



Universität
Zürich ^{UZH}

Institut für Informatik



Empa

Materials Science and Technology

LOTA: Ein Softwaretool zur Förderung eines normativ expliziten Diskurses in partizipativen TA-Prozessen

Prof. Dr. Lorenz Hilty
Forschungsgruppe Informatik und Nachhaltigkeit

Institut für Informatik, Universität Zürich
Abteilung Technologie und Gesellschaft, Empa, St. Gallen

LOTA: Landscape of Opinions for Technology Assessment

Problem:

- In TA-Prozessen beurteilen die Teilnehmenden mögliche Technikanwendungen hinsichtlich ihrer Chancen und Risiken. Häufig bleibt unklar, **aus welchen Gründen** sie zu unterschiedlichen Einschätzungen kommen:
 - Weil sie von unterschiedlichen Voraussetzungen über die **faktischen** Möglichkeiten, Grenzen und die konkrete Ausgestaltung zukünftiger Anwendungen ausgehen?
 - Weil von und unterschiedlichen **Wertesystemen** ausgehen, in denen sie die Folgen der Technikanwendung bewerten?

Lösungsidee:

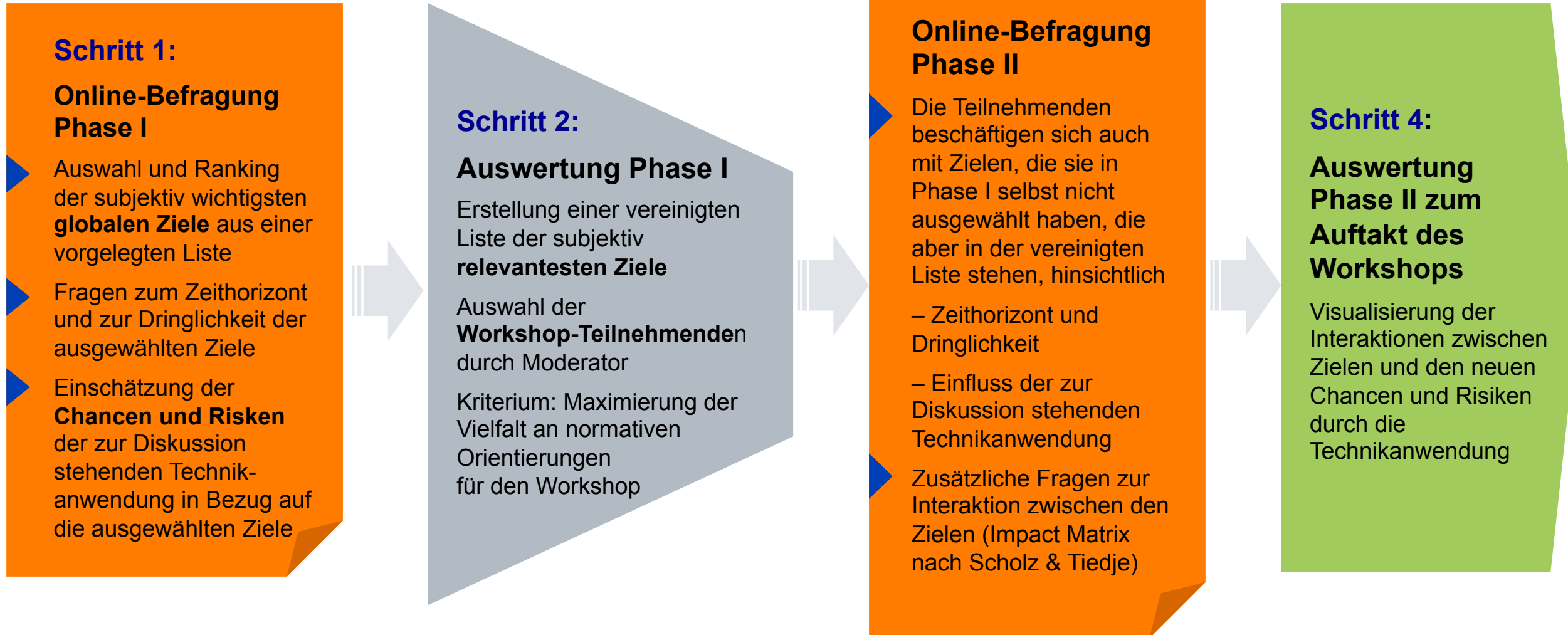
- Bevor die Teilnehmenden in einen direkten Diskurs eintreten, nehmen sie an einer Online-Befragung teil, in der sie u.a. ihre normative Orientierung ausdrücken können.
- Das Ergebnis wird mit Hilfe der Software als „Meinungslandschaft“ **visualisiert** und zum Auftakt eines Workshops an die Teilnehmenden zurückgegeben.
- Damit wollen wir den Teilnehmenden helfen, im Diskurs deskriptive und normative Grundannahmen zu unterscheiden.

