SYSTEMS MAP

Hella Hernberg | Aalto University | Design for Government | 14 Mar 2022

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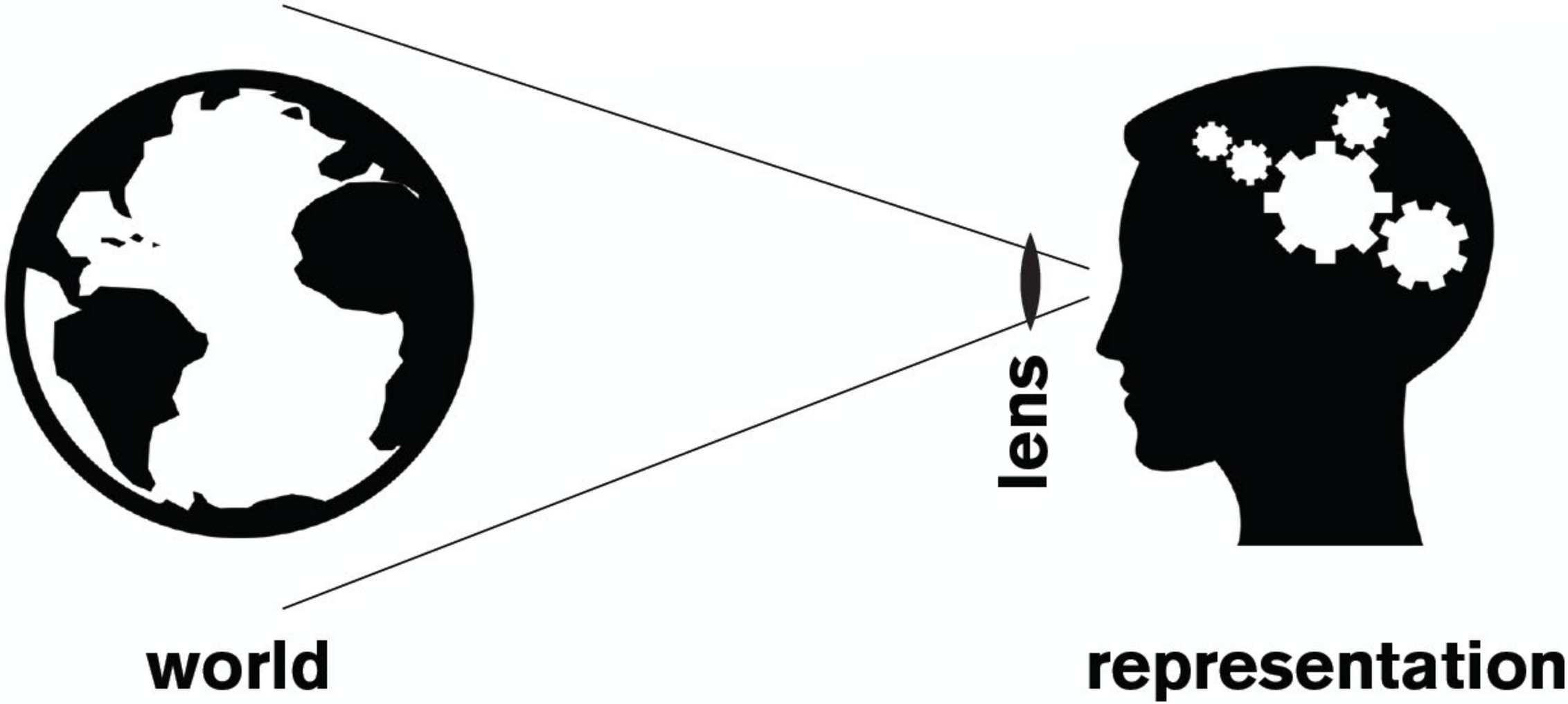
OUR INTERPRETATION



Creative Commons – Attribution (CC BY 3.0) Earth by Cassie McKown & Psyche designed by Julian Claus from the Noun Project

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“Everything we think we know about the world is a model.
Our models do have a strong congruence with the world.
Our models fall short of representing the world fully. “

– Donella Meadows

The purpose of systems mapping at DfG:

- Understanding
- Sensemaking
- Intervention design
- Communicating, storytelling

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A systems map/model can include:

- Elements or entities in the system, including their roles
- Their relations, such as
    - Power relations
    - Contracts
    - other
- Flows, such as
    - Decision flows
    - Communication
    - Knowledge transfer
    - Resource flows
- Feedback loops

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DIFFERENT TYPES OF SYSTEMS MAPS

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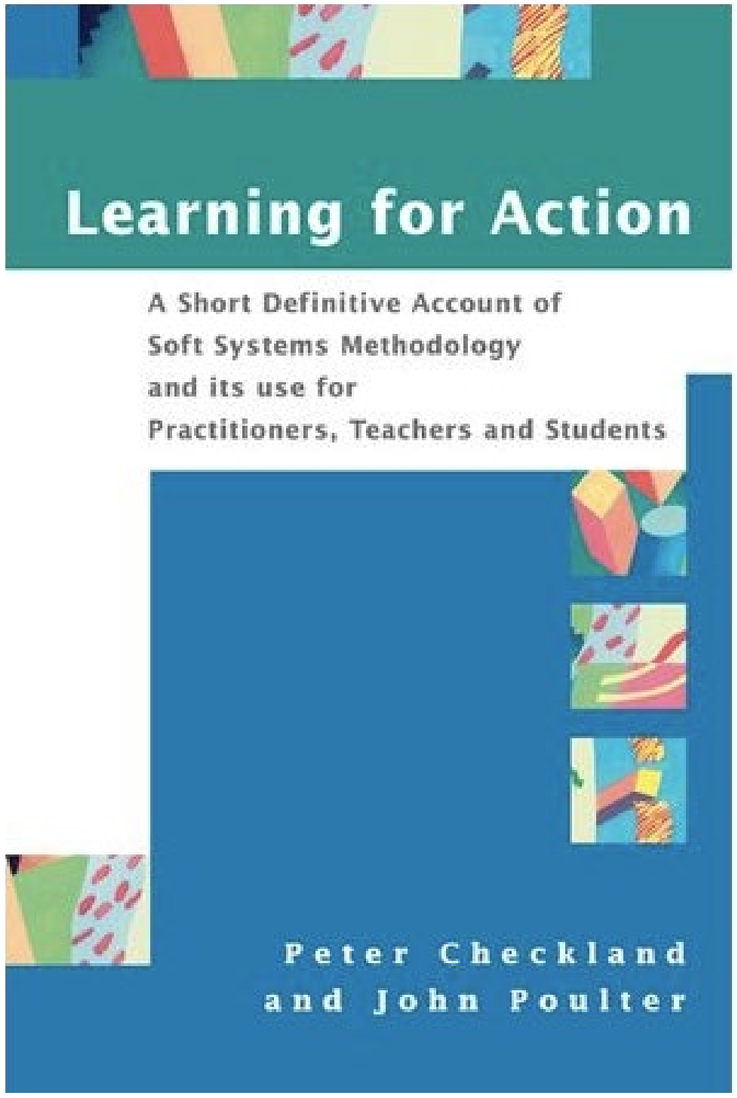
Systems mapping excercise:
Choose a type of map / method that makes sense for your project group:

- (a): **The Rich Picture**:
  Process oriented, one-human perspective
- (b): **CATWOE model**:
  Process oriented, birds-eye view
- (c): **STEEP model**:
  A more general mapping of the different elements and relations, birds-eye view.



