Integrated Q&Q systems analysis in policy relevant wicked problems

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Advanced Systems Analysis Program
DMDU Conference Nov 14th 2017
Oxford
Research questions set by policy makers

- How can we impact on the fear of the Finnish population?
- How could we control the flow of refugees more efficiently?
- How can we manage the expectations of the asylum seekers?
- Is the Finnish economy able to manage refugee inflow, what are the limits?
- When will the Finnish society collapse?

Warren L4: Unknown Model, Outcomes Weights
From policy questions to research questions

• How can we impact on the fear of the Finnish population?
• How could we control the flow of refugees more efficiently?
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• Is the Finnish economy able to manage, what are the limits?
• When will the Finnish society collapse?

What is the system?
Which parts of the system are more important than other?
What defines the dynamics of the system?
Which components of the system are sensitive for policy impact?
Complexity as an immanent property of public policy planning

• A complex system (Cairney 2015):
  – Cannot be explained by breaking it down into components due to their strong interdependency
  – Non-linear dynamics, positive (amplifying) and negative (dampening) feedback loops
  – Sensitive to initial conditions
  – Emergence, local interactions define macro behavior
• Wicked => resisting to resolution
• Qualitative systems analysis
  – Participatory methods for exploration of a problem as part of a decision-making process (Checkland 1985, Coyle, 2000), but conduct simulations (Homer et al., 2001) as well
  – Suffer from the connotation of being ‘soft’ (Mingers 2011)
System performance patterns are defined by feedback loops

http://www.thwink.org/sustain/glossary/FeedbackLoop.htm
Case refugee system and Finland

How to analyze a wicked system without data?
Background

Objectives

➢ To build a systems description potential impacts of refugee phenomenon in the Finnish society
➢ To identify potential focus areas for efficient policy actions

Data collection

• Virtually (survey, map descriptions comments) and in workshops (systems components relationships and preliminary policy planning)

Method

• Qualitative systems map, that is analyzed both qualitatively and quantitatively
• Triangulation:
  – Expert Map produced by the governmen experts & Researcher Map that is based on available literature
  – Qualitative analysis & Quantitative systems analysis
  – Bayesian analysis
Process step by step

1. Challenge description (together)
2. Collection of the drivers of the refugee system (from experts, survey)
3. Causalities between system’s components by experts
4. Quantitative analysis
5. Behavior in time
6. Potential policy focus choices
Step by step mapping:

STRUCTURE
Subsystems mapped in a workshop
Integration of subsystems
Comments by experts

LINK POWER
First version in the workshop
Comments by experts
Validation by independent experts
## Link matrix

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | AA | AB | AC | AD | AE | AF | AG | AH | AI | AJ | AK |
| EXP MAP EDITS MAY 23 | COMPONENT IN ENGLISH | NR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
| Budget cuts of gov. Agencies | 1 | 5 | 1 | 3 | -5 | -5 | 5 | -10 | 5 | 5 | -5 | 5 | -10 | -10 | -5 | -5 | -5 | 1 |
| Tighter border formalities in EU and Balkan countries. | 2 | 5 | 5 | -5 | -5 | 5 | 5 | 5 | 5 | 5 | -5 | -5 | -1 | 5 | 5 | 1 |
| EU-Turkish agreement > refugee camps to Turkey | 3 | 5 | -5 | -5 | 5 | 5 | -10 | -10 | 5 | 7 | -5 | -5 | 5 | -10 | 5 | -5 | -10 | -10 | -10 | 5 | 5 | 5 |
| Global mindset | 4 | -5 | 10 | -5 | -10 | 5 | 10 | 5 | 9 | 10 | -4 | 5 | -10 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Human rights supporters are in a defence mode | 5 | 7 | 5 | -10 | -5 | -5 | 5 | 5 | 5 | 5 | 5 | -10 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Self-organized activities against refugees. | 6 | 5 | 10 | -10 | -5 | 5 | 5 | 5 | 5 | -5 | -10 | -5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Increasing knowledge | 7 | 5 | 5 | -5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Polarized opinion climate | 8 | 5 | -10 | 10 | -10 | 5 | -10 | -10 | 5 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Integration to society | 9 | -5 | 10 | 5 | 7 | -5 | -10 | -10 | 5 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Asylum seekers education | 10 | 5 | 10 | 5 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | -5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Accommodation of cultures | 11 | -5 | -10 | -5 | -10 | 5 | -10 | -10 | 5 | -10 | -5 | -5 | -5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| International agreements and EU systems are weakening | 12 | 5 | -5 | -5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Wider contact network. | 13 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Tightening of the refugee policies | 14 | 5 | 10 | 5 | 5 | 10 | 5 | 10 | -5 | -5 | -5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| No future | 15 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Fast reactions of migration to information. | 16 | 5 | 5 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Refugees flows to Finland | 17 | 5 | 5 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Better social services for refugees. | 18 | 5 | 5 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Atmosphere of fear | 19 | 5 | 10 | 10 | -10 | 5 | 10 | 5 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Populistic policy that changes all the time | 20 | 5 | -10 | -5 | -5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Border control | 21 | -5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Crime | 22 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Accepted refugees | 23 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Refugees try to enter to Finland | 24 | -5 | -10 | -5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Speed of the decision making process | 25 | -5 | 5 | -5 | -5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Economic challenges | 26 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Voluntary return | 27 | 5 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Wrong information | 28 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Renewal of society | 29 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Info about opportunities | 30 | -5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Trust on society | 31 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Illegal Immigrants | 32 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Municipalities motivation to accept | 33 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

