Traceability of Chemicals in Products for a Non-Toxic, Resource-Preserving and Climate Neutral Circular Economy

Policy Workshop for a Theory of Change

Authors of the report:
Julian Schenten, Rebecca Niebler, Martin Führ
Research group *sofia* at Darmstadt University of Applied Sciences

Contact: julian.schenten@h-da.de

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Abstract

The LIFE AskREACH project hosted a workshop with invited decision-makers and experts from EU industry and trade associations (raw materials, technology, furniture, foreign trade), market leader brands (textiles and furniture), EU administration and Member State authorities (Austria, France, Germany, Luxembourg, and Sweden), NGOs (waste and environment), and research. The workshop was intended to create a clearer picture of how the Green Deal policy instruments can contribute to a non-toxic, resource-preserving and climate neutral Circular Economy, and in particular the role of traceability of chemicals as enabler. This report summarises the main outcomes of the workshop. After an executive summary and introduction, it provides a general description of the methodology used in the workshop (Chapter 3). It then documents the course of the deliberative process and the results (Chapter 4). Finally, it presents conclusions that emerged from the workshop and proposes how to build on the findings (Chapter 5).

Abbreviations:

CLP	Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures
CEAP	Circular Economy Action Plan (COM/2020/98 fin)
CSS	Chemical Strategy for Sustainability (COM/2020/667 fin)
DPP	Digital Product Passport
EDS	Enhanced data sheet
EoL	End of life
ERP	Enterprise Resource Planning (system used by companies)
ESPR	Ecodesign for Sustainable Products Regulation (Proposal COM(2022) 142)
FMD	Full Material Declaration
IMDS	International Material Data System
IPC	Association Connecting Electronics Industries
PBT	Persistent, bioaccumulative and toxic
R&D	Research and development
REACH	Regulation (EC) No. 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals
SCIP	Database for information on Substances of Concern in articles as such or in (complex) objects (products)
SDS	Safety Data Sheet
SPI	Sustainable Product Initiative
SoC	Substances of Concern (as defined in the ESPR Proposal)
SVHC(s)	Substance(s) of very high concern (under REACH)
ToC	Theory of Change
vPvB	Very persistent and very bioaccumulative

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1 Executive summary

The EU Green Deal outlines a strategy that aims to transform the EU into a "modern, resource-preserving and competitive economy where there are no net emissions of greenhouse gases in 2050" (COM(2019) 640, p. 2). Avoiding risk cycles of (legacy) substances of concern, enhanced management and control of chemical substances in materials and articles will be key. Hence, trustworthy traceability of chemicals along supply chains is one central enabler for a non-toxic, resource-preserving, and climate neutral Circular Economy.

> Traceability of chemicals shall mean the capacity of companies to trace back chemicals present in products.

Policies implementing the Green Deal (e.g. Circular Economy Action Plan – CEAP, Chemical Strategy for Sustainability – CSS, Sustainable Products Initiative – SPI) directly or indirectly touch upon the issue of traceability. They are complex and developed in parallel to each other, which makes it challenging to anticipate the impact and interplay across policy fields. A thorough systemic understanding is needed of how the building blocks may interact to create the required traceability of chemicals.

For this reason, the LIFE AskREACH project hosted a workshop with invited decision-makers and experts from EU industry and trade associations (raw materials, technology, furniture, foreign trade), market leader brands (textiles and furniture), EU administration and Member State authorities (Austria, France, Germany, Luxembourg, and Sweden), NGOs (waste and environment), and research.

The workshop was intended to provide a clearer picture of how the Green Deal policy instruments can contribute to a (more) circular economy, with a focus on the role of traceability of chemicals as enabler. Methodologically, the participants engaged in a three-step learning process combining elements of scenario building and Theory of Change, in an adapted, focused application on policy assessment. The approach combined visioning and backcasting, embedded in a format encouraging an open exchange of ideas that helped the group build up common perspectives.

1.1 Vision for traceability

The workshop participants first agreed on a common vision for "Traceability of Chemicals in 2035":

> "In 2035: Established trustful, proportionate and efficient EU traceability schemes for chemicals to enable circular value chains of articles ending up in final products, to the benefit of supply chains actors, end-users and authorities towards non-toxic, resource-preserving and climate neutral Circular Economy."

All organisations participating in the workshop, representing many different interests and sectors, agreed that traceability of chemicals is a key enabler for the circular economy, while there were different views concerning the necessary data depth and granularity, with industry arguing for an approach aimed at practicality for rapid implementation while allowing for stepwise enhancements over the time.

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1.2 Selection of most relevant policy instruments

In a second step, the participants identified policy instruments linked to the Green Deal and selected seven instruments that they considered most relevant in terms of reaching the vision. This process comprised three activities – brainstorming, clustering, and prioritization. For each selected instrument, the participants provided a definition as well as a description of the instrument's role in the 2035 vision (Table 1).

Table 1 Prioritized instruments and their roles in 2035

Enhanced data sheet (EDS) for substances and mixtures

In 2035, the enhanced data sheet provides information on (almost) all substances, i.e. full ingredient lists.

Ecodesign for Sustainable Products Regulation (ESPR) product requirements

In 2035, the delegated acts for the most relevant (30) product groups are in place. These requirements guide the design phase.

Phase-out of the most hazardous substances (via restrictions based on generic risk approach)

In 2035, the "sunset dates" will have passed. Most companies are aware of the restrictions and of market chances related to compliance. Meanwhile, new substances of concern will call for continuous improvement.

SCIP (database for information on Substances of Concern In articles as such or in (complex) Products)

In 2035, it fulfils its originally foreseen tasks (inform EoL actors/consumers/authorities) and covers other Substances of Concern besides SVHCs.

Capacity building (policy)

In 2035, the competences in the sectors will have been built up (for the most part) and sector-specific support is readily available.

