strategic evaluation of new technologies through	Research in Transportation	2004	Belgium	Method, case	Traffic	Stakeholder Analysis	MCA	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
	multicriteria analysis: the advisors case	Economics							
Macharis et al.	The Multi-Actor Multi-Criteria Analysis (MAMCA) application in the Flemish long-term decision making process on mobility and logistics	Transport Policy	2010	Belgium	Method, case	Traffic	Stakeholder Analysis	MAMCA ² (AHP)	
Monteroso et al.	New methods for the analysis of invasion processes: Multi-criteria evaluation of the invasion of <i>Hydrilla verticillata</i> in Guatemala	Journal of Environmental Management	2011	Guatemala	Case	Environmental	Institutional analysis	SMCE	
Munda	Social multi-criteria evaluation: Methodological foundations and operational consequences	European Journal of Operational Research	2004	Italy	Method	Economics	Institutional analysis	SMCE	
Munda	Measuring sustainability": A multi-criterion framework	Environment, Development and Sustainability	2005	Italy	Method	Economics	Institutional analysis	SMCE	
Munda	Social multi-criteria evaluation for urban sustainability policies	Land Use Policy	2006	Italy	Method	Urban planning	Institutional analysis	SMCE	
Nordström et al.	Integrating multiple criteria decision analysis in participatory forest planning: Experience from a case study in northern Sweden	Forest Policy and Economics	2010	Sweden	Case	Forestry	Stakeholder Analysis	AHP	
Nikodinoska et al.	Stakeholders' appraisal of biomass-based energy development at local scale	Journal of Renewable and Sustainable Energy	2015	Italy	Case	Energy	Stakeholder Analysis, SWOT	AHP	
Parra-López et al.	Integrating public demands into model-based design for multifunctional agriculture: An application to intensive Dutch dairy landscapes	Ecological Economics	2008	Spain	Case	Agriculture	Stakeholder Analysis	MCE	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Rosso et al.	Integrating multi-criteria evaluation and stakeholders analysis for assessing hydropower projects	Energy policy	2014	Italy	Case	Energy	Stakeholder Analysis, power/interest matrix	AHP	
Siciliano	Social multicriteria evaluation of farming practices in the presence of soil degradation. A case study in Southern Tuscany, Italy	Environment, Development and Sustainability	2009	Italy	Case	Agriculture	Institutional analysis was used to identify key parties	SMCE	
Tan et al.	Water planning in the Condamine Alluvium, Queensland: Sharing information and eliciting views in a context of overallocation	Journal of Hydrology	2012	Australia	Case	Hydrology and Water Management	Stakeholder Analysis	MCA	
Turcksin et al.	A multi-actor multi-criteria framework to assess the stakeholder support for different biofuel options: The case of Belgium	Energy Policy	2011	Belgium	Case	Energy	Stakeholder Analysis	MAMCA (AHP)	
Turner et al.	Ecological-economic analysis of wetlands: Scientific integration for management and policy	Ecological Economics	2000	Sweden	Method	Environmental	Stakeholder Analysis	MCE	

¹ Social Multi-Criteria Evaluation

² Multi-Actor Multi-Criteria Analysis

Table S-3b. Articles which combine Cognitive Maps/group maps and MCDA.

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Adrianto et al.	Assessing local sustainability of fisheries system: A multi-criteria participatory approach with the case of Yoron Island, Kagoshima prefecture, Japan	Marine Policy	2005	Japan	Case	Fishery	CM	MCA	
Bana e Costa et al.	Prioritisation of public investments in social infra-structures using multicriteria value analysis and decision conferencing: A case-study	International Transactions in Operational Research	2006	Portugal	Case	Infrastructure	CM, Means-ends networks	MACBETH	Decision conferencing
Bruen	Systems analysis – A new paradigm and decision support tools for the water framework directive	Hydrology and Earth System Sciences	2008	Ireland	Methodology	Hydrology and Water Management	CM	ELECTRE, AHP	
Carlucci	Assessing the links between knowledge assets and value creation in organisations	Measuring Business Excellence	2012	Italy	Methodology	Business and marketing	CM	MCDA	
Carra et al.	Diversification Strategies for sustaining small-scale fisheries activity: A multidimensional integrated approach	Rivista di Studi sulla Sostenibilita	2014	Italy	Case	Fishery	CM	AHP	
Eraslan and Kurt	Fuzzy multi-criteria analysis approach for the evaluation and classification of cognitive performance factors in flexible manufacturing systems	International Journal of Production Research	2007	Turkey	Methodology	Manufacturing engineering	CM/SODA	Fuzzy AHP	
Ferreira et al.	Adding value to bank branch performance evaluation using Cognitive Maps and MCDA: A case study	Journal of the Operational Research Society	2011	Portugal	Case	Business and marketing	CM/SODA	MCDA	
Ferreira et al.	A multiple criteria framework to evaluate bank branch	International Journal of Strategic Property	2012	Portugal	Method,case	Business and marketing	CM/SODA	MCDA	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
	potential attractiveness	Management							
Ferreira et al.	How to create indices for bank branch financial performance measurement using MCDA techniques: an illustrative example	Journal of Business Economics and Management	2014	Portugal	Case	Business and marketing	CM/SODA	MCDA	
Ferreira et al.	Evaluating retail banking service quality and convenience with MCDA techniques: A case study at the bank branch level	Journal of Business Economics and Management	2014	Portugal	Case	Business and marketing	CM	MCA	
Franco and Lord	Understanding multi-methodology: Evaluating the perceived impact of mixing methods for group budgetary decisions	Omega	2011	UK	Case	Health care	CM	Multi-criteria portfolio analysis	Composite programming
Henao and Benavides	A multi-methodological approach to structure portfolio investment projects	Academia	2012	Colombia	Case	Business and marketing	CM	MCDA	Binary linear programming
Kim and Kim	A CRM performance measurement framework: Its development process and application	Industrial Marketing Management	2009	South Korea	Framework, case	Management	Causal Map	AHP	
Longaray et al.	Assessment of a Brazilian public hospital's performance for management purposes: A soft operations research case in action	Operations Research for health Care	2015	Brazil	Case	Health care	CM	MACBETH	
Marafon et al.	The effectiveness of multi-criteria decision aid methodology: A case study of R&D management	European Journal of Innovation Management	2015	Brazil	Case	Management	CM	MACBETH	
Mendoza and Prabhu	Qualitative multi-criteria approaches to assessing	Forest Ecology and Management	2003	USA	Case	Forestry	CM	MCDA: Simple weighting	Hydrological simulation

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
	indicators of sustainable forest resource management							techniques	
Mendoza and Prabhu	Participatory modeling and analysis of sustainable forest management: Experiences and lessons learned from case studies	USDA Forest Service - General Technical Report PNW	2005	USA	Case	Forestry	CM	MCA	Qualitative and quantitative system dynamics
Mendoza and Prabhu	Evaluating multi-stakeholder perceptions of project impacts: A participatory value-based multi-criteria approach	International Journal of Sustainable Development and World Ecology	2009	USA	Case/Methodology	Forestry	CM	AHP, VFT	
Myllyviita et al.	Mixing methods – assessment of potential benefits for natural resources planning	Scandinavian Journal of Forest Research	2014	Finland	Case	Energy	Conceptual Content Cognitive Map (3CM)	SMART	
Ülengin et al.	An integrated decision aid system for Bosphorus water-crossing problem	European Journal of Operational Research	2010	Turkey	Case	Traffic	CM, Scenario analysis	(TOPSIS)	Structural equation model
Ventura et al.	On facilitating group decision making processes with VIP analysis	Book: Group decision and negotiation - A process-oriented view	2014	Brazil	Case	Management	CM	MCDA	
Wolfslehner and Vacik	Mapping indicator models: From intuitive problem structuring to quantified decision-making in sustainable forest management	Ecological Indicators	2011	Austria	Method, case	Forestry	CM, DPSIR	ANP	GIS

Table S-3c. Articles which combine DPSIR and MCDA.

