Interreg North-West Europe
Co-funded by the European Union
ECHT

ECHT INTERIM REPORT #4
THEORY OF CHANGE

REV 20250210_1

1. Background

The Green Deal transition towards a climate-neutral, resource-preserving and non-toxic Circular Economy (CE) creates new challenges for businesses. The EU Textiles Strategy aims to tackle the high waste generation and the low recycling rates and negative environmental and social impacts throughout the whole life-cycle. Textile apparel will become one of the first product groups subjected to Sustainable Product Policies (Ecodesign incl. Digital Product Passport). These policies imply value chain actors having access to detailed product information incl. material compositions: Trustworthy traceability of chemicals along supply chains is one central enabler for a non-toxic, resource-efficient and climate-neutral Circular Economy. Knowledge of material composition allows (eco-)design, informed procurement and purchasing decisions, improved recycling processes, thus minimised risks for health and environment from chemicals during the use phase and after the end of life. Volatility, complexity and supply chain structures, however, make it difficult for companies to work together and trace the chemicals in their products.

ECHT aims to help the industry establish chemicals traceability for a circular economy by enabling the digital product passport.

ECHT develops and implements the first traceability strategy with 3 action plans for actors of textile (1) apparel and (2) flooring value chains as well as for (3) policymakers at different levels. The action plans will draw from the learnings of innovative training schemes (capacity building). Results from the trainings and the insights gained in developing, testing and disseminating practical solutions are upscaled into a Knowledge Platform to support SME´s of the textile and other sectors "beyond pure compliance" towards innovative business models.

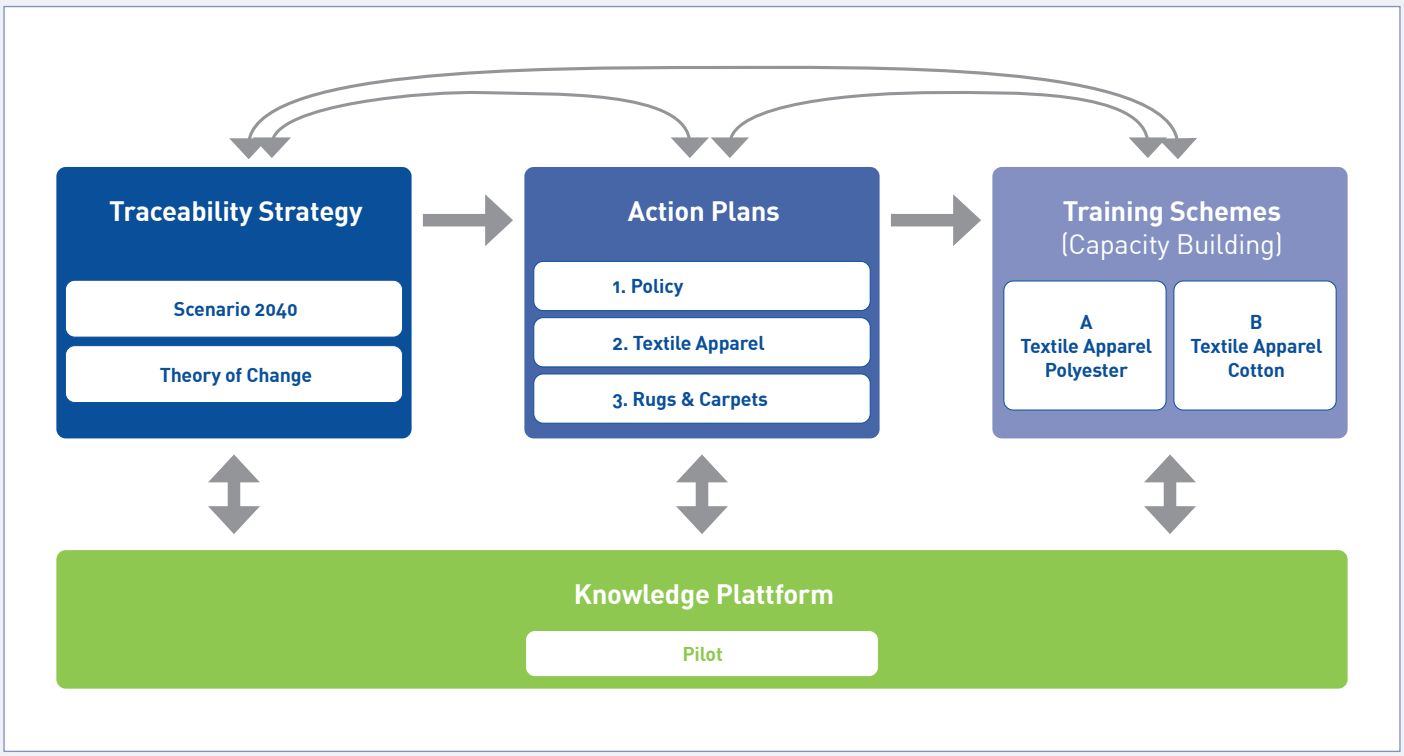


Fig. 1) Overall concept of the project ECHT

2. Scenario technique by Geschka as an instrument to develop the traceability strategy

To develop a traceability strategy, a clear vision on the preferred future state and the corresponding influencing factors as well as future projections are necessary. The apparel ecosystem shows a great variety of components, hampering a clear understanding what influencing factors create impact, from short-term to long-term, and which actors along the value chains need to provide which behavioural (change) contributions in this respect. However, a future picture of the influencing factors must be coherent and free of contradictions. For this reason, the ECHT project uses Geschka's "scenario technique" as a methodological basis. The aim of the scenario process is to find a common understanding of the challenges and to develop solution strategies and concrete action steps.

