

D3.3 COLLIDER'S "CLUSTER OF STUDENT IDEAS" I

CO-CREATING SOLUTIONS FOR THE CHALLENGES OF THE FUTURE

Goal: Based on the ideas and concerns expressed in the submitted proposals from the first call for ideas "Leave no Waste Behind", to draw thematic lines for the formulation of the challenges for the Collider.

REMINDING THE CONTEXT

In D3.1 we explained how we designed the Call for Ideas and in D3.2 how we collected ideas from a diversified target group of students, academics, industry and organisations.

The deliverable D3.3 explains how the collected ideas from the first Collider Call for Ideas "Leave no waste behind" have been clustered into concrete themes. The themes, that have been mentioned in relation to the overall topic "waste", will be basis for the development and formulation of challenges for the collider projects. This will be explained in D3.4, which is to be submitted by the end of February 2022.

Thus, this Deliverable 3.3 will:

- Explain how the TT/WW Committee has clustered the different submitted ideas and bundled them into themes;
- Explain how we created an information loop towards the associated partners with the outcome of the bundling exercise in order to future-proof the decision of the TT/WW Committee;
- Explain how the call for idea online platform supported the clustering of ideas (and information loop to the associated partners);
- Present the results of this cluster exercise: a number of defined themes as basis for the first EuroTeQ Collider design.

DEFINITION OF THE EUROTEQ COLLIDER THEME

This section is provided to give a brief overview on criteria used for choosing the EuroTeQ Collider theme for spring 2022: "Leave No Waste Behind" as well as a brief description of the vision & ambitions of choosing such a theme.

When choosing a theme for the EuroTeQ Collider, we deemed it important that the theme is relevant to all EuroTeQ universities. All partners should feel that they could draw interest and find expertise and resources from their respective ecosystem. The theme should further be transverse across multiple industries, technologies and levels of education. Furthermore, the theme should aim at bringing together multi-stakeholders in education, society and industry and allowing to address the grand challenges of the 21st century via co-creative innovative solutions.

One of these actual grand challenges, currently very relevant for the students, is Sustainability. “Leave No Waste Behind” is a theme that is action oriented and provides a visual framing for students, industry, and society from diverse backgrounds to work on. It also captures a desire to preserve a planet that is in good shape for future generations. “Leave no waste behind” enables a mind-set, thinking and a practice how to live, produce, and create without leaving waste behind.

Therefore, the topic “Leave no waste behind” gives room for discussing the desirable future. The EuroTeQ Collider can be here the mechanism, which explores challenges for real-life solutions to be developed from a clustering and collaborative process between students, industry and society. Challenges on topics related to waste will be set up and will be part of the local collider formats. The EuroTeQathon, finally, will accelerate concepts and ideas towards actionable solutions that bring us closer to a future in which we “leave no waste behind”.

CLUSTERING PROCESS

The Call for Ideas collected 164 responses in total. They have been transferred into an excel file format. The TTW working group within WP3 was in charge of the clustering process, which was carried out in a 2 rounds-process. No ideas were omitted in the process.

Figure 1 shows the overall process from the pool of ideas to challenges integrated into local EuroTeQ colliders. The focus in this document and deliverable report lies on the square segment transforming ‘clustering of ideas’ into ‘challenges.’



Figure 1. Pool of ideas to EuroTeQ Collider

Overall Methodology for Clustering:

Our methodology for clustering can be described as an inductive approach, where after collecting the data (respondent forms), we aim to analyse and reflect upon the data allowing themes and concepts to emerge.

Since the information or data that we collected from the respondents is of qualitative and descriptive nature, we have chosen to adopt a thematic analysis approach to categorise data. We first approached our data by defining categories, to which we then assigned different codes / labels in order to start organizing.

Example: Markdown keywords for the answers of each question categorise them and if appropriate sub-categorise to provide further richness and reflection of responses.

Round 1: Waste Areas

The purpose of process' round one was to get a quick overview on the waste prevention areas which have been mentioned and for which respondents hope to create impact towards in the future. This was done by first separating the respondent answers into 6 tabs by geographic location (CZ; DK; ES, FR; DE; NL) and then coding question 2, which asks respondents to select a waste related area which one would like to see to be affected by integrating a practice of *Leave no waste behind*.

