The LOTA Methodology –
enabling a rational sustainability discourse in the transdisciplinary research process

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LOTA: Landscape of Opinions for Technology Assessment

Problem:

– In transdisciplinary discussions about potential technological solutions to societal problems, it often remains unclear **for what reasons** the participants arrive at different conclusions:

  – Because they are making different assumptions on the **factual** possibilities and limitations of the technology?

  – Because they are using different **value systems** in which they evaluate the consequences of the technological applications?

Method to address the problem:

– Before the participants enter into direct discourse, they take part in an online consultation. This online consultation is made for the elicitation of their **normative orientation.**

– The result will then be **visualised** as a „landscape of opinions" and provided to the participants at the beginning of a following face-to-face workshop.

– With this tool, we want to support the participants in differentiating betweeen **descriptive** and **normative** basic assumptions (what *is or will be* vs. what *ought to be*).

Approach to elicit normative orientations in LOTA

LOTA provides the participants with **existing frameworks of normative ideas** which have reached some degree of international consensus:
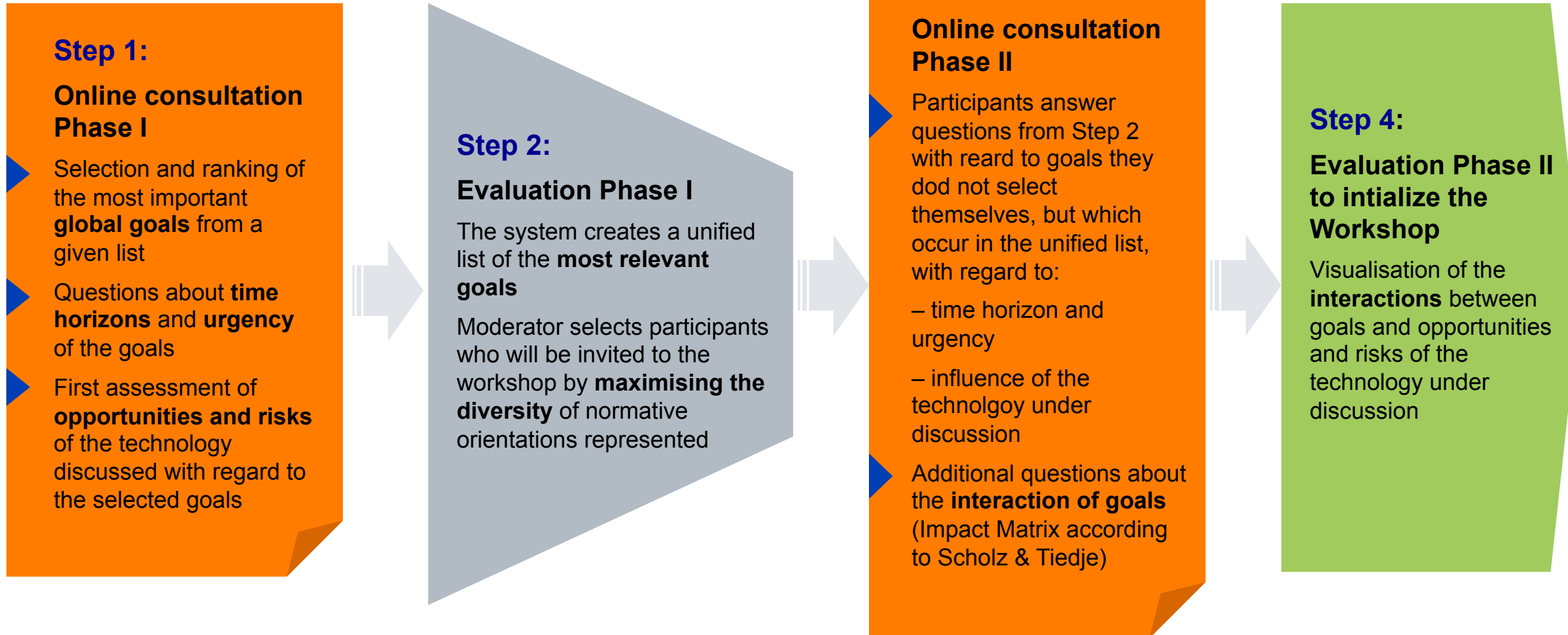
– Declaration of Human Rights

– UN Sustainable Development Goals (SDGs)

– Human Development Index (HDI)

– Happy Planet Index

By **prioritizing goals** from these frameworks and relating them to assumed opportunities and risks of the technology, the users express their value orientation.