Mögliche Formen, um normativen Orientierungen explizit auszudrücken

- In der Sprache der Ethik
 - Setzt Grundbildung in Philosophie voraus, würde den Kreis von Teilnehmenden stark einschränken.
 - Ethische Positionen auf das jeweilige Sachtema anzuwenden, ist ein weiter Weg im jeweiligen Diskurs (Sonderfall: selbstfahrende Autos).
- In psychologischen Kategorien
 - Macht den Menschen vom Subjekt zum Objekt des Diskurses.
 - Individuelle Wertorientierungen und soziale Normen sind verschiedene Ebenen.
- In einem **existierenden Rahmen normativer Ideen**, die sich international als relativ konsensfähig erwiesen haben
 - Menschenrechte
 - Sustainable Development Goals (SDGs) der Vereinten Nationen
 - Human Development Index (HDI)
 - Happy Planet Index



Die LOTA-Methode



Nach der Initiierung des Workshops ist die LOTA-Methode abgeschlossen. Sie dient nur als „Geburtshelfer“ für einen normativ expliziten Diskurs im nachfolgenden Workshop.

Beispiel: Autonome Lieferdrohnen

(durchgeführt als Test eines Prototyps des LOTA-Tools mit 25 Studierenden)

Einführung
der zur
Diskussion
stehenden
Technik-
anwendung



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](#)



Einführung
der globalen
Ziele (hier 9)

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, nationality. Reduction of inequality within and among countries.
Prosperity Well-being. Economic growth and full employment. 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:

Jedes Ziel ist mit Texten aus den zugrundeliegenden Abkommen und Prinzipien hinterlegt (Beispiel: 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

Jedes Ziel ist mit Texten aus den zugrundeliegenden Abkommen und Prinzipien hinterlegt (Beispiel: Education)

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 Freedom

Freedom of thought and of movement and assembly.

Security and

Safe cities and settlements, conditions of work. No

Healthy Environ

Stable world climate, no further land patterns.

Education and

Education and lifelong community, to enjoy

Rule of Law

Access to justice for fundamental rights

Equality

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

Prosperity

Well-being. Economic growth and full employment. 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

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):

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. 26: 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.

Art. 27:

Human Development Index (HDI):

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

Multidimensional Poverty Index (MDPI):

Close

Jedes Ziel ist mit Texten aus den zugrundeliegenden Abkommen und Prinzipien hinterlegt (Beispiel: Basic Freedoms)

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 of movement and assembly.

Security and

Safe cities and settlements, conditions of work. No

Healthy Environ

Stable world climate, no further land patterns.

Education and

Education and lifelong community, to enjoy

Rule of Law

Access to justice for fundamental rights

Equality

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

Prosperity

Well-being. Economic growth and full employment. 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.

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

Auswahl und
Ranking der
globalen Ziele

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.

1 Please select from 1 to 4 answers.

Your choices

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

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

Prosperity

Well-being. Economic growth and full employment. 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:

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

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.

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.

