Overview

- Quick introduction to CIB method
- Problem definition: Inconsistency, worth a look!
- Method – introduction to succession analysis / network analysis
- Some insights
- Discussion: So what? / How is it useful?
- Conclusion
Introduction to CIB method

• Cross-Impact Methods are heuristic approaches to analyze interdependent systems based on expert judgements.

• First proposed by Gordon and Hayward (1965-68) in order to better understand interdependence in socio-technological development and to improve Delphi surveys.

• Cross-Impact Balance Analysis (CIB) is a qualitative type of Cross-Impact Analysis, designed to construct qualitative scenarios in a semi-formalized way.

• Until now CIB has been used in the various areas, among others capturing framework assumptions for energy modeling practices (context scenarios).
Introduction to CIB method
Consistency and inconsistency

A scenario is consistent when:

- Each element is being more supported by others than inhibited (a mathematical sum is considered).
- No alternative state of an element is being supported more (bigger sum) by others.
- Inconsistency simply means that chosen assumptions are promoting an alternative state than themselves.

Consistency and Inconsistency:

Problem Definition
Inconsistency: worth a look!

- Notion of consistency has been a basis for scenario construction and selection.
- Inconsistency at the same time has been noted by some scholars as the potential places to discover surprises and out of the box thinking.
- CIB generates scenarios for all possibility space (thousands), but very few among them (mainly very less than 1%) are fully consistent and chosen for further analysis.
- For judgement based methods inconsistency might be a result of dissident, biased or uncertain opinions.
  → A technique to independently investigate inconsistent scenarios seems helpful.
Succession analysis

A technique to investigate inconsistency

- Succession in CIB terms means to correct inconsistencies of scenarios in a stepwise manner, by changing the inconsistent assumptions to their more supported alternative states (with already captured judgements), under certain algorithm.

\[ \{A1 \, B1 \, C1 \, D1 \, E1\} \rightarrow \{A1 \, B1 \, C2 \, D1 \, E2\} \]

- A succession might end to a consistent or inconsistent scenario, and the process continues until reaching a fully consistent scenario.

- Succession analysis provides the opportunity to connect scenarios and make a network of interconnected scenarios.

Succession analysis

Scenario network

- Each network has a consistent scenario at the core.

- Each edge (arrows) denotes a correction in one or more assumptions used to create scenarios.

- Network can be summarized by graph centrality measures to reach those scenarios that are more resulted and are more resulted from network hotspots.

e.g. Patriotic government changed into Socialist government
Succession analysis
Recurrent patterns, important scenarios

Some insights

- A succession network analysis introduces a technique that can differentiate between scenarios with a measure other than consistency degree.
- A network central position is independent of classic CIB measures. E.g. scenarios with high inconsistency scores could be more central comparing to the others.
- When considering inconsistency correction, minimum inconsistency (-1) is not guarantee for easier correction path. Sometimes a highly inconsistent combination gets corrected easier than a lesser one. Thus, inconsistency should be considered as a more structural feature for CIB scenarios.
Grunwald (2014) introduces 3 modes of orientation towards futures knowledge:

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<th>Mode 2 (selected futures)</th>
<th>Mode 3 (open futures)</th>
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Discussion


While in a classic CIB analysis diversity of the futures is bounded to the notion of consistency, and sensible futures are sought by employing existing expert/stakeholder knowledge (mode 2), wide majority of divergent futures (inconsistent scenarios) are left unused.

However, this set of inconsistent scenarios can be used as a knowledge repository to provide a “hermeneutic basis” for better decision making. To learn about our present we should first deconstruct the images of futures, in order to reach a common ground for dialogue and “deliberate choice”.

Discussion

Discussion

Some insights

1. How our current knowledge filters possible futures as inconsistent or implausible.

2. What assumptions matter more when looking at network structure.

3. The graph is a deconstruction of cross-impact matrix. It can be used to discuss or reconsider the judgements behind the assumptions (e.g. highly central assumptions can be discussed).

4. This graph and paths show how we think today and how we picture our future. What is behind the notion of consistency.

Conclusion

• CIB in its classical form falls under “orientation mode 2” presented by Grunwald. A limited diversity of futures is selected bounded to the current expert knowledge as plausible sets of assumptions.

• As CIB generates a large body of possible futures, there is a potential for researcher to look into a [relative] divergent sets of futures as a basis for “hermeneutics of present”.

• Studying successions network is a tool to deconstruct the concept of consistency and a platform to get into discussion about the process of sense making, and converging the divergent futures.

• It also provides an opportunity to reconsider some critical assumptions of our cross-impact matrix.
Succession analysis

Sum of impacts each component receives