We visualised the waste related areas in two formats.

Format 1:

We identified the overall waste prevention areas that mentioned at the different geographic location and transferred them into a table. Our goal was to see the overlaps, convergences and divergences among geographic location and partner university affiliation. When coding the waste prevention areas, it was not important to choose coding based on industry sectors or the waste source / generators (both types of labels were included). Three areas kept arising between all geographic locations. These were colour coded as BLUE, RED and ORANGE see in Figure 2.

- BLUE: Electronics
- RED: Food / Agriculture / Packaging / Restaurants
- ORANGE: Plastics

	A	B	C	D	E	F
1	THEMES CZ	THEMES DK	THEMES ES	THEMES FR	THEMES DE	THEMES NL
2	Construction / Building	Construction & Building	Electronics	Agriculture	Electronics	Nature
3	Electronics	Electronics	Food (restaurant; agriculture)	cities	Energy	Electronics
4	Energy (& Fuel)	Energy (& Fuel)	Manufacturing	Digital	Experiential (nightlife, restaurants, travel)	Food
5	Food	Food (Agriculture)	Medicine (Plastics)	Food (production / packaging)	Food	Plastics
6	Materials (biodegradable / reusable)	Industrial & Manufacturing	Residential (i.e. biowaste)	Nature	Nature (ocean)	Life Science Labs /Medicine
7	Nature	Materials / Packaging	Retail (Fashion / textiles)	Pharmaceutical	Packaging	Retail
8	Retail (packaging)	Plastic (food / medical)	Construction	Plastic (fishing gear)	Plastics	Energy & Fuels
9	Fashion, textiles	Residential	Residential	Retail	Retail (supermarkets)	Digital / Data
10		Retail	Industrial & Manufacturing	Transportation	Building	cities
11		Water ?				Automobile
12		Pharma / Life Science				Experiential (Festivals)
13		Fashion, textiles				Textiles
14						

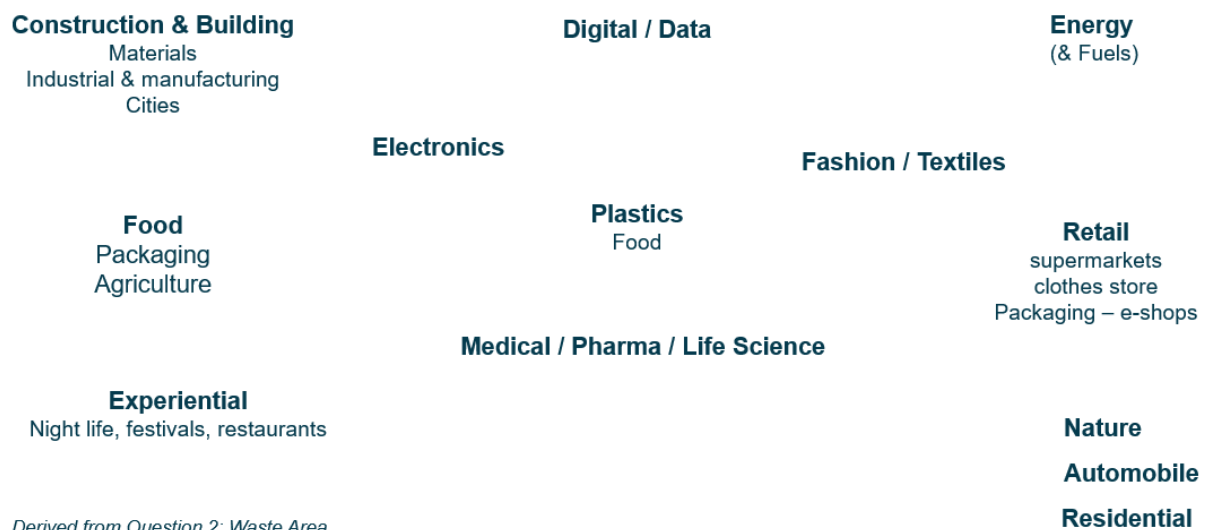
Figure 2. Waste areas segmented by geographic location

Format 2:

We then took all the waste related areas and further developed a mapping to start identifying touchpoints and synergies between the different areas identified. This is shown in Figure 3.

