



SPONSORED BY THE



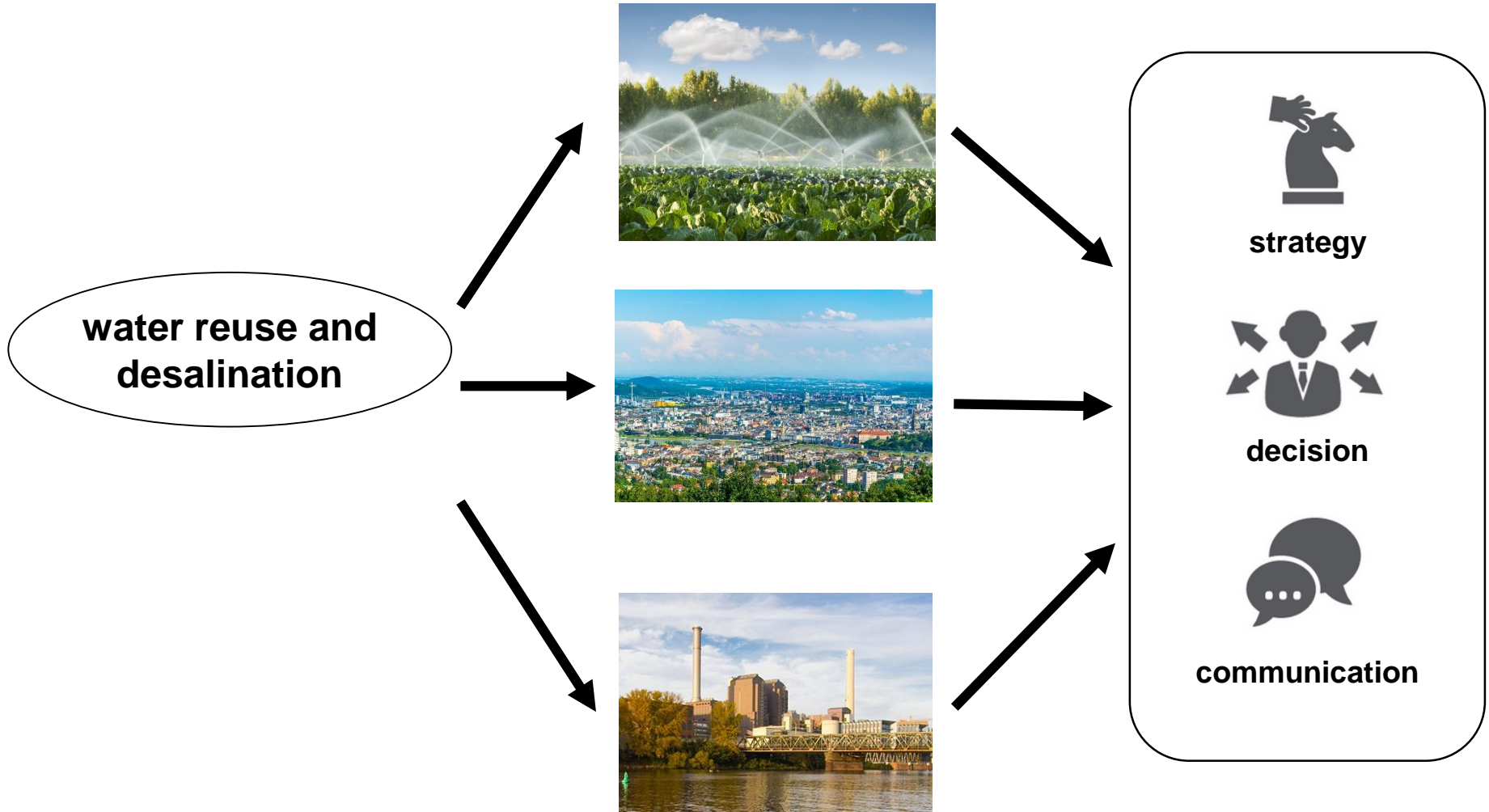
WavE-Working Group „Assessment Methods“

Approaches for the evaluation of future-oriented technologies and concepts in the field of water reuse and desalination

Webinar/Online Seminar of the BMBF Funding Measure WavE
31 March 2021

Kristina Wencki, Verena Thöne, Angela Ante, Tobias Hogen,
Claudia Hohmann, Felix Tettenborn, Dagmar Pohl, Philipp Preiss,
Christina Jungfer