Checkland & Poulter, 2006

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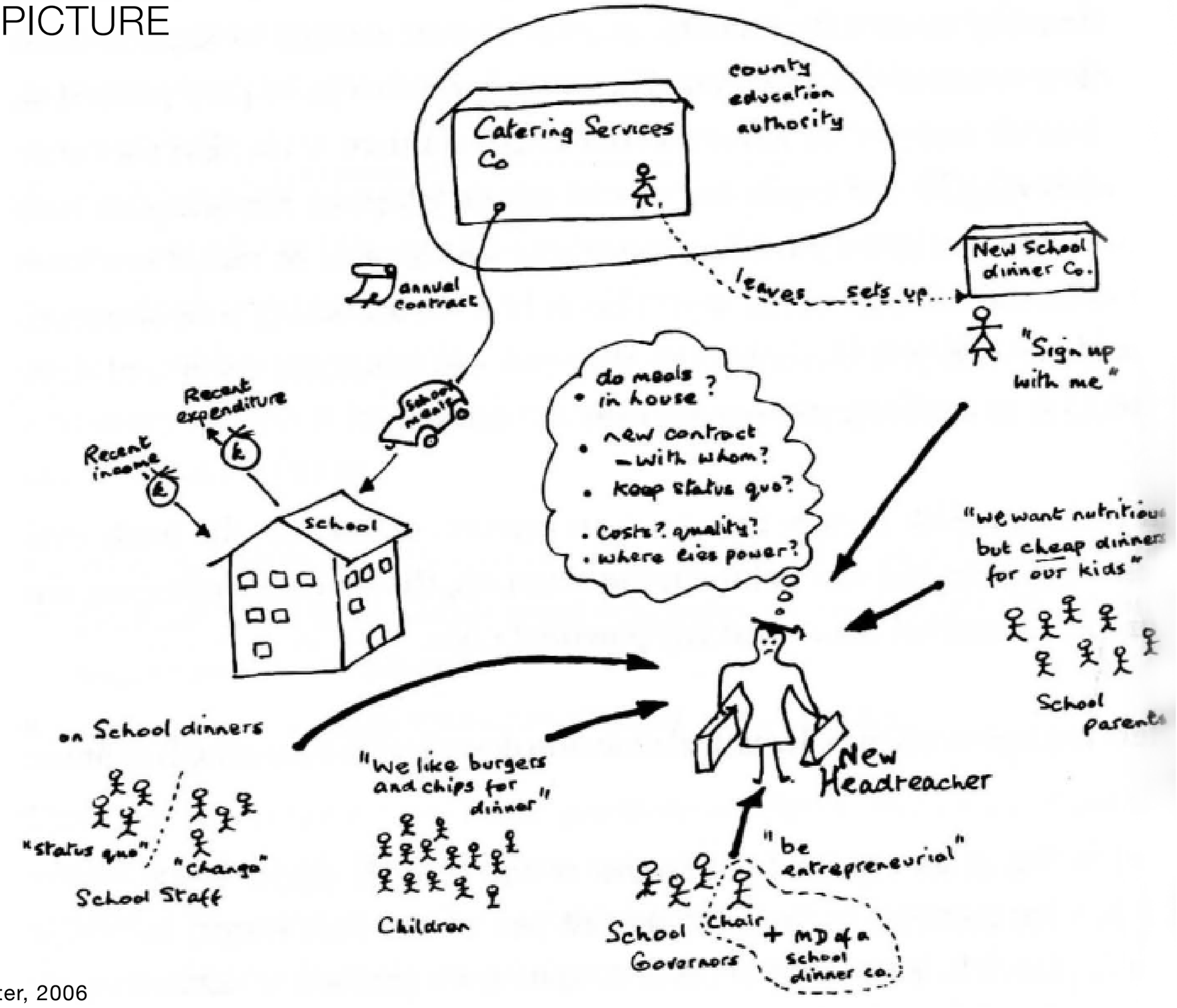
THE RICH PICTURE



Checkland & Poulter, 2006

In making a rich picture, the aim is to capture, informally, **the main entities, structures and viewpoints** in the situation, **the processes going on**, the **current recognized issues and any potential ones**.

A rich picture expresses **crucial relationships in the situation**, not just immediately but through time.

Checkland & Poulter, 2006

THE RICH PICTURE

Here is a real-world problematical situation described in a paragraph of prose:

> The newly appointed headteacher of an 11s-to-18s school, which has overspent its budget in the last year or two, finds herself, in her first term, facing an issue concerning the provision of school meals. Currently these are provided by the county education authority through their catering services company, the contract being renewed annually. A member of that company who is leaving to set up her own catering company urges the headteacher to make a contract with her instead of the county, suggesting the school could save money on this. Some staff members agree with this, others want to stick with the status quo. Some parents, alerted by a national debate about school meals, want more nutritious meals as long as they don't cost more. Pupils say: 'We like burgers and chips.' The school governors are discussing this issue; the Chairman, himself MD of a catering company, is urging the headteacher to be entrepreneurial and to take on responsibility for the provision of school meals, believing this could be profitable for the school.

