
Circular City-Port Regeneration: Hybrid Decision-Making Processes for Sustainable Transition

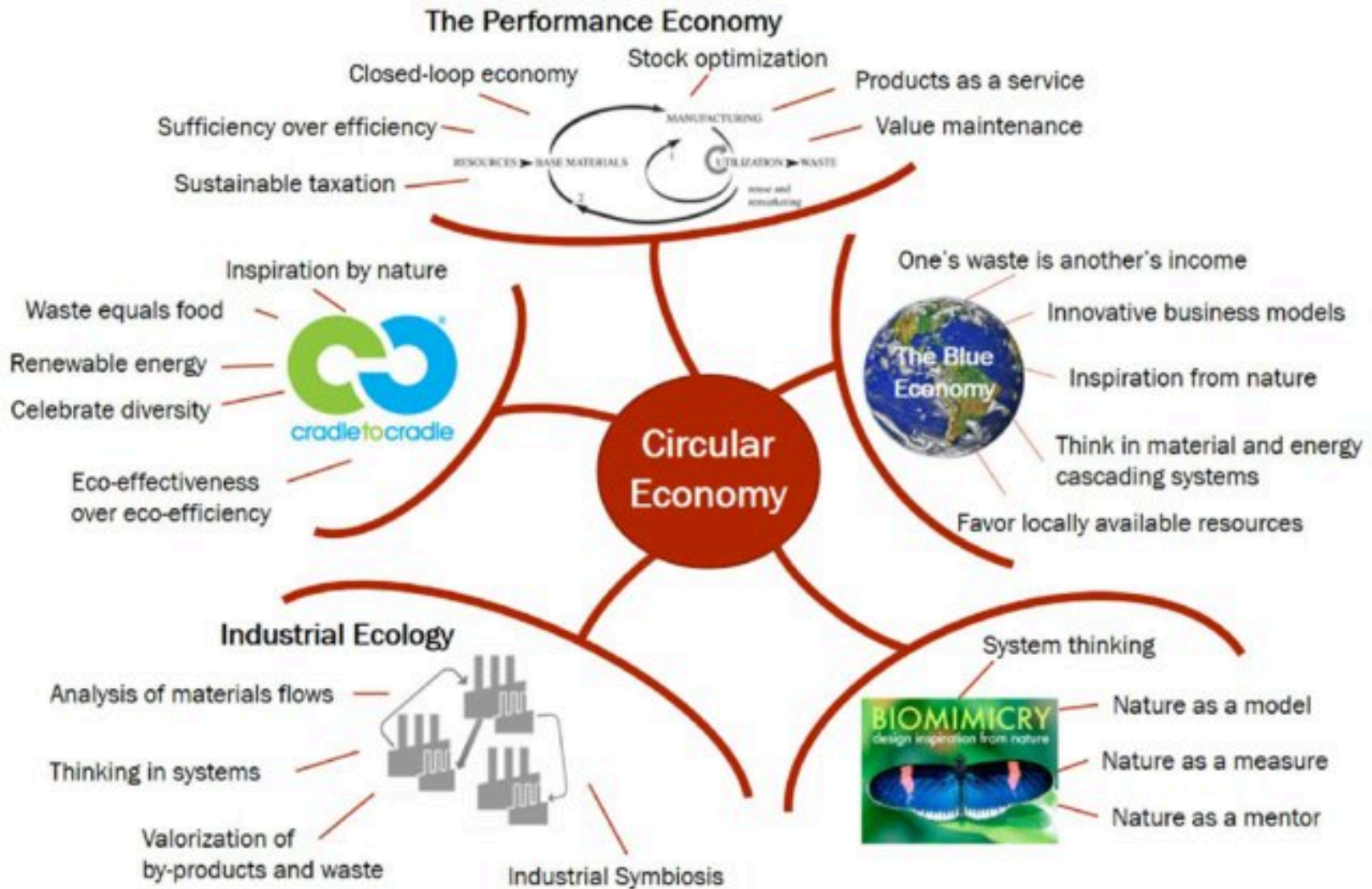
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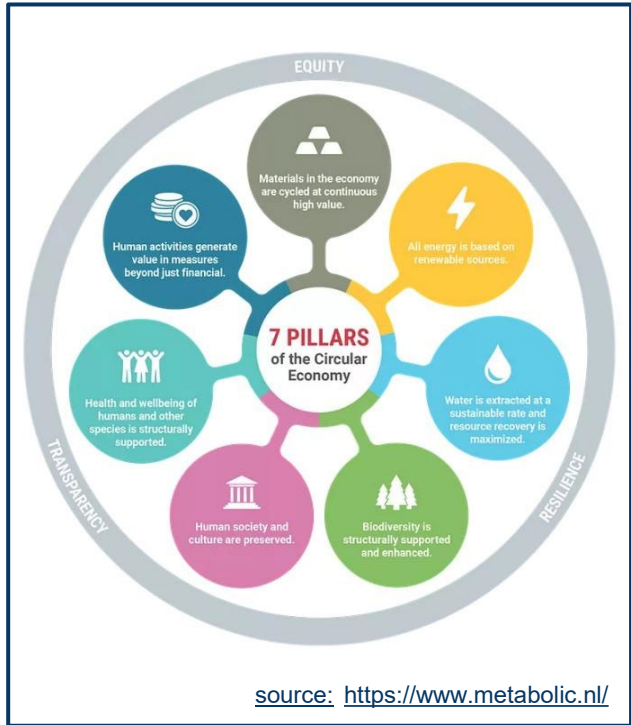
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1. RESEARCH GOALS WITHIN THE THEORETICAL BACKGROUND OF CIRCULAR ECONOMY