'Clustering' of Call for Ideas – Round 1 – Waste Area ONLY

Below are the top waste clusters identified



Derived from Question 2: Waste Area

Figure 3. Waste Areas Mapping, Round 1 Clustering of Call for Ideas

ROUND 2: Gaining the greater “Leave No Waste Behind” desirable future visions

With the master list of all respondents, we randomly split the data into six different groups (one tab for each university representative of the TTWW group /& colleagues to work with). The data was split in such a way that each tab had 56 respondents. Each respondent was part of two tabs and therefore was interpreted twice. This was decided to ensure a rich interpretation of our qualitative data.

Instructions were sent out to each university to guide the coding analysis of each respective 56 respondents and create alignment.

The instructions included the following information:

- When reviewing data, there are 6 questions in total
- The first 4 questions are most important in getting the overview / coding.
- You should analyse / pull from each question in the following ways:
 - Q1: “*Leave no waste behind*” - abstract: keywords & concepts
 - Q2: Has already been preliminary analysed in Round 1 of clustering but if helpful for you to do again you are welcome to.

- Q3: 2041, Future of Waste prevention scenarios - concepts / commonalities | tech applications / tech readiness | contextualize waste prevention areas from Q2 | examples | action verbs
- Q4: How we get there - concepts / commonalities | tech applications / tech readiness | contextualize waste areas from Q2 | examples | action verbs

Note: if one finds other ways to analyse the data that make sense when reviewing please feel free to expand and when doing so please write down or make it clear the patterns you observed.

By reviewing the first four questions, we aim to cluster the keywords & concepts in to 5-6 clusters that seem most relevant based on your data set. Please prepare one slide summarizing these clusters (which we will use for our TTWW-meeting discussions). Also, try to create one slide per defined cluster to summarize the commonalities | contextualize waste areas from Q2 | examples | action verbs gathered from the data and sorted per cluster.

Each university sent their summary of data and was further asked to integrate and create a comprehensive overview (see Figure 4).

CLUSTERING OF DATA – Collective – 18.11



Figure 4. Approaches towards a leave no waste behind future

OUTCOME

Each representative of the partner universities had a slightly different approach in making sense of the data. For all valuable insights and all supporting documents how to develop the challenges / project themes, please see annex C. This gives an overview of summaries of each university, which enabled us to set- up figure 4.

The clustering exercise enabled TTWW to identify:

- Overall industry sectors that survey participants see as most important to address
- Vision of the different perspectives/ approaches to addressing the grand societal vision of “Leave no waste behind”.
- Valuable insights to further contextualize a future towards *Leave no waste behind*
- First step towards create challenges that are 'north stars' towards the desirable future, “Leave no waste behind”
- Enriches us in understanding the impact/ visions on “Leave no waste behind” solutions should work towards

Using our clustering process and the overview provided in Figure 4, it was possible to discuss challenge formulation statements/ questions.

CHALLENGE FORMULATION STATEMENTS & QUESTIONS

In the TTWW meeting, it was discussed how to deal with those types of challenges statements & questions which should be deduced from the clustering process, in particular those which were open and exploratory and did not immediately suggest a solution. The TTWW group further confirmed that the North Star or foundational focus should be the overview obtained from Figure 3 and 4 obtained from the clustering process.

Another influential factor in the challenge formulation discussion was the model that each university was developing for their collider. Basically, the models requires slightly different needs in terms of broadness or depth of the challenges to be developed. For example, some local colliders have developed a specific Collider course where the EuroTeQ challenges are linked to, while other local Colliders have a need to develop EuroTeQ challenges that can be integrated into already pre-existing ECTS accredited courses.