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Azarnivand and Chitsaz	Adaptive policy responses to water shortage mitigation in the arid regions—a systematic approach based on eDPSIR, DEMATEL, and MCDA	Environmental monitoring assessment	2015	Iran	Case	Hydrology and Water Management	DPSIR (enhanced and modified)	AHP	DEMATEL model
Benini et al.	Assessment of land use changes through an indicator-based approach: A case study from the Lamone river basin in Northern	Ecological Indicators	2010	Italy	Case	Hydrology and Water Management	DPSIR	MCDA:MULINO DSS	
Bohai et al.	Ecosystem health assessment of Yellow Sea and Bohai coastal areas	Chinese Journal of Ecology	2015	China	Case	Environmental	PSR	AHP	
Bottero and Ferretti	Integrating the analytic network process (ANP) and the driving force-pressure-state-impactresponses (DPSIR) model for the sustainability assessment of territorial transformations	Management of Environmental Quality: An International Journal	2010	Italy	Case	Environmental	DPSIR	ANP	
Bottero and Ferretti	Using the analytic network process in sustainability assessment of territorial transformations: An application of the environmental DPSIR indicators framework	Geoingegneria Ambientale e Mineraria	2010	Italy	Case	Environmental	DPSIR	ANP	
Chen et al.	Ecosystem quality comprehensive evaluation and change analysis of Dongting Lake in 2001—2010 based on remote sensing	Shengtai Xuebao/Acta Ecologica Sinica	2015	China	Case	Hydrology and Water Management	PSR	AHP	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Chung and Lee	Prioritization of water management for sustainability using hydrologic simulation model and multicriteria decision making techniques	Journal of Environmental Management	2009	South Korea	Case	Hydrology and Water Management	DPSIR	AHP, ELECTRE II, Regime, EVAMIX	
Dai et al.	Integrated water resource security evaluation of Beijing based on GRA and TOPSIS	Frontiers of Earth Science in China	2010	China	Case	Hydrology and Water Management	PSR	TOPSIS	Gray relation analysis
Dong et al.	Delimitation of water conservation areas in the upper Yangtze River and analysis of influencing factors on eco-security	Beijing Keji Daxue Xuebao/Journal of University of Science and Technology Beijing	2010	China	Case	Hydrology and Water Management	PSR	AHP	Vector similarity and principal component projection method, Gray relation analysis
de Jonge et al.	Integrating ecological, economic and social aspects to generate useful management information under the EU Directives' 'ecosystem approach'	Ocean and Coastal Management	2012	UK	Methodology	Environmental	DPSIR	Mentions MCA	Ecological Network Analysis
Fassio et al.	A decision support tool for simulating the effects of alternative policies affecting water resources: An application at the European scale	Journal of Hydrology	2005	Italy	Case	Hydrology and Water Management	DPSIR	MCDA:MULINO DSS	
Giupponi	Decision support systems for implementing the European Water Framework Directive: The MULINO approach	Environmental Modelling and Software	2007	Italy	Case	Hydrology and Water Management	DPSIR	MCDA:MULINO DSS	
Giupponi, Vladimirova	Ag-PIE: A GIS-based screening model for assessing agricultural pressures and	Science of the Total Environment	2006	Italy	Case	Hydrology and Water Management		MCDA, SAW	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
	impacts on water quality on a European scale								
Hua and Zhang	Development evaluation and long-term mechanism research on low-carbon economy in jiangxi province of China	Energy Education Science and Technology Part A: Energy Science and Research	2013	China	Case	Environmental	PSR, SWOT	AHP	
Jia et al.	Assessment of wetland ecosystem health in the source region of yangtze, yellow and yalu tsangpo rivers of qinghai province	Wetland Science	2011	China	Case	Environmental	PSR	AHP	GIS
Johnston et al.	WETwin: A structured approach to evaluating wetland management options in data-poor contexts	Environmental Science & Policy	2013	Sri Lanka	Cases	Environmental	DPSIR	MCDA:MULINO DSS	Dynamic simulation model (WETSYS)
Jun et al.	Development of spatial water resources vulnerability index considering climate change impacts	Science of the Total Environment	2011	South Korea	Case	Hydrology and Water Management	DPSIR	TOPSIS	
Kim et al.	Prioritizing the best sites for treated wastewater instream use in an urban watershed using fuzzy TOPSIS	Resources, Conservation and Recycling	2013	South Korea	Case	Wastewater treatment	DPSIR	Fuzzy TOPSIS	
Lai et al.	Analysis on the ecological security of freeze-thaw agricultural area: Methodology and a case study for sanjiang plain	Fresenius Environmental Bulletin	2013	China	Case	Environmental	PSR	AHP	GIS
Le Gentil and Mongrue	A systematic review of socio-economic assessments in support of coastal zone management (1992-2011)	Journal of Environmental Management	2015	France	Review	Environmental	DPSIR	MCDA cases analysed	
Li and Wang	Assessment of agricultural ecological security of the	Shengtai Xuebao/Acta Ecologica Sinica	2008	China	Case	Environmental	PSR	AHP	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
	Zhifanggou Valley in the Loess Hilly Region over 70 years								
Li et al.	GIS-based methodology for erosion risk assessment of the muddy coast in the Yangtze Delta	Ocean and Coastal Management	2015	China	Case	Environmental	DPSIR	AHP	
Li et al.	Water safety assessment of drinking water of Hanjiang River in Wuhan City, China	Asian Journal of Chemistry	2014	China	Case	Hydrology and Water Management	PSR	AHP	
Li et al.	Assessment method of regional ecological security based on pressure-state-response model	Shengtai Xuebao/Acta Ecologica Sinica	2010	China	Case	Environmental	PSR	AHP	
Liu and Ou	A comparative analysis of sustainable fishery development indicator systems in Australia and Canada	Sustainable Development	2007	Taiwan	Case	Fishery	PSR	Fuzzy AHP	
Meng et al.	Ecological security early-warning and its ecological regulatory countermeasures in the Tuojiang River Basin	Journal of Ecology and Rural Environment	2009	China	Case	Environmental	PSR	AHP	
Meyar-Naimi and Vaez-Zadeh	Sustainable development based energy policy making frameworks, a critical review	Energy Policy	2012	Iran	Review	Energy	DPSIR, PSR	AHP	Fuzzy integrated evaluation, and principal component analysis
Mysiak et al.	Towards the development of a decision support system for water resource management	Environmental Modelling and Software	2005	Germany	Methodology	Hydrology and Water Management	DPSIR	MCDA:MULINO DSS (TOPSIS, AHP...)	Hydrological models
Petersson and Giupponi	Decision support for strategic water management: Mdss in the large dam contex	Water International	2007	Germany, Italy	Case (retrospective)	Hydrology and Water Management	DPSIR	MCDA:MULINO DSS	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Pu et al.	Integrated assessment of marine aquaculture ecosystem health: Framework and method	Shengtai Xuebao/Acta Ecologica Sinica	2012	China	Method	Environmental	PSR	AHP	
Rehr et al.	A Decision Support Framework for Science-Based, Multi-Stakeholder Deliberation: A Coral Reef Example	Environmental Management	2012	USA	Case	Environmental	DPSIR	MCDA, direct point allocation	Decision Landscape
Ren et al.	Role prioritization of hydrogen production technologies for promoting hydrogen economy in the current state of China	Renewable and Sustainable Energy Reviews	2015	China	Case	Energy	DPSIR	Fuzzy AHP, Fuzzy TOPSIS	
Roura-Pascual et al.	Ecology and management of alien plant invasions in South African fynbos: Accommodating key complexities in objective decision making	Biological Conservation	2009	Spain	Case	Environmental	DPSIR	AHP	
Shao et al.	Trends Analysis of Ecological Environment Security Based on DPSIR Model in the Coastal zone: A survey study in Tianjin, China	International Journal of Environmental Research	2014	China	Case	Environmental	DPSIR	AHP	
Shen et al.	Ecosystem health assessment of Yellow Sea and Bohai coastal areas	Chinese Journal of Ecology	2015	China	Case	Environmental	PSR	AHP	
Song et al.	Impact of fishing on fishery ecosystem: A case study in Changshan archipelago area	Chinese Journal of Ecology	2010	China	Case	Fishery	PSR	AHP	
Wang and Xu	Dynamic successive assessment method of water environment carrying capacity and its application	Ecological Indicators	2015	China	Case	Hydrology and Water Management	PSR	AHP	
Wang et al.	An eco-city evaluation method	Ecological Indicators	2015	China	Case	Environmental	PSR	AHP	GIS

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
	based on spatial analysis technology: A case study of Jiangsu Province, China								
Wang et al.	Ecological security assessment model and corresponding indicator system of the regions along Huaihe River in Anhui Province	Chinese Journal of Applied Ecology	2006	China	Case	Environmental	PSR	AHP	
Wang et al.	Evaluating sustainability of wetland system: A case study in east dongting lake area, China	African Journal of Agricultural Research	2011	China	Case	Environmental	PSR, Delphi	AHP	
Wolfslehner and Vacik	Mapping indicator models: From intuitive problem structuring to quantified decision-making in sustainable forest management	Ecological Indicators	2011	Austria	Case	Forestry	Cognitive Maps, DPSIR	ANP	Indicator network
Wolfslehner, and Vacik	Evaluating sustainable forest management strategies with the analytic network process in a pressure-state-response framework	Journal of Environmental management	2008	Austria	Case	Forestry	PSR	ANP	
Xiaodan et al.	A GIS-based decision support system for regional eco-security assessment and its application on the Tibetan Plateau	Journal of Environmental Management	2010	China	Case	Environmental	PSR	AHP	GIS
Xu et al.	Case studies on sustainability assessment of urban wetland resources	Fresenius Environmental Bulletin	2013	China	Case	Environmental	PSR, Delphi	AHP	
Yang et al.	Assessment on urban ecological security spatial differences based on causal network: A case of Dalian Cit	Shengtai Xuebao/Acta Ecologica Sinica	2008	China	Case	Environmental	DPSIR,PSR	Fuzzy AHP	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Yang et al.	Prioritization of water management under climate change and urbanization using multi-criteria decision making methods	Hydrology and Earth System Sciences	2012	South Korea	Case	Hydrology and Water Management	DPSIR	ELECTRE II	
Zhang and Ju	PSR-based Ecosystem Health Evaluation Research in Yellow River Delta Wetland	Advanced Materials Research	2013	China	Case	Environmental	DPSIR	AHP	
Zhang	Scenarios simulation and indices thresholds determination of ecological security in three gorges reservoir based on system dynamics	Shengtai Xuebao/Acta Ecologica Sinica	2015	China	Case	Hydrology and Water Management	DPSIR	AHP	System dynamics model
Zheng et al.	Empirical research on carrying capacity of human settlement system in Dalian City, Liaoning Province, China	Chinese Geographical Science	2015	China	Case	Environmental	CPSR (Capacity-PSR)	AHP	
Zhao and Ma	Spatial-temporal pattern and obstacle factors of cultivated land ecological security in major grain producing areas of Northeast China: A case study in Jilin Province	Chinese Journal of Applied Ecology	2014	China	Case	Agriculture	PSR-EES	TOPSIS	Markov chain
Zhou et al.	A DPSIR model for vulnerability assessment of water resources system in Chang-Zhu-Tan Area	Tongji Daxue Xuebao/Journal of Tongji University	2013	China	Case	Hydrology and Water Management	DPSIR	AHP	
Zhu et al.	Using state and trend analysis to assess ecological security for the vulnerable agricultural ecosystems of Pengyang County in the loess hilly region of China	International Journal of Sustainable Development and World Ecology	2009	China	Case	Environmental	PSR	AHP	Fuzzy model

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDAs methods used	Other methods used
Zhu et al.	Designing of health early-warning indicator system for littoral wetland ecosystems	Journal of Ecology and Rural Environment	2010	China	Case	Environmental	PSR	AHP	
Zhu et al. 2014	Study on ecological safety evaluation and warning of wetlands in Tumen river watershed based on 3S technology	Shengtai Xuebao/Acta Ecologica Sinica	2014	China	Case	Environmental	PSR	AHP	

Table S-3d. Articles which combine SWOT and MCDA.

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Akbulaka and Cengizb	Determining ecotourism strategies using A'WOT hybrid method: case study of Troia Historical National Park, Çanakkale, Turkey	International Journal of Sustainable Development & World Ecology	2014	Turkey	Case	Tourism	SWOT	AHP	
Arabzad et al.	Employing fuzzy TOPSIS and SWOT for supplier selection and order allocation problem	International Journal of Advanced Manufacturing Technology	2014	Iran	Case	Business and marketing	SWOT	Fuzzy TOPSIS	
Arslan and Turan	Analytical investigation of marine casualties at the Strait of Istanbul with SWOT-AHP method	Maritime Policy and Management	2009	Turkey	Case	Marine	SWOT	AHP	
Arslan and Er	SWOT analysis for safer carriage of bulk liquid chemicals in tankers	Journal of Hazardous Materials	2008	Turkey	Case	Marine	SWOT	AHP	
Azarnivand et al.	Extended fuzzy analytic hierarchy process approach in water and environmental management (case study: Lake Urmia Basin, Iran)	Environmental Earth Sciences	2014	Iran	Case	Hydrology and Water Management	SWOT	Fuzzy AHP	
Azimi et al.	Ranking the strategies of mining sector through anp and topsis in a swot framework	Journal of Business Economics and Management	2011	Iran	Case	Mining	SWOT	ANP, TOPSIS	
Banihabib et al.	A new framework for strategic planning to stabilize a shrinking lake	Lake and Reservoir Management	2015	Iran	Case	Hydrology and Water Management	SWOT	AHP, SAW, TOPSIS	
Bas	The integrated framework for analysis of electricity supply chain using an integrated SWOT-fuzzy TOPSIS methodology combined with	International Journal of Electrical Power and Energy Systems	2013	Turkey	Case	Energy	SWOT	AHP, Fuzzy TOPSIS	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Baykasoglu and Gölcük	AHP: The case of Turkey Development of a novel multiple-attribute decision making model via fuzzy Cognitive Maps and hierarchical fuzzy TOPSIS	Information Sciences	2015	Turkey	Method,case	Education	SWOT	Fuzzy TOPSIS	Fuzzy Cognitive Mapping,
Bottero	A multi-methodological approach for assessing sustainability of urban projects	Management of Environmental Quality: An International Journal	2014	Italy	Case	Traffic	SWOT	ANP	Discounted cash flow analysis
Bruderman et al.	Agricultural biogas plants - A systematic analysis of strengths, weaknesses, opportunities and threats	Energy Policy	2015	Austria	Case	Energy	SWOT	AHP	
Catron et al.	Bioenergy development in Kentucky: A SWOT-ANP analysis	Forest Policy and Economics	2013	USA	Case	Energy	SWOT	ANP	
Celik et al.	Application of axiomatic design and TOPSIS methodologies under fuzzy environment for proposing competitive strategies on Turkish container ports in maritime transportation network	Expert Systems with Applications	2009	Turkey	Case	Traffic	SWOT	Fuzzy TOPSIS	Fuzzy axiomatic design
Celik et al.	Structuring fuzzy integrated multi-stages evaluation model on academic personnel recruitment in MET institutions	Expert Systems with Applications	2009	Turkey	Case	Administration	SWOT	Fuzzy AHP, Fuzzy TOPSIS	
Chaghooshi et al.	Integration of FPM, fuzzy AHP and ANP methods in formulation of Software Industry strategy (Case study: System group company)	Australian Journal of Basic and Applied Sciences	2011	Iran	Case	Management	SWOT	ANP, fuzzy AHP	
Chen	Structured methodology for	Information Sciences	2011	Taiwan	Case	Business and	SWOT	TOPSIS	DEA