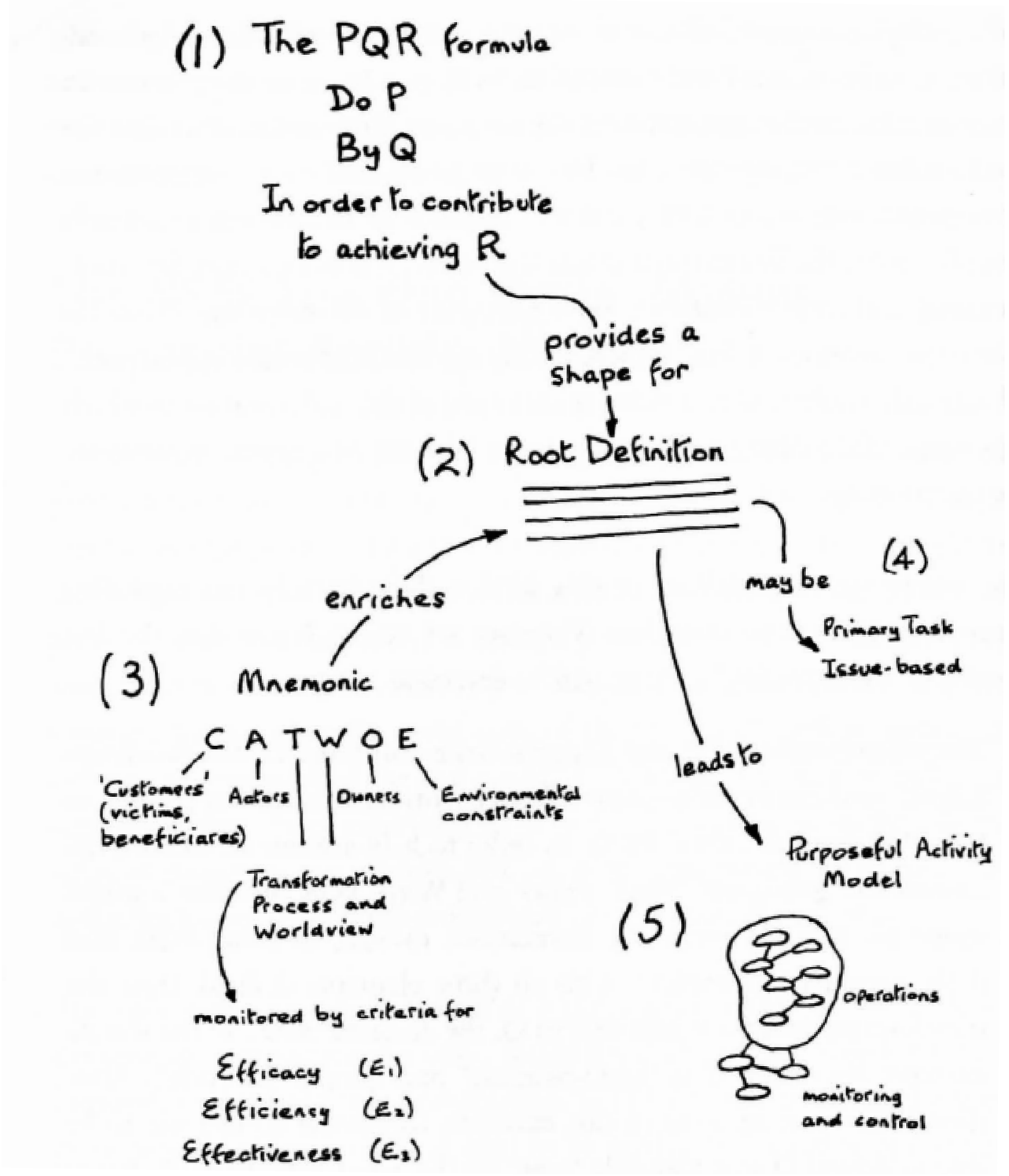
Checkland & Poulter, 2006

The rich picture can serve as **a basis for discussion** with client / stakeholders: “This is how we are seeing your situation. Could we talk you through it so you can comment on it and draw attention to anything you see as errors or omissions?”

The picture can be an **ongoing process, getting richer as inquiry proceeds**.

Checkland & Poulter, 2006

CATWOE
ANALYSIS



Checkland & Poulter, 2006

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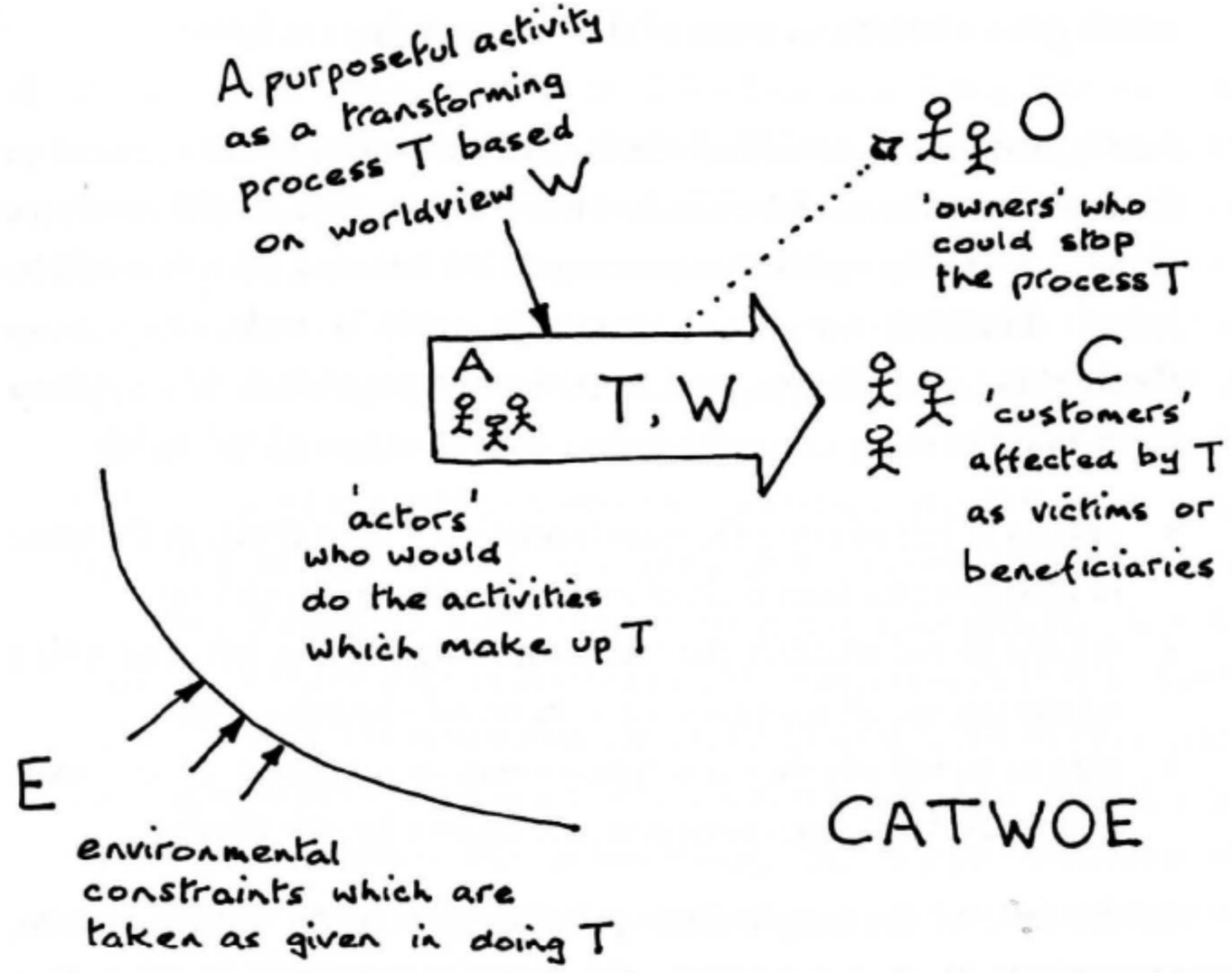
CATWOE ANALYSIS