- Motivation and objectives
- Valuation issues in WavE
- Evaluation framework
- Universally applicable and case-specific criteria
- Conclusion and outlook



■ Ambition of the working group

- (1) review of assessment methods used in six different projects
- (2) present a general approach for comparative multi-criteria evaluation of water reuse and desalination systems
- (3) showcase exemplary sets of criteria for the application in a more industrial, municipal and/or international context
- (4) identify possible data sources, challenges in using them and indicators to measure data quality to guide data collection

Process alternatives for the treatment of concentrates from water reuse

Pulsed Electric Field (PEF) treatment and other bath treatment (dip-paint coating in serial automotive painting)



Modular treatment plants for water reuse

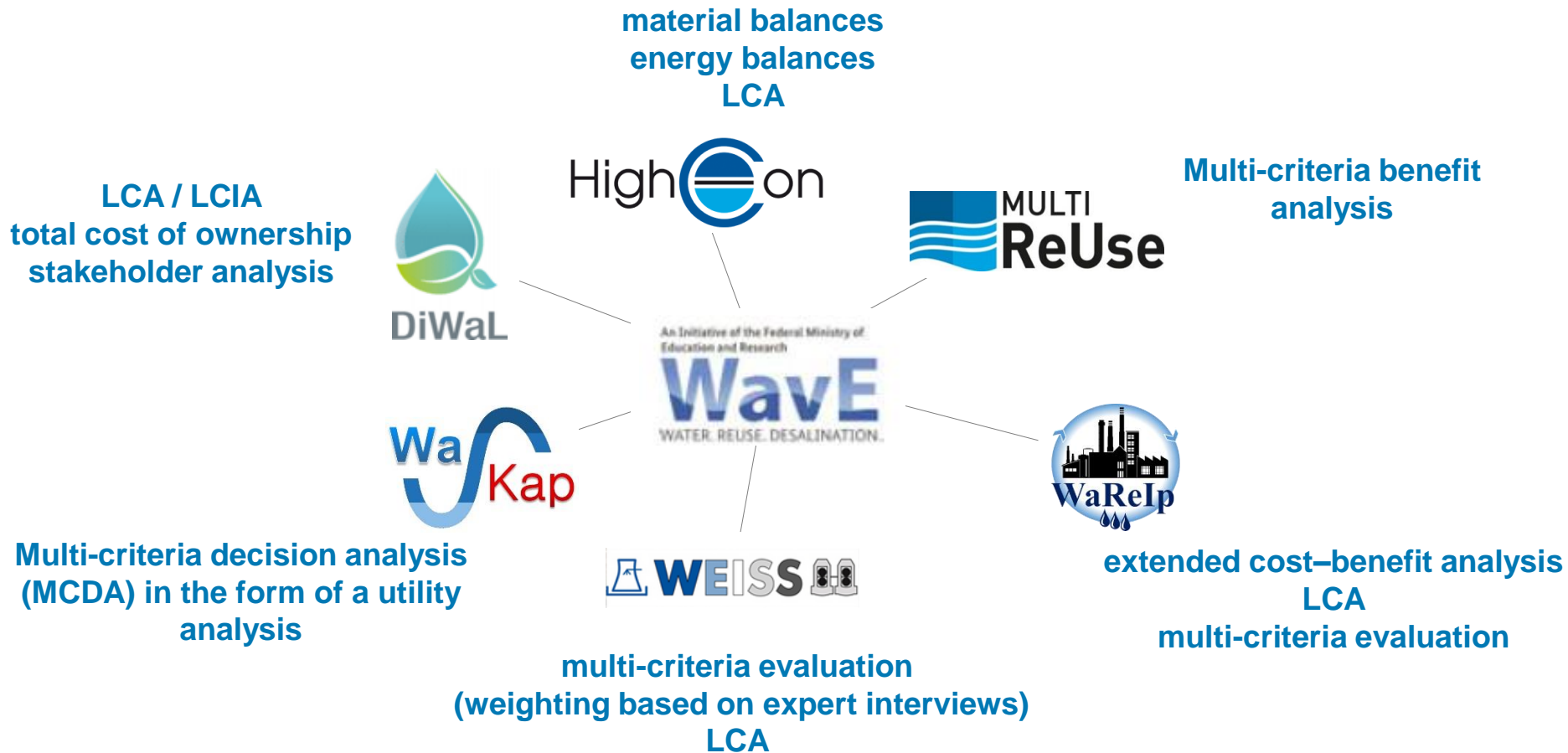


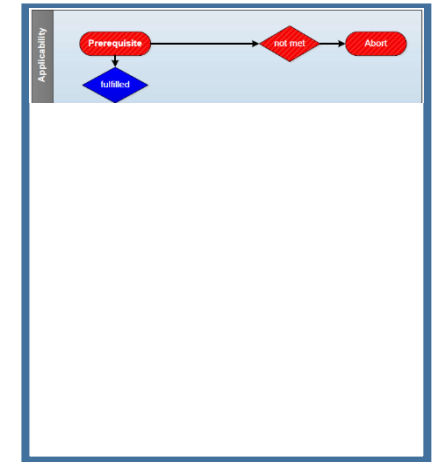
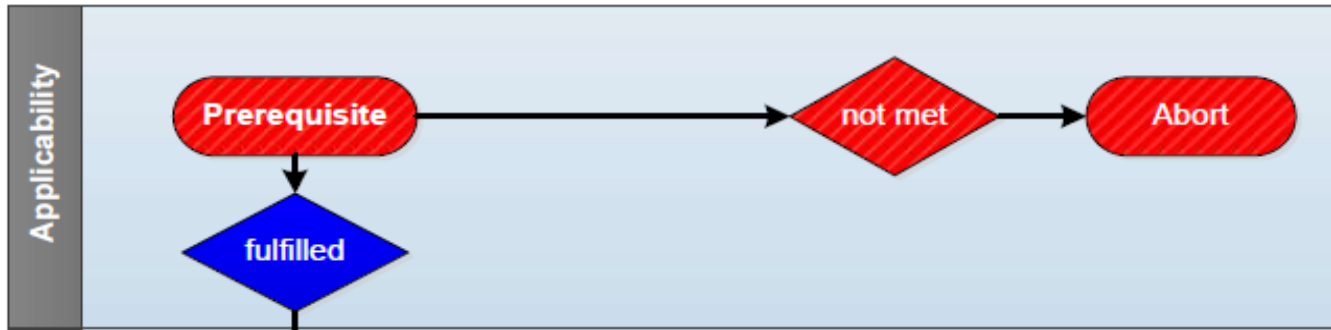
Modular process chains for wastewater treatment and treatment for reuse



Single and combined desalination processes (example steel industry)

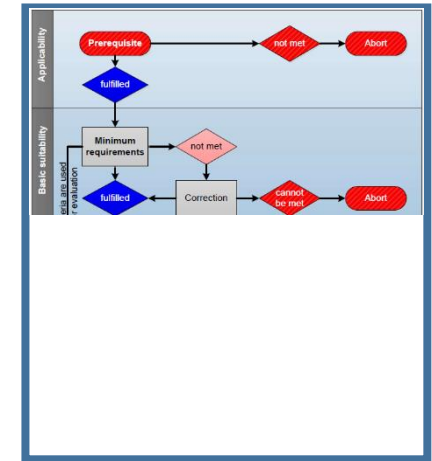
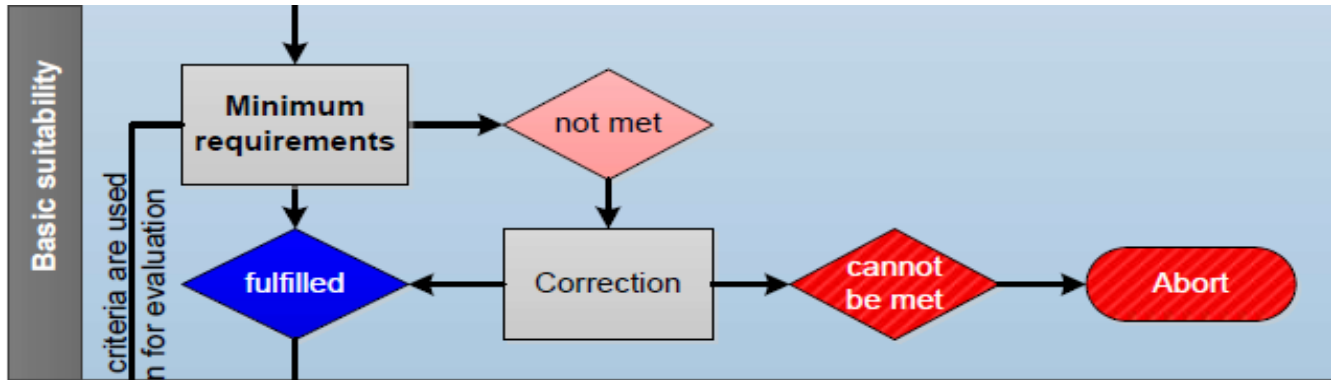
Modular concept for sustainable water treatment using capacitive deionisation