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
	supplier selection and evaluation in a supply chain					marketing			
Chen et al.	Decision-making of industry development on three-dimensional SWOT-AHP - Taking the development of off-season cut roses in Hainan for example	Xitong Gongcheng Lilun yu Shijian/System Engineering Theory and Practice	2014	China	Method, case	Industry	SWOT	AHP	Double-line radar chart
Chowdhury et al.	With or without a script? Comparing two styles of participatory video on enhancing local seed innovation system in Bangladesh	Journal of Agricultural Education and Extension	2010	Austria	Case	Agriculture	SWOT	AHP	
Coscia et al.	Project management, briefing and territorial planning. The case of military properties disposal	Territorio	2015	Italy	Case	Economics	SWOT	AHP	CIA
Darshini et al.	Capturing stakeholders views on oil palm-based biofuel and biomass utilisation in Malaysia	Energy Policy	2013	UK	Case	Energy	SWOT	AHP	
Dey et al.	Managing healthcare quality in project management framework	International Journal of Services and Operations Management	2007	UK	Method, case	Healthcare	SWOT	AHP	
Duchelle et al.	Evaluating the opportunities and limitations to multiple use of Brazil nuts and timber in Western Amazonia	Forest Ecology and Management	2012	Brazil	Case	Forestry	SWOT	AHP	
Dwijanto et al.	Model of Agro-food and beverages SMEs development based on environmentally friendly strategy for Pasuruan acceleration of economic	International Journal of Applied Environmental Sciences	2013	Indonesia	Case	Regional development	SWOT	AHP	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
	development as a regional Agropolitan in Java Economic Corridors								
Dwivedi	Stakeholders' perceptions on forest biomass-based bioenergy development in the southern US	Energy Policy	2009	USA	Case	Energy	SWOT	AHP	
Ekmekçioğlu et al.	A Fuzzy Multi-Criteria SWOT Analysis: An Application to Nuclear Power Plant Site Selection	International Journal of Computational Intelligence Systems	2011	Turkey	Case/hypothetical?	Energy	SWOT	AHP, TOPSIS	
Eriksson and Vuojärvi	Different backgrounds - different priorities? Student perceptions of a technology initiative	Higher Education Research and Development	2014	Finland	Case	Information and communication technology	SWOT	AHP	
Erol and Topcu	An integrated decision aid for identifying and prioritizing strategies in forest management	Environmental Engineering and Management Journal	2011	Turkey	Case	Forestry	SWOT	AHP	
Ertugrul and Özbay	Supply chain optimization and distribution network application with ahp in a yarn company	Tekstil ve Konfeksiyon	2013	Turkey	Case	Business and marketing	SWOT	AHP	Linear programming
Eslamipoor	Firm relocation as a potential solution for environment improvement using a SWOT-AHP hybrid method	Process Safety and Environmental Protection	2014	Iran	Case	Environmental	SWOT	AHP	
Esmaeili	The formulation of organizational strategies through integration of freeman model, SWOT, and fuzzy MCDM methods: A case study of oil industry	Transformations in Business and Economics	2014	Iran	Case	Industry	SWOT	Fuzzy AHP	
Forghani et al.	Contractor selection based on	World Applied Sciences	2013	Iran	Method,case	Business and	SWOT	TOPSIS, VIKOR	Fuzzy logic

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
	SWOT analysis with VIKOR and TOPSIS methods in fuzzy environment	Journal				marketing			
Fouladgar et al.	An integrated model for prioritizing strategies of the Iranian mining sector	Technological and Economic Development of Economy	2011	Iran	Case	Mining	SWOT, balanced scorecard	Fuzzy AHP; Fuzzy TOPSIS	
Frank et al.	A framework for decision-making in investment alternatives selection	International Journal of Production Research	2013	Brazil	Framework, case	Economics	SWOT	MAUT	
Frank et al.	A systematic analysis for multi-criteria evaluation of product development investments	Producao	2011	Brazil	Case	Economics	SWOT	MAUT	
Gallego and Ayala	Strategic implementation of integrated water resources management in Mozambique: An A'WOT analysis	Physics and Chemistry of the Earth	2011	Mozambique	Case	Hydrology and Water Management	A'WOT	AHP	
Gerasimov	Nordic forest energy solutions in the Republic of Karelia	Forests	2013	Finland	Case	Forestry	SWOT	AHP	
Gerasimov	Prospects of forest road infrastructure development in northwest Russia with proven Nordic solutions	Scandinavian Journal of Forest Research	2013	Finland	Case	Infrastructure	AHP	AHP	
Grošelj and Zadnik Stirn	Between compromise and consensus in group decisions in forest management	Sumarski List	2013	Slovenia	Case	Forestry	SWOT	AHP	
Grošelj et al.	Methods based on data envelopment analysis for deriving group priorities in analytic hierarchy process	Central European Journal of Operations Research	2011	Slovenia	Method/case	Forestry	SWOT	AHP	Data envelopment analysis
Grošelj et al.	The environmental management problem of	Journal of Environmental	2015	Slovenia	Method/case	Environmental	SWOT	ANP	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
	Pohorje, Slovenia: A new group approach within ANP - SWOT framework	Management							
Gu et al.	SWOT analysis for planning development of Agricultural Logistics in Anhui Povice	Information Technology Journal	2013	China	Method, case	Agriculture	SWOT, Delphi	AHP	
Han et al.	Research on development strategy of China's machinery agricultural machinery insurance	Energy Education Science and Technology Part A: Energy Science and Research	2013	China	Case	Agriculture	SWOT	AHP	
Hatami-Marbini	An extended compromise ratio method for fuzzy group multi-attribute decision making with SWOT analysis	Applied Soft Computing Journal	2013	Belgium	Method	Energy	SWOT	Compromise ratio method (CRM), Fuzzy	
Ho	Integrated analytic hierarchy process and its applications - A literature review	European Journal of Operational Research	2008	UK	Review	Computer science and information systems	SWOT	AHP	
Hua and Zhang	Development evaluation and long-term mechanism research on low-carbon economy in jiangxi province of China	Energy Education Science and Technology Part A: Energy Science and Research	2013	China	Case	Environmental	SWOT	AHP	
Jiang et al.	SWOT-AHP hybrid model for vehicle lubricants from CNPCLC, China	Petroleum Science	2012	China	Case	Industry	SWOT	AHP	
Jozi et al.	Rural waste management strategic plan by A 'WOT Method (Case study: Minab)	Journal of Environmental Studies	2013	Iran	Cae	Waste management	SWOT, Delphi	AHP	
Kahraman et al.	Prioritization of e-Government strategies using a SWOT-AHP analysis: the case of Turkey	European Journal of Information Systems	2007	Turkey	Case	Information and communication technology	SWOT	AHP	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Kajanus et al.	Making use of MCDS methods in SWOT analysis—Lessons learnt in strategic natural resources management	Forest Policy and Economics	2012	Finland	Methodology/Case study	Forestry	SWOT	AHP, SMART, SMAA-O	
Kajanus,M., Kangas,J., Kurttila,M.	The use of value focused thinking and the A'WOT hybrid method in tourism management	Tourism Management	2004	Finland/Germany	Case	Tourism	SWOT	MCDA, SMART, VFT	
Kc et al.	Community users and experts perspective on community forestry in Nepal: A SWOT-AHP analysis	Forest Trees and Livelihood	2014	USA	Case	Forestry	SWOT	AHP	
Keča et al.	Value chains of serbian non-wood forest products	International Forestry Review	2013	Serbia	Case	Business and marketing	SWOT	AHP	
Kibria et al.	Analysing the land uses of forest-dwelling indigenous people in the Chittagong Hill Tracts, Bangladesh	Agroforestry Systems	2015	Japan	case	Land use	SWOT	AHP	
Kukrety et al.	Stakeholders' perceptions on developing sustainable Red Sanders (Pterocarpus santalinus L.) wood trade in Andhra Pradesh, India	Forest Policy and Economics	2013	USA	Case	Forestry	SWOT	AHP	
Kurttila et al.	Utilizing the analytic hierarchy process (AHP) in SWOT analysis — a hybrid method and its application to a forest-certification case	Forest Policy and Economics	2000	Finland	Case	Forestry	SWOT	AHP	
Lee et al.	Locating the competitive relation of global logistics hub using quantitative SWOT analytical method	Quality and Quantity	2009	Taiwan	Case	Business and marketing	SWOT	Fuzzy AHP	
Lee	Analyzing the competitive relations among the location in	Journal of Marine Science and	2007	Taiwan	Case	Business and marketing	SWOT	AHP	Grand strategy matrix, Fuzzy

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
	the Asia-Pacific region for developing the re-export type of global logistics hub	Technology							theory
Lee	Two-phase fuzzy approach for evaluating service strategies in an airport's international logistic system	Journal of the Chinese Institute of Industrial Engineers	2010	Taiwan	Case	Traffic	SWOT	ANP	Fuzzy
Lee	Application of a SWOT-FANP method	Technological and Economic Development of Economy	2013	Taiwan	Method, case	Business and marketing	SWOT	Fuzzy ANP	
Leskinen et al.	Adapting modern strategic decision support tools in the participatory strategy process- a case study of a forest research station	Forest Policy and Economics	2006	Finland	Case	Forestry	SWOT	MCDA	
Li	Contrast of Arctic route issue strategy based on linguistic information processing	Dalian Haishi Daxue Xuebao/Journal of Dalian Maritime University	2010	China	Method, case	Marine	SWOT	MADM	Delphi
Liu et al.	SWOT analysis of China's shipping enterprises based on AHP	Dalian Haishi Daxue Xuebao/Journal of Dalian Maritime University	2009	China	Case	Business and marketing	SWOT	AHP	
Luczak et al.	Multi-criteria decision-making as a tool for distinguishing types of developmental strategies in communes	Studia Regionalne i Lokalne	2013	Poland	Case	Regional development	SWOT	AHP	
Ma and Wie	RISK measurement and its application based on Inner Mongolia electricity market	Advances in Information Sciences and Service Sciences	2012	China	Case	Energy	SWOT	AHP	Markov chain
Macharis et al.	PROMETHEE-GDSS revisited: Applications so far and new developments	International Journal of Multicriteria Decision Making	2015	Belgium	Review and analysis	Computer science and information systems	SWOT	PROMETHEE	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Mahdavi et al.	Applying multi-criteria decision methods and SWOT factors to analyze the role of information technology in industry development in Iran	Journal of Applied Sciences	2008	Iran	Case	Information and communication technology	SWOT	AHP, TOPSIS	
Malekdar	Strategic analysis of the presence of corporate venture capital in Iranian science and technology parks and incubators	Life Science Journal	2012	Iran	Case	Business and marketing	SWOT	TOPSIS	
Margles et al.	Participatory planning: Using SWOT-AHP analysis in buffer zone management planning	Journal of Sustainable Forestry	2010	USA	Case	Land use	SWOT	AHP	
Masozera et al.	Assessing the suitability of community-based management for the Nyungwe Forest Reserve, Rwanda	Forest Policy and Economics	2006	Rwanda	Case	Forestry	SWOT	AHP	
Menga Ebonzo and Liu	The use of axiomatic fuzzy set theory in AHP and TOPSIS methodology to determine strategies priorities by SWOT analysis	Quality and Quantity	2013	China	Method	Computer science and information systems	SWOT	AHP, TOPSIS	Fuzzy set theory
Matušková et al.	SWOT analysis and its environmental aspects of the Leoš Janáček airport in Ostrava	Inzynieria Mineralna	2014	Czech Republic	Case	Environmental	SWOT	MCA	
Miyamoto et al.	Development of an integrated decision-making method for effective flood earlywarning system	Journal of Disaster Research	2014	Japan	Case	Hydrology and Water Management	SWOT	AHP, fuzzy AHP	
Moedjiono and Mas'At	Cloud computing implementation strategy for information dissemination on meteorology, climatology, air quality, and geophysics	Journal of Information Technology Research	2012	Indonesia	Case	Information and communication technology	SWOT	ANP	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Moghimi et al.	(MKKuG) ANP-based strategic planning for Iran's Trade Promotion Organization	International Journal of Engineering, Transactions B: Applications	2014	Iran	Case	Business and marketing	SWOT	AHP, ANP	
Monavari et al.	Delphi-based strategic planning for tourism management - A case study	Polish Journal of Environmental Studies	2013	Iran	Case	Tourism	SWOT	AHP	Delphi
Monavari	Evaluation of strategic factors in environmental management of nature-based tourism in coastal areas: The case of Gorgan Bay, Iran	Journal of Food, Agriculture and Environment	2010	Iran	Case	Tourism	SWOT	AHP	
Nganga and Maruyama	Market attractiveness evaluation of sub-saharan Africa, applying swot analysis and AHP methods	Journal of Economics and Economic Education Research	2015	Japan	Case	Business and marketing	SWOT	AHP	
Nikodinoska et al.	Stakeholders' appraisal of biomass-based energy development at local scale	Journal of Renewable and Sustainable Energy	2015	Italy	Case	Energy	SWOT	AHP	
Năstase and Kajanus	The role of the universities in a regional innovation system—a comparative A'WOT analysis	Amfiteatru Economic	2008	Romania	Case	Education	SWOT	AHP	
Okello et al.	Appraising bioenergy alternatives in uganda using strengths, weaknesses, opportunities and threats (SWOT)-analytical hierarchy process (AHP) and a desirability functions approach	Energies	2014	Uganda	Case	Energy	SWOT	AHP	
Ozkok and Cebi	A fuzzy based assessment method for comparison of ship launching methods	Journal of Intelligent and Fuzzy Systems	2014	Turkey	Case	Industry	SWOT	AHP, TOPSIS	Fuzzy Information Axiom