Sector harmonized approaches / Standardization (Circular Economy Action Plan: "harmonised tracking systems")

In 2035, sectors have established specific reporting approaches (based on common formats/rationales to allow for cross-sector reporting, see Proactive Alliance).

Digital Product Passport (DPP)

In 2035, the DPP provides the information required to the benefits of value chains actors, end-users and authorities towards a non-toxic, resource-preserving and climate neutral Circular Economy.

1.3 Cross-impact analysis of the instruments

In the third step, the participants discussed the interactions of the seven instruments, with a cross-impact analysis. For each instrument they considered how strongly it affects the others, in light of the 2035 future perspective. The impact was quantified by assigning numerical values. Cross-impact analysis ultimately results in the identification of driven factors and driving factors that have a high influence on the other instruments. Apart from the results, another advantage is the deliberation process that led to them. Negotiating numerical values helps the actors on an individual level to build up a distance from their usual patterns of perception and argumentation. They are able to engage with new perspectives, and on this basis they can build a common understanding of influence relationships.

According to the analysis, capacity building, sector harmonised approaches, and the Enhanced Data Sheet (EDS) are the strongest drivers in terms of the 2035 traceability vision, whereas the phase-out of the most hazardous substances and SCIP are rather driven factors. The DPP and ESPR regulation can be seen as factors that can either drive or be driven, depending on the context.

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1.4 Conclusions and the way forward

The results from the cross-impact analysis indicate which instruments should be prioritised to contribute to the 2035 vision. The deliberations also revealed possible steps that relevant actors driving the transformation need to take (see Table 2).

Table 2 Summary of steps per actor to implement the vision

Legislators	Policies stimulating capacity building are needed, addressing identified gaps as to the willingness, capacities (e.g. resources) and opportunities (e.g. standardisation) of industry actors, including End of Life actors, but also of civil society, which plays a role in the transformation (see below).
	The EDS could provide a (data) foundation that positively affects all the other instruments, calling for very timely implementation of this new legal instrument.
	Products subject to ESPR delegated acts should also be selected with a strategic view to support the traceability vision, e.g. because the need for substance tracking is evident.
	For digital solutions such as the DPP to become effective, they have to be embedded in a supporting institutional framework, ranging from – a "tailor made" legislative framework on the macro level responding to the actual incentives and impediments of the value chain actors through – sectoral and cross-sectoral standardisation efforts on the meso-level to – stipulating organisational innovations within companies and their contractual interactions with their suppliers and customers on the micro-level.
	A close link between the DPP and SCIP could reduce complexities, but it requires fundamental improvements to SCIP (among others, the extension to other Substances of Concern than SVHCs).
	Considering the mere number and potential interlinks of policies currently prepared under the Green Deal with relevance for traceability, the European Commission should consider performing a "systemic" impact assessment as opposed to the current patchwork approach. The ToC workshop might serve as role model.
Industry	Downstream users and End of Life actors need to increase their knowledge about the chemical contents of their products and related hazards and risks.
	An unbiased assessment of the short-term costs of traceability versus the medium-term benefits is essential.
	Industry should begin developing sector harmonised approaches, i.e. standards on the language, granularity, and quality control of substances in products reported along supply chains. The ESPR proposal already provides some hints as to what standards should be capable of. Reporting formats should be harmonised across sectors.
R&D	Practical research that involves supply chain actors in learning processes is needed to convey a deeper understanding of why change towards traceability is necessary.
	There is a need for technical and social innovations, e.g. instruments, tools, and capacities to create and analyse data, as well as approaches to overcome a lack of trust.
Civil Society	The main role of civil society will be to exert and maintain pressure on industry, but also on legislators, to actively engage in achieving the 2035 traceability vision.
	Make sure that product-related information is communicated in a way that allows consumers to make informed decisions.

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2 Introduction

The EU Green Deal outlines a strategy that aims to transform the EU into a "modern, resource-efficient, and competitive economy where there are no net emissions of greenhouse gases in 2050"[1]. In the transition towards a resource-preserving "clean and circular economy"[2] that is capable of avoiding risk cycles of (legacy) substances of concern, enhancing management and control of chemical substances in materials and articles will be key: **Trustworthy traceability of chemicals along supply chains is one central enabler for a non-toxic, resource-preserving, and climate neutral circular economy.**

Traceability of chemicals in this context shall mean the capacity of companies to trace back chemicals present in products.[3]

Policies implementing the Green Deal[4] directly or indirectly touch upon the issue of traceability. They are developed in parallel to each other, and it is challenging to anticipate the impact and interplay across the policy fields. Thus, it is critical to gain a thorough systemic understanding of how the building blocks may interact to create the required traceability of chemicals – and how this translates into benefits for the actors along circular value chains.

However, the European Green Deal shows a great variety of components (Figure 1), hampering a clear understanding of how the long list of measures envisaged in the various policies and strategies create impact, from short-term to long-term, and which actors along the multiple supply chains need to provide which behavioural (change) contributions in this respect. Which supply chain actor has to generate which data and transfer the data to whom under what circumstances? Which actors in supply chains, authorities, and the public at large, need access to which level of detail in their data?