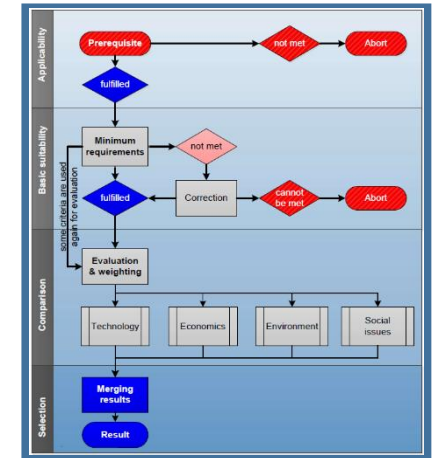
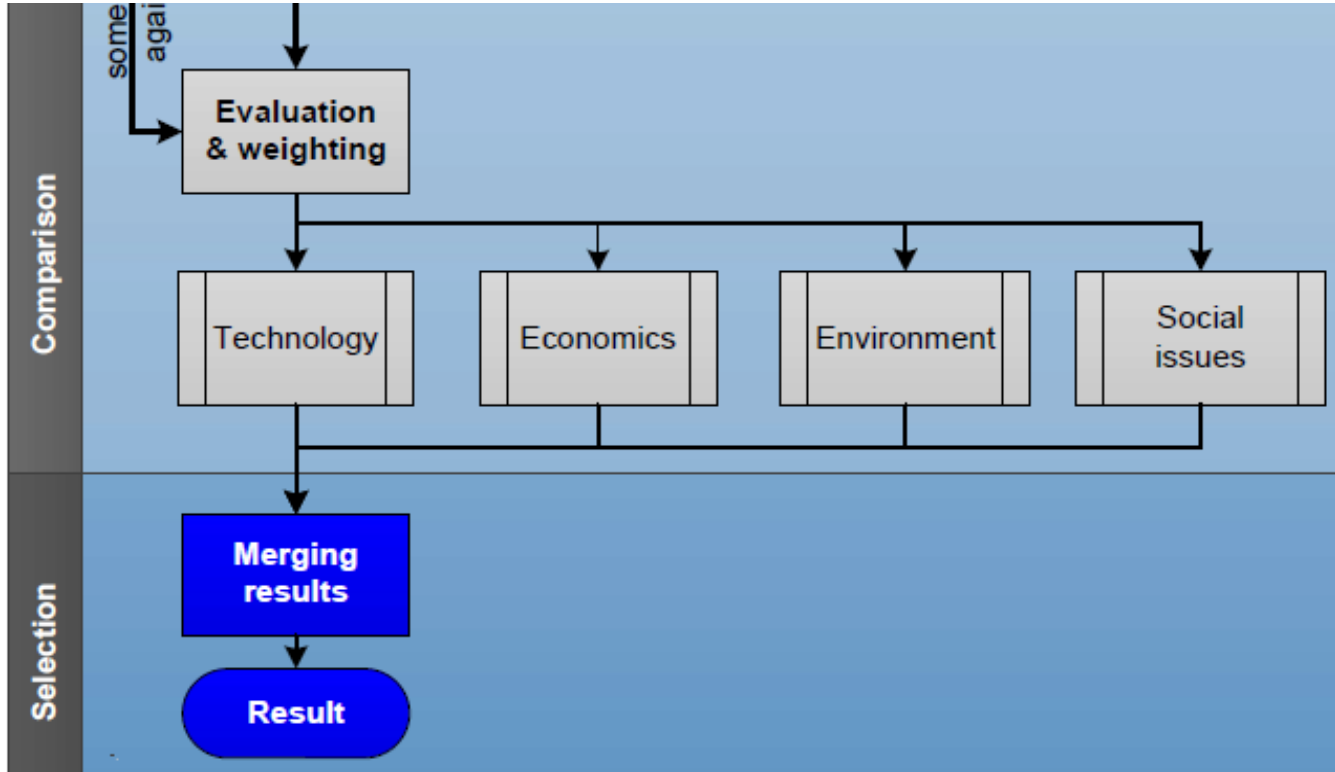
■ Prerequisites:

- compliance (legal)
- resources availability
- openness of the decision-makers



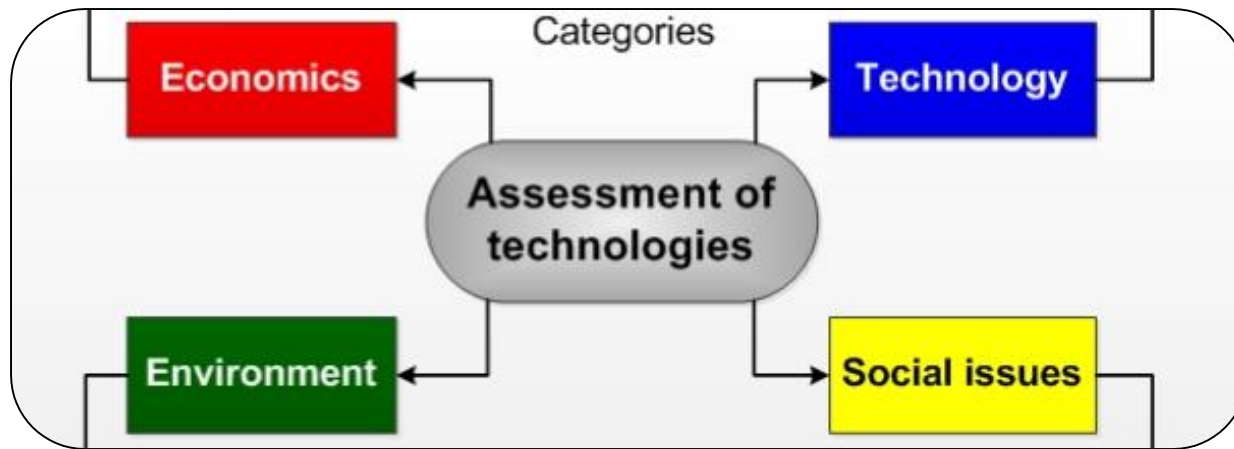
■ Minimum requirements:

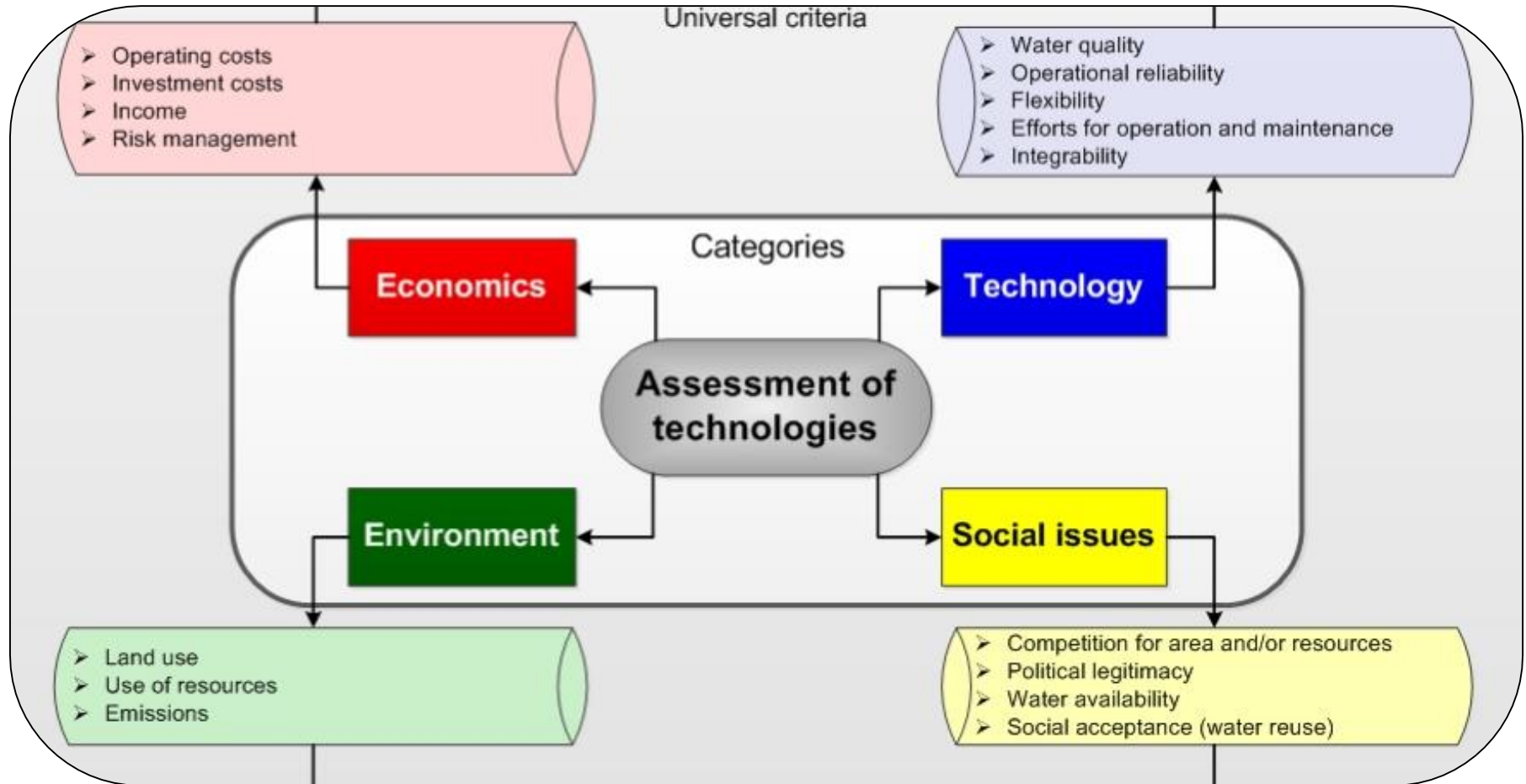
- compliance (legal, operational)
- integrability (infrastructure, building / system technology)
- synchronization of supply and demand



■ Assessment criteria:

- around 50 different criteria from the participating projects
- differentiation between universally applicable and case-specific criteria





■ Case-specific assessment criteria

Example:



- local added value
- environmental sustainability
- Resources and land competition
- job creation
- transparency of the decision
- social acceptance
- participation
- economic burden
- ...