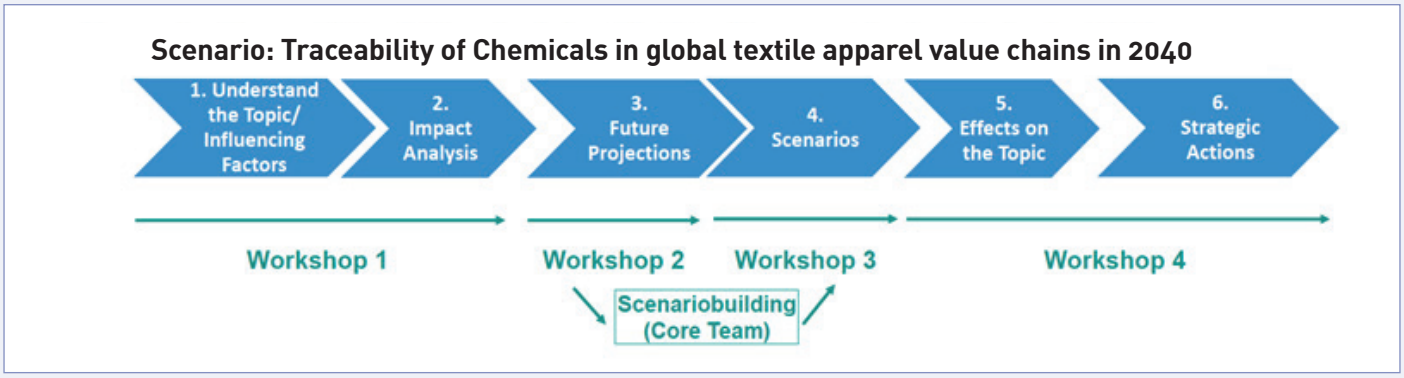


Fig. 2) Process for strategy development in the project ECHT

The starting point is the joint definition of a topic and the associated development of a common understanding of the problem. To this end, Darmstadt University of Applied Sciences organised a kick-off workshop in which interested participants from the textile apparel supply chain and related areas first defined the thematic and temporal boundaries of the system and analysed influencing factors with regard to the traceability of chemicals in textile apparel. In a second (online) workshop, the influencing factors were analysed and put in relation to see how they affect one another. These factors formed the basis to create future projections for 2040 on how the factors might develop. The individual projections were then used in a third workshop to develop two different future scenarios that describe possible, realistic versions of the future.

THIS DOCUMENT DESCRIBES THE PROCEEDINGS AND RESULTS OF THE FOURTH WORKSHOP DEALING WITH THE DEVELOPMENT OF A THEORY OF CHANGE

3. Proceedings and results of the fourth workshop

Workshop Specific

Date:	03.09.2024
Time:	09:30 – 17:30 h
Location:	Ökohaus, Ka Eins Frankfurt/Main
Organiser:	Darmstadt University of Applied Sciences

14 representatives of textile value chains and related stakeholders from 12 organisations and 4 countries as well as 5 members of the university team participated in this fourth (on-site) workshop (fig. 3).

Fig. 3) Participants of fourth workshop in Frankfurt

3.1. Previously and preparatory work: Scenario Stories

The workshop started with a brief recap of the previous work done in the past month from defining the system ("Traceability of chemicals in global textile apparel value chains as prerequisites for a non-toxic, resource-preserving, climate-neutral circular economy in 2040") to the 16 influencing factors finally leading to a set of two selected future scenarios for the year 2040. The first scenario story titled "Empowered by Transparency" sketches a world where chemicals traceability in the value chain of global textile apparel is fully in place as well as the Digital Product Passport (DPP) is successfully introduced on a global level. The second scenario story titled "No P(l)ace for Trace" shows a future where there is still no genuine traceability of chemicals in the textile value chains and legislators lack the ambition to make chemicals traceability a priority.

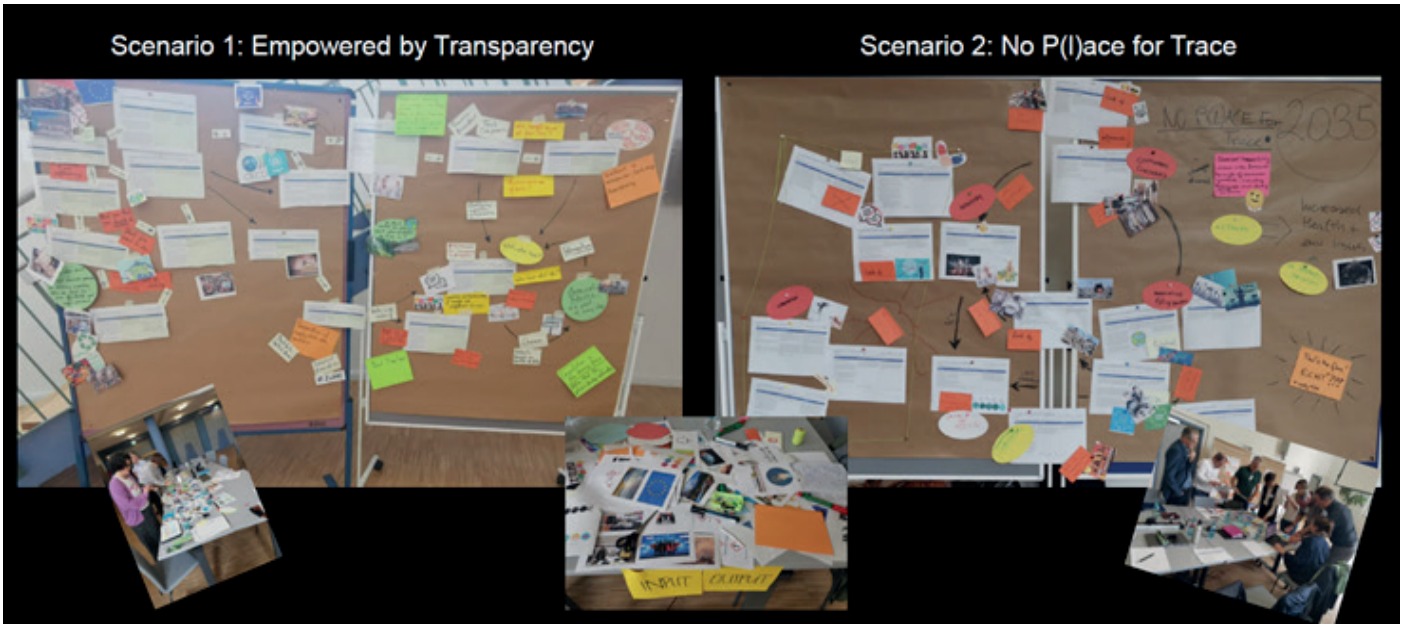


Fig. 4) Creative process of developing two scenario stories during the third workshop

During the finalisation of the stories, all partners committed to the positive and ambitious vision of the first scenario story "Empowered by Transparency" including full chemicals traceability in the global textile apparel value chain and at the same time actively distancing themselves from the definitely more negative future scenario. The main objective of this fourth workshop was to define strategic actions based on the chosen scenario including questions like what strategic measures can be derived from the scenario and identifying goals as well as a strategic roadmap on how to get there.