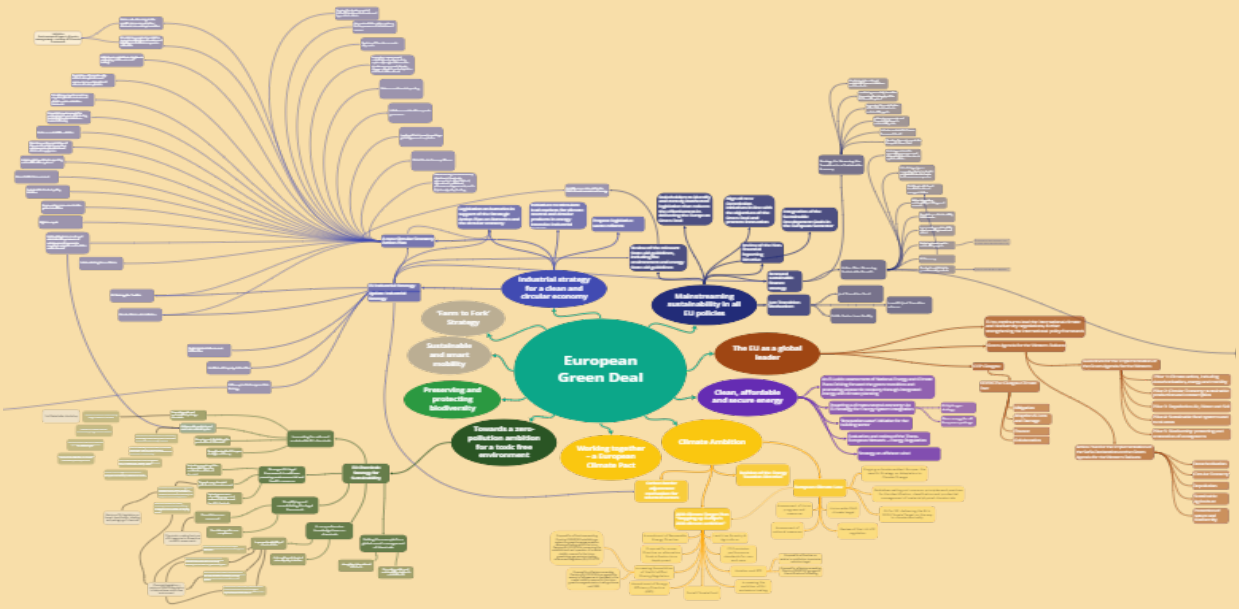

Figure 1 The Green Deal and its subsequent strategies and policies (to see the Figure in detail visit: sofia-research.com)

1 COM(2019) 640, 2.
2 COM(2019) 640, 7.
3 E.g. in the IMDS, automotive suppliers have to report material compositions of delivered car parts. The level of detail goes down to the individual chemical substances.
4 E.g. Circular Economy Action Plan (CEAP), Chemical Strategy for Sustainability (CSS), Sustainable Product Initiative (SPI)

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Against this backdrop, the EU project "LIFE AskREACH" conducted a Theory of Change workshop from May 31 to June 01, 2022 in Brussels and followed this up with a virtual meeting on June 17, i.e. some weeks after the Commission launched the Sustainable Products Initiative (SPI). The workshop aimed to explore how Green Deal policies influence each other in order to gain a better understanding of the necessary steps towards the vision of a non-toxic, resource-preserving, and climate neutral circular economy. In addition, the process of the workshop should motivate the participants to carry the insights forward in their area of responsibility and to initiate concrete change processes towards the commonly shared understanding of challenges.

The workshop was prepared (facilitated) and moderated by the AskREACH partners, Society for Institutional Analysis (*sofia*), with support from the Baltic Environmental Forum in Germany (BEF DE).

3 Methodology

Implementing a workshop dealing with the different policies of the Green Deal and their role in the issue of traceability is a demanding task. Not only because of the complexity due to the sheer number of potential interlinks between relevant policies, but also because of the different mindsets that have to be involved. Therefore, the facilitation team developed and employed a three-stage learning process based on scenario building and Theory of Change approaches. This chapter presents the underlying methodology (Section 3.1) and explains how the facilitation team adapted it for the course of action of this workshop (Section 3.2). The chapter then explains in more detail the impact matrix, the methodological core of the common learning process (Section 3.3), and how conclusions have been derived (Section 3.4). Finally, Section 3.5 reflects on the practical application of the methods.

3.1 A three-step learning process

The learning process combines elements of scenario building and Theory of Change in an adapted, focused application on policy assessment. "Theory of Change" (ToC)[5] describes, from a future perspective, the idea of how actors relevant in a certain context specifically interact to bring about a desired change. This includes identifying key influencing factors relevant for these contexts and their interactions. At the same time, this is methodologically consistent with the procedure in a scenario process.[6]

3.1.1 Common vision

As a first step, participants have to agree on a common vision with regard to the topic of the workshop, i.e. a version of the future that all participants would want to see, notwithstanding their different backgrounds. The vision also defines the system boundaries for the following assessment steps.

3.1.2 Selection of instruments

Subsequently, the participants identify policy instruments linked to the Green Deal and relevant for the vision and select those they consider most relevant in terms of reaching the vision. Instrument, in this

[5] The term "Theory of Change" is used because the envisaged effects occur in the future, not because they are based on a specific set of scientific hypotheses and related theoretical framework. "Modes of change" [MoC] might convey the meaning more clearly.

[6] Geschka et al. 2008. See Schenten / Rehn 2021 for the methodological integration.

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respect, means legislation and other policies, or elements thereof (e.g. specific tools, concepts, principles, mechanisms) that are already in place, drafted, planned, or even not officially planned but reasonable to assume (= missing instruments). This process step comprises three activities, i.e.

Brainstorming: Participants have the opportunity to write down policy approaches that they consider particularly important for the vision to be included in the discussion.

Clustering: The moderation team groups the suggestions into eleven clusters. This is done to avoid duplicate nominations. It also makes possible to fish out those approaches that are not directly policy instruments but rather additional contextual factors (see Table 3). The participants discuss the results of the clustering with the moderation team.

Prioritization: The participants choose the three instruments that they consider most important for achieving the vision. Based on this choice, the moderation team puts together the seven tools that were most frequently identified as key.

Subsequently, the participants provide a definition for each instrument as well as a short description of the instrument's role in the vision. This is a recursive task, i.e. in the course of the workshop, based on their improved understanding of how the instruments delineate, the participants may refine the definitions and descriptions. Ideally, they reach a common understanding of the profile of the policies that are chosen for the next step.