**Note:** The matrix shows the link matrix with values ranging from -5 to 5, indicating the strength and direction of the links between different components.
Question: Which parts of the system are more important than others?

CENTRALITY:
In-degree – number of incoming links
Out-degree – number of outgoing links

Aggregate degree:
In-degree+out-degree

Weighted degree:
Links strengths included to the calculation
Question: What defines the dynamics of the system
Question: Which components of the system are sensitive for policy impact?

System dynamical modeling

We consider a network consisting of \( n \) nodes \( v_i \) that are marked with a certain value \( x_i \). We further have a weighted adjacency matrix \( C = [c_{ij}] \) that describes how changes of the node values \( x_i \) are generated by changes of the neighboring nodes. We consider here the scenario where changes \( x(k) \) at time step \( k \) result in changes of the feature values at time step \( k + 1 \), but where \( x(k) \) does not have a persistent effect further in the future. Let \( u_j(k) \) denote the input (investment) in feature \( j \) at time \( k \), then we can write

\[
\Delta x_j(k + 1) = \sum_i c_{ij} \Delta x_i(k) + u_j(k)
\]
Two different analysis

I. Scenarios
   - Policy scenarios: How investment in Xi (border control) impacts on the other system components?
   - Development scenarios: If the component Xj (fear) is changing radically, what happens?

II. Which scenario has the biggest impact on component Xy?
   - How different scenarios such as investment in communications, investment in border control, increasing populist policy making or increase of the public sector budget cuts, impact on illegal immigration?
One question
– analysis process
How to prevent increase of fear?

1. Step: Quantitative analysis and stimulation of scenarios will show what type of policies are efficient or not efficient.

2. Step: Qualitative analysis reveal why those policies are efficient or not efficient.
1. How the S1 or the S2 policy impacts on key components of our system?

S1: Investment into application processing speed (E25)  
S2: Investment into communications (E7)
2. Anomalies
Collaboration of authorities

- This is an efficient way to decrease fear, polarized debate and increase renewal of society, because via indirect impact decreases populist politics and number of immigrants is increasing.

- But as seen in S3, impact is even stronger if only in one of the areas, integration to society (E9) is invested.

**Explanation:** efficiency of screening process and improvement of social services are causing some negative indirect impact by increasing populist policy making and fear.
3. How sensitive the ‘Fear’ component is to the different scenarios?

**Scenarios S1…S9 impact on Fear (E19)**

**SCENARIOS**
- S1 Investment into efficiency of the application processing
- S2 Investment into communications
- S3 Investment into integration
- S4 Populist policy making is increasing
- S5 Fear increases
- S6 Decrease of fear by communications and improvement of application process
- S7 Investment into authority collaboration
4. Why populist policy making has such a role?
5. How can we manipulate the system so that the ‘Fear’ does not increase?

Assimilation of cultures is the only component of these feed back loops that is able to decrease fear both directly and indirectly.
**Is this systems map ‘the right one’?**

<table>
<thead>
<tr>
<th><strong>RES Matrix</strong></th>
<th><strong>EXP Matrix</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>S1: The decision makers decide to invest in the efficiency of the applications processing.</td>
<td>Two different systems representations produced by different groups</td>
</tr>
<tr>
<td>S2: .... Investment in communications</td>
<td>&gt;&gt; SAME CONCLUSIONS</td>
</tr>
</tbody>
</table>
What a heck?

If speed of decision making (E25) is doubled - what is the impact on Illegal immigration (E32)

>> Very strange
>> Long term impact??????
What a heck?
Conclusions

• We can decrease fear by investing in improved
  – Acculturation
  – Education for refugees
  – Decrease of the amount of refuge inflow

• BUT SIMULTANEOUSLY ERODE TRUST IN INSTITUTIONS

• Quality: rigorous?
  – Research layout quality
  – Process quality
  – Results quality
  – Recommendations quality