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Pamučar et al.	Development of an integrated transport system in distribution centres: A fa'wot analysis	Tehnicki Vjesnik	2015	Serbia	Case	Traffic	SWOT	Fuzzy AHP	
Pamučar et al.	A new fuzzy mathematical model for multi criteria decision making: An application of fuzzy mathematical model in a SWOT analysis	Scientific Research and Essays	2011	Serbia	Method, case	Management	SWOT	MCDM	Fuzzy logic
Parmooze et al.	Risk analysis of oil and gas processing units using fuzzy logic: A case study of construction of operational and desalination unit of dehloran	Advances in Environmental Biology	2014	Iran	Case	Energy	SWOT	AHP, fuzzy AHP	
Pesonen et al.	Assessing the priorities using A'WOT among resource management strategies at the Finnish Forest and Park Service	Forest Science	2001	Finland	Case	Forestry	SWOT	AHP	
Pezdevšek et al.	The present state and prospects of Slovenian private forest owners' cooperation within machinery rings	Croatian Journal of Forest Engineering	2012	Slovenia	Case	Forestry	SWOT	AHP	
Podimata et al.	Evaluating challenges and priorities of a trans-regional river basin in Greece by using a hybrid SWOT scheme and a stakeholders' competency overview	International Journal of River Basin Management	2013	Greece	Case	Hydrology and Water Management	SWOT	AHP	Least squares method
Pradhan and Roytroy	Development of supply chain risk mitigation strategy: A case study	International Journal of Procurement Management	2014	India	Case	Business and marketing	SWOT	AHP	
Rachid et al.	Comparative SWOT analysis of strategic environmental assessment systems in the Middle East and North	Journal of Environmental Management	2013	Lebanon	Case	Environmental	SWOT	MCDA	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDAs methods used	Other methods used
Raharjo et al.	Africa region Dynamic benchmarking methodology for quality function deployment	Benchmarking	2010	Sweden	Case	Management	SWOT	AHP	
Ramezanpour et al.	Market implementation of the MVA platform for pre-pandemic and pandemic influenza vaccines: A quantitative key opinion leader analysis	Vaccine	2015	Netherlands	Case	Medicine	SWOT	AHP	
Ramirez et al.	Perceptions of stakeholders about nontraditional cookstoves in Honduras	Environmental Research Letters	2012	USA	Case	Environmental	SWOT	AHP	
Ren et al.	Hydrogen economy in China: Strengths-weaknesses-opportunities-threats analysis and strategies prioritization	Renewable and Sustainable Energy Reviews	2015	China	Case	Energy	SWOT	Fuzzy weights, Goal programming	
Scolozzi et al.	Ecosystem services-based SWOT analysis of protected areas for conservation strategies	Journal of Environmental Management	2014	Portugal		Environmental	SWOT	MCA	
Sevкли et al.	Development of a fuzzy ANP based SWOT analysis for the airline industry in Turkey	Expert Systems with Applications	2012	Turkey	Case	Industry	SWOT	Fuzzy AHP, Fuzzy ANP	
Shahabi et al.	An ANP-SWOT approach for interdependency analysis and prioritizing the Iran's steel scrap industry strategi	Resources Policy	2014	Iran	Case	Industry	SWOT	AHP, ANP	
Shestra et al.	Exploring the potential for silvopasture adoption in south-central Florida: an application of SWOT-AHP method	Agricultural Systems	2004	USA	Case	Agriculture	SWOT	AHP	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Shiiri et al.	Developing and applying one model for formulating and ranking the strategies in educational organizations based on the criteria of EFQM model by using TOPSIS technique	Advances in Environmental Biology	2013	Iran	Case	Education	SWOT, Balanced Scorecard	TOPSIS	
Simelyte et al.	Formation of foreign direct investment policy: Case of Estonia	Engineering Economics	2014	Lithuania	Case	Economics	SWOT	ANP	
Shojale and Soorkali	Ict strategic planning for mazandaran province	Information Sciences and Technology	2012	Iran	Case	Information and communication technology	SWOT	ANP	QSPM matrix
Srdjevic et al.	Identifying the Criteria Set for Multicriteria Decision Making Based on SWOT/PESTLE Analysis: A Case Study of Reconstructing AWater Intake Structure	Water Resources Management	2012	Serbia	Case	Hydrology and Water Management	SWOT, PESTLE	ANP	QSPM matrix
Stainback et al.	Smallholder Agroforestry in Rwanda: A SWOT-AHP Analysis	Small-Scale Forestry	2012	USA	Case	Agriculture	SWOT	AHP	
Šušteršič et al.	Evaluating patients' health using a hierarchical multi-attribute decision model	Journal of International Medical Research	2009	Slovenia	Case	Healthcare	SWOT	AHP	
Tahernejad	Determining proper strategies for Iran's dimensional stone mines: A SWOT-AHP analysis	Arabian Journal of Geosciences	2013	Iran	Case	Mining	SWOT	AHP	
Taheri et al.	Analysis attractions of sport tourism of Khorasan Razavi province with hybrid model SWOT & AHP	Advances in Environmental Biology	2014	Iran	Case	Tourism	SWOT	AHP	
Talaei et al.	Surveying general prospects and challenges of GIS implementation in developing	Journal of Geographical Systems	2009	Iran	Case	Information and communication technology	SWOT	AHP	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
	countries: A SWOT-AHP approach								
Talaei et al.	Climate friendly technology transfer in the energy sector: A case study of Iran	Energy Policy	2014	Iran	Case	Energy	SWOT	MCDA	
Tang- Nguyen and Lee	The SWOT-ANP decision framework for the enterprise's cloud computing strategy	Information (Japan)	2015	South Korea	Method	Information and communication technology	SWOT	ANP	
Tavana et al.	A hybrid Delphi-SWOT paradigm for oil and gas pipeline strategic planning in Caspian Sea b	Energy Policy	2012	USA	Case	Energy	SWOT	MCDA	Delphi
Tavana et al.	A PROMETHEE-GDSS for oil and gas pipeline planning in the Caspian Sea basin	Energy Economics	2013	USA	Case	Energy	SWOT,	PROMETHEE	Delphi, Geometrical Analysis for Interactive Assistance
Tavana et al.	A soft multi-criteria decision analysis model with application to the European Union enlargement	Annals of Operations Research	2010	USA	Case	Other	SWOT	MCDA	Defuzzification method
Terrados et al.	Regional energy planning through SWOT analysis and strategic planning tools. Impact on renewables development	Renewable and Sustainable Energy Reviews	2007	Spain	Case	Energy	SWOT	MCDA	
Terrados, Almonacid, Pérez-Higueras	Proposal for a combined methodology for renewable energy planning. Application to a Spanish region	Renewable and Sustainable Energy Reviews	2009	Spain	Case	Energy	SWOT	PROMETHEE	
Usman and Murakami	Preliminary evaluation for strategy on coastal vegetation belts against tsunami hazard in Pacitan, Indonesia	European Journal of Scientific Research	2011	Japan	Case	Environmental	SWOT	AHP	GIS

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Vafaei and Harati	Strategic management in decision support system for coastal flood management	International Journal of Environmental Research	2010	Iran	Case	Marine	SWOT	MCDM	
Wan et al.	Emerging LNG-fueled ships in the Chinese shipping industry: a hybrid analysis on its prospects	WMU Journal of Maritime Affairs	2015	China	Case	Industry	SWOT	AHP	
Wang et al.	Hybrid SWOT approach for strategic planning and formulation in china worldwide express mail service	Journal of Applied Research and Technology	2014	China	Case	Other	SWOT	AHP	
Wasike et al.	Factors that influence the efficiency of beef and dairy cattle recording system in Kenya: A SWOT-AHP analysis	Tropical Animal Health and Production	2011	Germany	Case	Agriculture	SWOT	AHP	
Wickramansinghe et al.	Application of combined SWOT and Analytic Hierarchy Process (AHP) for tourism revival strategic marketing planning: a case of Sri Lanka tourism.	Journal of the Eastern Asia Society for Transportation Studie	2009	Sri Lanka	Case	Tourism	SWOT	AHP	
Yuan et al.	Quantitative SWOT analysis of public housing delivery by public-private partnerships in China based on the perspective of the public sector	Journal of Management in Engineering	2012	China	Case	Other	SWOT	AHP	
Yuksel and Dagdeviren	Using the analytic network process (ANP) in a SWOT analysis – A case study for a textile firm	Environmental Management	2007	Turkey	Case	Business and marketing	SWOT	ANP	
Zaerpor et al.	Make-to-order or make-to-stock decision by a novel hybrid approach	Advanced Engineering Informatics	2008	Iran	Method, case	Business and marketing	SWOT	Fuzzy AHP	
Zavadskas et al.	Selection of construction	Archives of Civil and	2011	Lithuania	Case	Management	SWOT	AHP	Permutation