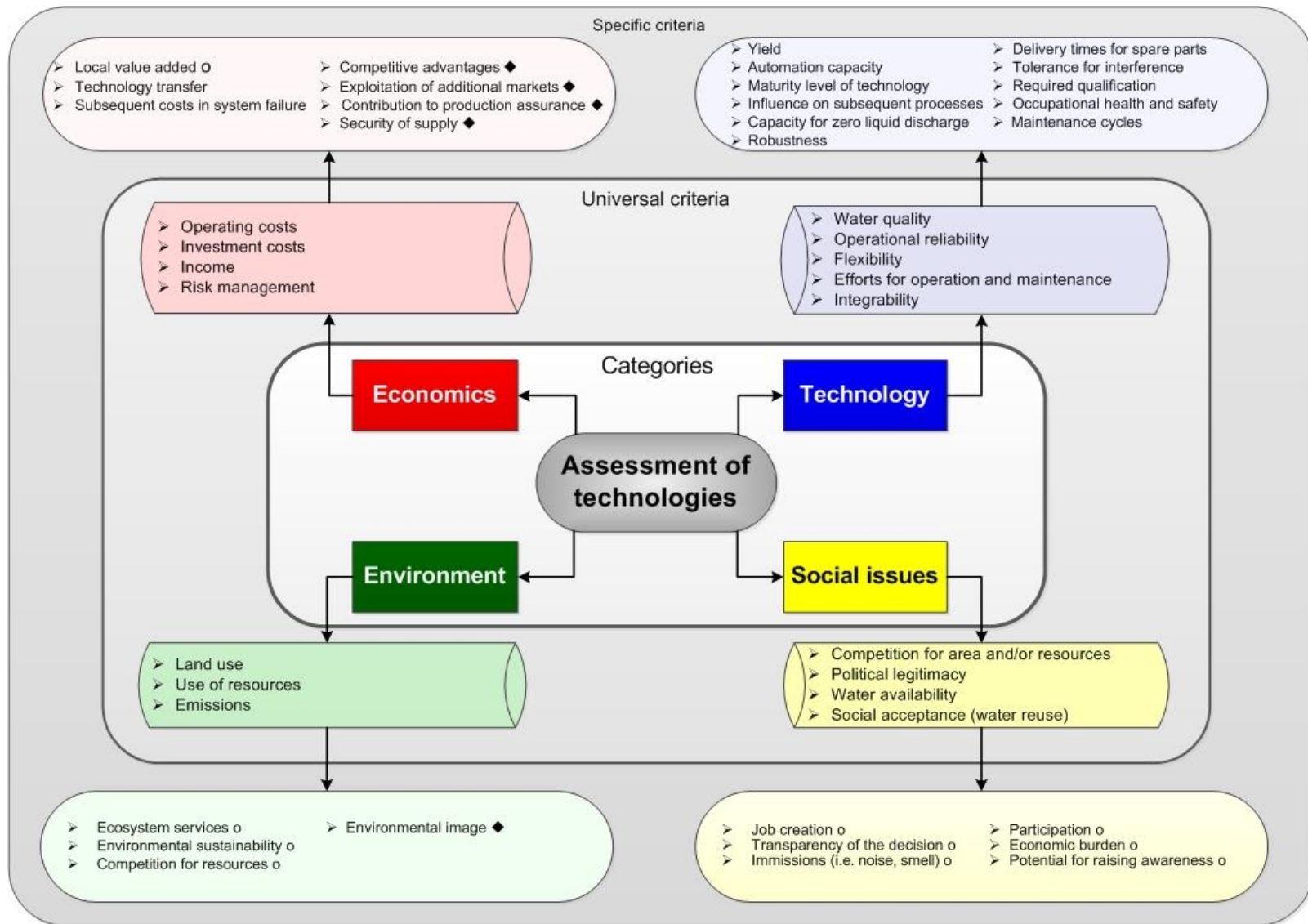
Perspective and evaluation with regards to public services of general interest

Example:



- competitive advantages
- development of further markets
- contribution to production security
- security of supply
- environmental image
-

Economic / entrepreneurial perspective



Data source	Challenge	Measures to ensure data quality
Literature	Transferability, reproducibility	Thorough literature review based on case-specific criteria, consideration of grey literature as complementary source for local data
Laboratory tests and piloting	Data processing, up-scaling	Long test periods under stable conditions with continuous data recording
Modelling	Model quality, quality of the input data	Model calibration and validation based on historical data
Experience	Transferability	Exchanging with practitioners and other scientists
Stakeholder interviews	Different, ideally complementary knowledge and experience, lack of common understanding and common terminology	Defining a common language and shared understanding of the problem and targeted solution
Statistical data	Future development, sample size and quality	Making use of methods for statistical quality control
Proprietary databases	Transparency, costs, expandability	Favoring public data bases
Laws and regulations	Uniqueness, physical consistency	Periodic review (local/regional) laws and regulations

- comparison of six multi-criteria evaluation concepts
- general procedure for the comparative multi-criteria assessment of water reuse systems, consisting of:
 - prerequisites
 - minimum requirements
 - evaluation criteria (qualitative, semi-quantitative, quantitative)
 - results aggregation
- exemplary sets of criteria for use in a more industrial or municipal context as an aid to analyzing issues in the field of water reuse and desalination

Thank you for your attention!

Members of WavE-Working Group „Assessment Methods“

Kristina Wencki (IWW Water Centre)

Verena Thöne (IWW Water Centre)

Dr. Angela Ante (SMS group)

Tobias Hogen (TU Berlin)

Claudia Hohmann (Fraunhofer ISI)

Dr.-Ing. Felix Tetterborn (Fraunhofer ISI)

Dagmar Pohl (ISAH, Leibniz Univ. Hannover)

Philipp Preiss (HS Pforzheim)

Dr. Christina Jungfer (DECHEMA)



Available online at:

<https://iwaponline.com/jwrd/article/10/4/269/76359/Approaches-for-the-evaluation-of-future-oriented>