Scenario Story 1: Empowered by Traceability

In 2040, chemicals traceability in the global textile apparel value chain is fully in place. This is possible thanks to the Digital Product Passport (DPP) that has been introduced globally and expands beyond the use phase of textile apparel. Reliable data on chemicals in products and processes is now recognised as an important aspect of business models in all value chains. Accordingly, the textile

Fig. 5) Scenario story in layout

apparel value chains have made significant progress towards a nontoxic, climate-neutral, resource-preserving circular textile apparel economy.

The starting point for this transformation therefore is an active and critical opinion, the fact that EU regulations definitely were tightened in the process as well as several factors concerning the creation of traceability standards. In addition, the inclusion of the chemical industry was a fundamental factor providing sufficient information to move forward in the process.

3.2. Methodological Background: Theory of Change

After a brief recap and bevor moving on to developing and formulating the next steps, Jonas Rehn-Groenendijk introduced the theoretical background on the underlying methodological framework of the Theory of Change. The Theory of Change (ToC) describes a method for analysing longer-term causal systemic relationships along short-, medium- and long-term timeframes. The results from a Theory of Change process show where and how to start in order to effectively initiate change. The method can be used in different contexts, for example in transformative research groups as a longer-term strategy across several projects or as a process step within a specific transformative research project. Particularly within this limited project work, the basic assumption of the ToC is that, with regard to the desired systemic change, three spheres can be distinguished: The "Sphere of Control" describes one's immediate sphere of influence and encompasses all aspects where we have direct control. The "Sphere of Influence" on the other hand is an indirect sphere of influence, but is directly influenced by our actions. Finally, the "Sphere of Interest" represents the larger systemic context, which we cannot influence directly, but which we want to change in the long-term.

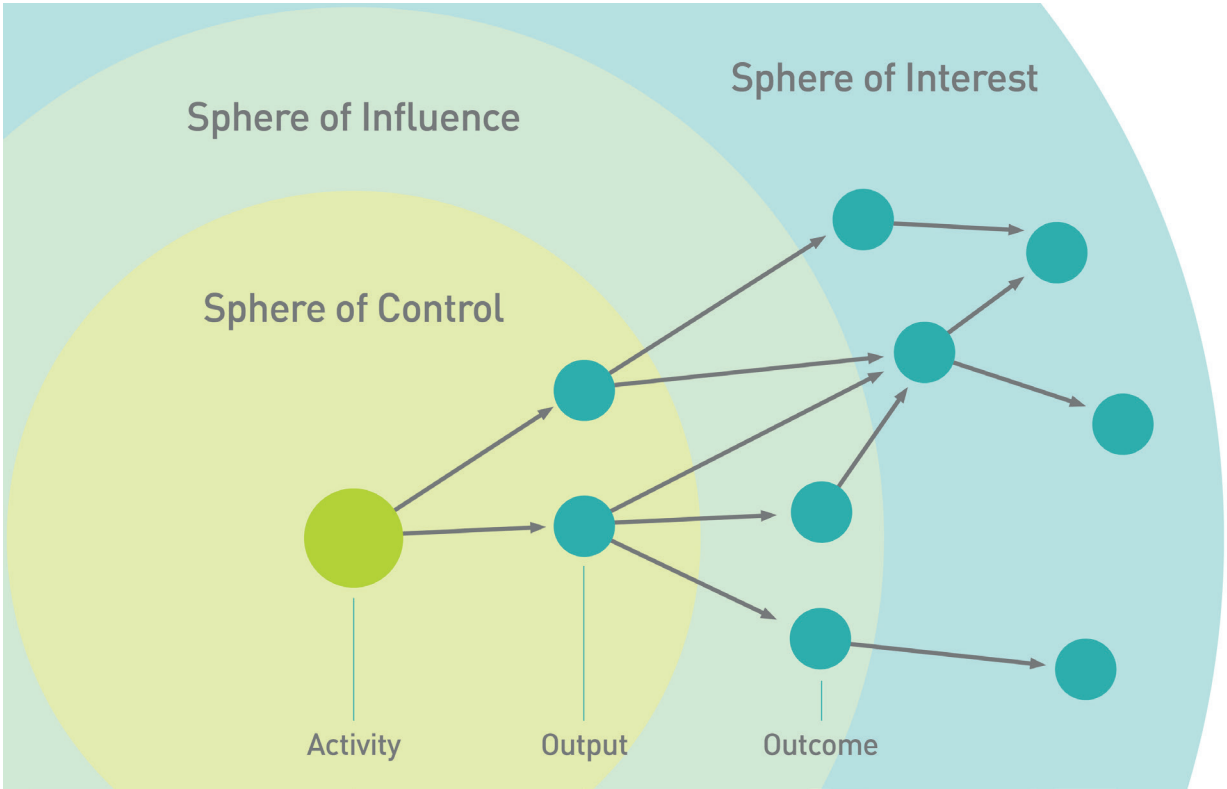


Fig. 6) Concept of "Theory of Change" based on Claus and Belcher, 2020

The development of a Theory of Change corresponds to the process of "backcasting": Based on a desired goal (impact), medium-term developments (outcomes) are defined, which must take place for the desired impact to happen. Specific results (outputs) are then identified that should lead to the developments described above. Finally, concrete measures (activities) are developed that can be implemented today in order to achieve the results described above. In this sense, the ToC leads backwards from the abstract to the concrete and provides direct instructions for action, which can lead to the conceptualisation of sub-projects, for example. From a strategic point of view, the ToC is suitable as a process for working with practitioners to design meaningful implementation measures and to communicate their causal significance in the context of a long-term strategy for change.

