

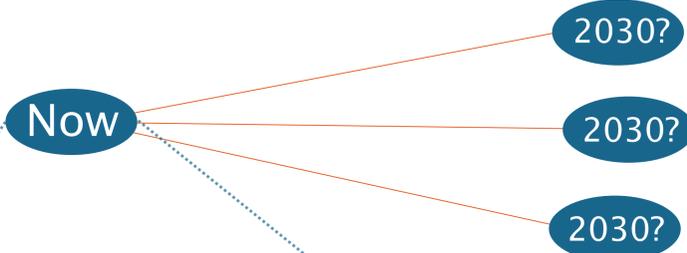
Explorative Scenarios using Consistency and Robustness Analysis and Wild Cards

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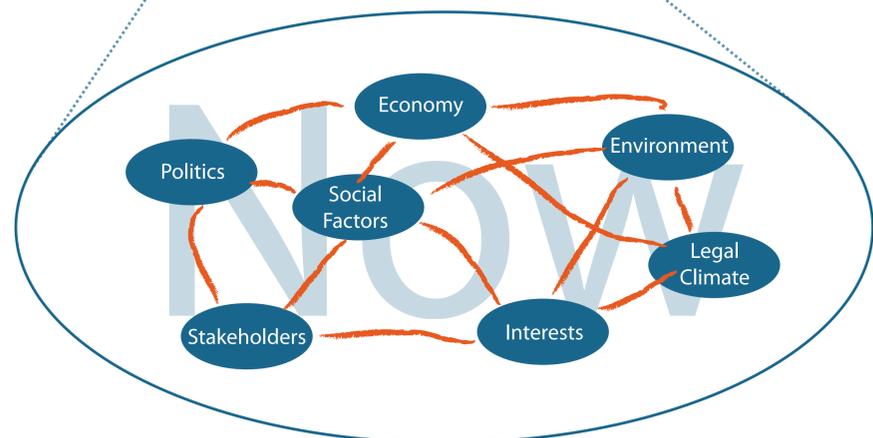


Future or Futures?

It is inherently difficult to forecast the future. Thus, think in multiple futures, aka scenarios



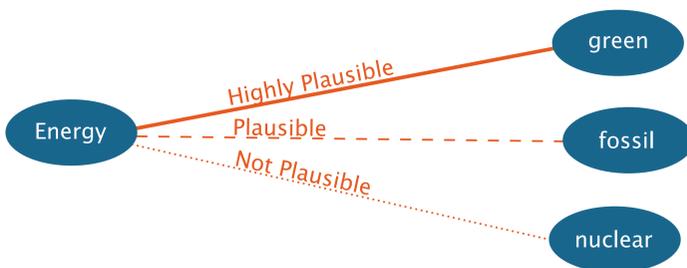
Limit the Field



The present and its future development are defined by many Key Factors and their interaction. For studying futures of a specific field carefully pick the most important Key Factors. This is done best during a workshop with stakeholders and experts.

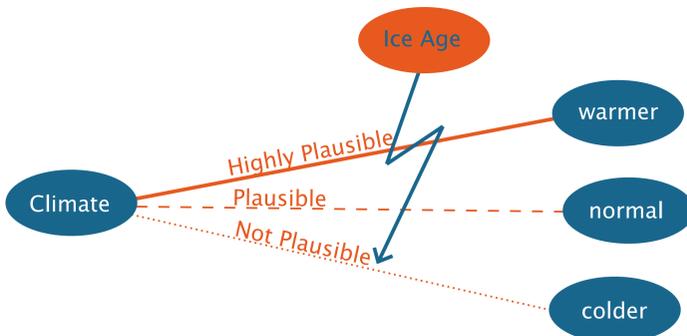
Key Factor – quo vadis?

In workshop, assign Future Projections (2–5) to each Key Factor. Rate their Plausibility (from 0 to 1). Think outside the box!



What if?

Find extreme, low plausibility, disruptive events – Wild Cards. Think outside the box!



Consistent Pairs

Compare each Future Projection to all other Future Projections. Is it consistent for a pair to appear in the same future?