The LOTA procedure

Step 1:

Online consultation Phase I

- Selection and ranking of the most important **global goals** from a given list
- Questions about **time horizons** and **urgency** of the goals
- First assessment of **opportunities and risks** of the technology discussed with regard to the selected goals

Step 2:

Evaluation Phase I

The system creates a unified list of the **most relevant goals**

Moderator selects participants who will be invited to the workshop by **maximising the diversity** of normative orientations represented

Step 3:

Online consultation Phase II

Participants answer questions from Step 2 with reard to goals they dod not select themselves, but which occur in the unified list, with regard to:

– time horizon and urgency

– influence of the technolgoy under discussion

- Additional questions about the **interaction of goals** (Impact Matrix according to Scholz & Tiedje)

Step 4:

Evaluation Phase II to intialize the Workshop

Visualisation of the **interactions** between goals and opportunities and risks of the technology under discussion

After the start of the workshop, the LOTA procedure is completed. It serves to **intitialize** a discourse in which the participants can successfuly differentieat betweeen their descriptive and normative assumptions.

Example: Autonomous delivery drones
(used for testing the current prototype of the LOTA software tool with 25 students)

Introducing the technology application under discussion

LOTA

16%

Autonomous Delivery Drones (Phase I)

Autonomous Delivery Drones can deliver goods within a radius of typically 20 km without the need of any street, railroad, or starting and landing infrastructure. They are operated by electric energy and have a typical payload of 2 kg, which they transport at a speed of about 70 km/h.

Previous

Next

Step 1

Introduction of the global goals (list of 9 aggregated goals)

Fulfillment of Basic Needs

No poverty, no hunger, availability of water and sanitation for all, standard of living adequate for health and well-being, including food, clothing, housing, energy, medical care and necessary social services.

Basic Freedoms

Freedom of thought and religion; freedom of opinion, expression and peaceful assembly; freedom of movement and asylum. Democratic and economic freedoms. Right to rest and leisure. No slavery.

Security and Peace

Safe cities and settlements. Peaceful and inclusive societies. Social security, just and favourable conditions of work. No torture or cruel, inhuman or degrading treatment or punishment.

Healthy Environment

Stable world climate. Healthy oceans and water resources. Sustainable use of terrestrial ecosystems, no further land degradation and biodiversity loss. Sustainable consumption and production patterns.

Education and Access to Knowledge

Education and lifelong learning opportunities for all. Right to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits.

Rule of Law

Access to justice for all and effective, accountable and inclusive institutions. Guarantee of fundamental rights granted by the constitution or by law.

Equality

Equal rights for all human beings, no discrimination due to gender, religion, race, nationaliy. Reduction of inequality within and among countries.

Prosperity

Well-being. Economic growth and full employement. High income per capita. Resilient infrastructure, ongoing industrialization and innovation.

Global Consensus and Governance

Strengthen the means of implementation and the global partnerships for human rights and for sustainable development.

Other:

Step 1

Each goal is documented with original texts from agreements and principles it is based on (example: Equality)

International agreements and principles behind Equality

UN Sustainable Development Goals (SDG):

SDG 5: Achieve gender equality and empower all women and girls
SDG 10: Reduce inequality within and among countries

Universal Declaration of Human Rights (HR):

Art. 1: All human beings are born free and equal in dignity and rights.
Art. 7: All are equal before the law and are entitled without any discrimination to equal protection of the law.
Art. 15: Everyone has the right to a nationality.

Happy Planet Index (HPI):

HPI 3: Inequality of outcomes

Close

Fulfillment of Basic Needs

No poverty, no hunger, availability of water and sanitation for all, standard of living adequate for health and well-being, including food, clothing, housing, energy, medical care and necessary social services.

Basic Freedoms

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Security and P

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Rule of Law

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Equality

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Global Consensus and Governance

Strengthen the means of implementation and the global partnerships for human rights and for sustainable development.

Step 1

Each goal is documented with original texts from agreements and principles it is based on (example: Education)

Fulfillment of Basic Needs

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Basic Freedoms

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Global Consensus and Governance

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International agreements and principles behind Education and Access to Knowledge

UN Sustainable Development Goals (SDG):

SDG 4:   Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Universal Declaration of Human Rights (HR):

Art. 26:   Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory. Technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit.