“CATWOE” is part of the Soft Systems Methodology

Customers affected by the activity (beneficiaries or victims)
Actors performing the activity
Transformation process = the activity
Worldview that defines the activity
Owners, who could stop or change the process
Environmental constraints outside, which are taken as a given



Checkland & Poulter, 2006

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STEEP MODEL

Political

Economical

Environmental

Technological

Social

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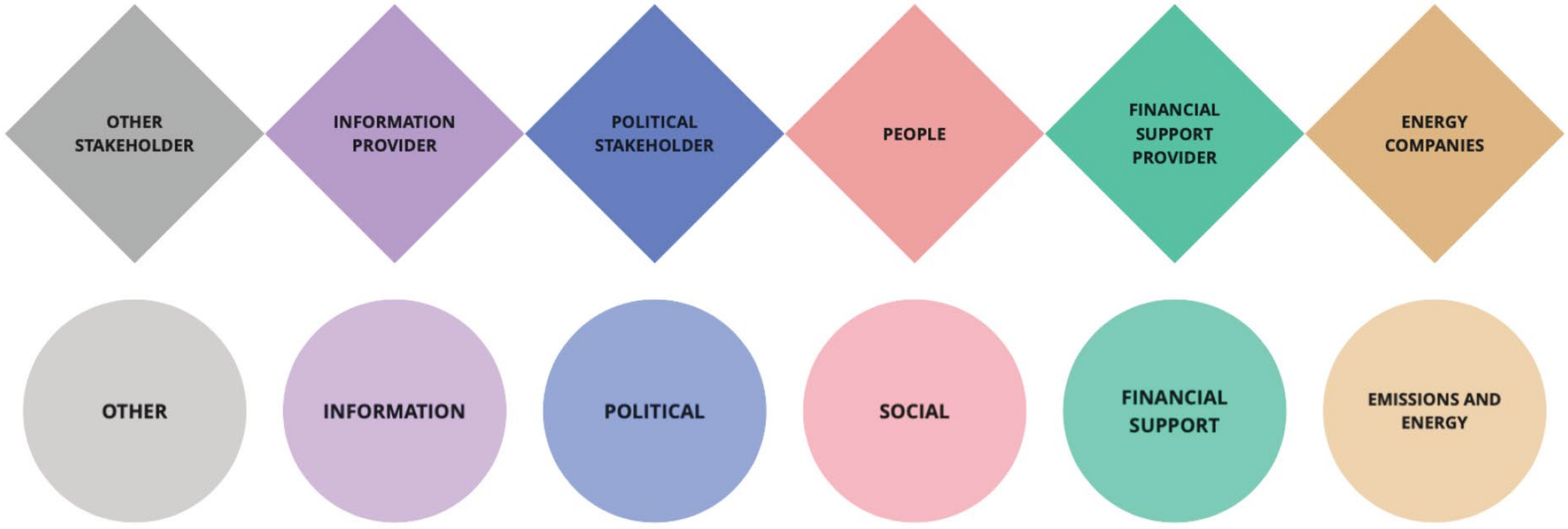

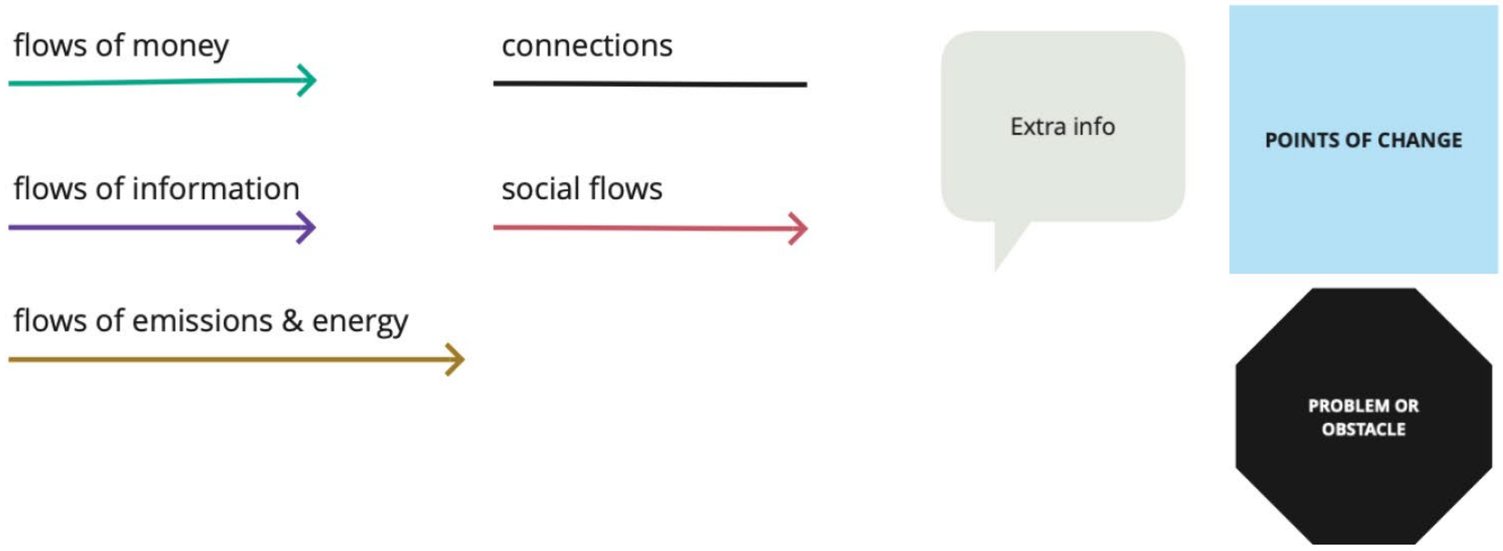

‘License to Heat’ project on post-oil heating, DfG 2020, by Hsin-Yun Lai, Daniel Leiviskä, Anh Nguyen, Emile Rebours