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ReSOLVE: an approach to Circular Economy (CE)

REGENERATE

- Shift to renewable energy and materials
- Reclaim, retain, and restore health of ecosystems
- Return recovered biological resources to the biosphere

SHARE

- Share assets (eg cars, rooms, appliances)
- Reuse/secondhand
- Prolong life through maintenance, design for durability, upgradability etc

OPTIMISE

- Increase performance/efficiency of product
- Remove waste in production and supply chain
- Leverage big data, automation, remote sensing and steering

LOOP

- Remanufacture products or components
- Recycle materials
- Digest anaerobically
- Extract biochemicals from organic waste

VIRTUALISE

- Dematerialise directly (eg books, CDs, DVDs, travel)
- Dematerialise indirectly (eg online shopping)

EXCHANGE

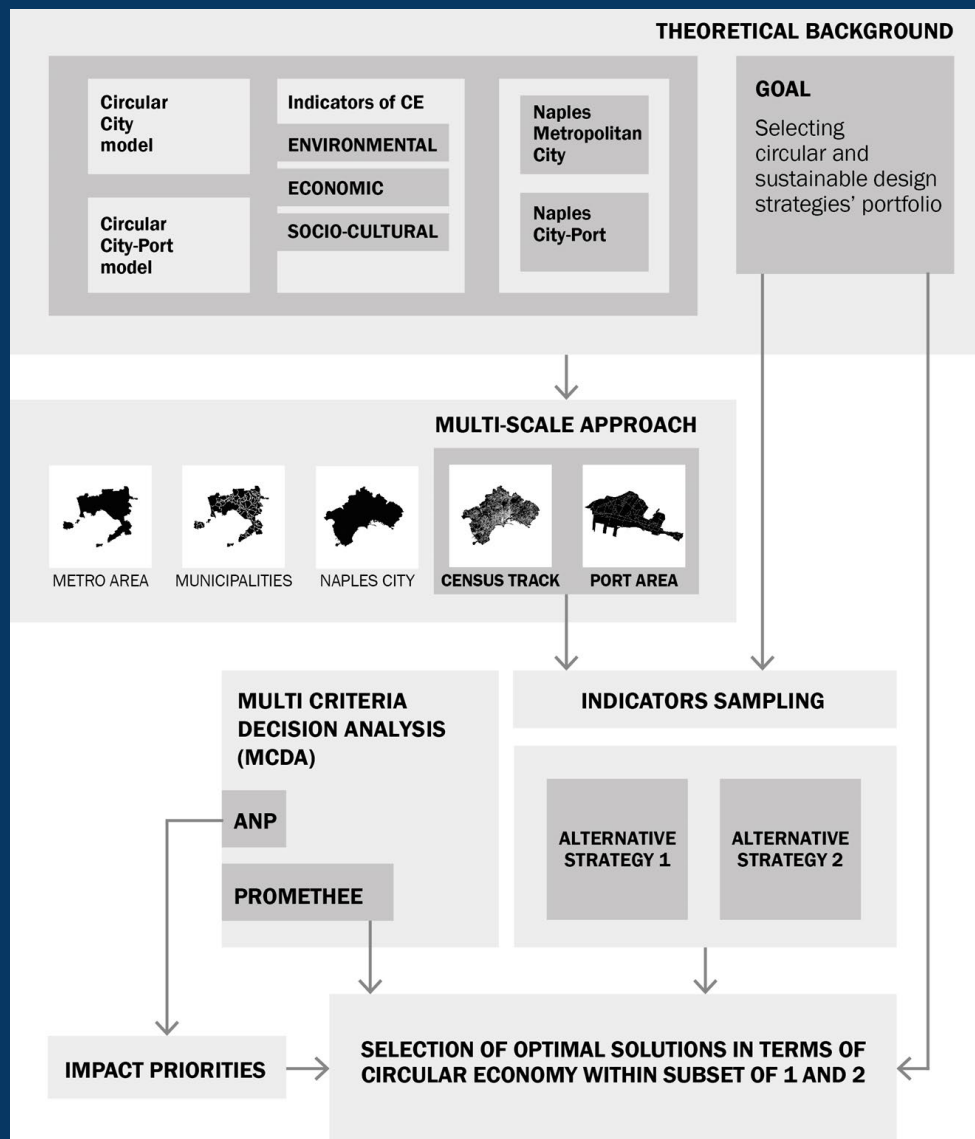
- Replace old with advanced non-renewable materials
- Apply new technologies (eg 3D printing)
- Choose new product/service (eg multimodal transport)