Short summary of the challenge formulation discussions

Example of a Challenge Statement

How might we _____action

For _____ primary user / stakeholder / industry

So that _____ desired effect / what change

HMW (How Might We) Questions

- Challenges are framed opportunities
- Should not suggest a particular solution but give a frame for innovative thinking
- Maintain a level of ambiguity, and open up the exploration space to a range of possibilities
- Re-wording the core needs
- Can we take our clustering and use the action terminologies into a challenge formulation

EXAMPLES from a brainstorm TTWW session (some too broad or too specific)

XXXX is where we insert industry sector name / domain or another user

- How might we re-think waste as a resource in XXXX to enable a *leave no waste behind* future?
- How might we organize and distribute waste in XXXX so that our waste output is no longer 'thrown away'?
- How might we individually and/or collectively incentivize waste behaviour for XXXX in order to reach a leave no waste behind future?
- How might we manage (and minimize) the impact of residual resources generated by human activity for XXXX in order to efficiently use Earth's finite resources while simultaneously improve human well-being?
- How might we create personal accountability in waste production in order to reach a leave no waste behind future?
- How might we develop new innovations in technology, materials, business models, supply chains for XXXX in order to create environmental positive impact?
- How might we alter the rate of consumption and use of Earth's finite resources for XXXX in order to ...
- How might we develop new value to used resources for XXX in order to eliminate the concept of waste
- How might we develop new technologies for organizing and distributing waste for XXXX in order to ...
- How might we for XXX in order to stop seeing waste materials as waste.
- How might we redesign / redevelop / rethink ...
- How might we get products to people without generating plastic waste?

SUMMARY OF OUTCOME

CLUSTERING LEADS TO

Overarching Challenge Question & Challenge themes/areas

In the spirit of "Leave no waste behind", how would you innovate to make the biggest impact on [x] in collaboration with [y]?

x= cities, energy or consumption

y= local partners

The challenge themes/areas were chosen as Cities / Consumption / Energy as these three areas most reflected in Figure 2. Coding of waste prevention areas. Almost all waste prevention areas mentioned could fit into these three areas.

CLUSTERING LEADS TO

Perspectives towards concepts & approaches towards a “Leave No Waste Behind” Future

The main overarching actions towards “Leave no waste behind” are:

- Incentivizing Behaviour
- New Innovations
- Organizing / Distributing / Sorting more efficiently
- Rethinking & Redefining
- Targeting areas within the closed system, Earth

These perspectives can be developed at different macro-micro levels of the system view of waste prevention.

NEXT STEPS

Once the Challenge question and themes were derived in the spirit of “Leave no waste behind”, how would you innovate to make the biggest impact on cities, consumption or energy? It was agreed that each university would confer with LAB members in either a LAB group meeting or 1:1 meeting settings to further gain feedback and develop the formulation of challenges. This will be further discussed and elaborated on in deliverable 3.4.

PROJECT LEARNINGS & REFLECTIONS

From an academic and innovation perspective, one could argue the quality of submissions was quite broad and inconsistent. This was expected to be the case as the only guidance to the form were the questions and subtext to provide support and context. The digital form was created in a way that it could be translated into an in-person or online ideation/ brainstorm ‘workshop’ session. This was tested and piloted with one university and with student participation. It could potentially be expanded on in future collider iterations. The benefit of doing more focus group sessions is that there is the possibility to gain richer descriptions of the call of ideas to support the clustering. This could also be a way to attract and engage more industry & society in the call of ideas process.

There were 6 questions for a respondent to answer about their “Leave no waste behind” future. Questions 1 to 4 were most valuable in the clustering process. There could be discussions if Question 5 and 6 are needed in the next round of the Collider.