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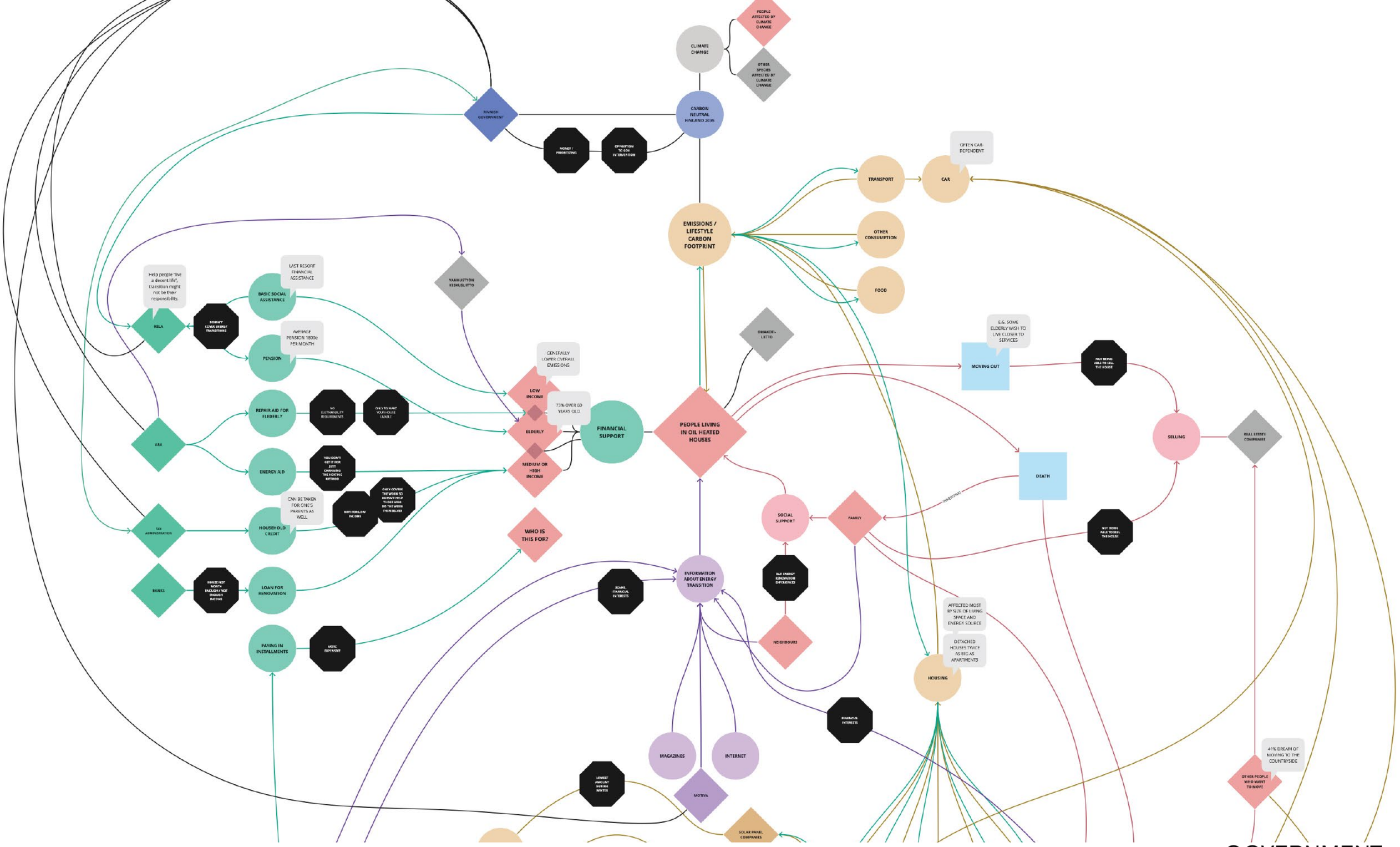

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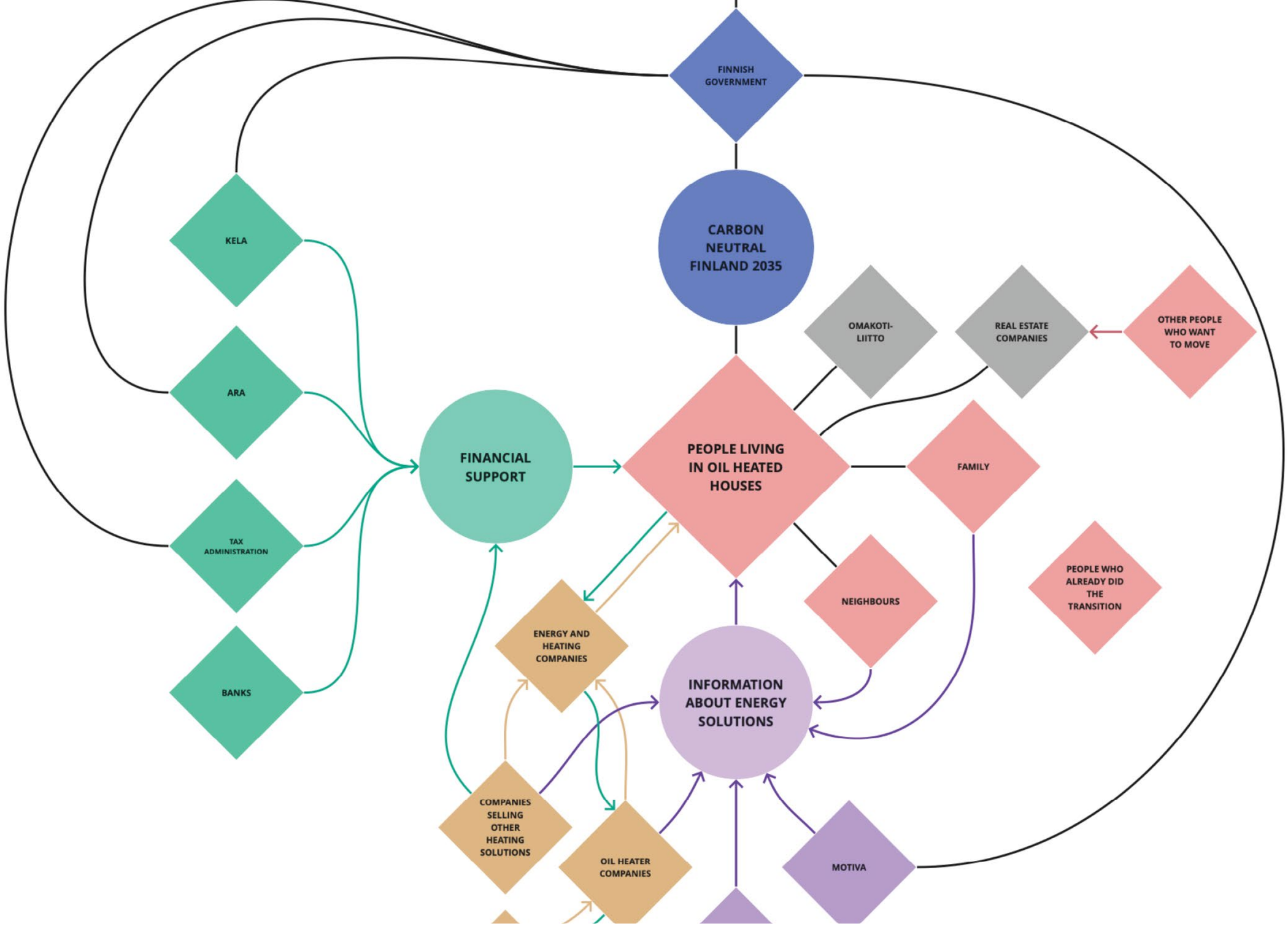