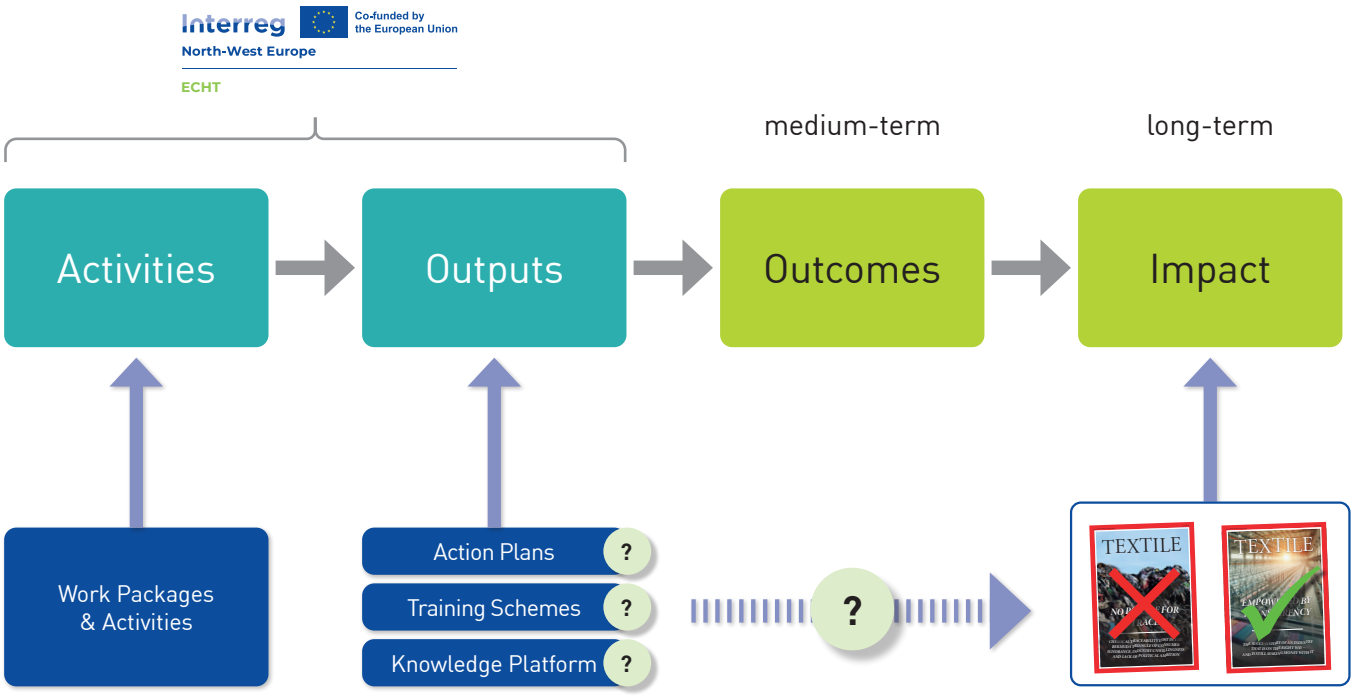
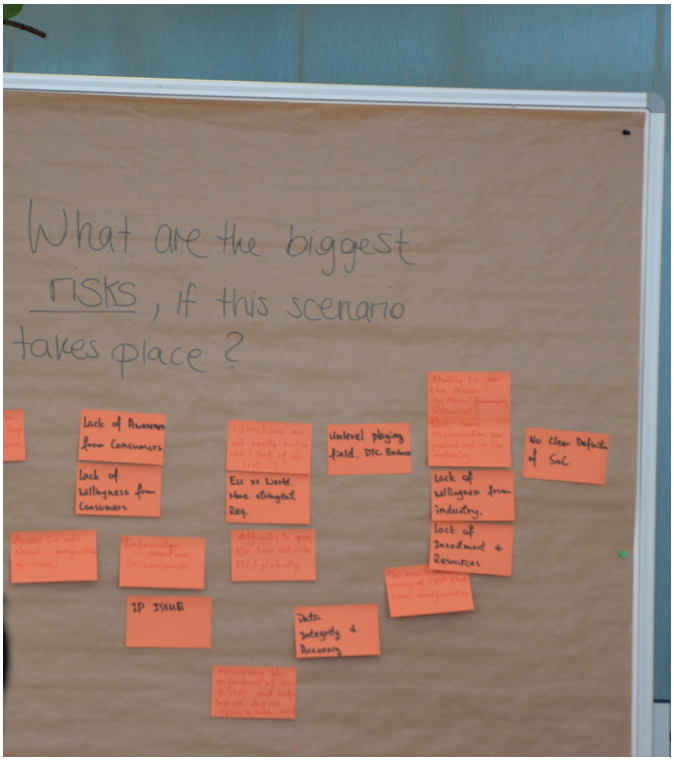


Fig. 7) Structure Theory of Change (based on Grantcraft (2006). Mapping Change: Using a Theory of Change To Guide Planning and Evaluation. p.8.)

3.3. Theory of Change for ECHT project

The theoretical steps described above were now to be developed for the given project. Therefore, the next part of the workshop was splitted into several smaller tasks, starting with the first phase and the definition of "long-term key changes" (outcomes). For this reason, the participants familiarised themselves again with the details of the first scenario story. While re-reading the story, participants were asked to internalise and understand not only the essence of the story, but also to pay attention to potential changes and risks if this scenario becomes reality as well as what key aspects would need to be considered then. After first thinking about these questions individually, participants teamed up in small groups to discuss more in detail and compare results. Then participants were divided into two groups, with one focusing on "chances" and the other one on "risks", pinning ideas on green and red sticky notes.



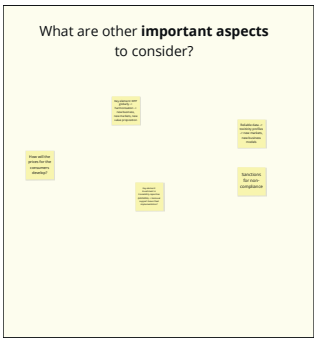


Fig. 8 & 9) Results on boards (left) and online elaboration of results (right)

Next, participants brainstormed about big key changes that need to happen, in order to utilise these chances and at the same time avoid potential risks. Additionally, thinking about networks, institutions, products, results and structures that need to be established in order to make this happen.