Art. 27:   Everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits.

Human Development Index (HDI):

HDI 2:   Expected Years of Schooling
HDI 3:   Mean Years of Schooling

Multidimensional Poverty Index (MDPI):

Close

Step 1

Each goal is documented with original texts from agreements and principles it is based on (example: Basic Freedoms)

Fulfillment of Basic Needs

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Basic Freedoms

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Global Consensus and Governance

Strengthen the means of implementation and the global partnerships for human rights and for sustainable development.

International agreements and principles behind Basic Freedoms / Self-determination

Universal Declaration of Human Rights (HR):

Art. 4:	No one shall be held in slavery or servitude; slavery and the slave trade shall be prohibited in all their forms.
Art. 9:	No one shall be subjected to arbitrary arrest, detention or exile.
Art. 13:	Everyone has the right to freedom of movement and residence within the borders of each state.
Art. 14:	Everyone has the right to seek and to enjoy in other countries asylum from persecution.
Art. 16:	Men and women of full age, without any limitation due to race, nationality or religion, have the right to marry and to found a family. They are entitled to equal rights as to marriage, during marriage and at its dissolution.
Art. 17:	Everyone has the right to own property alone as well as in association with others.
Art. 18:	Everyone has the right to freedom of thought, conscience and religion; this right includes freedom to change his religion or belief, and freedom, either alone or in community with others and in public or private, to manifest his religion or belief in teaching, practice, worship and observance.
Art. 19:	Everyone has the right to freedom of opinion and expression.
Art. 20:	Everyone has the right to freedom of peaceful assembly and association.
Art. 21:	Everyone has the right to take part in the government of his country, directly or through freely chosen representatives.
Art. 22:	Everyone, as a member of society, has the right to social security and is entitled to realization, through national effort and international co-operation and in accordance with the organization and resources of each State, of the economic, social and cultural rights indispensable for his dignity and the free development of his personality.

Close

Step 1

Double-click or drag-and-drop items in the left list to move them to the right - your highest ranking item should be on the top right, moving through to your lowest ranking item.

❶ Please select from 1 to 4 answers.

Your choices

Selection and ranking of the global goals

Security and Peace

Safe cities and settlements. Peaceful and inclusive societies. Social security, just and favourable conditions of work. No torture or cruel, inhuman or degrading treatment or punishment.

Rule of Law

Access to justice for all and effective, accountable and inclusive institutions. Guarantee of fundamental rights granted by the constitution or by law.

Equality

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Prosperity

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Global Consensus and Governance

Strengthen the means of implementation and the global partnerships for human rights and for sustainable development.

Other:

Your ranking

Fulfillment of Basic Needs

No poverty, no hunger, availability of water and sanitation for all, standard of living adequate for health and well-being, including food, clothing, housing, energy, medical care and necessary social services.

Healthy Environment

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Education and Access to Knowledge

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drag & drop

Step 1

Individual visualisation of results at the end of Phase I

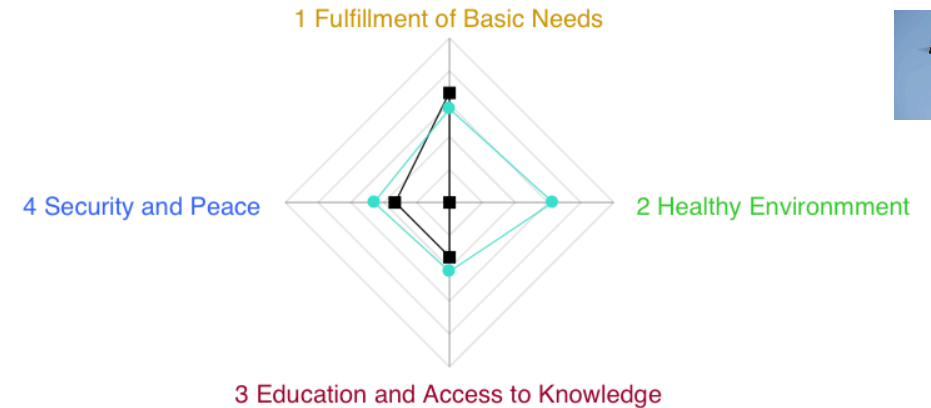Three **indicators** for each of the invididually selected goals:
– Level of Concern
– Perceived Technological Opportunities
– Perceived Technological Risk