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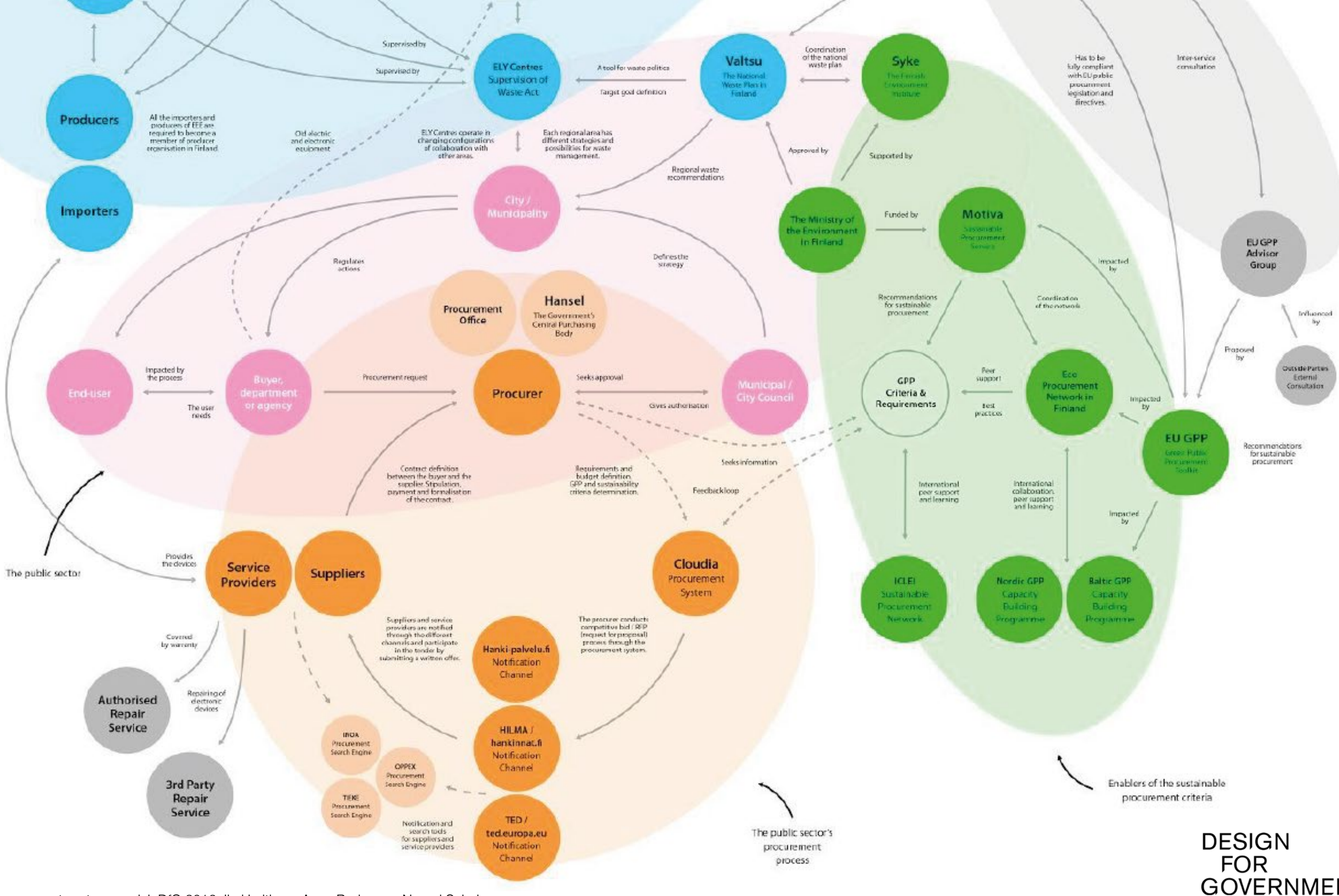

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Public Procurement system model, DfG 2016: Ilari Laitinen, Anna Pyyluoma, Noomi Schulman

PRODUCT
(NON-WASTE)

FINLAND

399:-

GIGANTTI
MEGASTORE

?

WASTE

WASTE PROCESSING

KUUSAKOSKI
RECYCLING

Systems model by DfG 2016 Waste team 1: Suvi Kinnarinen, Merja Lang, Riikka Ylitalo

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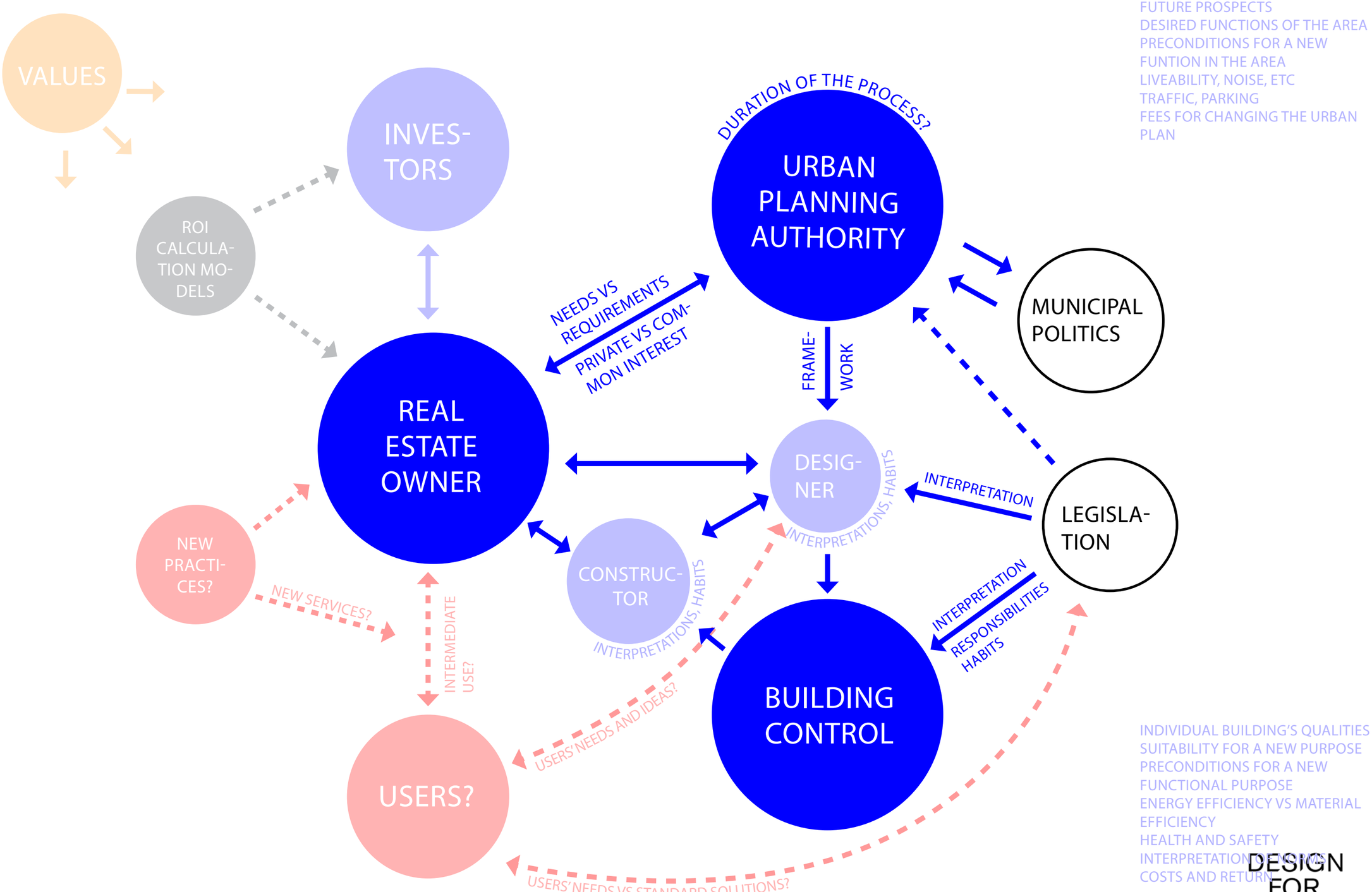