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.

drag & drop

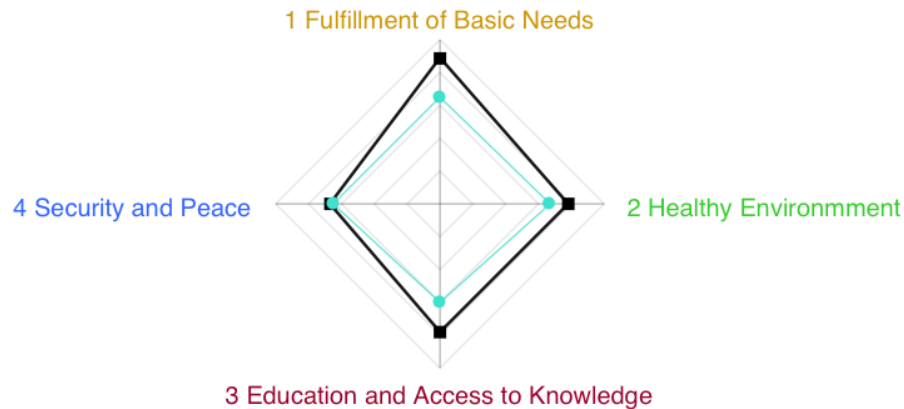
Individuelle Visualisierung der Resultate zum Abschluss von Phase I

Drei Indikatoren für jedes der inividuell ausgewälten Ziele:

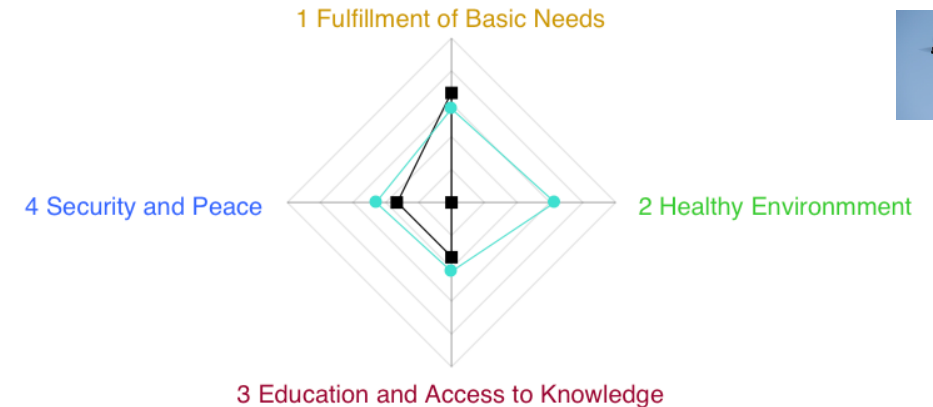
- Level of Concern
- Perceived Technological Opportunities
- Perceived Technological Risk

in schwarz: Indikatoren basierend auf den individuellen Eingaben
in türkis: **Durchschnitt über die Teilnehmenden**, die das jeweilige Ziel ebenfalls ausgewählt hatten