in black: indicatoers based on the participant's input
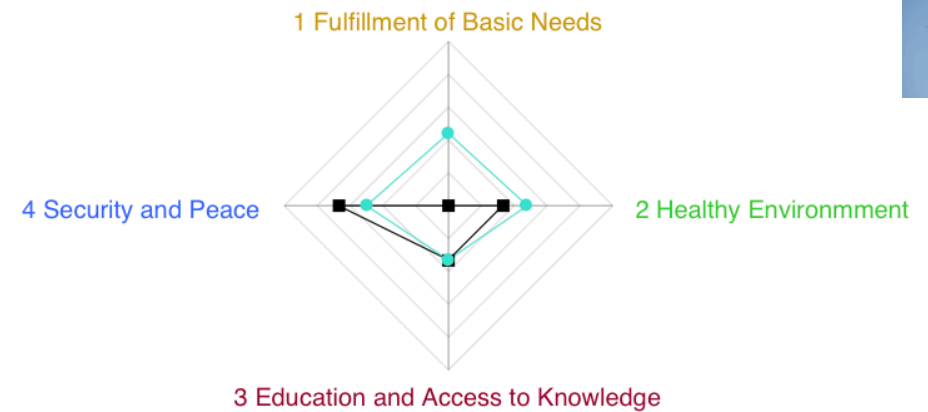**in turqouis: average over all participants** which also selected the respective goal