Diagram showing 'Economy' branching into 'soaring', 'normal', and 'weak'.

| | | | |
|---------|------|--------|------|
| | full | normal | low |
| soaring | 1.5 | 0.0 | -0.5 |
| normal | -0.5 | 1.0 | 0.0 |
| weak | -2.0 | -0.5 | 1.0 |

Assign pairwise Consistency Values, from -2

(totally inconsistent) to 2 (totally consistent). This generates the Consistency Matrix. This process is best done by several individuals. Results from participants are merged.

Projection Bundles

Find all possible bundles of Future Projections. That is, all combinations of Future Projections, one from each Key Factor. This requires software support.

| | | | |
|--------|---------|---------|------------|
| Energy | Climate | Economy | Employment |
| green | colder | soaring | normal |
| fossil | normal | full | low |
| green | warmer | weak | full |

Plausible, Consistent, Robust

Evaluate Projection Bundles by:

Bundle Plausibility: multiply all Plausibility values of a Projection Bundle.

Bundle Consistency: add all pairwise Consistency values of a Projection Bundle.

Partial Inconsistencies: count the occurrence of pairwise Consistency values smaller than -1.

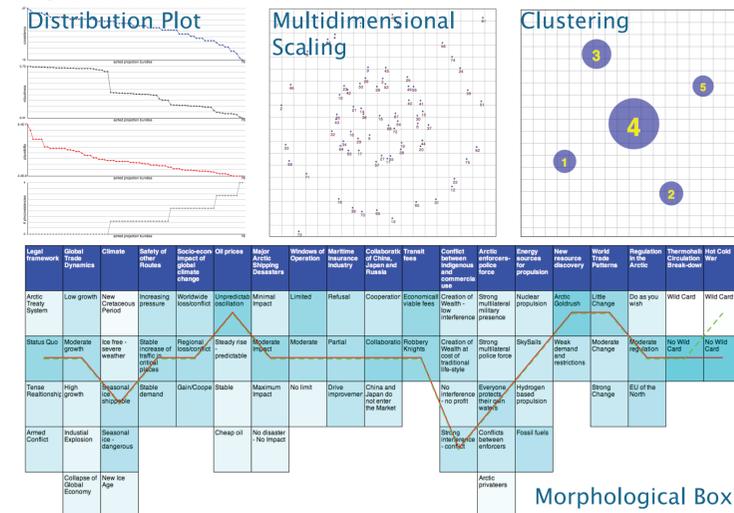
Total Inconsistencies: discard all Projection Bundles with one or more pairwise Consistency value less than -1.5.

Robustness: find Projection Bundles that have high Plausibility and Consistency values and no or few Partial Inconsistencies.

$$\text{Robustness} = \left(\frac{\log(\text{Plausibility}) * \text{normalized}(\text{Consistency})}{1 + \text{Number of Partial Inconsistencies}} \right)^{1/2}$$

Retrieve Raw Scenarios

The list of Projection Bundles is very long; many are similar. Aim: Find 3–5 dissimilar Projection Bundles, these will be the Raw Scenarios.



Tools:

Distribution Plot: this gives information about the Projection Bundles quality.

Multidimensional Scaling: maps the high-dimensional Projection Bundles in 2D. Similar Bundles are close together.

Clustering: sorts the Projection Bundles into groups based on similarities.

Morphological Box: visualizes Projection Bundles over the set of Future Projections.

Write Scenarios

Based on the selected Raw Scenarios write well flowing Scenarios. Use similar Future Projections to point out possible variations. Discuss how the Scenarios are affected under occurrence of Wild Cards.

Live Project

For detailed information, references and the live scenario project 'Arctic Marine Transportation in 2030' visit <http://seace.scenlab.com>

Open Scenario Process

Make all above steps available for discussion online. Invite all stakeholders to participate. Use incentives (give-aways, prize drawings) to ensure good amount of participation. Open discussions will improve the final product!

Tools we use

Scenario Process Support Software: **ScenLab v1.7** (www.scenlab.com)

Web Publishing and Commenting System: **WordPress** (www.wordpress.org)

Info

evolve:IT, Complex Systems Solutions LLP is the developer of ScenLab. Z_punkt GmbH is a leading European Future Studies Think Tank. Questions? Contact Marc: marc@evolvet.it