3.4. Evaluation of results

After a break, participants voted and ranked the compiled results to identify the most important long-term key changes.

The next step was to formulate mid-term milestones based on these long-term key changes. This was done in a creative session using cards that helped to phrase the milestones in a specific way: "How can we ensure that..." Here, participants were asked to answer questions like what preliminary processes and solutions (milestones) must be achieved in order to reach these key changes (e.g. changes in behaviour, practices, strategies, relationships, political guidelines, new collaborations, products and systems)? Based on the milestones participants formed groups referring to their preferences and their expertise.

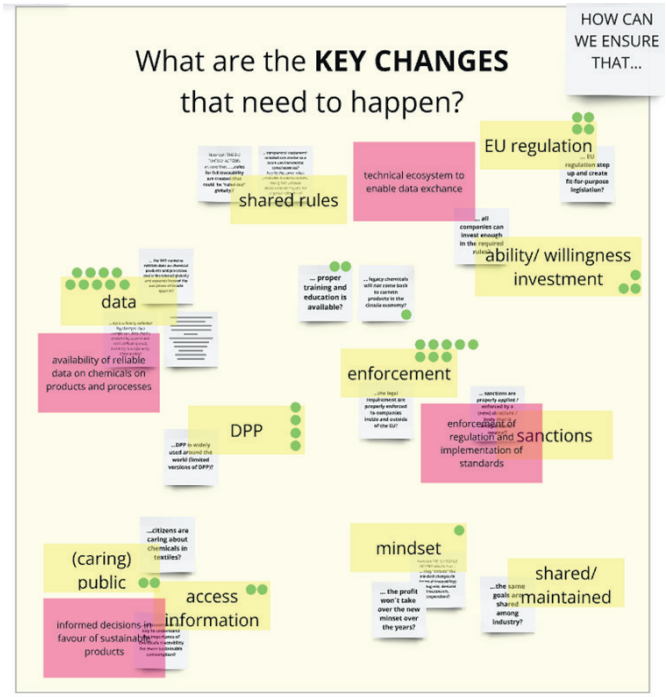


Fig. 10) Ranked key changes that need to be accomplished

3.5. Defining specific outputs & project results

In a final step of this workshops, five boards were prepared - each referring to a specific work package of the ECHT project (e.g. Knowledge Platform).

Participants were divided into groups and asked to brainstorm specific activities, outputs and of this particular work package that fostered one or more of the mid-term goals defined before (see fig. 11). In several iterations, groups moved from one board to the next to add activities and outputs.

Eventually, all five boards were placed in a row („roadmap matrix“) and participants were asked to indicated synergies and mention actors and organisations that are relevant for each of the tasks. They were also asked to indicate commitment for specific tasks by writing their names next to that task.

Fig. 11) Roadmap Matrix

3.6. Elaboration and refinement of results

This row of boards forms the framework based on which a first draft of the Theory of Change was developed by the university team after the workshop. For this process, the boards were first digitalised using Miro Boards (fig. 12 & 13). These online boards were again reviewed by the project consortium in an asynchronous working phase. Additional items, thoughts and comments were added and content corrected.