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDAs methods used	Other methods used
	enterprises management strategy based on the SWOT and multi-criteria analysis	Mechanical Engineering							method
Zhang and Wenig	Development assessment of leisure agriculture in Henan province of China based on SWOT-AHP method	Journal of Industrial Engineering and Management	2013	China	Case	Agriculture	SWOT	AHP	
Zheng and Liu	Evaluating multifunctional agriculture in dalishu, China: A combined application of SWOT analysis and the analytic network process method	Outlook on Agriculture	2013	China	Case	Agriculture	SWOT	ANP	
Zhoud and Chen	Exploring the potential of community-based grassland management in Yanchi County of Ningxia Hui Autonomous Region, China: an application of the SWOT-AHP method	Environ Earth Sci	2014	China	Case	Environmental	SWOT	AHP	
Zheng and Huiqing	Evaluating multifunctional agriculture in Dalishu, China: A combined application of SWOT analysis and the analytic network process method	Outlook on Agriculture	2013	China	Case	Agriculture	SWOT	ANP	
Zhou and Yang	The Research of Port Competitive Strategies Based on Quantified SWOT Analysis	Management and Service Science (MASS), 2011 International Conference on	2011	China	Case	Economics	SWOT	AHP	
Zohrabi	Formulating and ranking qualitative strategies and studying the five competitive forces of porter in industrial organizations	Advances in Environmental Biology	2013	Iran	Case	Management	SWOT, balanced scorecard, five competitive forces of porter	TOPSIS	
Zhou and Li	Developing theory and method of urban public traffic in China	Chang'an Daxue Xuebao (Ziran Kexue	2007	China	Case	Traffic	SWOT	AHP	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Yu and Shi	Analysis of the impact factors in development of Uyghur medicine industry by AHP-SWOT	Ban)/Journal of Chang'an University (Natural Science Edition) Chinese Journal of New Drugs	2008	China	Case	Medicine	SWOT	AHP	
Öztürk	Determining management strategies for the Sarikum Nature Protection Area	Environ Monit Assess	2015	Turkey	Case	Environmental	R'SWOT (ranking+SWOT)	Weights calculated according to the ranking of SWOT factors	

Table S-3e. Articles which combine Scenario Planning (SP) and MCDA.

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Akai et al.	AHP analysis of the preference of engineers for suitable CFRP for automobile parts	International Journal of Automation Technology	2015	Japan	Case	Industry	SP	AHP	
Akgün et al.	A multi-actor multi-criteria scenario analysis of regional sustainable resource policy	Ecological Economics	2012	Turkey	Case	Environmental	SP	MCA	
Allesch and Brunner	Assessment methods for solid waste management: A literature review	Waste Management and Research	2014	Austria	Review	Waste management	SP	MCDA	
Aydin et al.	Technical and Environmental Sustainability Assessment of Water Distribution Systems	Water Resources Management	2014	Germany	Method, case	Hydrology and Water Management	SP	MCDA	
Azapagic	Sustainable production and consumption: A decision-support framework integrating environmental, economic and social sustainability	Computer Aided Chemical Engineering	2015	UK	Method, case	Environmental	SP	MCA	Monte Carlo simulations
Benedetti et al.	Multi-criteria analysis of wastewater treatment plant design and control scenarios under uncertainty	Environmental Modelling and Software	2010	Belgium	Case	Environmental	SP	MCE	
Bhave et al.	A combined bottom-up and top-down approach for assessment of climate change adaptation options	Journal of Hydrology	2014	India	Case	Hydrology and Water Management	SP	MCA	
Biloslavo et al.	Scenario Planning for climate strategies development by integrating group Delphi, AHP and dynamic fuzzy Cognitive Maps	Foresight	2010	Slovenia	Case	Environmental	SP	AHP	Delphi, Dynamic Fuzzy Cognitive Mapping
Browne et al.	Use of multi-criteria decision	Energy	2010	Ireland	Case	Energy	SP	MCDA	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
	analysis to explore alternative domestic energy and electricity policy scenarios in an Irish city-region								
De Gisi et al.	An integrated approach for monitoring efficiency and investments of activated sludge-based wastewater treatment plants at large spatial scale	Science of the Total Environment	2015	Italy	Method, case	Environmental	SP	MCA	
Fazil et al.	Choices, choices: The application of multi-criteria decision analysis to a food safety decision-making problem	Journal of Food Protection	2008	Canada	Case	Other	SP	MCDA	Cost benefit analysis
Ferreira et al.	Analysis of production and environmental effects of Nile tilapia and white shrimp culture in Thailand	Aquaculture	2015	Portugal	Case	Fishery	SP	MCE	
Ghanbarpour et al.	A comparative evaluation of flood mitigation alternatives using GIS-based river hydraulics modelling and multicriteria decision analysis	Journal of Flood Risk Management	2013	Canada	Case	Hydrology and Water Management	SP	MCDA	
Gómez-Limón et al.	Conflicting implementation of agricultural and water policies in irrigated areas in the EU	Journal of Agricultural Economics	2002	Spain	Case	Agriculture	SP	MCA	
Grazhdani	An approach for assessing ecosystem services with application in a protected area case study: Al-Prespa	Bulgarian Journal of Agricultural Science	2014	Albania	Case	Environmental	SP	MCDA	
Gurung and Scholz	Community-based ecotourism in Bhutan: Expert evaluation of stakeholder-based	International Journal of Sustainable Development and World	2008	Switzerland	Case	Tourism	SP	MCE	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
	scenarios	Ecology							
Hanafizadeh et al.	Portfolio design for investment companies through Scenario Planning	Management Decision	2011	Iran	Case	Business and marketing	SP	PROMETHEE	
Harmon and Viles	Beyond geomorphosites: Trade-offs, optimization, and networking in heritage landscapes	Environment Systems and Decisions	2013	UK	Case	Tourism	SP	MCA	
Häyhä et al.	Economic and environmental performance of electricity production in Finland: A multicriteria assessment framework	Ecological Modelling	2011	Italy	Case	Energy	SP	MCA	
Heinrich et al.	Ranking and selection of power expansion alternatives for multiple objectives under uncertainty	Energy	2007	South Africa	Case	Energy	SP	MCDA	
Hickman et al.	Examining transport futures with scenario analysis and MCA	Transportation Research Part A: Policy and Practice	2012	UK	Case	Traffic	SP	MCA	
Higgins and Foliente	Evaluating intervention options to achieve environmental benefits in the residential sector	Sustainability Science	2013	Australia	Case	Energy	SP	MCA	
Hill et al.	Multi-criteria decision analysis in spatial decision support: The ASSESS analytic hierarchy process and the role of quantitative methods and spatially explicit analysis	Environmental Modelling and Software	2005	Australia	Methodology	Land use	SP	AHP	
Hill and Olson	Possible future trade-offs between agriculture, energy production, and biodiversity conservation in North Dakota	Regional Environmental Change	2013	USA	Case	Environmental	SP	MCA	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Hjortsø and Stræde	Strategic multiple-use forest planning in Lithuania - Applying multi-criteria decision-making and scenario analysis for decision support in an economy in transition	Forest Policy and Economics	2001	Denmark	Case	Forestry	SP	MCDM	
Hjortsø et al.	Applying multi-criteria decision-making to protected areas and buffer zone management: A case study in the Royal Chitwan National Park, Nepal	Journal of Forest Economics	2006	Denmark	Case	Environmental	SP	Multi-objective linear programming	
Hosseini et al.	Using fuzzy multi-criteria decision making for strategic management	Australian Journal of Basic and Applied Sciences	2011	Spain	Case	Management	SP	TOPSIS, fuzzy-TOPSIS	
Hu et al.	A Scenario Planning approach for propositioning rescue centers for urban waterlog disasters	Computers and Industrial Engineering	2015	China	Case	Other	SP	MAUT	
Huang et al.	Port competitiveness evaluation by fuzzy multicriteria grade classification model	Journal of Marine Science and Technology	2003	Taiwan	Case	Business and marketing	SP	Fuzzy Multi-criteria Grade Classification	
Karvetski et al.	Emergent conditions and multiple criteria analysis in infrastructure Prioritization for Developing Countries	Journal of Multi-Criteria Decision Analysis	2009	USA	Methodology, case	Infrastructure	SP	MAVT, SWING	
Karvetski et al.	Scenario and multiple criteria decision analysis for energy and environmental security of military and industrial installations	Integrated Environmental Assessment and Management	2011	USA	Case	Energy	SP	MCDA	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Karvetski et al.	Climate change scenarios: Risk and impact analysis for Alaska coastal infrastructure	International Journal of Risk Assessment and Management	2011	USA	Case	Environmental	SP	MCDA	
Karvetski and Lambert	Evaluating deep uncertainties in strategic priority-setting with an application to facility energy investments	Systems Engineering	2012	USA	Case	Energy	SP	MCA	
Klibi and Martel	The design of robust value-creating supply chain networks	OR Spectrum	2013	Canada	Methodology	Business and marketing	SP	MCA	Monte Carlo simulations
Kowalski et al.	Sustainable energy futures: Methodological challenges in combining scenarios and participatory multi-criteria analysis	European Journal of Operational Research	2009	UK	Case	Energy	Stakeholder Analysis, SP	MCA	
Kropp and Lein	Assessing the geographic expression of urban sustainability: A scenario based approach incorporating spatial multicriteria decision analysis	Sustainability	2012	USA	Case	Land use	SP	MCDA	
Kropp and Lein	Scenario analysis for urban sustainability assessment: A spatial multicriteria decision-analysis approach	Environmental Practice	2013	USA	Case	Environmental	SP	MCDA	
Lambert et al.	Climate change influence on priority setting for transportation infrastructure assets	Journal of Infrastructure Systems	2013	USA	Case	Traffic	SP	MCDA	
Leskinen et al.	Adapting modern strategic decision support tools in the participatory strategy process- a case study of a forest research station	Forest Policy and Economics	2006	Finland	Methodology, case	Forestry	SP, SWOT	MCDA	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Lee et al.	The competitiveness of Korea as a developer of hydrogen energy technology: The AHP approach	Energy Policy	2008	South Korea	Case	Energy	SP	AHP	
Lienert et al.	Structured decision-making for sustainable water infrastructure planning and four future scenarios	Decision Process	2015	Switzerland	Case	Infrastructure	SP, Structured decision making	MAUT	
Linhoss et al.	Decision analysis for species preservation under sea-level rise	Ecological modelling	2013	USA	Case	Environmental	SP	MCDA	
Liu et al.	An integrated decision-support approach in prioritizing risks of non-indigenous species in the face of high uncertainty	Ecological Economics	2011	Australia	Case	Environmental	SP	MCE	
Madlener et al.	New ways for the integrated appraisal of national energy scenarios: The case of renewable energy use in Austria	Energy Policy	2007	Germany	Case	Energy	SP, Stakeholder Analysis	MCE	
Martinelli et al.	Multicriteria analysis model for urban open space renovation: An application for Rome	Sustainable Cities and Society	2015	Italy	Case	Other	SP	MCA	
Michnik	Scenario Planning + MCDA procedure for innovation selection problem	Foundations of Computing and Decision Sciences	2013	Poland	Methodology	Management	SP	MCDA	
Molinos-Senante et al.	Assessing the sustainability of small wastewater treatment systems: A composite indicator approach	Science of the Total Environment	2014	Spain	Case	Wastewater treatment	SP	AHP	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Montibeller et al.	Combining Scenario Planning and Multi-Criteria Decision Analysis in Practice	Journal of Multi-Criteria Decision Analysis	2006	UK	Case	Management	SP	MCDA	
Mosadeghi et al.	Comparison of Fuzzy-AHP and AHP in a spatial multi-criteria decision making model for urban land-use planning	Computers, Environment and Urban Systems	2015	Australia	Case	Land use	SP	AHP, Fuzzy-AHP	
Nava and Daim	Evaluating alternative fuels in USA: A proposed forecasting framework using AHP and scenarios	International Journal of Automotive Technology and Management	2007	USA	Case	Energy	SP	AHP	
Neto et al.	Modelling the environmental impact of an aluminium pressure die casting plant and options for control	Environmental Modelling and Software	2008	Portugal	Case	Industry	SP	MCA	
Paksoy et al.	Fuzzy multi-objective optimization of a green supply chain network with risk management that includes environmental hazards	Human and Ecological Risk Assessment	2012	Turkey	Case	Environmental	SP	Multi-objective model, AHP, F-AHP, fuzzy TOPSIS	
Panou and Sofianos	A fuzzy multicriteria evaluation system for the assessment of tunnels vis-à-vis surface roads: The WPMA case - Part II	Tunnelling and Underground Space Technology	2002	Greece	Case	Other	SP	Fuzzy Multi-criteria Evaluation System, Fuzzy-AHP	Cost Benefit Analysis
Parlak et al.	Population behavioral scenarios influencing radiological disaster preparedness and planning	Accident Analysis and Prevention	2012	USA	Case	Other	SP	MCDA	
Penning-Rowse et al.	A threatened world city: The benefits of protecting London from the sea	Natural Hazards	2013	UK	Case	Other	SP	MCA	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Pourebrahim et al.	Integration of spatial suitability analysis for land use planning in coastal areas; case of Kuala Langat District, Selangor, Malaysia	Landscape and Urban Planning	2011	Iran	Case	Land use	SP	MCE, ANP	
Ram et al.	Extending the use of Scenario Planning and MCDA for the evaluation of strategic options	Journal of the Operational Research Society	2011	UK	Case/ Methodology	Food	SP	MCDA	
Ram and Montibeller	Exploring the impact of evaluating strategic options in a scenario-based multi-criteria framework	Technological Forecasting and Social Change	2013	UK	Case	Other	SP	MCDA	
Reichert et al.	The conceptual foundation of environmental decision support	Journal of Environmental Management	2015	Switzerland	Methodology	Environmental	SP	MAUT	
Riesgo and Gómez-Limón	Multi-criteria policy scenario analysis for public regulation of irrigated agriculture	Agricultural Systems	2006	Spain	Case/Methodology	Agriculture	SP	MAUT	
Rubarenzya et al.	A site-specific land and water management model in MIKE SHE	Nordic Hydrology	2007	Belgium	Case	Hydrology and Water Management	SP	MCE	
Salmeron et al.	Ranking fuzzy Cognitive Map based scenarios with TOPSIS	Expert Systems with Applications	2012	Spain	Methodology	Environmental	SP	TOPSIS	Fuzzy Cognitive Mapping
Santoyo-Castelazo and Azapagic	Sustainability assessment of energy systems: Integrating environmental, economic and social aspects	Journal of Cleaner Production	2014	UK	Case	Energy	SP	MCDA	
Salling et al.	Modelling decision support and uncertainty for large transport infrastructure projects: The CLG-DSS model of the Øresund Fixed Link	Decision Support Systems	2007	Denmark	Case/Methodology	Infrastructure	SP	MCA	Cost-Benefit Analysis, Monte Carlo simulations