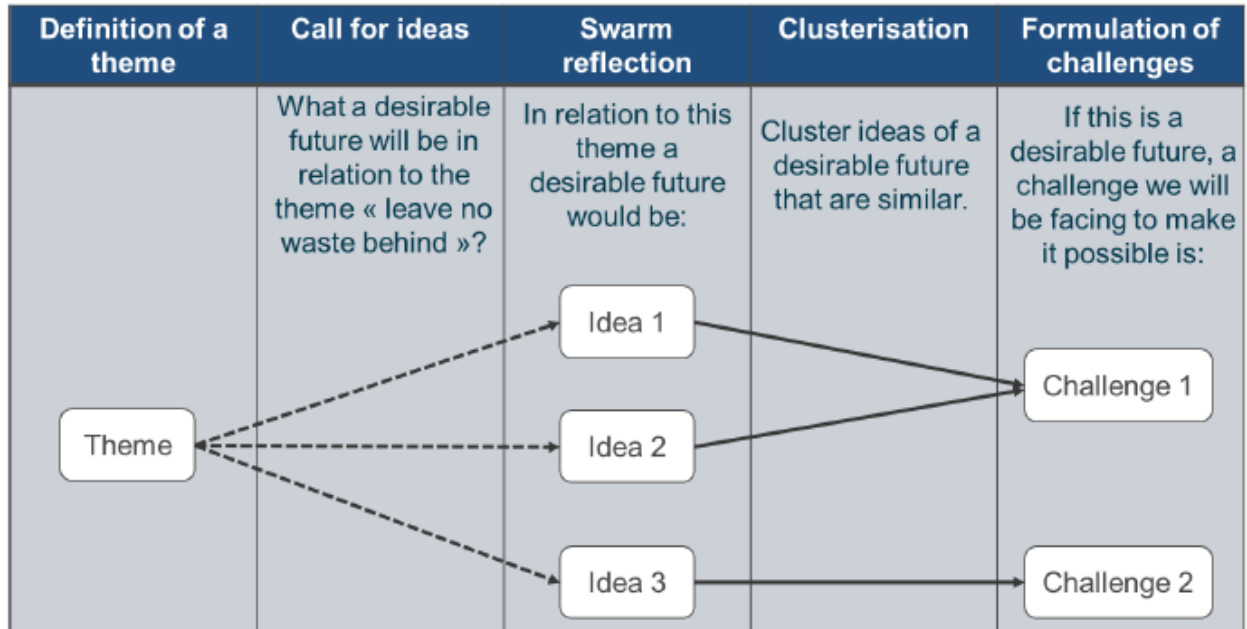
It should be noted that with 164 respondents, it was feasible to split the work in clustering groups among the universities and gain an overview however our clustering process specifically interpreting the raw data is not a scalable process for 1000 ideas. This is something WP3 will have to further develop in the coming years. One idea is to gain access to NVivo, a software that allows for extensive and systematic analysis of qualitative data. Another consideration and discussion that

we already had, is related to the possibility of developing a call for ideas with questions that are more quantifiable and less descriptive. We have thus derived that it is quite difficult to develop challenges that have societal relevance without some form of qualitative approach.

It is our ambition to increase the gross number of contributions in the future Call for Ideas. A higher number of respondents would allow a better scalability. The types of questions that allow for a good analysis should continue to be part of our discussions within the TTWW committee and WP3 when developing the next Collider iteration round.

ANNEXES

A. Call for ideas and clustering process



Note: Original diagram to represent the definition of theme to formulation of challenges process. Figure 1 presented in this report is a further visual representation of portion of this diagram.

B. Timeline of Clustering

- Nov 4 – Round 1. Preliminary clustering of Waste Aras
- Nov 7 – stop of call for ideas & Raw Data master list created
- Nov 18 – Round 2 of Clustering: Leave No Waste Behind desirable future visions to Challenge question and themes

C. PowerPoint Slides of each university summarization of call for ideas data

CTU RESULTS

1

The problem of waste is that in every aspect of human activity, the proportion between what we do and how much waste is associated with that, is too high. Waste ends up everywhere, damaging the ecosystem (sea, forests, cities). We must reduce the amount of waste that we create, and at the same time find ways how to use waste as a resource, ideally eliminating all waste.

3

1. Process/preparation/design.
2. At home/work.
3. Mentality/lifestyle.
4. Material/technology/energy.
5. Composting/food cycles.
6. Socio-economic-political.

4

1. Technologies.
2. Processes.
3. Policies/economy.
4. Education/science.

5

1. Technology.
2. Social-political-economic factors.
3. Education/research.

DTU Results

After Waste is Created

- gasification (CO2 to fuel gas)
- landfills
- limiting
- littering
- making energy - pilot power plants
- new ways of degradation
- pollution (marine & air)
- processing of waste
- recycling
- repairing
- resue /upcycle / repurpose
- salvaging
- separation / segregation of waste
- transparency of disposal
- waste as resources
- waste collection services
- waste disposal
- Waste management practices
- waste treatment

Before Waste is Created

- biodegradability
- Circular economy
- Inputs / Outputs
- lifecycle assessment
- new bio-materials
- new concepts
- new materials for packaging
- new systems
- new ways
- optimize resources
- packaging
- storing of energy more efficiently / better
- supply chain

Peronsal & Collective (incl. Governane)