source: McKinsey & Company, <https://www.mckinsey.com/>

GOAL

Selecting a sustainable design strategies' portfolio related to Naples City-Port in order to boost a Circular City-Port Model for the Metropolitan Port-Cities. The specific objective focuses on the comparison of two urban regenerative alternatives and it intends to foster an exportable and robust methodology for other maritime cities, which must deal with CE processes and resource allocation troubles, and, so that, need multidimensional impacts assessment.

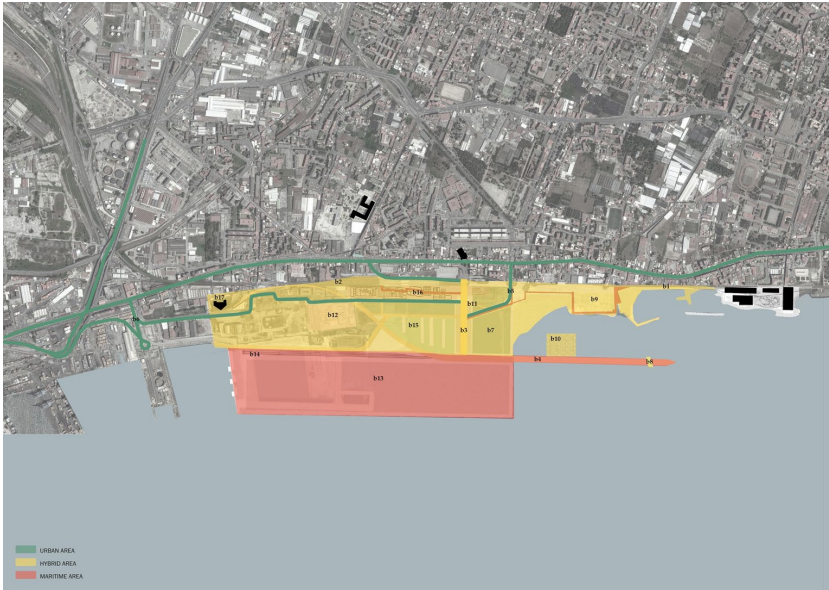
2. HYBRID METHODOLOGICAL APPROACH: THE CASE STUDY OF NAPLES CITY-PORT



3. REGENERATIVE STRATEGIES EVALUATION: THE CASE STUDY OF NAPLES CITY-PORT

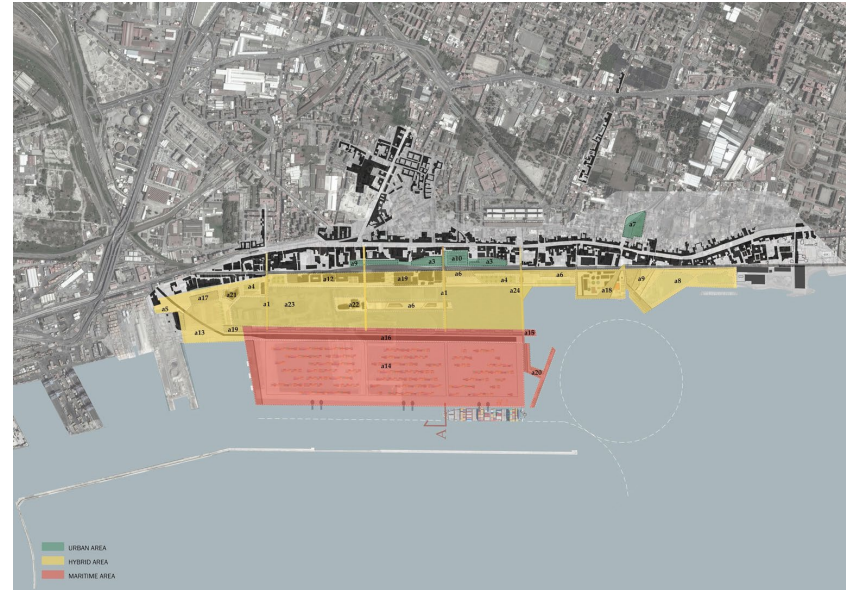
The Alternative Strategies by comparison

Two alternative strategies have been selected within some studies of the Department of Architecture, University of Naples Federico II.



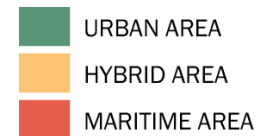
Alternative Strategy 1

Interdepartmental Research Center in Urban Planning “Alberto Calza Bini”