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Scholten et al.	Strategic rehabilitation planning of piped water networks using multi-criteria decision analysis	Water Research	2014	Switzerland	Case	Infrastructure	SP	MCDA	
Scholten et al.	Tackling uncertainty in multi-criteria decision analysis - An application to water supply infrastructure planning	European Journal of Operational Research	2015	Switzerland	Case	Infrastructure	SP	MAUT	
Stefan et al.	Sustainable water resources management in the Long Bien district of Hanoi, Vietnam	Water Science and Technology: Water Supply	2012	Germany	Case	Hydrology and Water Management	SP	MCA	
Stewart et al.	Integrating multicriteria decision analysis and Scenario Planning-Review and extension	Omega	2013	UK	Review	Agriculture	SP	MCDA	
Song et al.	Envisioning Beijing 2020 through sketches of urban scenarios	Habitat International	2006	USA	Case	Land use	SP	MAUA	Delphi, GIS (INDEX)
Straton et al.	Exploring and Evaluating Scenarios for a River Catchment in Northern Australia Using Scenario Development, Multi-criteria Analysis and a Deliberative Process as a Tool for Water Planning	Water Resources Management	2011	Australia	Case	Hydrology and Water Management	SP	MCE	Cost-Benefit Analysis
Surer et al.	Innovation strategy evaluation process using fuzzy Cognitive Mapping	Intelligent Systems Reference Library	2015	Turkey	Case/Method	Industry	SP,	MCDM	Fuzzy Cognitive Mapping
Tian and Qiao	Modeling urban expansion policy scenarios using an agent-based approach for Guangzhou Metropolitan	Ecology and Society	2014	China	Case	Urban planning	SP	AHP	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
	Region of China								
Trutnevyte et al.	Linking stakeholder visions with resource allocation scenarios	European Journal of Operational Research	2012	Switzerland	Case	Energy	SP	MCA	
Validi et al.	Integrated low-carbon distribution system for the demand side of a product distribution supply chain: A DoE-guided MOPSO optimiser-based solution approach	International Journal of Production Research	2014	Ireland	Case	Traffic	SP	TOPSIS	MOPSO
Validi et al.	A case analysis of a sustainable food supply chain distribution system - A multi-objective approach	International Journal of Production Research	2014	Ireland	Case	Food	SP	TOPSIS	
Van der Pas et al.	ExploratoryMCDAfor Handling Deep Uncertainties:The Case of Intelligent Speed Adaptation Implementation	Journal of Multi-Criteria Decision Analysis	2010	Netherlands	Case	Traffic	SP	MCDA	
Van der Voet et al.	A decision support tool for assessing scenario acceptability using a hierarchy of indicators with compensabilities and importance weights	Ecological Indicators	2014	Netherlands	Methodology	Computer science and information systems	SP	MCDA	
Wang et al.	GIS-based framework for supporting land use planning in urban renewal: Case study in Hong Kong	Journal of Urban Planning and Development	2015	China	Case	Land use	SP	MCDA	GIS
Wenig et al.	An integrated scenario-based multi-criteria decision support system for water resources management and planning - A case study in the Haihe River Basin	Expert Systems with Applications	2010	Canada	Case	Hydrology and Water Management	SP	MCDA	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDAs methods used	Other methods used
Winebrake and Creswick	The future of hydrogen fueling systems for transportation: An application of perspective-based scenario analysis using the analytic hierarchy process	Technological Forecasting and Social Change	2003	USA	Method, case	Energy	SP	AHP	
Wright et al.	Teaching Scenario Planning: Lessons from practice in academe and business	European Journal of Operational Research	2009	UK	Review	Education	SP	MADA	
Wright et al.	Does the intuitive logics method - and its recent enhancements - produce "effective" scenarios?	Technological Forecasting and Social Change	2013	UK	Methodology	Management	SP	MAVT	
Zanuttigh et al.	THESEUS decision support system for coastal risk management	Coastal Engineering	2014	Italy	Case	Marine	SP	MCA	
Zeng et al.	Post-evaluation of a water pollution control plan: methodology and case study	Frontiers of Environmental Science and Engineering	2015	China	Methodology, case	Environmental	SP	MCA	
Zhang et al.	Coordination of urbanization and water ecological environment in Shayinghe River Basin, China	Chinese Geographical Science	2011	China	Case	Environmental	SP	TOPSIS	Cooperative models using linear programming
Ziara et al.	Strategic implementation of infrastructure priority projects case study in Palestine	Journal of Infrastructure Systems	2002	Palestine	Case	Infrastructure	SP	AHP	

Table S-3f. Articles which combine Soft Systems Methodology (SSM), Strategic Options Development and Analysis (SODA), the Strategic Choice Approach (SCA) or Strategic Assumptions Surfacing and Testing (SAST).

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
Bana e Costa et al.	A Socio-technical Approach for Group Decision Support in Public Strategic Planning: The Pernambuco PPA Case	Group Decision and Negotiation	2014	Portugal	Case	Administration	Causal mapping, strategic graph analysis, two-dimensional graphs (benefit vs. Doability), Decision conference, Value-focused thinking, means-ends networks, SCA (AIDA, Analysis of Interconnected Decision Areas),	MACBETH	
Belton and Stewart	Problem Structuring and Multiple Criteria Decision Analysis	Book:Trends in Multiple Criteria Decision Analysis	2010	UK	Case	Business and marketing	Case 3: SSM (Rich Picture , Stakeholder Analysis, PQR formula, 3E's)	ELECTRE III	
Cerreta et al.	Multidimensional Spatial Decision-Making Process: Local Shared Values in Action	Book: ICCSA 2012, Part II, LNCS 7334, pp. 54–70	2012	Italy	Method,case	Traffic	Stakeholder Mapping, SSM (CATWOE, Rich Picture)	AHP	Spatial Decision Support System
Coelho and Antunes	Using SSM for structuring decision support in urban energy planning	Technological and Economic Development of Economy	2010	Portugal	Case	Energy	SSM (Rich Picture , CATWOE, root definition)	ELECTRE III (discussed)	
Cuozzo	Integrated assessment for a sustainable valorization project	Scienze Regionali	2014	Italy	Case	Energy	Stakeholder Analysis, SSM (Rich Picture), Scenario Planning	SMCE, NAIAD, MACBETH	
Ferreira et	Adding value to bank branch	Journal of the	2011	Portugal	Case	Business and	CM/SODA	MCDA	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDA methods used	Other methods used
al.	performance evaluation using Cognitive Maps and MCDA: A case study	Operational Research Society				marketing			
Ferreira et al.	A multiple criteria framework to evaluate bank branch potential attractiveness	International Journal of Strategic Property Management	2012	Portugal	Method,case	Business and marketing	CM (SODA)	MCDA	
Ferreira et al.	How to create indices for bank branch financial performance measurement using MCDA techniques: an illustrative example	Journal of Business Economics and Management	2014	Portugal	Case	Business and marketing	CM (SODA)	MCDA	
Ferreira et al.	Evaluating retail banking service quality and convenience with MCDA techniques: A case study at the bank branch level	Journal of Business Economics and Management	2014	Portugal	Case	Business and marketing	CM	MCA	
Longaray et al.	Multicriteria decision analysis to lead about messes problems: an illustrated case	Independent Journal of Management & Production	2014	Brazil	Case	Health care	SSM (Rich Picture , CATWOE)	MACBETH	
Neves et al.	Structuring an MCDA model using SSM: A case study in energy efficiency	European Journal of Operational Research	2009	Portugal	Case	Energy	SSM (Rich Picture , CATWOE)	VFT	
Petkov et al.	Mixing Multiple Criteria Decision Making with soft systems thinking techniques for decision support in complex situations	Decision Support Systems	2007	USA	Case	Information and communication technology	Case 1: SAST(part), SSM (Rich Picture , CATWOE), Nominal Group Technique, Boundary Judgment Questions Case 2: SSM (Rich Picture , CATWOE), brainstorming, Critical System Heuristics (Boundary Judgment	AHP	

Authors	Title	Journal	Year	First author's country	Type of the article	Application area	PSMs used	MCDAs methods used	Other methods used
							Questions)		
							Case 3: SSM (Rich Picture), Critical System Heuristics, Interpretive Structural Modeling, Stakeholder Analysis, boundary judgment questions		
Rolando	Multicriteria decision problem structuring: The strategic choice approach in the context of public projects in Italy	International Journal of Multicriteria Decision Making	2015	Italy	Case	Traffic	SCA	ELECTRE (discussed)	
Suriya and Mudgel	Soft systems methodology and integrated flood management: a study of the Adyar watershed, Chennai, India	Water and Environment	2013	India	Case	Hydrology and Water Management	SSM (CATWOE, Root Definition, Rich Picture), Force Field Analysis	Pairwise ranking	

Table S-4a. Selected articles which combine Stakeholder Analysis and MCDA.