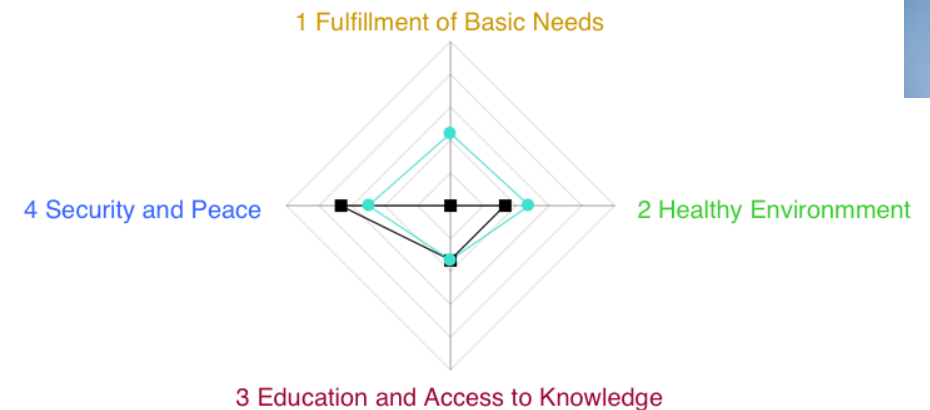
Level of Concern



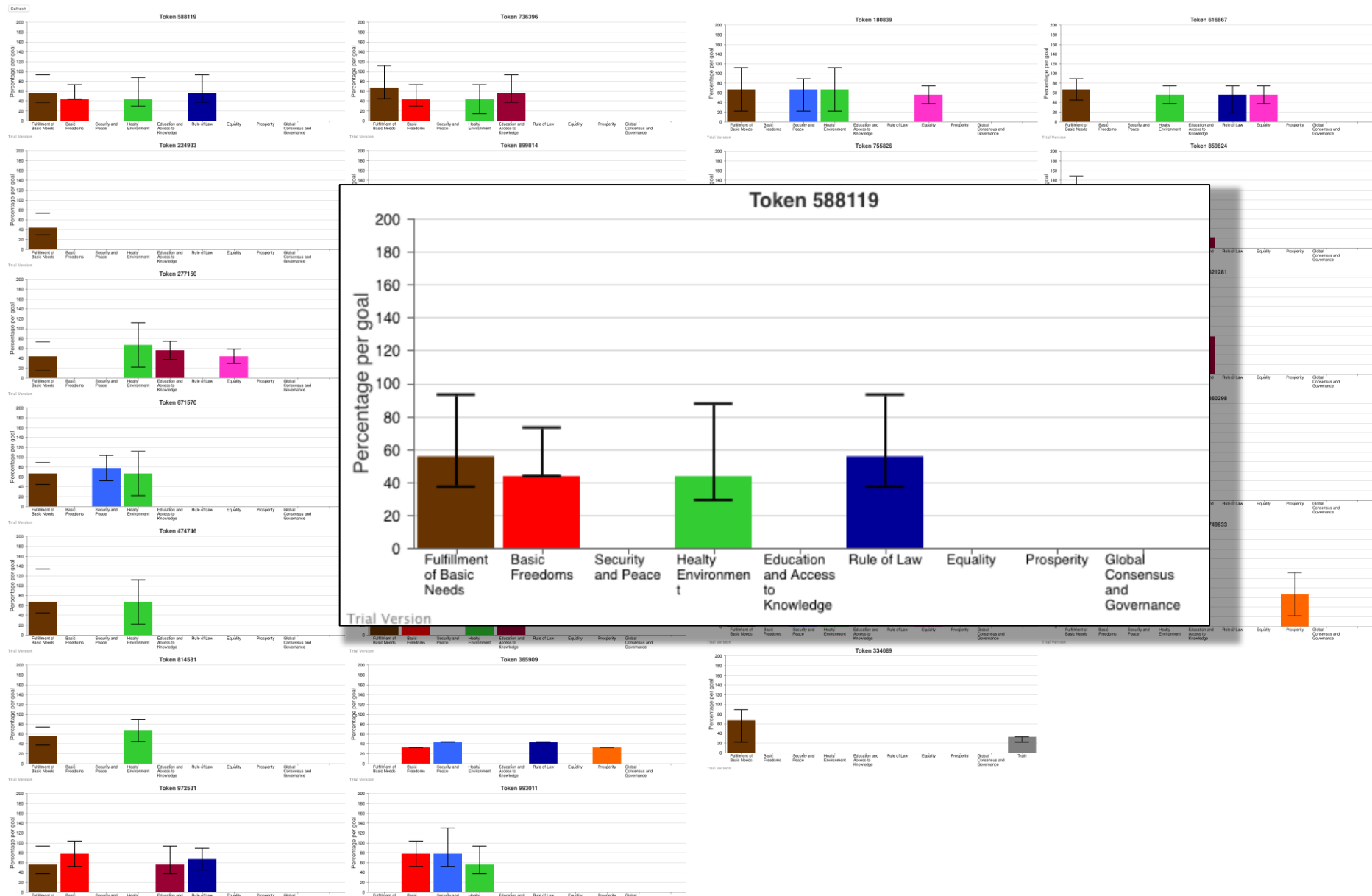
Perceived Technological Opportunities



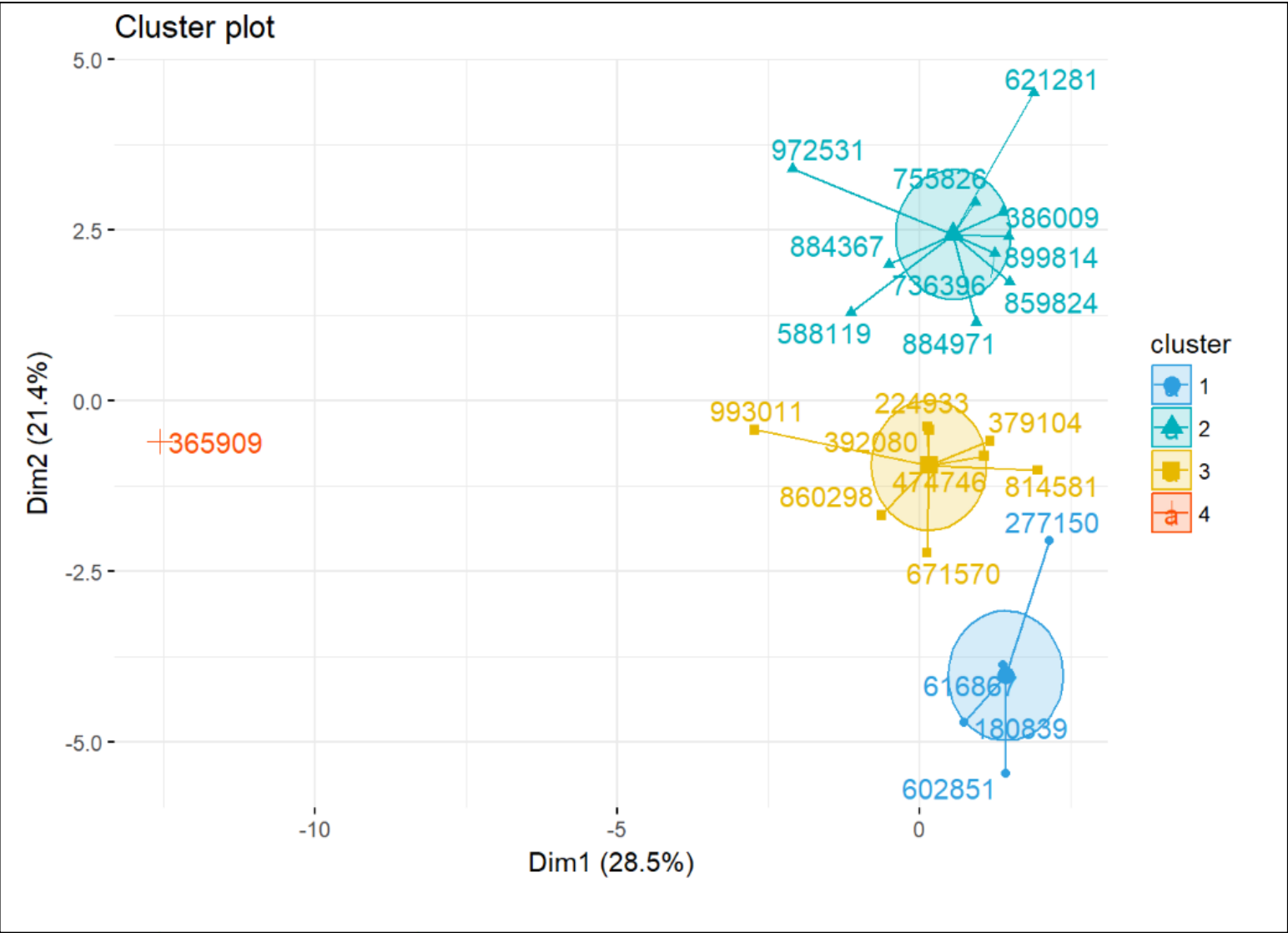
Perceived Technological Risks



Visualisierung der Resultate von Phase I für die Moderationsperson



Clusteranalyse zur Darstellung der Meinungslandschaft



Weitere Schritte

Schritt 3:

Online-Befragung Phase II

Die Teilnehmenden beschäftigen sich auch mit Zielen, die sie in Phase I selbst nicht ausgewählt haben, die aber in der vereinigten Liste stehen, hinsichtlich

- Zeithorizont und Dringlichkeit

- Einfluss der zur Diskussion stehenden Technikanwendung

Zusätzliche Fragen zur Interaktion zwischen den Zielen (Impact Matrix nach Scholz & Tiedje)



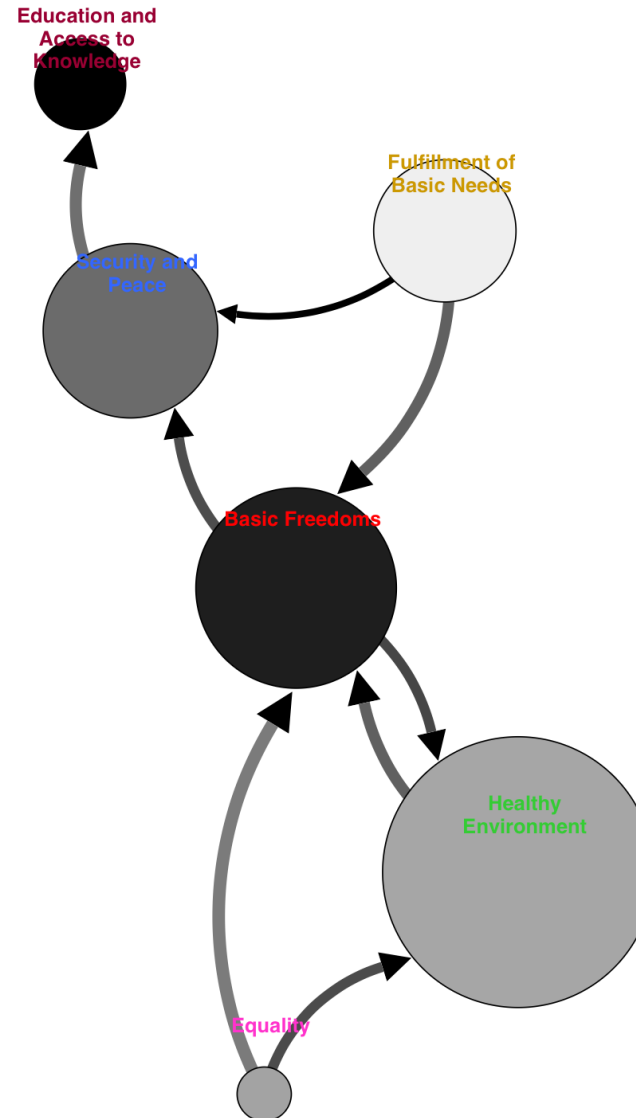
Schritt 4:

Auswertung Phase II zum Auftakt des Workshops

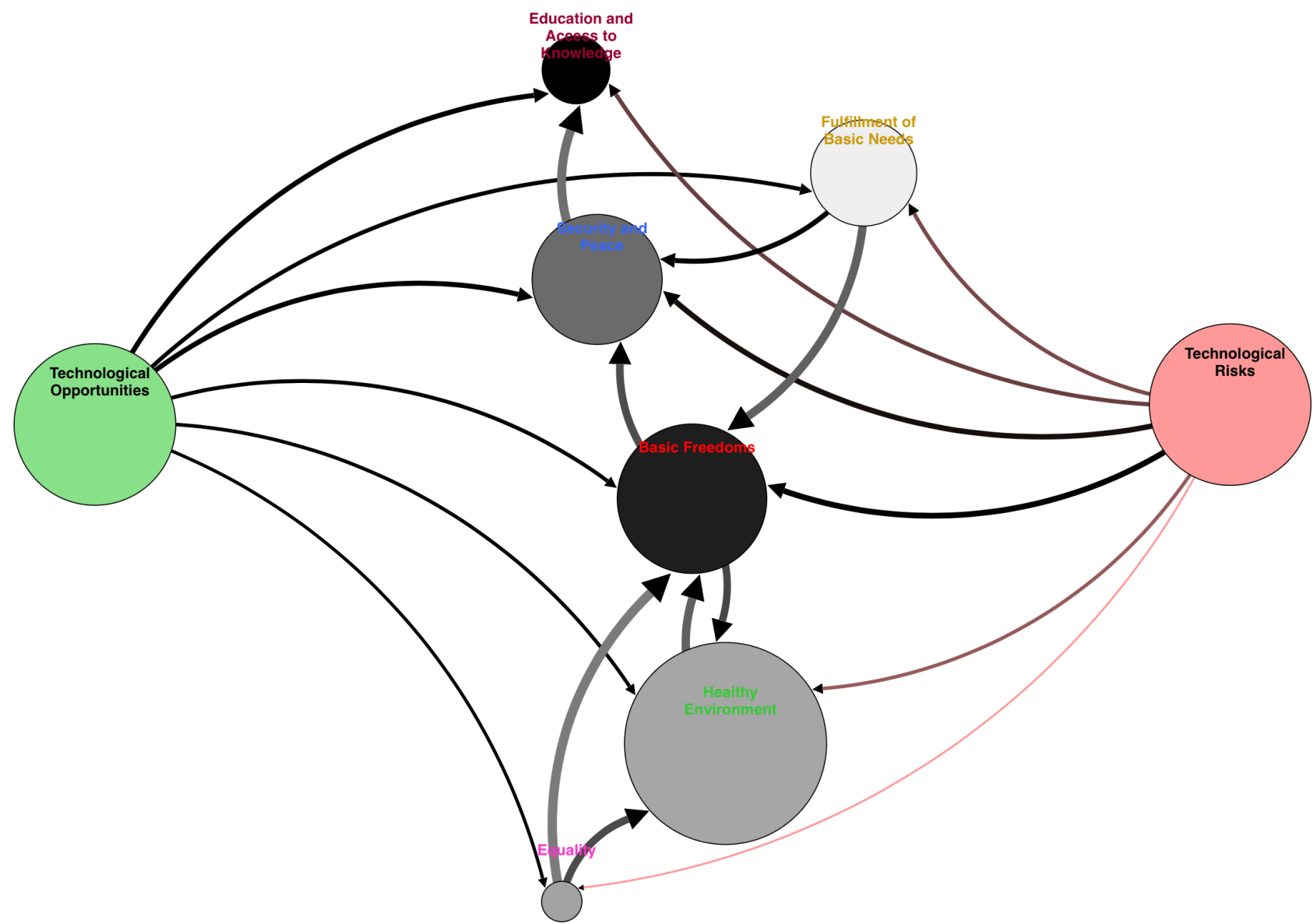
Visualisierung der Interaktionen zwischen Zielen und den neuen Chancen und Risiken durch die Technikanwendung

Visualisierung von Relevanz und Interaktionen (Impact Matrix)

- **Grösse eines Knotens:** Relevanz des globalen Ziels, basierend auf Angaben der Teilnehmenden zu den Fragen:
 - Wie wichtig ist diese Ziel für das Leben der Menschen?
 - Wie lange wird es wichtig sein?
 - Wann werden verheerende negative Folgen auftreten, wenn das Ziel nicht erreicht wird?
- **Dicke eines Pfeils:** Stärke des Einflusses eines Ziels auf ein anderes (ohne Vorzeichen)
- **Helligkeit eines Knotens oder Pfeils:** Ausmass der Abweichungen (Standardabweichung).



Einfluss der diskutierten Technikanwendung



Vielen Dank für Ihre Aufmerksamkeit!



Landscape of Opinions for Technology Assessment

Credits:

Catrin Loch, Studentin, Universität Zürich
Stephanie Waeber, Studentin, Universität Zürich
Dr. Clemens Mader, Empa, St. Gallen

Contact:

Prof. Dr. Lorenz Hilty, hilty@ifi.uzh.ch
Forschungsgruppe Informatik und Nachhaltigkeit
<https://www.ifi.uzh.ch/isr.html>