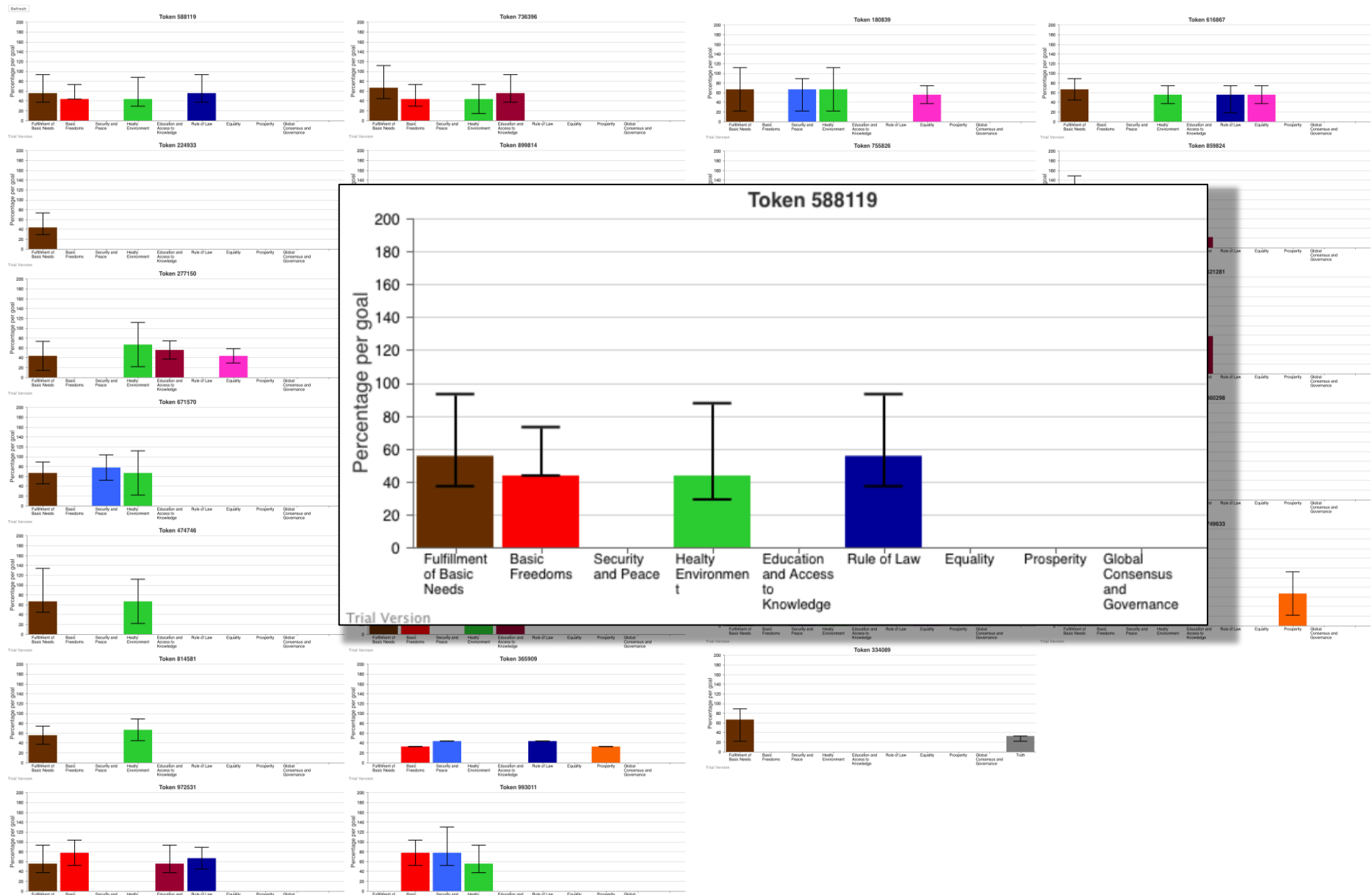
Level of Concern
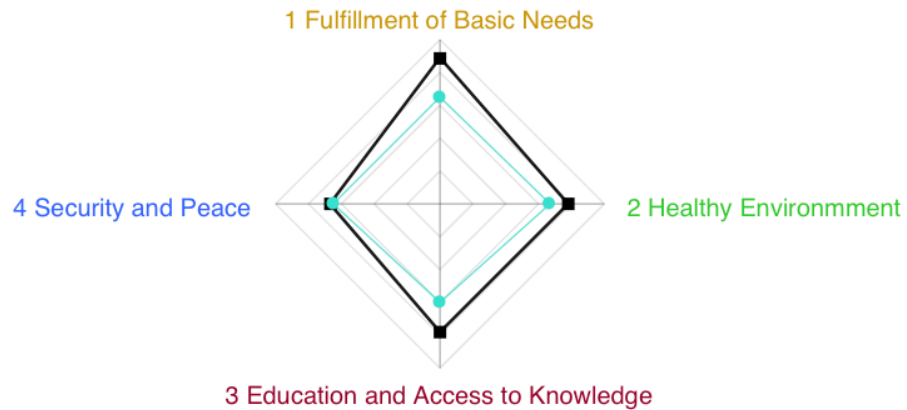
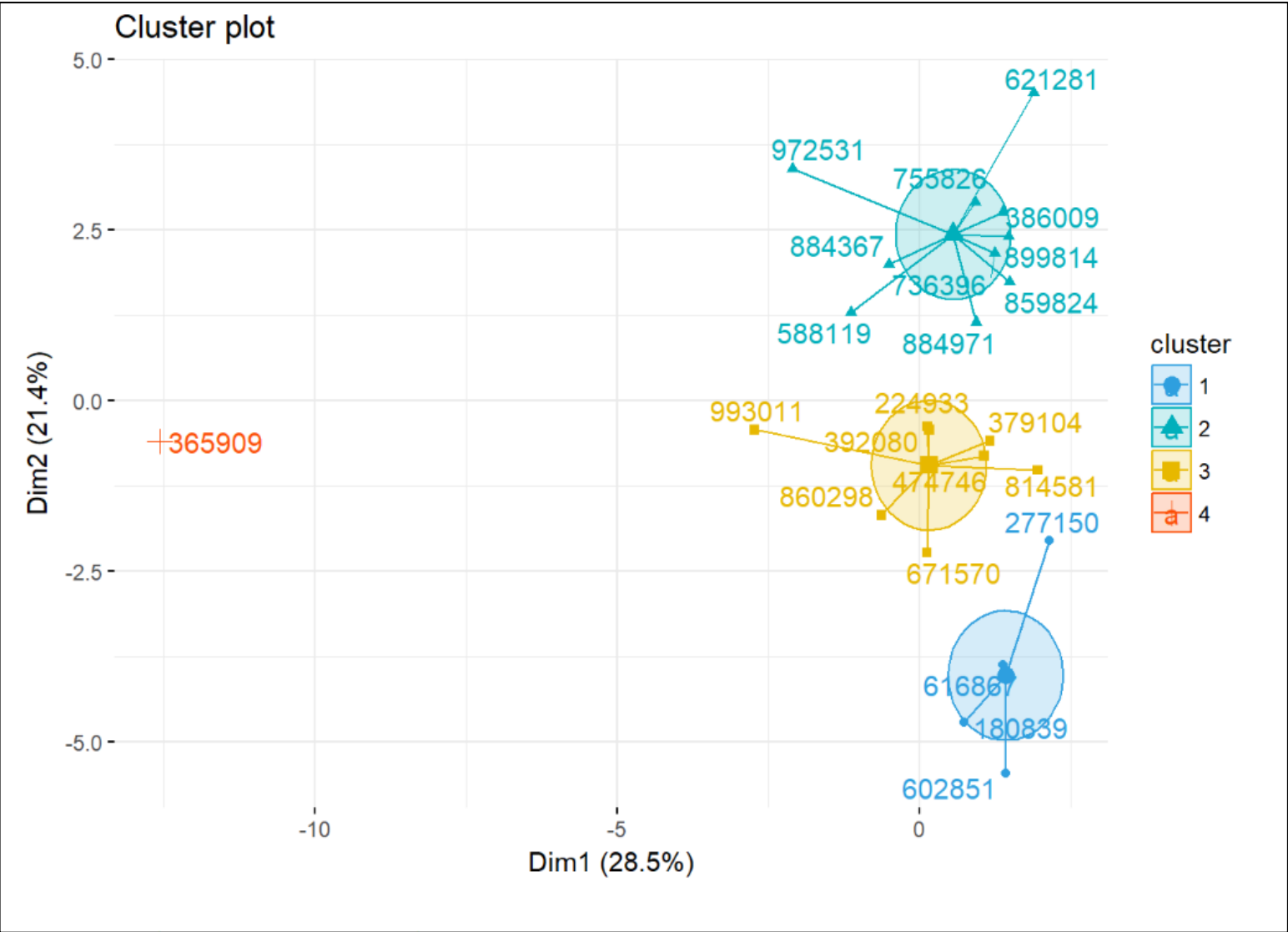## Perceived Technological Opportunities