3.1.3 Cross-impact analysis

The third step comprises the cross-impact analysis of how the selected instruments influence each other. A cross-impact matrix helps to structure the discussion and to show the impact of one instrument on the other instruments listed in the columns (see Figure 2). The approach derives from the scenario techniques method developed by Horst Geschka.[7] The impact is described in four levels: no influence at all (0), weak influence (1), moderate influence (2), strong influence (3).

		Instrument A	Instrument B	Instrument C	Instrument D	Instrument E	Instrument F	Instrument G	Row sum	**Impact direction** (Row sums/Column sums)
1	Instrument A	x								
2	Instrument B		x							
3	Instrument C			x						
4	Instrument D				x					
5	Instrument E					x				
6	Instrument F						x			
7	Instrument G							x		
	Column sum									

Figure 2 Cross-impact matrix

To this end, the participants have to take the defined vision for granted and look back from a future perspective in the year 2035 at how the chosen instruments will have influenced this success. To carry

[7] Geschka et al. 2008.

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out the cross-impact analysis, they ask the following question for each interrelation: How strong was the influence (neutral, i.e. regardless of whether this influence is of a rather supporting or blocking nature) of reaching the vision for instrument A on achieving the vision for instrument B? See Figure 3.

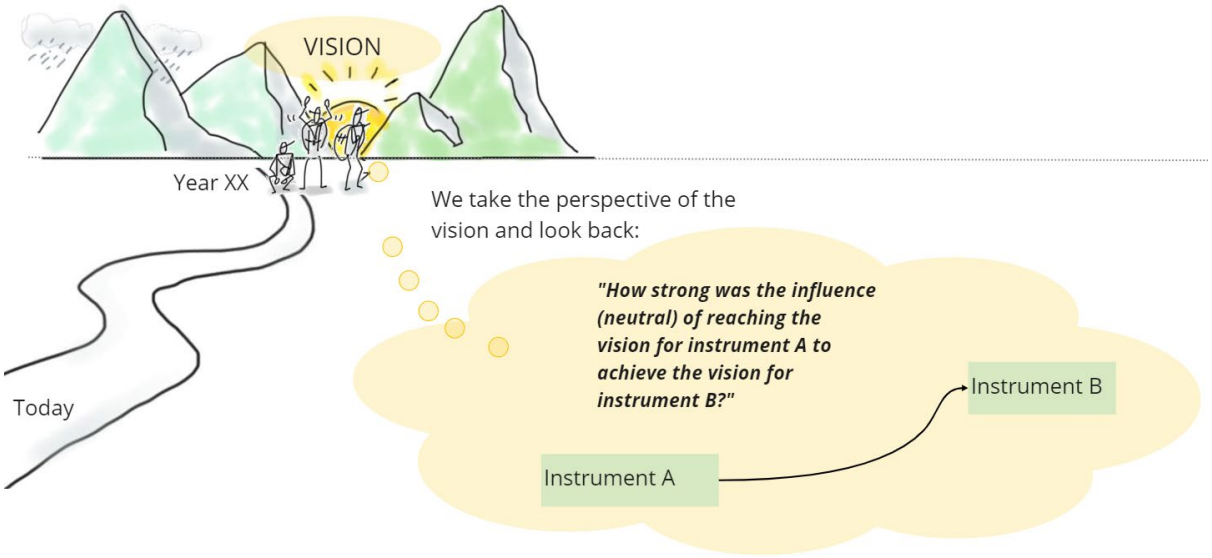

Figure 3 Perspective of assessment (source of picture: https://www.pinterest.de/pin/127156389453818434/)

During the discussion, participants have to reach consensus for each interrelation. There may be relationships for which participants cannot agree on one value. To manage these uncertainties instead a range of two values can be assigned. This can result in different scenarios for the impact matrix.

Dividing the row sums for each instrument (an indicator for the influence of the instrument on all the others) by the column sums (indicator for how the instrument is influenced by all other instruments) shows the impact direction of instruments. The higher the value, the more an instrument can be seen as a driver for the vision. The lower the value, the more an instrument is to be seen as driven by the others. There are also instruments that are neither exclusively driven nor driving. Those instruments can be either, depending on the situation in the specific context.

In the end, the matrix identifies those driving factors with a high influence on the other factors, and driven factors which are strongly influenced by the other factors. In addition, the matrix shows the degree of connection between all the influencing factors.

3.2 Adaptation of the "Theory of Change" course of action

Usually, developing a ToC is a lengthy process.[8] Going through the three steps of the learning process requires much discussion, as in the end it depends on the consensus of all participants.

The workshop was scheduled from May 31 to June 1, 2022 in Brussels. Due to the time restrictions, the moderation team provided a vision, derived from the aims of the Green Deal and its subsequent policies, as a proposal to the participants. During a discussion, the participants then altered the wording and adapted the vision according to their knowledge and perspectives. Based on the deliberations in step 2, the moderation team proposed that the group consider just seven instruments, recognising the time restraints. Even with this somewhat limited scope, it was not possible to complete

[8] Belcher et al 2020.

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the analysis during the workshop. The participants therefore completed the analysis concerning the last three impact relationships as a "home assignment". On June 17, the group met virtually again, filled in the gaps in the cross-impact analysis, and discussed the results.

3.3 Working with the impact matrix as a common learning process

Contributions from various actors are necessary to initiate the transition towards the vision of the traceability of chemicals in products. The entire range of actors (inter alia, industry, consumer associations, policymakers, NGOs, and researchers) should participate in the ToC process. This gives the discussion the required plurality since the actors approach the topic with different experiences, professional backgrounds, thinking styles, and resulting perception patterns.[9] At the workshop presented in this report the group of participants included decision-makers and experts from industry, administration, NGOs and research.