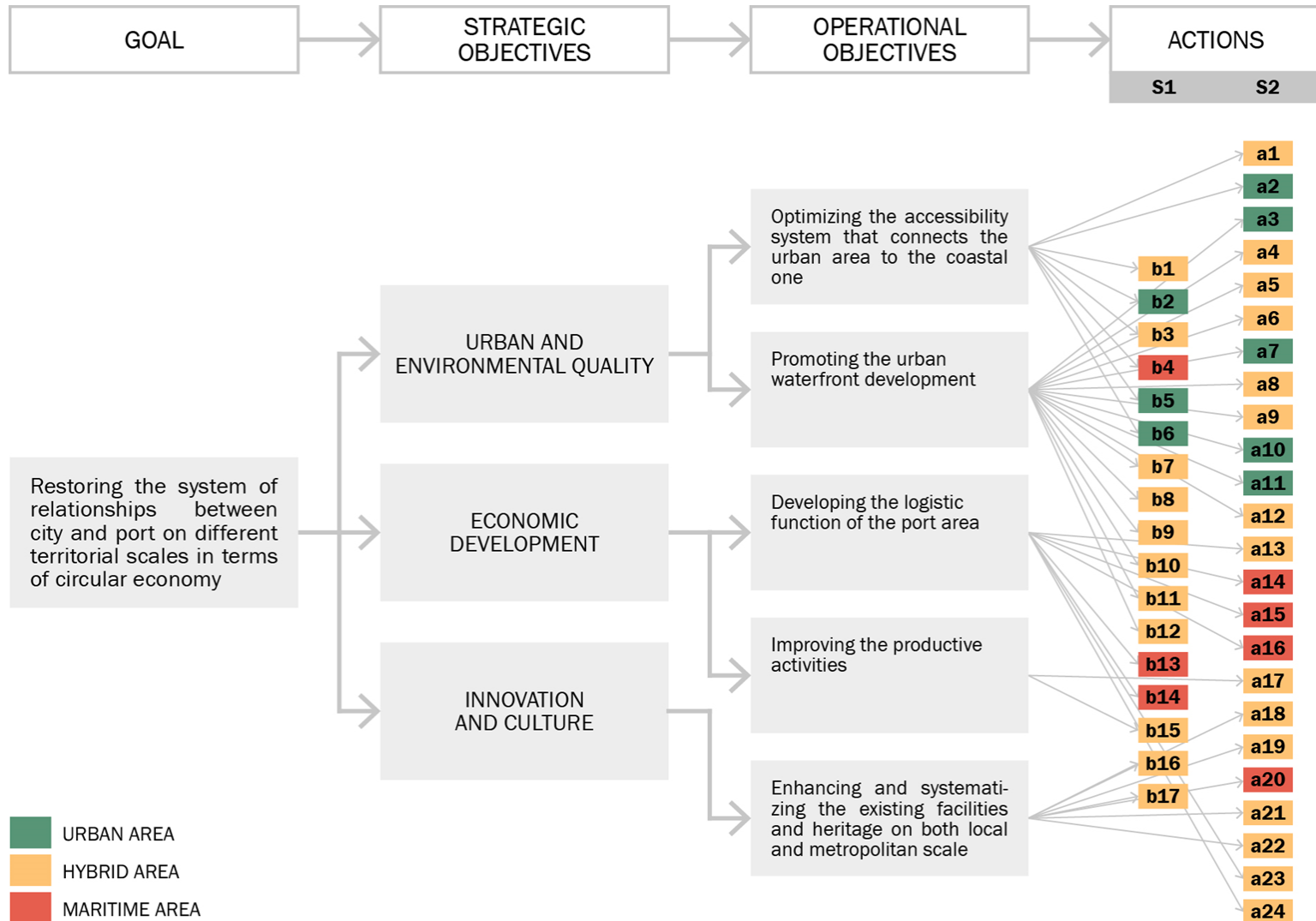
Alternative Strategy 2

II Level Master in Planning and Sustainable Design of Port Areas



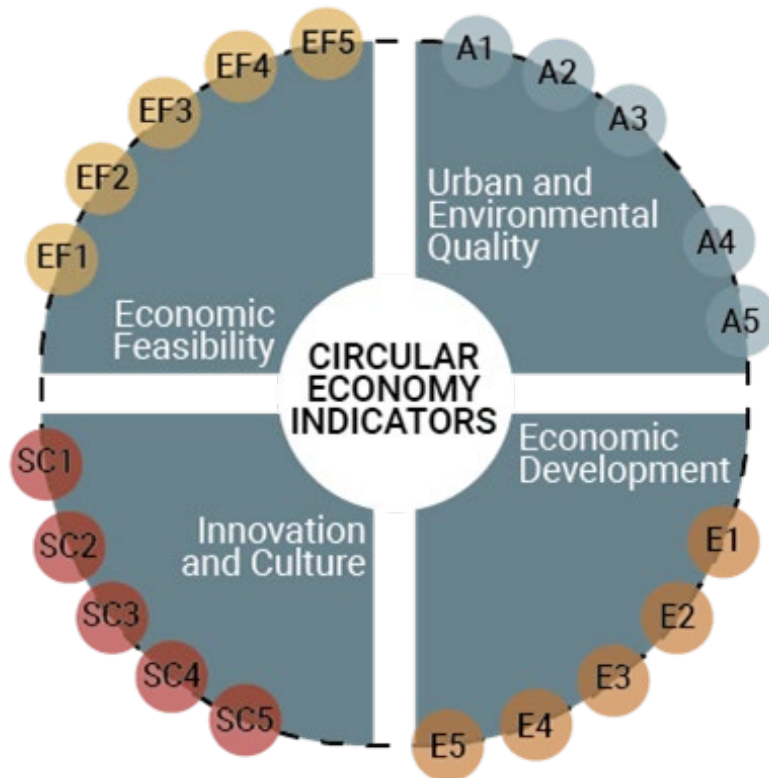
3. REGENERATIVE STRATEGIES EVALUATION: THE CASE STUDY OF NAPLES CITY-PORT

The decision tree



4. RESULTS

The core-set of indicators



QUANTITATIVE INDICATORS

- EF1 Overall cost
- EF2 Revenue
- EF3 Operating cost
- EF4 Ordinary maintenance cost
- EF5 Extraordinary maintenance cost

QUALITATIVE INDICATORS

- A1 Sustainable energy
- A2 Air pollutant emission
- A3 Public green space
- A4 Amount of municipal separate waste by sector
- A5 Stormwater runoff control by green roofs
- E1 Port trade balance
- E2 Port companies
- E3 Innovative start-up companies in the circular economy
- E4 Cruise passengers
- E5 Residential real estate listings
- SC1 Employment rate
- SC2 Percentage of employees in cultural and creative industries
- SC3 Innovative cultural associations
- SC4 Tourism intensity
- SC5 Demand for cultural heritage