Perceived Technological Risks

Step 1

Cluster analysis to show the "landscape of opinions" (example: 4 clusters)

Step 2

Further steps

Step 3:

Online consultation Phase II

▶ Participants answer questions from Step 2 with reard to goals they dod not select themselves, but which occur in the unified list, with regard to:

– time horizon and urgency

– influence of the technolgoy under discussion

▶ Additional questions about the **interaction of goals** (Impact Matrix according to Scholz & Tiedje)

Step 4:

**Evaluation Phase II to intialize the Workshop**

Visualisation of the **interactions** between goals and opportunities and risks of the technology under discussion

Visualisation of relevance and interactions (still working on the format)

- **Node size:**
  Relevace of the global goal,
  based on answers of the
  participants on the questions::
  - How important is this goal for
    the life of humans?
  - How long will it stay relevant?
  - When will there be disastrous
    consequences if the goal is
    not reached?

- **Arrow thickness:**
  Strength of the impact of one
  goal to another one (positive or
  negative impact)

- **Brightness of node or arrow:**
  Standard deviation
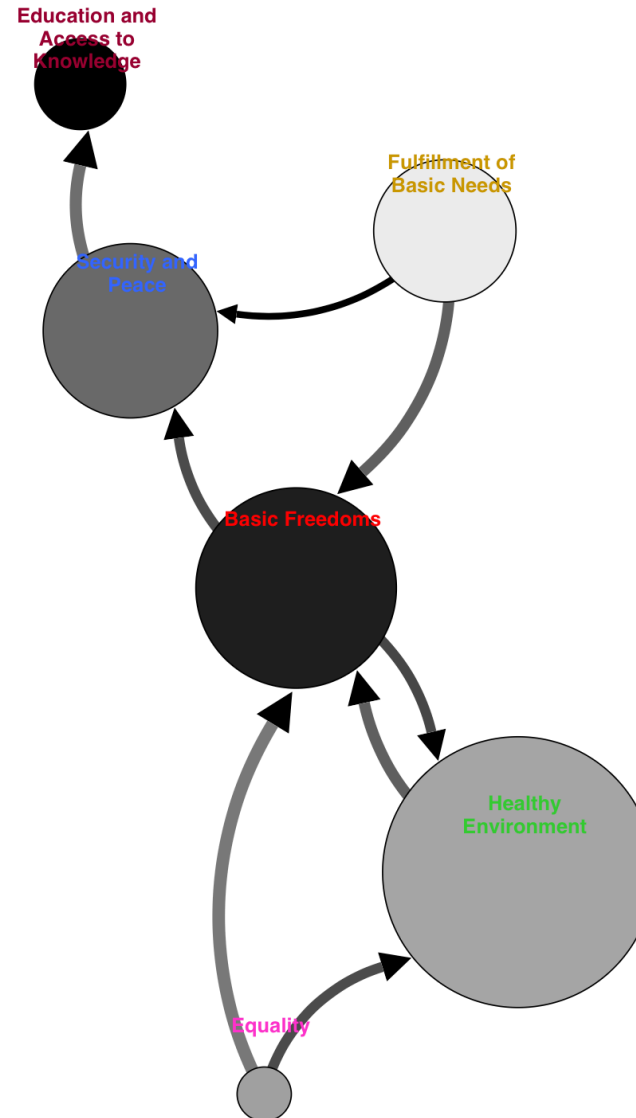
Adding the impact of the technology under discussion