There are two benefits to working with the impact matrix: the actual outcome (a completed matrix), and the deliberation process to get there. Ranking the extensive and diverse linkages of the instruments on a simple scale of values reduces the complexity to a level that allows for a structured discussion. The values therefore support the qualitative reasoning in deriving trends from the mechanisms of impact rather than providing quantitative significance.

The negotiation of numerical values helps the actors on an individual level to build up a distance from their usual patterns of perception and argumentation. They are able to engage with new perspectives, and on this basis, they can build a common understanding of influence relationships. In addition, the abstraction detaches the actors from their conflicts (with each other) in everyday life. This enables them to forget the established routines for the moment, at least within the framework of the workshop, which creates good conditions for a productive working atmosphere. The almost playful approach of the format additionally supports the "passion" in the cooperation.

In the end, this process can result in a common understanding among the participants of how the Green Deal instruments influence each other with regard to the vision.

3.4 Deriving conclusions

The *sofia* research group derived draft conclusions from the learning process and its results, which were discussed in November / December 2022 with two-thirds of the participants. Section 5 presents the final conclusions.

4 Deliberative process and its results

Building on the methodology outlined above, the team implements the workshop. This chapter describes this process and its results, divided into three stages: visioning (Section 4.1), selection of instruments (Section 4.2), and cross-impact analysis (Section 4.2.8).

[9] Belcher and Claus 2020.

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4.1 Visioning

To start shaping the vision, the moderation team proposed a text for the vision as a basis for discussion among the participants:

"Established EU traceability schemes (B2B) for chemicals in circular value chains of consumer articles in 2035"

The participants discussed the need to further specify those traceability schemes. They established that traceability schemes must be trustful, proportionate, and efficient. The question arose as to why the vision focuses only on B2B traceability schemes. They subsequently agreed that the information is needed first in the supply chain. To this end, the participants defined what is meant by "circular value chains". In the vision, the term circular value chains comprises "production supply chains", repair/maintenance services, and "End of Life" processes. Furthermore, participants pointed out that the term "article" is REACH specific, whereas the vision should refer to the broader concept of "product" which is used in the Sustainable Products Initiative (SPI). Ultimately, to draw on the advantages of both concepts, they decided on the wording "articles ending up in final products".[10]

As a conclusion, the participants agreed on the following vision:

> "In 2035: Established trustful, proportionate and efficient EU traceability schemes for chemicals to enable circular value chains of articles ending up in final products, to the benefit of supply chains actors, end-users and authorities towards non-toxic, resource-preserving and climate neutral Circular Economy."

4.2 Selection and definition of instruments

The participants chose seven instruments to be most relevant to the vision. Some of these instruments are policies that are already in place (Phase-out, SCIP), or are scheduled (ESPR, DPP), others are extensions of current measures (capacity building policies) or entirely new (EDS). The following sub-sections introduce these instruments and their roles in the 2035 vision, as discussed by the participants. Table 1 already summarised the definitions and roles per instrument.

In addition, while discussing instruments and their cross-impact relationships, the participants identified other relevant context factors that are important for achieving the vision but do not fit the definition of a policy instrument (see Section 4.2.8).

4.2.1 Enhanced data sheet for substances and mixtures

The Enhanced Data Sheet (EDS) builds upon Safety Data Sheets (SDS) but goes beyond safety concerns. Safety Data Sheets have to be provided for substances and mixtures that are classified as hazardous according to the CLP[11] Regulation, are persistent, bioaccumulative and toxic (PBT), very persistent and very bioaccumulative (vPvB), or are included in the Candidate List of substances of very

[10] In the context of REACH, the term final products refers to complex objects (comprising more than one article), cf. ECHA 2017, 22.

[11] Classification, Labelling and Packaging (Regulation (EC) No 1272/2008).

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high concern (SVHCs) due to other properties. The SDS contains information about those substances or mixtures, such as their properties, their hazards, and instructions for safe handling, disposal, and transport. In addition, it includes first aid and exposure protection measures. The format and content of the SDS sheets are specified in the REACH Regulation.[12]

With a view to the challenges of a non-toxic circular economy, extending the safety perspective of the SDS, the EDS, as foreseen in the 2035 vision, is mandatory for all substances and mixtures and does cover (almost) all substances, i.e. full ingredient lists. Exceptions are granted in rare cases where confidentiality claims are justified. The Enhanced Data Sheet would thus establish a solid foundation for determining chemicals in input streams related to materials and products.

4.2.2 ESPR product requirements

The product requirements of the Ecodesign for Sustainable Products Regulation (ESPR) are part of the proposal for a new Ecodesign Regulation, which was published by the European Commission on March 30, 2022.[13] The proposal builds on the existing Ecodesign Directive, which currently only covers energy-related products. The proposal potentially creates a framework for almost all product groups in which different ecodesign requirements can be set. The aim is to improve the following aspects among others: durability, reusability, reparability, and the presence of substances of concern.[14] Delegated acts for different product groups to be adopted by the Commission "shall, as appropriate, include (a) performance requirements […] and (b) information requirements […]".[15]

The vision for this instrument in 2035 assumes that there are delegated acts in place for the 30 most relevant product groups. Furthermore, the companies affected by the delegated acts have already integrated the ecodesign requirements into their relevant corporate organisation and management structures; notably, the ESPR guides the product design phase.

4.2.3 Phase-out of the most hazardous substances

Instrument 3 refers to restrictions based on the generic risk approach that enable the phase-out of the most hazardous substances. In the EU regulatory framework for chemicals, the generic risk approach means that defined risk management measures (e.g. restrictions) automatically apply when substances fulfil defined hazardous properties or fall under certain considerations of exposure (e.g. widespread use, use in children's products).[16] Phase-out is a dynamic process. Not all hazardous substances will be phased out by 2035. On the contrary, new substances of concern will emerge, calling for continuous improvement.

For this reason, the participants determine that in 2035 the sunset dates for the chemicals addressed in the Chemical Strategy for Sustainability will have passed. The 2035 vision of this instrument also foresees that companies are compliant with the restrictions due to related market opportunities.