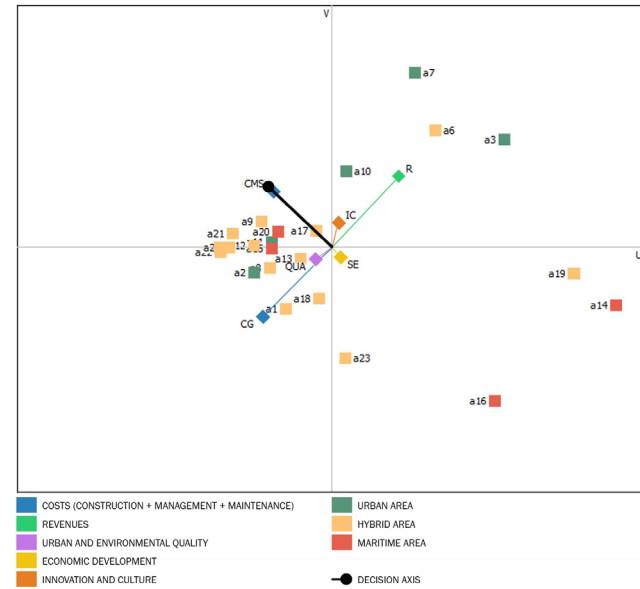
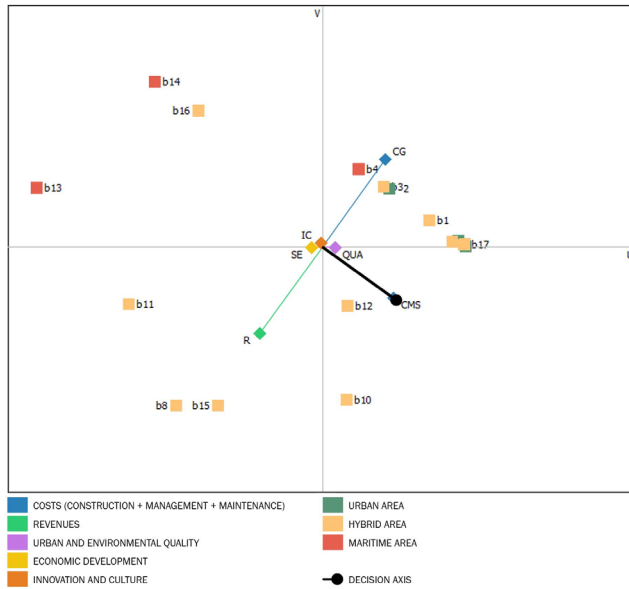
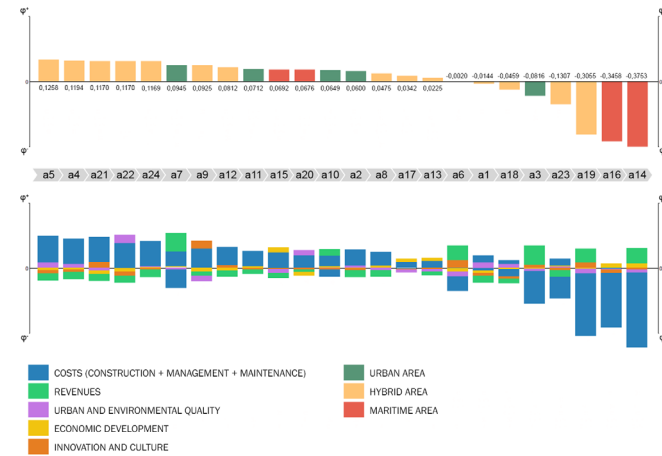
4. RESULTS