LOCATION
FUTURE PROSPECTS
DESIRED FUNCTIONS OF THE AREA
PRECONDITIONS FOR A NEW
FUNTION IN THE AREA
LIVEABILITY, NOISE, ETC
TRAFFIC, PARKING
FEES FOR CHANGING THE URBAN
PLAN

INDIVIDUAL BUILDING'S QUALITIES
SUITABILITY FOR A NEW PURPOSE
PRECONDITIONS FOR A NEW
FUNCTIONAL PURPOSE
ENERGY EFFICIENCY VS MATERIAL
EFFICIENCY
HEALTH AND SAFETY
INTERPRETATION OF NORMS
COSTS AND RETURN

From Vacant Spaces project at the Ministry of the Environment
Hella Hernberg

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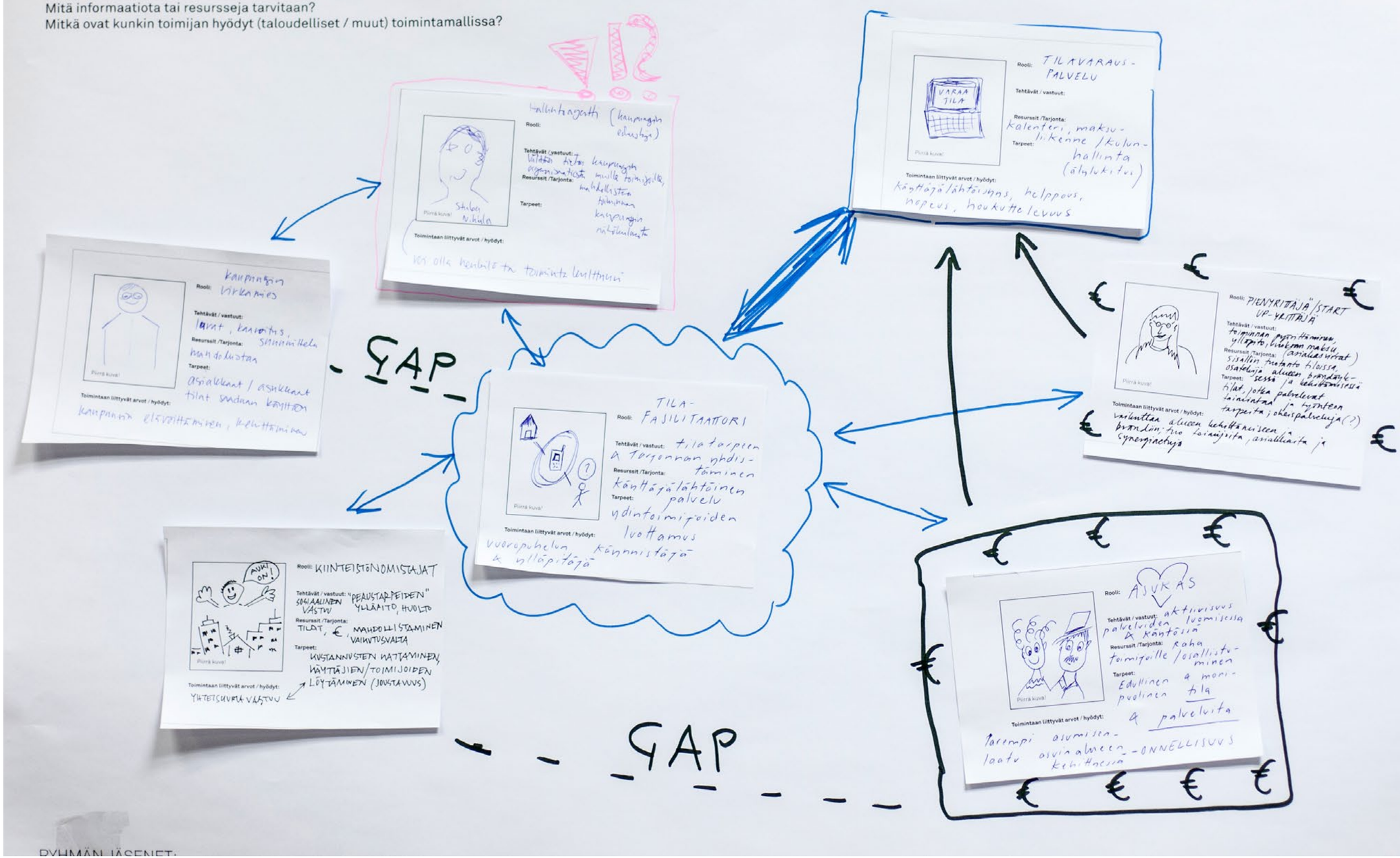
TILAPÄISKÄYTÖN TOIMINTAMALLI

Mitä ovat olennaisimmat toimijat/roolit, joita tarvitaan tilapäiskäytön toteuttamiseen käytännössä Kutojantiellä?
Kuvaa toimintamalli roolien välisenä vuorovaikutuskaaviona hyödyntäen roolikortteja.
Piirrä nuolilla vuorovaikutussuhteet.
Mitä vastuita / tehtäviä / tarpeita kullekin kuuluu?
Mitä ongelmia / haasteita toimintamalliin liittyy?
Mitä informaatiota tai resursseja tarvitaan?
Mitkä ovat kunkin toimijan hyödyt (taloudelliset / muut) toimintamallissa?



From Temporary Kera project workshop, Hella Hernberg

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The Vicious Circle

Increasing Pork & Chicken Intake

High Dairy Intake

Finns are encouraged to drink milk for calcium and all the lunchrooms provide fresh milk. Paradoxically, high dairy intake coupled with high meat consumption provides us with excessive protein, which causes even more calcium deficiency.