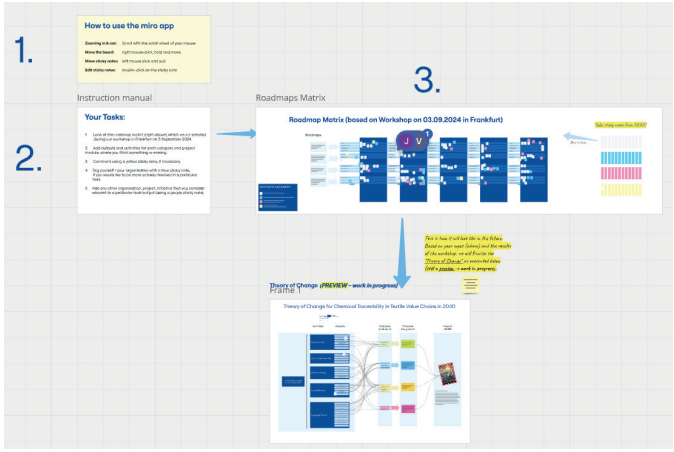


Fig. 12) Asynchronous review task for consortium using Miro Boards

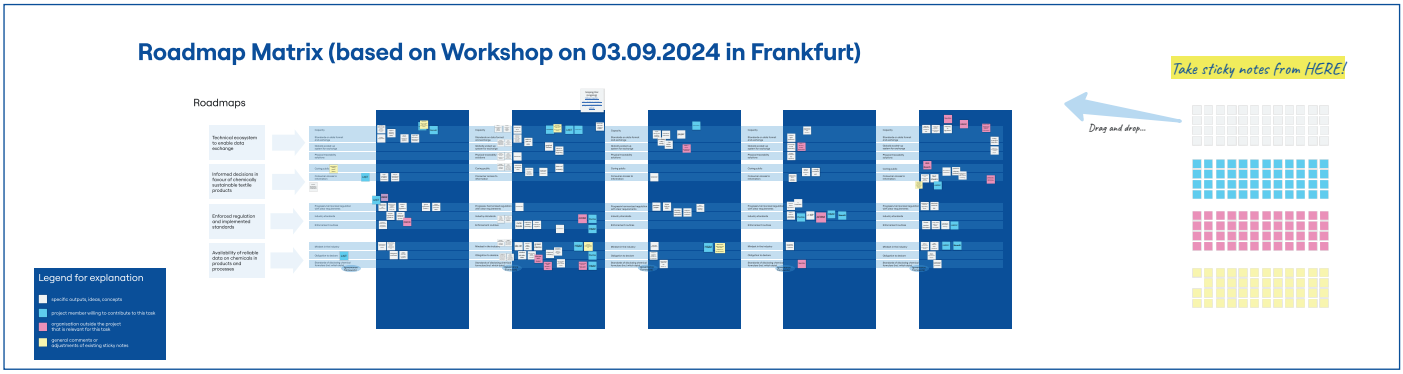


Fig. 13) Digitalised and commented Roadmap Matrix using Miro Boards

Theory of Change for Chemical Traceability in Textile Value Chains in 2040

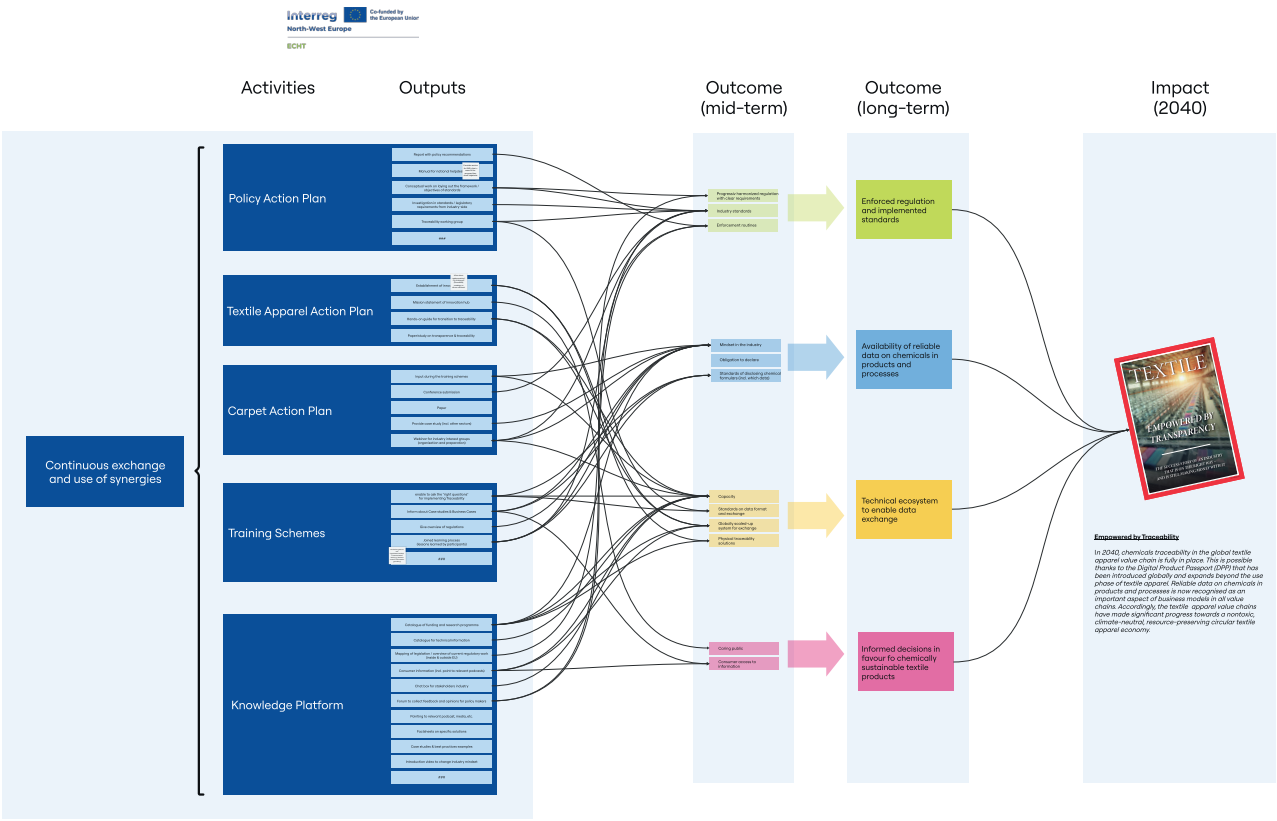


Fig. 14) First Draft of Theory of Change

Based on this a first draft of the theory of change (fig. 14) was developed by the university team and placed next to the roadmap matrix on the same Miro Board. The consortium was then again asked to review and comment on this first draft using the Miro Board. This review process was continued in the general steering group and consortium meetings that regularly took place and allowed for live discussions on this output.

After this comprehensive review phase an updated version of the Theory of Change was developed and presented to the consortium. In a second iteration this updated version was accompanied by additional text elements to outline the content and logical structure of the ToC (see Appendix p. 9-14; fig. 15 on p. 14). The entire document (ToC illustration and text) will be published and shared on the ECHT communication channels.

The ToC and other project outputs are available on the ECHT website:

▶ **https://echt.nweurope.eu/outcomes**

For questions and remarks contact

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Appendix: Final version of Theory of Change (see next pages)

ECHT PROJECT OUTPUT

Theory of Change for Chemical Traceability in Textile Value Chains in 2040

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Imprint

The Theory of Change presented in this document is a co-creative result of the ECHT project consortium as composed at the time of development:

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Inditex (Industria de Diseño Textil, S.A.)
Ineris
Lacoste Operations
Luxinnovation G.I.E.
Sympany
Techtera

Darmstadt University of Applied Sciences, 2025

This document is the result of the transdisciplinary research project “ECHT - Enable Digital Product Passports with Chemicals Traceability for a Circular Economy”. The project is funded by Interreg North-West Europe (2024-2026) and led by Dr. Jonas Rehn-Groenendijk, Darmstadt University of Applied Sciences.

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Methodological Background

Aiming to change complex systems represents a particularly difficult endeavour because this requires long-term impact, which is influenced by a number of confounding factors. A key challenge lies in the fact that actions need to be taken right now, while their actual effects are beyond the scope of the activity itself. What sounds rather abstract has been theorised by researchers and coined by the term "Theory of Change" (e.g. Claus & Belcher, 2020). Claus and Belcher (Fig. 1) differentiate between three spheres when aiming for long-term impact in complex systems:

1. **The Sphere of Control** refers to all aspects a group can actually control, i.e. by conducting specific activities that lead to certain outputs. Since the members of this group are themselves active in these activities and produce these outputs, they can control how and what is done.

2. **The Sphere of Influence** is affected by the outputs of the **Sphere of Control**, but is not directly controlled by the group. Instead, the outputs of the Sphere of Control create or at least shape mid-term outcomes.