- (life style) choices
- accountaibility
- better ways to education each other
- community building
- consumption behavior
- educate good practices
- human health
- more thoughtful
- new ways / thoughts of design
- no single use objects
- packaging
- reducing / minimizing
- responsibility
- see waste like money
- slow fashion
- understanding one's (environmental) impact
- urgency
- waste generation

L'X RESULTS

1

Keywords

- Behaviors
- Stakeholder management
- Circularity
- Politics
- What
- Where

2

What
What's wrong
Solutions

4

Keywords

- Regulations
- Behaviors
- Politics
- Innovation

3

Keywords

- Sorting & Resusing Waste
- Behavior Changes
- Regulations & Incentives
- Politics
- Manufacturing – Production

5

Keywords

- Economics
- Politics
- Individuals
- Design

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TalTech Results

1. Recycle/reuse/repair, leftover, take home, replace, second-hand
2. Building & Construction, factory, industry
3. Technology, AI, automatization, digitalize
4. Changing process, better process, collaboration, models
5. Government, regulations, policies, law, penalties, corruption, war, lobbying, public needs
6. Money, finance, greed, tax, funding, capitalism, profit, cost, funding, price, economy
7. Awareness, habits, willingness, interest, conscious, responsible, ignorance, mindset, motivation, behavior, consumption, culture, trends
8. Education, research, innovation, entrepreneur, competence, knowledge
9. Packaging, plastic, design
10. Materials
11. Energy, fuel, chemicals
12. Compost, bio, green, eco, footprint, no-waste, local
13. Polluting
14. Sustainable

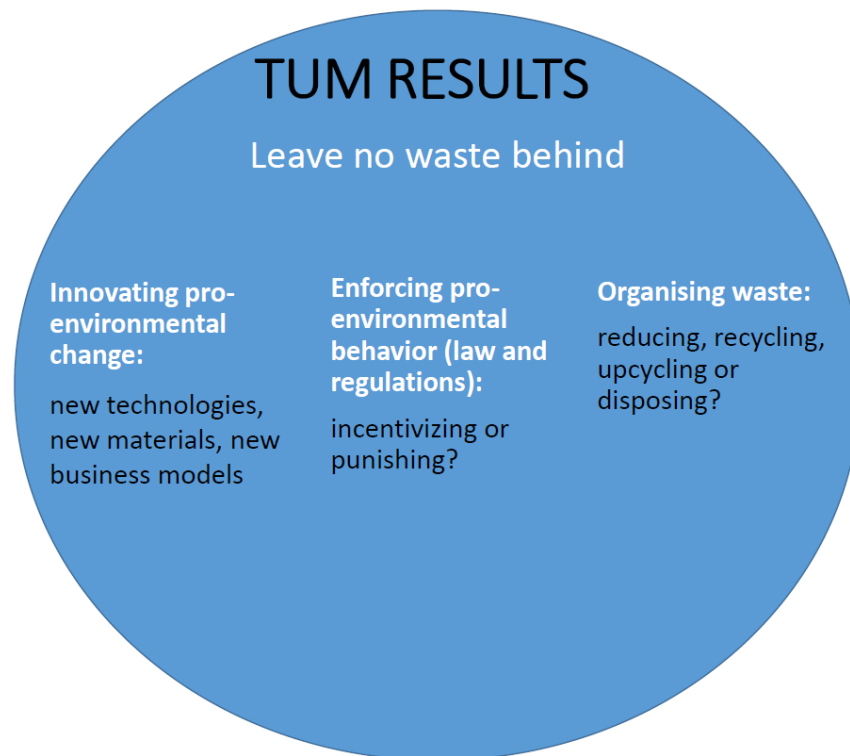
Categorizing these topics

- 5 & 6 & 8 – “Everything institutional”
- 1 & 7 – “Individual commitment”
- 4 & 14 & 9 & 10 – “Materials and process”
- 12 & 13 – “Earthly”
- 2 & 11 & 3 – “The big three”

TU/e Results

- Future plastics
- Future Food
- Future city
- Future (energy) production
- Future (proof) energy use

- How do we deal with plastic when we aim to leave no waste behind?
- How would a future city where no waste behind look like?
- How can we produce energy in such a way that we do not produce new waste?
- How can we transform our energy use (at least on a personal level)?



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