12 Art. 31 of REACH, cf. ECHA 2022a.
13 European Commission 2022.
14 European Commission 2022, Art. 5.
15 European Commission 2022, Art. 5(3).
16 European Commission 2020b, 9.

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4.2.4 SCIP

The SCIP database for information on "Substances of Concern in Articles as Such or in (Complex) Objects (Products)" was established under the Waste Framework Directive. In the database, suppliers of articles report on articles they place on the EU market that contain SVHCs at a concentration above 0.1% by weight (w/w). The European Chemicals Agency (ECHA) hosts the database and disseminates the information notified by companies. The SCIP database is intended to ensure that information on articles containing substances on the candidate list is available to actors throughout the life cycle of products and materials, including End of Life actors, consumers, and authorities.[17] Currently, there are concerns that SCIP does not realise its full potential, as the disseminated information is of limited use and the number of notifications is well below expectations.

In the 2035 vision, participants imagine that SCIP will fulfil these originally foreseen tasks and cover more substances of concern (SoC) besides SVHCs.

4.2.5 Capacity building (policy)

Capacity building was first defined as a context factor, but during the selection of the instruments, participants agreed that there was a need for a real policy on capacity building to make the traceability vision happen. This is touched on in the Green Deal[18], but it is not formulated as a strong policy.

For the vision in 2035 the participants defined that the competences in the sectors will have been built up (for the most part) and sector-specific support is readily available. While discussing the cross-impact matrix for a capacity building policy, the participants agreed that capacity building is not a prerequisite for the other policies themselves but for their successful implementation.

4.2.6 Sector harmonized approaches / standardisation

This instrument picks up on the Commission's objective from the Circular Economy Action Plan to "co-operate with industry to progressively develop harmonised systems to track and manage information on substances identified as being of very high concern and other relevant substances [...]".[19] For the 2035 vision, this means that sectors have established specific reporting approaches (based on common formats/rationales to allow for cross-sector reporting, see Proactive Alliance[20]). Those approaches can include industry-wide standards (e.g. IPC 1752B – Materials Declaration Management Standard for electrical and electronic products and other products) or harmonised IT-tools used in one sector (e.g. IMDS – International Material Data System used in the automotive sector). Such standards allow for communication along the supply chain while reducing transaction costs.

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17 See ECHA 2022b.

18 E.g. the CSS calling for "advice and assistance in particular for SMEs" to promote safe and sustainable-by-design chemicals (European Commission 2020b, p. 5) and support to the capacity of third countries to "assess and manage chemicals in a sound manner" (European Commission 2020b, p. 24).

19 European Commission 2020a, 13.

20 Proactive Alliance 2021.

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4.2.7 Digital Product Passport (DPP)

The Digital Product Passport originates from the ESPR proposal. The DPP is a digital tool to implement the information requirements for the different product groups, which will be set in the delegated acts. The reference base for the DPP is the (final) product.[21] This term is not the same as the concept of "article" under REACH. Paint, for example, could be a product under the ESPR, consisting of the paint itself and the bucket containing it. Once implemented, the DPP consists of "a structured collection of product related data with a predefined scope and agreed data ownership and access rights conveyed through a unique identifier".[22] The product passport shall "(a) ensure that actors along the value chain, in particular consumers, economic operators, and competent national authorities, can access product information relevant to them; (b) facilitate the verification of product compliance by competent national authorities; and (c) improve the traceability of products along the value chain".[23] Parts of the information requirements of the DPP include substances of concern. However, these are not primarily subject to the ESPR for reasons of chemical safety but due to other factors, such as that they hinder reuse or recycling.[24] Participants agreed that in its vision for 2035, the DPP provides the information required to understand the benefits of value chains for actors, end-users, and authorities toward a non-toxic, resource-preserving, and climate neutral circular economy.

4.2.8 Additional context factors

Besides the instruments subject to evaluation, additional factors have been identified that do not fit the instrument definition. These will have a crucial impact on the 2035 vision, as they are, for example, linked to technical and social innovation, or market conditions. These factors can be indirectly addressed via specific policy instruments (e.g. research funding). They might also give hints as to instruments that are lacking.

Table 3 documents a selection of factors complementing the policy instruments on the way to achieving the vision.

Table 3 Additional context factors

Technical innovation	Technique for transport of information (ensure that the provided data is useful for all actors during the products life cycle)
	Single entry point of data
	(Further) develop non-toxic recycling systems
	Better capacities for data analysis
	Chemical analysis to show compliance
	Company level: tools for product designers to consider different circular economy aspects in the design process

[21] European Commission 2022, Art. 9.
[22] Galatola 2022, 5.
[23] European Commission 2022, Art. 8.
[24] European Commission 2022, Art 6(3), Recital 22.

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Social innovation and governance	Overcome trust issues with regard to traceability
	Re-established European production
	Cooperation at sector level (minimum requirements, governance mechanisms, …)
	Policies of companies take instruments into account
	Close missing link between mixtures and materials
	Improved enforcement of the requirements for chemicals
	Incentives (including legislation) and support for the substitution of SoCs
	Companies have to include material data system (MDS) into the ERP system

4.3 Cross-impact analysis

The findings of the discussion in the context of the cross impact analysis are structured along the seven policy instruments: EDS (4.3.1), ESPR (4.3.2), phase-out (4.3.3), SCIP (4.3.4), capacity building (4.3.5), sector-harmonised approaches (4.3.6) and DPP (4.3.7) and their influence on the other six policy areas. Following the discussion of the influence of these policy areas, the chapter considers driving and driven factors as a result of the impact matrix (4.3.8).