3. These outcomes (which are also influenced by other processes outside the group's scope) ultimately influence the long-term impact the group seeks to achieve. This impact lies in the **Sphere of Interest** that is neither controlled by nor directly linked to the group, but only mediated through a chain of causal relationships.

The "Theory of Change" (ToC) method is a valuable tool for designing ("roadmapping") and monitoring of system innovations. It allows individual steps and sub-measures to be captured and examined in a structured way, taking into account the respective impact relationships. Against this background, the ToC extends the perspective beyond the directly workable aspects of a project and includes parallel developments with regard to the overall goal orientation. In summary, the ToC has several functions: on the one hand, it creates structures and points out systemic weaknesses in the project. The development of a ToC is based on an iterative process that reflects measures and projects in relation to their effects and makes necessary upstream measures visible. On the other hand, it can be used as a communication tool, as it reduces complex transformation processes to their essentials. Finally, it provides starting points for the development of project performance indicators.

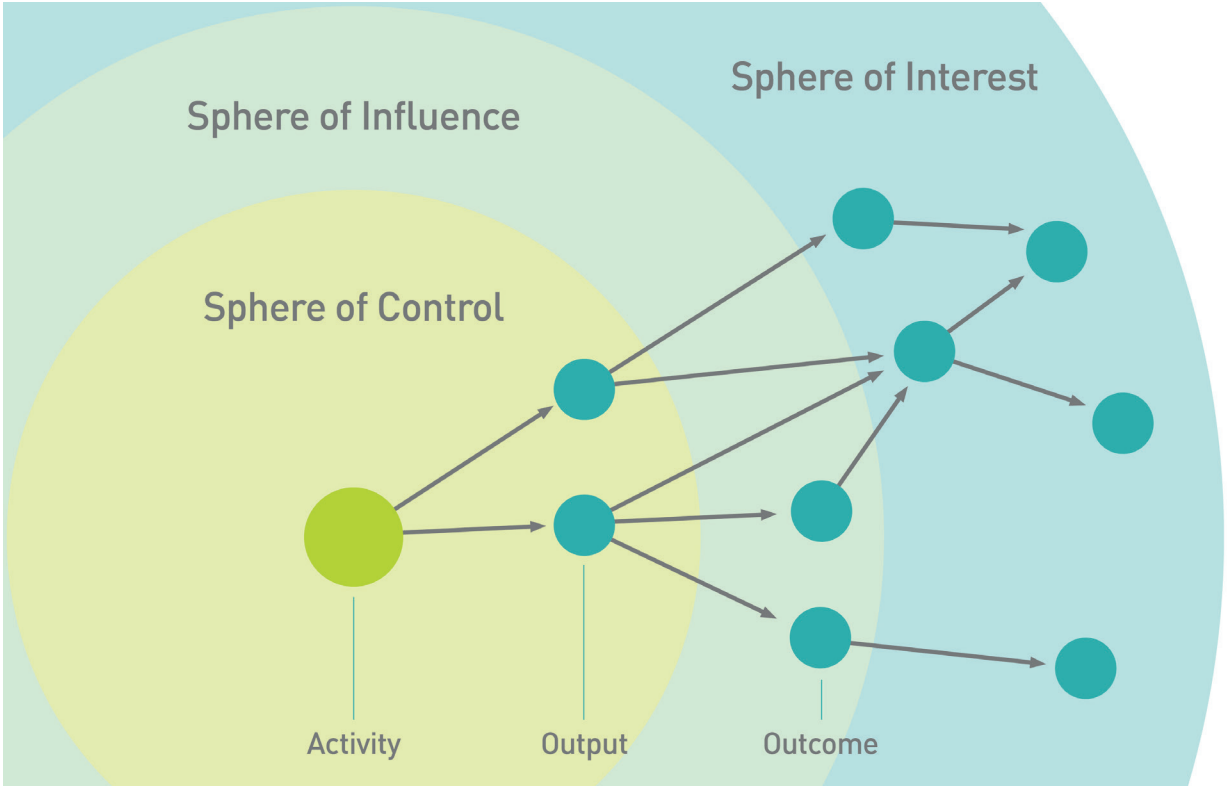

Fig. 1) Concept of „Theory of Change" based on Claus and Belcher, 2020

With regard to the project at hand and chemicals in global textile value chains, the project group does not have sufficient power and size to directly influence the entire system. The desired changes require complex, subsequent and long-term processes of which the project group can only control a small part. However, the key to unlocking the potential of this project is to understand the complex system and form a logical structure of how to most effectively influence these processes.

ToC for Chemical Traceability

In line with this assumption, the project group developed a Theory of Change for "Chemical Traceability in Textile Value Chains in 2040" in a series of workshops and asynchronous work phases over a period of several month (2024). In a back-casting process, starting from a future vision (targeted impact outlined in the scenario story / Sphere of Interest), long-term and mid-term outcomes (Sphere of Influence) as well as short-term activities and outputs (Sphere of Control), outcomes were formulated and aligned with the overall project structure (see p. 6).

The overall goal of the ToC is represented by the scenario story "Empowered by Transparency" the project team envisioned:

"In 2040, chemicals traceability in the global textile apparel value chain is fully in place. This is possible thanks to the Digital Product Passport (DPP) that has been introduced globally and expands beyond the use phase of textile apparel. Reliable data on chemicals in products and processes is now recognised as an important aspect of business models in all value chains. Accordingly, the textile apparel value chains have made significant progress towards a nontoxic, climate-neutral, resource-preserving circular textile apparel economy."

Four lines of separate but interdependent developments are displayed in the Sphere of Influence that make the overall impact possible:

1. **Enforced regulations and implemented standards** are the result of a progressive harmonised regulatory process with clear and actionable requirements for all relevant stakeholders, collaboratively developed industry standards and effective enforcement routines.

2. **The availability of reliable data** on chemicals in products and processes depends on three parallel processes: The mindset of the industry (incl. SMEs) is being adapted to a perspective of traceability and substitution as the "new norm". There is an obligation to declare chemicals in both products and processes. Specific standards are being established for the disclosure of chemical formulas, including what data is disclosed to whom and how, while protecting the intellectual property and business interests of all parties.