Dietary recommendation
More Milk for Calcium

Cultural trait
Working mom, Nordic tradition

Abundant and cheap minced beef
Popular for its versatility

Stabilized Beef Intake

Meat taken from young cattle isn't good enough for other recipe but meatballs, burgers and laatikko, which are associated with all the more problematic eating habits.

Market Pressure
Monopoly, unfair profit sharing

Excessive Protein Intake

Soy & Grain Based Feed

Soy & grain feed is one of the prime source of shortened breeding cycle and industrial farming.

Shortened breeding cycle

Our body discharge sulphur and phosphorus that are abundant in protein, and while doing so calcium is also expelled to make the required chemical reaction.

If we can keep dairy cattle as long as we traditionally did and feed them on hay, we can produce really good steak parts. The beef parts you buy from Eat & Joy are exactly these!

Lack of Steak parts

Import
from South America

Pollution
Global Warming
Soil erosion
Water Scarcity
Food crisis

Concentrated, Industrial Production
Farm Number decreased from 95,562 (1995) to 62,450 (2010)

Calcium deficiency

Finland is among the countries with the highest rate of osteoporosis.

Fair enough, we are encouraged to drink more milk, which will reinforce calcium deficiency.

Osteoporosis

Overweight
Obesity
Diabetes
Cardio Vascular
Alzheimer

Non-dietary Contributers
Lack of exercise, alcohol, lack of sleep, stress ...

Productive society

Financially burdened government

We spend €5.1 billion out of its €50 billion state budget to diabetes alone. During the next 20 years, a population-wide intervention directed at salt intake and dietary fat quality could potentially save €150-225 million annually, which may be reinforced by aging of the Finnish population.

From Beef Finland project /Seungho Lee, 2012

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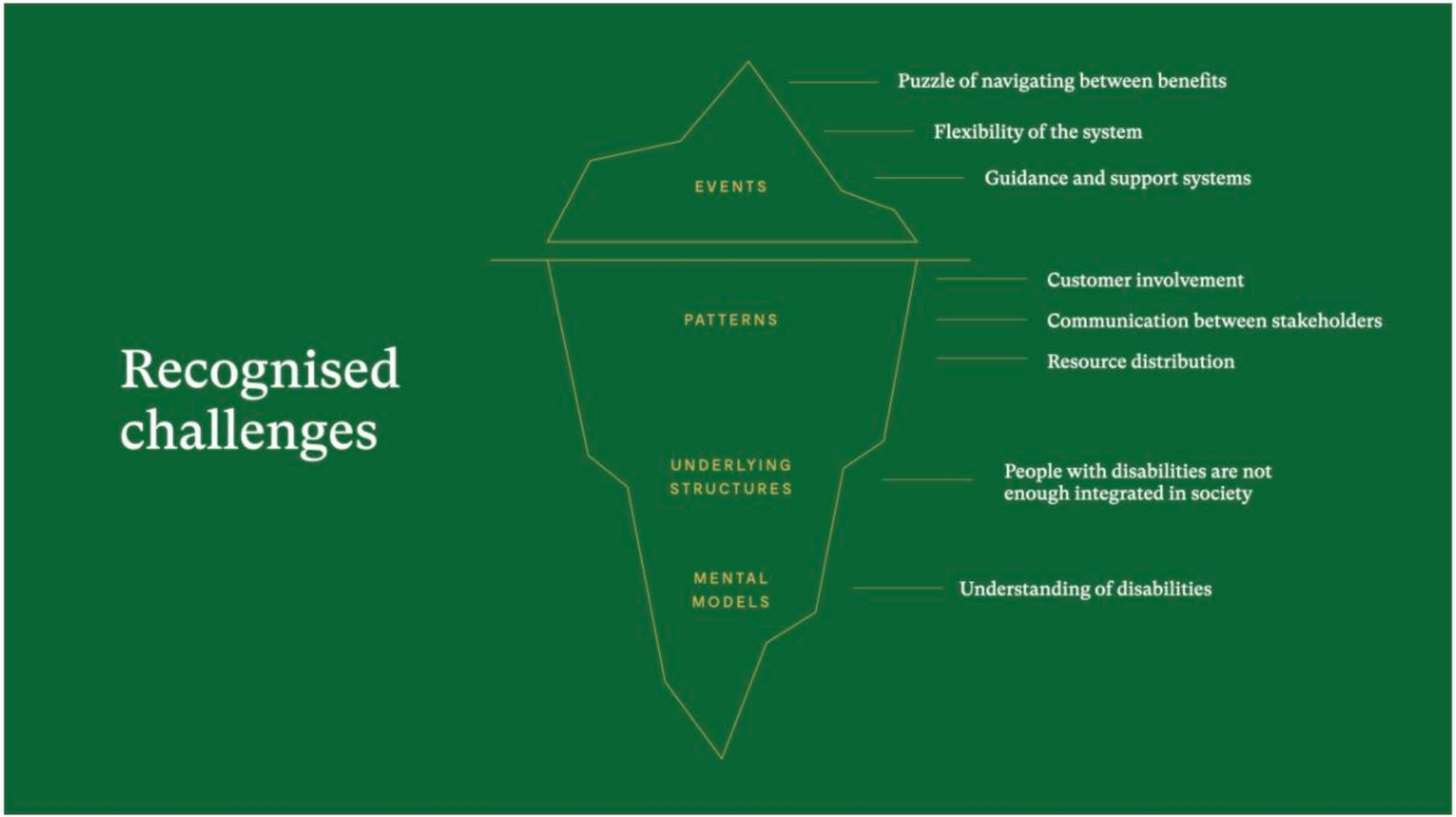
Recognised challenges



We used a systems thinking tool - the Iceberg model to structure the challenges, their connections, and their underlying reasons. Graphics by Ruta Jumite.

Systems mapping excercise (1 hour)
Within your team, choose one of the options a, b, or c:

Exercise, option (a) Rich Picture

Based on your research, choose “a person” representing a stakeholder group. Sketch a rich picture map based on their situation within your bigger system. Keep in mind other key people and entities that are relevant issue or resource owners in the situation. Keep also in mind relevant roles, (power) relations, flows, etc.

I.e. “follow the people” from one human point-of-view

Exercise, option (b) CATWOE analysis

Based on your research, choose “an activity” representing a key issue/problem over time. Develop a map of the activity based on milestones, touchpionts, people and entities. Keep in mind relevant roles, (power) relations, flows, etc. Think also of obstacles, or poits of divergence that are relevant to the situation.

I.e. “follow the process” from a birds-eye point-of-view

Exercise, option (c) STEEP model

Based on your research, map out relevant elements of the system, such as different stakeholder groups, organisations, artefacts, policies, technologies, processes, etc. differentiating **Social, Technological, Economical, Environmental and Political** aspects.

Develop a map of the entities and their relations. Keep in mind relevant roles, (power) relations, flows, etc.

I.e. “follow the system” from a birds-eye point-of-view

"We can't control systems or figure them out but we can dance with them!"

– Donella Meadows