4.3.1 Enhanced data sheet for substances and mixtures

Taking the perspective of the 2035 traceability vision and looking back, the participants rated the influence of reaching the vision for the enhanced data sheet to achieve the vision for the **ESPR product requirements** as moderate. They argued that the EDS is not linked to materials, but to chemicals (substances or mixtures). Designers, however, are not interested in chemicals, they rather need information on materials. That said, the group acknowledged that data sheets can be relevant for the designer in rare cases, e.g. when a substance is added to a fabric which could have an impact on the design phase.

Concerning the influence on the vision for the **phase-out of the most hazardous substances** (via restrictions based on a generic risk approach), participants saw a strong influence. Admittedly, at the moment, the current SDS has little if any impact regarding information exchange and incentives for substitution: a plethora of SDS sheets are on the market, yet many of the most hazardous substances are still in use. However, the participants agreed that industry cannot phase-out substances if they do not know which substances are used in which products and processes. In this respect, SDS sheets are so far the only information source for companies. An EDS that goes beyond safety with regard to chemicals could thus bring the necessary information into the supply chain to trigger the phase-out.

Looking at the influence of the EDS on **SCIP**, participants argued that an EDS would help to create a better SCIP, because if there is more knowledge about substances and their properties, more of them will become subject to SCIP reporting obligations. In addition, data sheets are often the only information source for companies to know which substances are present in their processes, notwithstanding the fact that what you put in your process is not always what is in your product, because of chemical reactions. The participants could not find consensus and therefore chose a weak to moderate influence.

When asked about the influence of the EDS on **capacity building,** the group was undecided between no and moderate influence.

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Regarding **sector-harmonised approaches**, the participants agreed on a low influence because the EDS could create pressure on industries to develop standards.

Participants discussed that the influence on the product passport depends on how the **DPP** and REACH, or the EDS, will be interlinked. Especially considering that the different target objects (substances/mixtures for EDS and products for DPP). However, the DPP will most likely contain information on the chemicals in the product. In order to get this information, there is a need for the EDS on the chemical mixtures because those mixtures usually remain in the product. For some products (e.g. paint in a bucket) it will be easy to link the EDS with the DPP, for others this will be more challenging (e.g. complex objects in terms of REACH). Additionally, the informational scope of the DPP goes beyond chemical aspects relevant to the EDS. As a result, participants agreed on a moderate influence. Figure 4 illustrates the overall scoring of the influence of the vision of the EDS on the visions of the other instruments.

0 no influence at all 1 weak influence 2 moderate influence 3 strong influence		1 Enhanced Data Sheet	2 ESPR product requirements	3 Phase-out of the most hazardous substances	4 SCIP	5 Capacity building (policy	6 Sector harmonized approaches	7 Digital Product Passport
1	Enhanced Data Sheet	X	2	3	1/2	0/2	1	2

Figure 4 Influence of the Enhanced Data Sheet on the other instruments

4.3.2 ESPR product requirements

Participants recognised that the ESPR product requirements, as defined in the 2035 vision, have no impact on the achievement of the vision for the **EDS**. The ESPR requirements are about the product and do not, in contrast to the EDS, contain requirements for chemical safety information (an aspect covered by chemicals legislation). Thus, the ESPR does not oblige or otherwise incite chemical producers to provide more information, which would be needed for the EDS.

Looking at the impact on the **phase-out of the most hazardous substances**, the participants settled on a moderate influence. Even if the ESPR is not about safety, it will require tracking and create the mandate to restrict substances for different product categories based on sustainability considerations[25]. This may also lead to the phase-out of some hazardous substances. Furthermore, if you oblige actors to track substances, they will aim for substitution because this tracking is costly.

When companies choose substances that are less hazardous, it will lead to fewer products with SVHCs. As a result, fewer products need to be entered into the **SCIP** database, and there is less potential for non-compliance. Meanwhile, the potential for better-quality entries increases as imported items are also affected by the ESPR requirements, which include that some substances must be tracked. For these reasons, the participants consider the ESPR to have a moderate to high influence on SCIP.

[25] E.g. they hinder the recycling of a product, as is the case of black ink in plastic, which impedes the sorting of the materials, Turner 2018, p. 316.

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With regard to the impact on reaching the vision for **capacity building**, participants only saw a low influence of the 2035 vision for the ESPR. Although, it could trigger some discussion at the sector level and, thus allowing for capacity building around the ESPR requirements.

For the last two influence relationships, the participants agreed that the ESPR requirements have a high influence. To meet the requirements of the ESPR, common reporting approaches and standards are essential. As a result, the introduction of the product requirements triggers and drives work on these **sector-harmonised approaches**. With regard to the **DPP**, there was no discussion because there is an ESPR obligation to make the product passport mandatory. Figure 5 gives the summary of the assessment of the influence of the ESPR product requirements instrument.

0 no influence at all
1 weak influence
2 moderate influence
3 strong influence

		1	2	3	4	5	6	7
		Enhanced Data Sheet	ESPR product requirements	Phase-out of the most hazardous substances	SCIP	Capacity building (policy	Sector harmonized approaches	Digital Product Passport
2	ESPR product requirements	0	x	2	2/3	1	3	3

Figure 5 Influence of the ESPR product requirements on the other instruments

4.3.3 Phase-out of the most hazardous substances

The participants agreed that reaching the 2035 vision for the phase-out of the most hazardous substances has no influence on reaching the vision for the **EDS**.

Looking back from the 2035 traceability vision on the instrument of **ESPR product requirements**, the participants could not agree on a value. They settled on a low to medium influence. It can be argued that if more substances have been restricted and phased out, it will affect the design process because the variety of materials available to the designer will be limited. Furthermore, any restrictions covered by REACH do not have to be addressed by ESPR product requirements.