Authors	First authors' country	Application	PSMs used	MCDA methods used	Other methods used	Value tree	Participation
Borzoni et al. (2014)	Italy	Explore the different legitimate perspectives of geothermal power in Italy		SMCE (NAIADE)	Sensitivity analysis	7 criteria 11 alternatives	18 interviews
Gamboa (2006)	Spain	Environmental Impact Assessment of smelter aluminium plant in Chile	Stakeholder Analysis	SMCE (NAIADE)	Sensitivity analysis	9 criteria 4 alternatives	25 interviews 3 focus groups of 5–8 people Workshop for teenagers (14-18 years)
Garmendia et al. (2010)	Spain	Integrated coastal zone management	Stakeholder Analysis	SMCE (NAIADE)	Sensitivity analysis	8 criteria and > 10 subcriteria 11 alternatives	>20 interviews (2 rounds) Open meeting Workshop Interviews (2 rounds)
Geneletti (2015)	Italy	Selection of landfill sites in Italy	Stakeholder Analysis	MCDA	Sensitivity analysis (DEFINITE) GIS	7 criteria => suitability map, 3 criteria in evaluation of 8 alternatives	
Lienert et al. (2013)	Switzerland	Water infrastructure planning	Stakeholder Analysis Social Network Analysis	MAVT		MAVT implementation described in Lienert et al. (2015)	27 interviews
Lennox et al. (2011)	New Zealand	Case 1: water storage and irrigation in New Zealand Case 2: development of water management strategy in New Zealand	Citizen's Jury process	MCDA		Case 1: 15 criteria Case 2: 16 criteria and 8 sub-criteria, 4 alternatives	Case 1: Several workshops (ca 20 stakeholders) 60–80 people attended each of 2 open public workshops
Macharis et al. (2010)	Belgium	Evaluation of a set of policy measures for mobility and logistics	Stakeholder Analysis	MAMCA (AHP)		4 criteria, 10 policy measures	
Nordström et al. (2010)	Sweden	Evaluation of strategic forest plans	Stakeholder Analysis	AHP		4–6 criteria (each stakeholder had own criteria) 3 alternatives	Interviews meetings
Turcksin et al. (2011)	Belgium	Evaluation of biofuel options	Stakeholder Analysis	MAMCA (AHP)		7 stakeholder groups each had 3–7 criteria Altogether 33 criteria	31 stakeholders from 7 groups

Table S-4b. Selected articles which combine Cognitive Maps/ Group Maps and MCDA.

Authors	First authors' country	Application	PSMs used	MCDA methods used	Other methods used	Number of concepts/ indicators in CM and criteria in value tree	Participation
Adrianto et al. (2005)	Japan	Fishery	CM	Rating, Saaty's scale (1–9)	Stakeholder Analysis	18 concepts, 18 criteria	15 stakeholders
Bana e Costa et al. (2006)	Portugal	Public investments in social infra-structures	CM Means-ends networks	MACBETH	DEMATEL, CPORAS-G	CMs 230 concepts final value tree included 8 criteria	Individual interviews, 3 workshops (40 people), decision conferences (2), 4 group sessions
Franco and Lord (2011)	UK	Teenage pregnancy	CM	Multi-criteria portfolio analysis	Composite programming	8 criteria in portfolio model	8 interviews, workshop with 6 people (6 hour), Multi-criteria portfolio analysis workshop
Longaray et al. (2015)	Brazil	Hospital's performance	CM	MACBETH		Concepts not mentioned, 32 criteria	Several interviews of one decision maker
Marafon et al. (2015)	Brazil	R&D development of a multinational company	CM	MACBETH		Complete model 65 concepts, 8 presented in article	One decision maker
Mendoza and Prabhu (2003)	USA	Forestry	CM	9-point scale		From 51 identified indicators, 30 were included in CM. No value tree	10 experts, 2 day workshop, phase I and phase II
Myllyviita et al. 2014	Finland	Bioenergy	Conceptual Content Cognitive Map (3CM)	SMART	Hydrological simulation	49 indicators No value tree	12 experts were interviewed twice
Ventura et al. (2014) ¹	Brazil	3 cases: Travel agency, university, private company	CM	MCDA		29 concepts in aggregated map	Decision makers, numbers not mentioned
Wolfslehner and Vacik (2011)	Austria	Sustainable forest management	CM, DPSIR	ANP	GIS	35 indicators No value tree	None

¹Book chapter

Table S-4c. Selected articles which combine DPSIR and MCDA.

Authors	First authors' country	Application	PSMs used	MCDA methods used	Other methods used	Number of criteria in value tree ¹⁾	Participation
Azarnivand and Chitsaz (2015)	Iran	Adaptive policy responses to water shortage mitigation	eDPSIR	AHP	DEMATEL, CPORAS-G	D(7), P(9), S(5), I(9), R(13) Total 30 6 used in evaluation	None
Benini et al. (2010)	Italy	Assessment of land use changes	DPSIR	MULINO decision support system (DPSIR and MCA)		Total 13 indicators: D(2), P(5), S(6), I(3) 5 used in evaluation	None, value functions were elicited in earlier project
Bottero and Ferretti (2010)	Italy	Sustainability assessment of territorial transformations	DPSIR	ANP		Total 24 indicators: D(6), P(7), S(6), I(5), R(7) All criteria used in prioritization	None
Chung and Lee (2009)	Republic of Korea	Prioritization of water management alternatives	DPSIR	AHP, ELECTRE II, Regime, EVAMIX	Composite programming	Water quantity: D(2), P(4), S(1), I(1), R(3) Water quality: D(2), P(3), S(2), I(2), R(4) Total 24	Experts and 31 stakeholders
Johnston et al. (2013)	Sri Lanka	Wetland management (summary of experiences from 7 case studies)	Stakeholder Analysis DPSIR Rapid assessment methods, role-playing games	MULINO decision support system (DPSIR and MCDA: SAW, OWA, TOPSIS, ELECTRE)		Varied in different cases: 11, 18, 23, 23, 24, 29, 77 Narrowed down to 5–8 criteria classes	Stakeholder consultation, workshops, small groups, individual discussions
Kim et al. (2013)	Republic of Korea	Prioritization of best sites for treated wastewater	DPSIR	DPSIR, fuzzy TOPSIS	Hydrological simulation	Water quantity: D(3), P(3), S(2), I(2), R(2) Water quality D(5), P(4), S(1), I(1), R(2) Total 25	Expert researchers and local governmental officials Individual interviews with 31 experts
Li et al. (2015)	China	Coastal erosion risk assessment	DPSIR	DPSIR, AHP	GIS	10 vulnerability indicators and 3 impact indicators Total 13	None
Petersson et al. (2007)	Germany	Evaluation of hydro power plant alternatives	DPSIR	MULINO decision support system (DPSIR and MCA)		Total 15	None
Shao et al. (2014)	China	Coastal ecological security assessment	DPSIR	AHP	Delphi	D(6), P(4), S(5), I(4), R(1) Total 20	20 experts
Wolfslehner and Vacik (2008)	Germany	Evaluating sustainable forest management strategies	PSR	ANP		P(12), S(12), R(12) Total 36	Key informants were interviewed to derive impact information

¹⁾ D is driving force, P pressure, S state, I impact and R response

Table S-4d. Selected articles which combine SWOT and MCDA.

Authors	First authors' country	Application	PSMs used	MCDA methods used	Other methods/SA used	Number of SWOT factors/criteria, number of strategies/alternatives	Participation
Akbulak and Cengiz (2014)	Turkey	Determining ecotourism strategies	SWOT	AHP		27 SWOT factors, 8 strategies	None
Banihabib et al. (2015)	Iran	Develop a strategic plan to lake management	SWOT	MCDA (SAW, TOPSIS, AHP)		26 SWOT factors, 6 criteria, 8 strategies	Experts, questionnaire
Baykasoğlu and Gölcuk (2015)	Turkey	Development of strategic plan for the university department	SWOT	Fuzzy TOPSIS	Fuzzy Cognitive Map	24 SWOT factors, 4 alternatives	3 decision makers
Bottero (2015)	Italy	Assessing sustainability of urban projects	SWOT	ANP	Discounted Cash Flow Analysis Sensitivity analysis	26 SWOT factors, 3 strategies	None
Catron et al. (2013)	USA	Assessing development of biomass-based energy production in Kentucky	SWOT	ANP		12 SWOT factors, no strategies	Online survey, focus group
Duchelle et al. (2012)	Brazil	Evaluation of the stakeholders perceptions about the land use in Amazonia	SWOT	AHP		17 SWOT factors, no strategies	Consultation of key stakeholders (10-15 participants), meetings (4 stakeholders), questionnaire
Ekmekçioglu et al. (2011)	Turkey	Selection of nuclear power plant site Prioritizing factors	Fuzzy SWOT	Fuzzy AHP, fuzzy TOPSIS	Sensitivity analysis	10 SWOT factors, 5 strategies	Experts
Gallego-Ayala and Juizo (2011)	Mozambique	affecting the implementation of water resources management	SWOT	AHP		21 SWOT factors, no strategies	Questionnaire (26)
Kajanus et al. (2004)	Finland	Analysis of the potential of local culture to promote rural tourism	SWOT	SMART, Value-Focused Thinking		31 factors (Case Finland) 12 factors (Case Germany) No strategies.	Expert interviews
Kurttila et al. (2000)	Finland	Evaluation a strategic decision in forest management	SWOT	AHP		13 SWOT factors, no strategies	Interviews
Margles et al. (2010)	USA	Development of national park buffer zone management plan in Rwanda	SWOT	AHP		17 SWOT factors, no strategies	Workshops, 30 stakeholders
Nikodinoska et al. (2015)	Italy	Finding out stakeholders opinions about biomass-based energy development	SWOT	AHP		12 SWOT factors, no strategies	56 stakeholders
Scolozzi et al. (2014)	Italy	Analysis of conservation effectiveness of protected areas	SWOT	Multi-criteria assessment		12 SWOT factors, no strategies	Not mentioned

Authors	First authors' country	Application	PSMs used	MCDA methods used	Other methods/SA used	Number of SWOT factors/criteria, number of strategies/alternatives	Participation
Sevklı et al (2012)	Turkey	Strategic management decisions in Turkish airline industry	SWOT	Fuzzy AHP, Fuzzy ANP		20 SWOT factors, 7 strategies	Not mentioned
Shrestha et al. 2014	USA	Exploring the potential for silvopasture adoption	SWOT	AHP		12 SWOT factors, no strategies	3 respondents, questionnaire
Srdjevic et al. (2012)	Serbia	Water resources	SWOT PESTLE	AHP		31 SWOT factors, no strategies	None
Terrados et al. (2009)	Spain	Renewable energy planning	SWOT	PROMETHEE	Delphi	11 criteria (not SWOT factors) and 28 strategies	9 experts
Yüksel and Dağdeviren (2007)	Turkey	Business	SWOT	AHP, ANP	Delphi	14 SWOT factors and 4 strategies	9 experts,
Zhou and Chen (2014)	China	Grassland management	SWOT	AHP		16 SWOT factors, no strategies	3 stakeholders
Öztürk (2015)	Turkey	Nature protection	SWOT	AHP	Ranking analysis, linear combination analysis	23 SWOT factors, no strategies	12 stakeholders and local people interviews

Table S-4e. Selected articles which combine Scenario Planning (SP) and MCDA.