Step 4
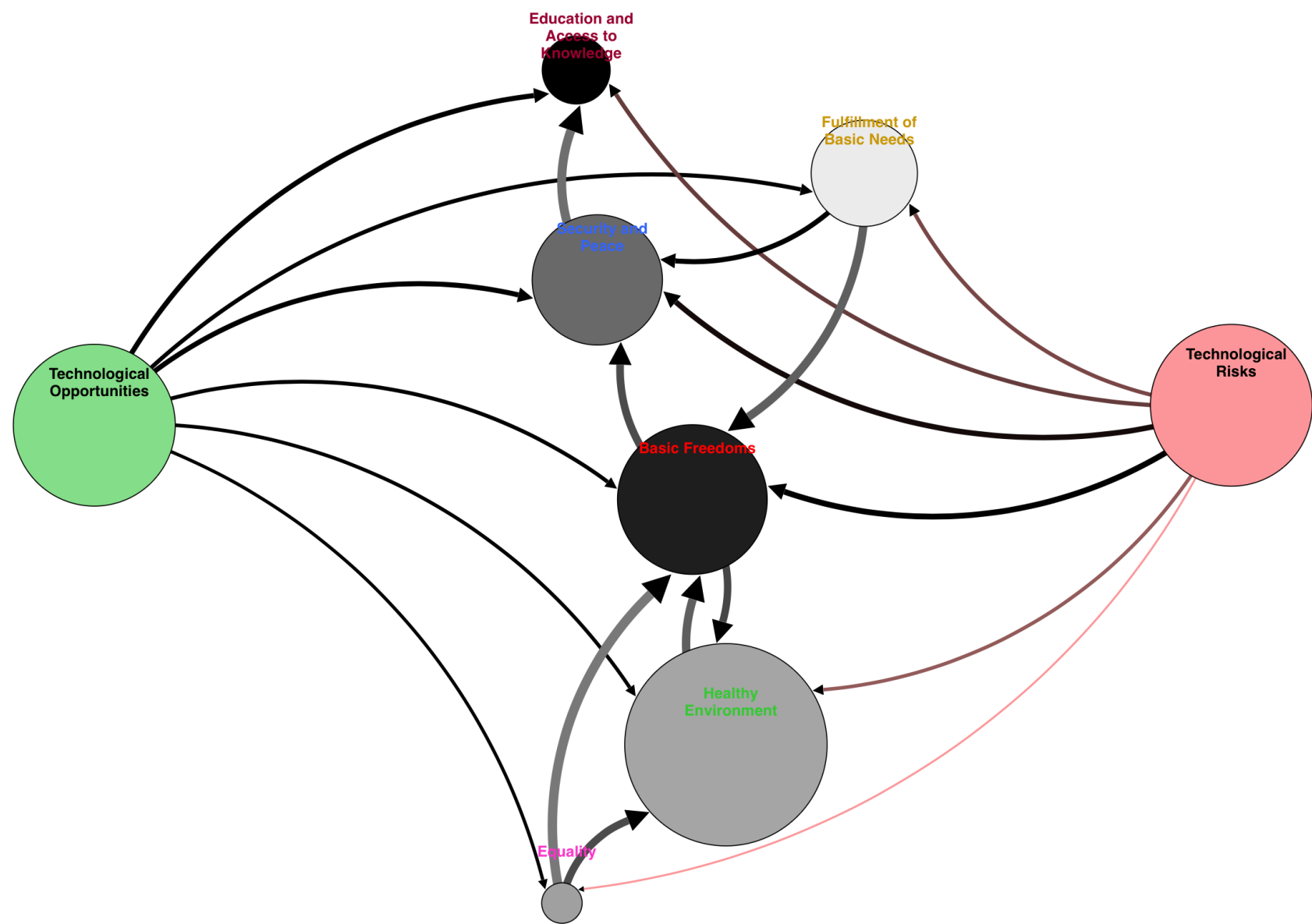
Different Visualization
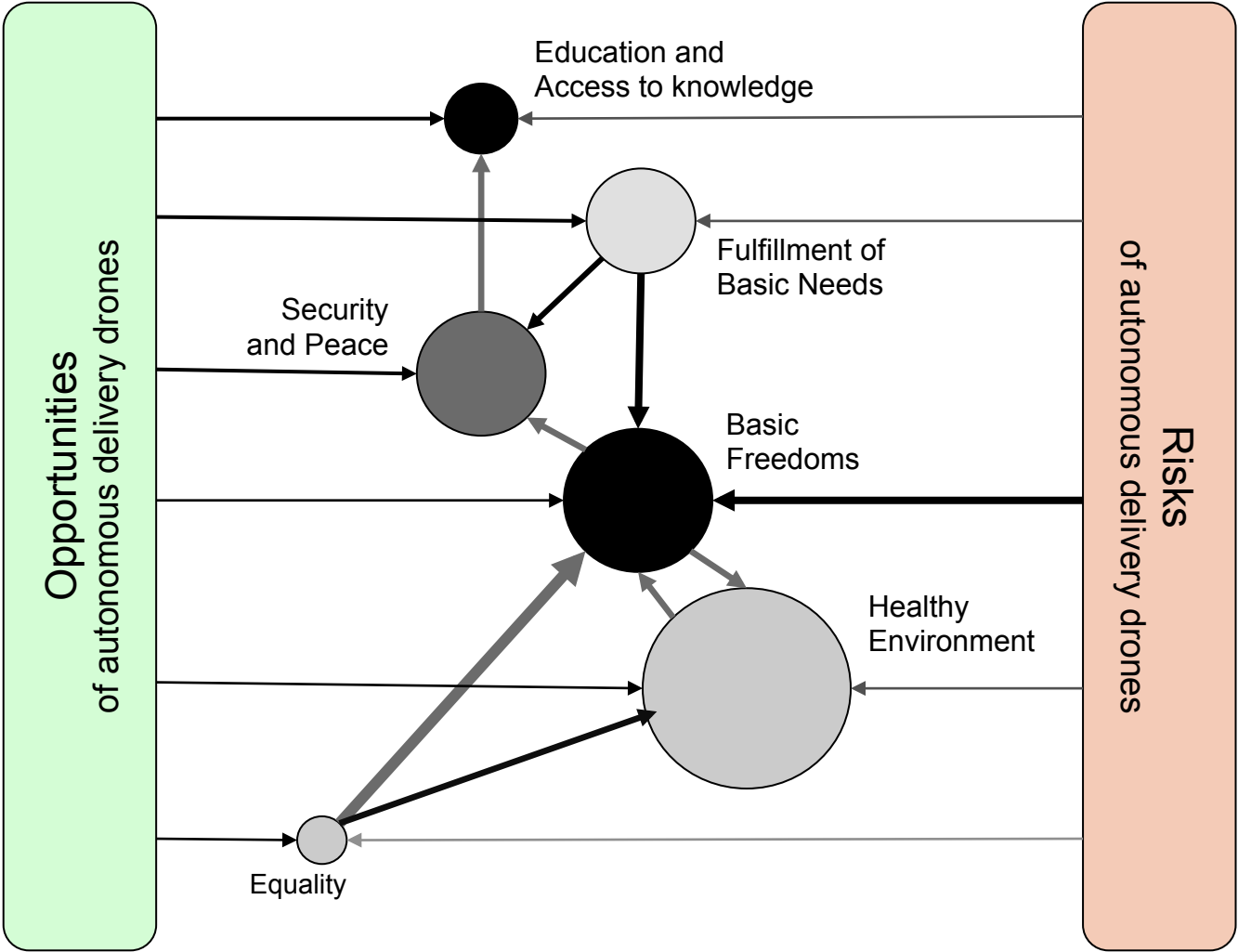
Thank you for your attention!

Landscape of Opinions for Technology Assessment

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