3. **A technical ecosystem to enable data exchange is established** and depends on four different processes: Capacity is built up along the entire value chain including both know-how and human resources. Standards for data formats and exchange are agreed upon, allowing all members of the value chain to participate in the process. An effective conceptual system for exchange is scaled-up globally. This is closely linked to physical traceability solutions that are both feasible and user-friendly for all value chains members who need to participate.

4. **Informed decision-making in favour of chemically sustainable textile products** is taking place along the entire value chain (incl. consumers, companies and governments). This is based on the majority of the global public being aware of the relevance of this topic and caring about these processes. Customers (B2C, B2B and GPP) have access to information according to their individual needs and competences regarding the specific decision-making process. Product development and product design teams have access to information to support their processes in line with the aforementioned objectives of this ToC.

The main purpose of this ToC is to inform the implementation of the ECHT project in order to increase its effectiveness and impact towards the vision mentioned before. In line with this, specific activities and outputs have been formulated and designed to address the mid-term outcomes described above. These activities and outputs are structured according to the logic of the overall project, which is divided into five major work packages:

three Action Plans (policy, textile apparel and rugs/carpets), a set of Training Schemes and the Knowledge Platform.

A detailed description of the individual tasks and outputs is beyond this introductory paper and can be found in Figure 2 (page 6). However, it is worth noting that all of the five work packages are interlinked and feed into each other, while the Knowledge Platform acts as a central hub for information and dissemination and is therefore a foundation for the other four work packages. All activities and outputs do not address a specific mid-term outcome, but are intended to work synergistically to influence a set of mid-term outcomes that in turn aim to influence long-term outcomes eventually having an overall impact on the system at hand.

The Theory of Change is a living document that can be revisited and adapted throughout the project.

REFERENCES:

Claus, Rachel; Belcher, Brian (2020): Theory of change. Hg. v. Swiss Academies of Arts and Sciences: td-net toolbox for co-producing knowledge (td-net toolbox profile, 5) available online at www.transdisciplinarity.ch/toolbox.

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THEORY OF CHANGE: TRACEABILITY OF CHEMICALS IN TEXTILE VALUE CHAINS IN 2040

ACTIVITIES

POLICY ACTION PLAN
UBA

- Conceptual work on laying out the framework / objectives of standards
- Investigation in standards / legislatory requirements from industry-side
- Calculation & allocation of budget needs (allow SMEs to participate in harmonisation process)

TEXTILE APPAREL ACTION PLAN
NEOVILI & PUMA

- Developing the capacity building guidance
- Formalised kick-off meetings to discuss rule book
- Assess EDSCA requirements, benchmarks & practices
- Appraise the current ecosystem of solutions
- Analyse the current mindset (consumer & industry)
- Design prevention, monitoring scheme (CSDDD)
- Analyse the current relationship flows and leverage points (key levers) across the supply chain

RUGS & CARPETS ACTION PLAN
GUT

- Input during the training schemes
- Raise awareness to regulatory watching

TRAINING SCHEMES
- ▶ Textile Apparel Polyester
- ▶ Textile Apparel Cotton

H_DA

- Simulation game to test hypotheses/ underpin harmonisation work
- Give overview of regulations
- Inform about case studies & business cases
- Enable to ask the "right questions" for implementing traceability

KNOWLEDGE PLATFORM
LIST

- Pilot Action
- Mapping of legislation / overview of current regulatory work (inside & outside EU)
- Derive input from action plans

OUTPUTS

- Report with policy recommendations
- Manual for national helpdesks
- Fit-for-purpose services specifically for SMEs
- Traceability working group
- Innovation Hub (incl. Mission Statement)
- Hands-on guide for transition to traceability
- Paper/study on transparence & traceability
- Consumer-Facing Guidance Report (incl. Consumer-Mindset-vs-Behaviour-Graph)
- Governance Blueprint Report incl. mapping of current solutions, Governance framework recommendations, Industry-Mindset-vs-Behaviour-vs-Goal-Graph (EDSCA recommendations)
- Conference submission & papers
- Provide case study (incl. other sectors)
- Webinar for industry interest groups (organisation and preparation)
- Catalogs of potential danger or penalties for no declaration
- Joined learning process (lessons learned by participants)
- Collection of industry insights
- Template and guidelines for data collection
- Guides for the translation of data in common languages
- Catalog of funding and research programms for implementing traceability
- Catalog for technical information
- Consumer information (incl. point to relevant podcasts)
- AI Chatbot ("ECHT-GPT")
- Forum to collect feedback and opinions for policy makers
- Pointing to relevant podcast, media, etc.
- Factsheets on specific solutions
- Case studies & Best practices examples
- Introduction video to change industry mindset

MID-TERM OUTCOMES

- Progressive harmonised regulation with clear requirements
- Industry standards
- Enforcement routines
- Mindset in the industry (traceability & substitution the new norm)
- Obligation to declare
- Standards of disclosing chemical formulars (incl. which data)
- Capacity
- Standards on data format and exchange
- Globally scaled-up system for exchange
- Physical traceability solutions
- Caring public
- Customer (B2C, B2B & GPP) access to information
- Product development / design access to information

LONG-TERM OUTCOMES

- Enforced regulation and implemented standards
- Availability of reliable data on chemicals in products and processes
- Technical ecosystem to enable data exchange
- Informed decisions in favour of chemically sustainable textile products

IMPACT

EMPOWERED BY TRANSPARENCY

"In 2040, chemicals traceability in the global textile apparel value chain is fully in place. This is possible thanks to the **Digital Product Passport (DPP)** that has been introduced globally and expands **beyond the use phase** of textile apparel. **Reliable data** on chemicals in products and processes is now recognised as an important aspect of **business models** in all value chains. Accordingly, the textile apparel value chains have made significant progress towards a nontoxic, climate-neutral, resource-preserving circular textile apparel economy."

Fig. 15) Output from the transdisciplinary research project "ECHT - Enable Digital Product Passports with Chemicals Traceability for a Circular Economy". REVIEW VERSION - 08.10.2024 - For more information visit: https://echt.nweurope.eu/