The optimal solutions by PROMETHEE method

S1

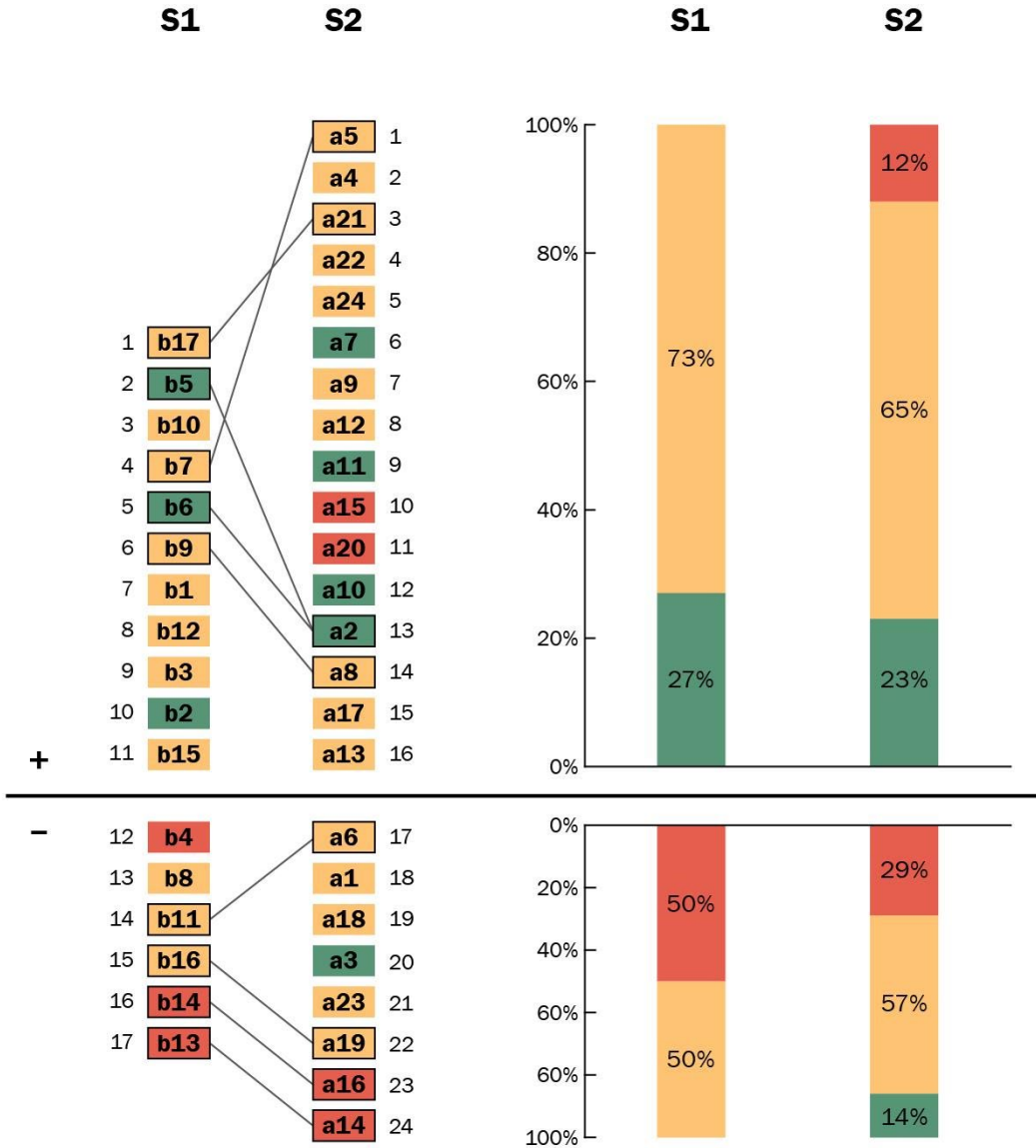


S2



4. RESULTS

- **Ranking of preferable actions** in terms of CE, for each Scenario and distinguished by areas. Connections between similar actions across the two scenarios are shown.
- **Preferable actions' concentration** within each area in percentage terms.



5. DISCUSSION AND CONCLUSIONS

The **selection of sustainable design strategies' portfolio** related to Naples City-Port represents a suitable process to boost a Circular City-Port Model for the Metropolitan Port-Cities. The selection procedures have been addressed to **operationalise CE principles** through the assessment of the **multidimensional impacts** of regenerative solutions.

The outcomes highlight that the **hybrid areas**, as interfaces among harbour's functions and city's facilities, are the most important spaces in which the **stakeholders need to converge** in terms of **allocation of sustainable and circular solutions**.



thank you