Authors	First authors' country	Application	PSMs used	MCDA methods used	Other methods used	Number of criteria in value tree	Participation
Bhave et al. (2014)	India	Water resources: climate change adaptation	SP	Pairwise comparisons, weighted summation	Hydrological models, GIS	Not mentioned	278 participants. 14 stakeholder consultation workshops
Kowalski et al. (2009)	UK	Energy production	SP	PROMETHEE	Quantitative models	National case 17, local case 15	Interviews
Leskinen et al. (2006)	Finland	Strategy development	SP, SWOT	AHP		SWOT:12,9,7,3; Value tree 18 bottom level criteria 4 in both cases	Workshop (SWOT), questionnaire
Lienert et al. (2015)	Switzerland	Water infrastructure planning	Stakeholder Analysis, SP	MAVT: SWING			Workshops
Linhoss et al. (2013)	USA	Species preservation under sea-level rise	SP	SMAA	Three models (geomorphological, habitat, metapopulation)	7	Experts
Montibeller et al. (2006)	UK	Strategic decision making: private companies	SP	MAVT: SWING	Value-Focused Thinking	Case 1:4; Case 2:4	Case 1: Two directors Case 2: One director
Ram and Montibeller (2013)	UK	Public sector decision making	SP	MAVT	Cost equivalent regret	Case 1: 9; Case 2: 3; Case 3:5	Case1-3: One person in each. The article focuses on the evaluation of the cases based on the interviews and questionnaire.
Straton et al. (2011)	Australia	Water planning	SP	MCA, compromise programming	Stakeholder Analysis	16	Citizens' jury was established. Two workshops were arranged, 7 and 9 people attended
Trutnevyte et al. (2012)	Switzerland	Energy production	SP	AHP, weighted sum method	Not mentioned	7	29 actors
van der Pas et al. (2010)	Netherlands	Traffic safety	SP	AHP	EMA, Classification and Regression Tree technique	4	Experts

Table S-4f. Selected articles which combine Soft Systems Methodology (SSM), Strategic Assumption Surfacing and Testing (SAST), Strategic Choice Approach (SCA) or Strategic Options Development and Analysis (SODA) and MCDA.

Authors	First authors' country	Application	PSMs used	MCDA methods used	Other methods used	Number of criteria in value tree	Participation
Bana e Costa et al. (2014)	Portugal	Public strategic planning	Causal mapping, strategic graph analysis, two-dimensional graphs (benefit vs. doability), decision conference, strategic choice approach (AIDA, Analysis of Interconnected Decision Areas), value-focused thinking	MACBETH		3 (fundamental objectives)	30 technical and political actors meeting over 5 consecutive days
Belton and Stewart (2010) ¹	UK	Business, security and telecommunication (3 cases presented)	SSM (Rich Picture , Stakeholder Analysis, PQR formula, 3E's), CAUSE	ELECTRE III		14	1 decision-maker
Cerreta et al. (2012) ¹	Italy	Territorial transformation strategy	SSM (stakeholder mapping, CATWOE, Rich Picture),	AHP	Spatial decision support system	9	
Coelho et al. (2010)	Portugal	Energy planning	SSM (Rich Picture , CATWOE, Cognitive Map, 3Es)	ELECTRE, use not described		Not presented	Interviews
Ferreira et al. (2011), (2012)	Portugal	Bank sector (two articles describe the same case)	Value-Focused Thinking SODA	MCDA		Final value tree included 5 criteria	Several work sessions over two-week period (problem structuring). Panel of 6 members
Longaray et al. (2014)	Brazil	Physical health	SSM (Rich Picture , CATWOE)	MACBETH		43	1 decision-maker
Neves et al. (2009)	Portugal	Energy efficiency	SSM (Rich Picture , CATWOE)	Value-Focused Thinking (VFT)		3 value trees (12–21 criteria)	SSM: Two workshops for experts VFT: performed by authors
Petkov et al. (2007)	USA	Information and communication technology (3 cases)	Stakeholder Analysis, SAST, SSM (Rich Picture, CATWOE), Critical System Heuristics (Boundary Judgment Questions)	AHP	Interpretive Structural Modelling		Several workshops
Rolando (2015)	Italy	Road planning	SCA	Not mentioned			No real interaction (observing steering committee meetings)
Suriya and Mudgai (2012)	India	Flood management	SSM (Rich Picture , CATWOE), Force Field Analysis	AHP			2 workshops (ca 25 participants), questionnaire

¹ Book chapter

Table S-5. Characteristics of selected scenario planning and MCDA cases.

Authors	Topic	Participation	Number of scenarios	MCDA method	Other methods applied	Number of objectives	Objectives' weights	Number of alternatives	Comparison of alternatives	Time horizon
Bhave et al. 2014	Water resources: climate change adaptation	278 participants. 14 stakeholder consultation workshops	4 scenarios, 5 climatic projections	Pairwise comparisons, weighted summation	Hydrological models, GIS	Not mentioned	None	3	One-to-one comparison between each pair of adaptation options. A preferred was chosen by stakeholder and criteria used by them for making a choice were determined. Criteria determined were used in the evaluation of most preferred adaptation options.	30 years
Kowalski et al. 2009	Energy production	Evaluation framework was discussed with stakeholders, expert and citizen interviews to assess the impacts. Weights were derived from the stakeholder interviews. Citizen interviews in the local level case only.	National case: 16 reduced to 10	PROMETHEE	Quantitative models	National case 17, local case 15	SIMOS method based on the ranking. Weights were derived from the stakeholder interviews. Same weights were used in different scenarios.	None. 4-5 scenarios were compared in MCDA	Rankings of alternatives over the scenarios. National case set of weights were used base on criteria rankings, not aggregated.	2020
Leskinen et al. 2006	Strategy development	Workshop (SWOT), questionnaire	3	AHP	SWOT	SWOT factors:12,9,7,3; Value tree 18 bottom level criteria	Varied in different scenarios	None	None	Not defined

Authors	Topic	Participation	Number of scenarios	MCDA method	Other methods applied	Number of objectives	Objectives' weights	Number of alternatives	Comparison of alternatives	Time horizon
Linhoss et al. 2013	Species preservation under sea-level rise	Experts	2	SMAA	Three models (geomorphological, habitat, metapopulation)	7	Entire weight space was explored	4	Rank acceptability index, central weight vector and confidence factor	2100
Montibeller et al. 2006	Strategic decision making: private companies	Case 1: Two directors Case 2: One director	Case 1:3; Case 2:2	MAVT: SWING	Value-Focused Thinking	Case 1:4; Case 2:4	Case 1 Same over the scenarios, Case 2 same and different (extension)	Case 1: 15; Case 2: 5	Overall performance values (VISA)	Some years
Ram and Montibeller 2013	Public sector decision making	Case1-3: One person in each.	Not mentioned.	MAVT	Cost equivalent regret	Case 1: 9; Case 2: 3; Case 3:5	Varied in different scenarios	Case 1:7; Case 2:3; Case 3:6	Overall performance values	10-20 years
Scholten et al. 2015	Water infrastructure planning	10 stakeholders	3	MAVT, SWING	Attribute predictions were partly based on models	44	Similar weights in different scenarios (long time horizon)	5	Overall performance values, global sensitivity analysis was applied to assess the contribution of single uncertain preference parameters to the uncertainty of the ranking of alternatives	40 years
Straton et al. 2011	Water planning	Citizens' jury was established. Two workshops were arranged, 7 and 9 people attended	4	MCA, compromise programming	Stakeholder analysis	16	Same over the scenarios, each participant assessed separately the importance of the criteria.	Scenarios were used as alternatives in MCA	For each individual (9) the priority values were calculated	20 years
Trutnevyte et al. 2011, 2012	Energy production	29 actors	6	AHP, weighted sum method	Not mentioned	7	Not given	20	Mean values of all alternatives (scenarios) in different visions with	2035

Authors	Topic	Participation	Number of scenarios	MCDA method	Other methods applied	Number of objectives	Objectives' weights	Number of alternatives	Comparison of alternatives	Time horizon
									respect to each criterion	
van der Pas et al. 2010	Traffic safety (intelligent speed adaptation)	Experts	50,688 computer runs	AHP	EMA, Classification and Regression Tree technique	4	AHP was used. Weights were based on the findings from literature	24	Alternatives were combinations of policy options	Not defined

Table S-6. The pros and cons of different PSMs and of their combination with MCDA; + positive aspect, - negative aspect.

Pros and cons of PSM	How the PSM benefits MCDA	Challenges and issues to be aware of when combining
<i>Stakeholder analysis</i>		
+ Easy to use.	Helps to identify key stakeholders to be	Decision about who should be engaged
+ Systematic if done properly.	engaged in MCDA. Encourages consideration	in MCDA can still be difficult.
- Subject to criticism for lack of academic rigor.	of a range of perspectives.	
- Difficult if little initial knowledge of stakeholders.		
<i>Cognitive / Group Mapping and SODA</i>		
+ Helps to surface and structure an individual's or a group's collective ideas using people's natural language.	Improved understanding of problem and different perspectives can help to define the goal of MCDA, build a value tree and develop alternatives. Detailed map can serve as	Defining a value tree directly from the cognitive/group map can be challenging and / or laborious. Use of DPSIR is so far limited to environmental assessments.
+ Helps to understand different perspectives.	"organisational memory" and support use of a simpler MCDA (e.g. smaller value tree).	Potentially useful in other domains.
- Skilful facilitator(s) needed in complex cases.		
- Specialist software needed to analyse large maps.		
- Merging individual cognitive maps to group is challenging.		
<i>DPSIR framework</i>		
+ Helps to identify key relationships between environment and society.	Supports criteria identification. In particular, impact factors are good candidates for criteria. Thinking about driving forces, pressures, states and impacts supports development of alternatives. DPSIR provides a useful framework to calculate an index.	Difficult to derive criteria from DPSIR factors. Need to be selective in using DPSIR factors in value tree. Uncritical use of factors can result in double counting or preferential dependence.
- Deciding to which category a variable belongs (e.g. state or impact) can be difficult.		
- Unidirectional cause and effect relations (no feedback loops).		
<i>SWOT analysis</i>		
+ Easy to use, widely known.	Supports criteria identification and development of alternatives (using TOWS matrix).	Can be difficult to transform SWOT factors to a coherent set of objectives.
+ Thinking about internal and external factors improves overall understanding of decision situation.		Need to be selective in using SWOT factors in MCDA value tree. May not generate all relevant factors.
- Provides no means to determine the relative importance of factors.		
<i>Scenario Planning</i>		
+ Encourages to think about different possible futures.	Can broaden scope of MCDA to analyse problems with long time horizons and encourage creativity in developing new alternatives. Scenarios can be used to explore the robustness of alternatives.	Interpretation and elicitation of criteria importance weights can be challenging (depends on approach).
+ Challenges people's conventional thinking.		
- Design of scenarios can be demanding and laborious.		
- No "inbuilt" tools for comparing alternatives/ strategies.		
- Skilful facilitator needed in complex cases.		

Soft Systems Methodology (SSM)

- + Encourages looking at a decision from new perspectives, leading to fresh insights.
- + Stimulates thinking.
- + Individual components can easily be used (e.g. CATWOE).
- Skilful facilitator needed to use the overall methodology.

Strategic Assumptions Surfacing and Testing (SAST)

- + Encourages people to discuss the assumptions why they favour particular alternative.

Improved understanding of problem and different perspectives can help in defining goal of MCDA, building value tree and developing alternatives.

Improved understanding of the relationship between underlying assumptions can help in building value tree and developed alternatives.

Combining whole methodology with MCDA can be very demanding and may only be feasible for experienced facilitator (often two facilitators guide intervention).

Strategic Choice Approach (SCA)

- + Particularly helpful in defining options in complex decision situations (e.g. when there are multiple decision areas to consider and/ or sequential considerations).

Process was developed to explore complex planning situations and it incorporates analysis from a multi-criteria perspective.