With regard to the **SCIP** database, participants discussed whether there is a need for SCIP when the phase-out of hazardous substances is completed. However, the definition of the phase-out instrument only refers to the phase-out of the most hazardous chemicals, and SCIP covers more than just those most hazardous substances. Furthermore, there will be new SVHCs in 2035 that one is not aware of today. In addition, legacy entries in SCIP allow the tracking of SVHCs that are already restricted but still remain in articles already on the market. If a substance is restricted, it can at best no longer used for new products. However, it can take a while for older products already registered in SCIP to reach their end of life. Only after this is the substance finally withdrawn from circulation. Then again, if many SVHCs are restricted (to be phased out) by 2035, problems with the imported articles in SCIP may become less apparent, if it is assumed that compliance with restrictions is higher than with information requirements (as required in SCIP). Nevertheless, the phase-out impacts the operation of SCIP, but it is not so important for the improved SCIP database, as defined in the vision for this instrument. Finally, the participants decided on a moderate influence.

Regarding the influence of the phase-out on **capacity building** policies, participants agreed that the phase-out creates more pressure in the direction of companies, especially for building up capacities in the field of substitution. Consequently, the policy makers (commission and EU member states) have to

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provide help to the companies to understand the obligations. In the end, the participants decided on a weak influence.

Concerning the instrument of **sector-harmonised approaches,** the participants considered whether the pressure that the generic risk approach puts on industry will trigger standardisation measures or harmonised approaches. Some standards will reflect or mirror what happened in the field of phase-out. This is shown by several standards which refer to certain substances that shall not be used. For example, the automotive industry was mentioned, which immediately puts a substance on their standardised declarable substance list (GADSL) if it becomes an SVHC. However, the discussion led the participants ultimately to vote for a weak impact.

Looking at the influence of the phase-out on the **DPP**, participants also agreed on a weak influence since, where restrictions are in place and successfully implemented, this will also reduce the amount of data that needs to be tackled with the DPP. Figure 6 presents the scores for the assessment of instrument 3 Phase-out for the most hazardous substances.

	1	2	3	4	5	6	7
0 no influence at all 1 weak influence 2 moderate influence 3 strong influence	Enhanced Data Sheet	ESPR product requirements	Phase-out of the most hazardous substances	SCIP	Capacity building (policy	Sector harmonized approaches	Digital Product Passport
3 Phase-out of the most hazardous substances	0	1/2	x	2	1	1	1

Figure 6 Influence of the Phase-out of the most hazardous substances on the other instruments

4.3.4 SCIP

As for the influence of the SCIP database on the **EDS**, the participants agreed on a moderate influence because a fully operational SCIP could trigger a pull effect. SCIP requests information from the final supplier, who pushes the request upstream in his supply chain. It is easier to get this information if the EDS are complete and available along the supply chain. SCIP could thus create incentives to comply with the duties related to the EDS.

The participants opted for a moderate influence of the SCIP vision on the vision for the **ESPR product requirements**. It can be argued that companies do not want their products displayed in the SCIP database. Thus, if a substance triggers requirements under ESPR, but also under SCIP, this could create stronger incentives to avoid this substance in order to meet the requirements of both ESPR and SCIP. In addition, when designing or reviewing the delegated acts of the ESPR, SCIP could be a useful information source. A functioning SCIP discloses which industries are notifying which substances (or not), which could provide hints for substances to be tackled under the ESPR.

Looking back from the 2035 traceability vision, the participants voted for a weak to moderate influence of the SCIP's vision on reaching the vision of the **phase-out of the most dangerous substances**. In light of the previous discussion on the influence of SCIP on ESPR, they saw less influence on phase-out. However, SCIP enables the tracking of restricted SVHCs that are still present in articles already on the market. Those legacy entries could have contributed to the final phase-out of these chemicals, as foreseen in Vision 2035.

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The participants discussed whether there is still a need for **capacity building** measures when the vision for SCIP has become reality, i.e. when SCIP is a functioning system, which is at least an indication of existing traceability capacities in the supply chains. In this scenario, if SCIP is already working, there would be a reduced need for capacity building, e.g. perhaps only with regard to a small group of actors. However, one could also argue that in this scenario, there is still a need to increase the knowledge of the actors involved. The vision includes an enhanced SCIP database, with advanced compliance by actors. This requires will increase the need for capacity building. In the end, the participants settled for a moderate influence.

Concerning the **sector-harmonised approaches**, participants also agreed on a moderate influence because the SCIP obligation triggers a need for harmonisation processes in the industries. An example of this is the Proactive Alliance[26], which was established as a reaction to SCIP and similar obligations.

Considering the **DPP**, participants shared the opinion that SCIP and the DPP should be closely interlinked. Possible approaches include linking the chemical information pursuant to the DPP to SCIP or incorporating SCIP into the DPP. Figure 7 summarises the results for the influence of SCIP on the other instruments.

0 no influence at all 1 weak influence 2 moderate influence 3 strong influence	1 Enhanced Data Sheet	2 ESPR product requirements	3 Phase-out of the most hazardous substances	4 SCIP	5 Capacity building (policy	6 Sector harmonized approaches	7 Digital Product Passport
4 SCIP	2	2	1/2	x	2	2	3

Figure 7 Influence of SCIP on the other instruments

4.3.5 Capacity building (policies)

Companies need capacity-building to create the **EDS**, but even if they have the capacity, they are dependent on the basic ingredient suppliers to get the right information.

Although capacity-building policies do not influence the **ESPR** delegated acts, they are a prerequisite for designers having the relevant knowledge to implement the ESPR requirements. This can imply at least that traceability capacities exist along the supply chains.

Because it is important that companies be aware of **phase-outs**, capacity-building policies will play a medium role in reaching the vision for phase-out. In addition, as the phase-out goal in some cases will force companies to rethink their whole processes or business model, capacity-building can support companies' change management.

Regarding **SCIP**, the participants felt that SCIP will never function without the right capacities.

At the same time, suitable capacities could speed up **sector-harmonising approaches**.

As for the **DPP**, it again depends on the structure of the passport. If the passport is based on a more decentralised system, which could include SCIP and other already running databases, there would not be such a big need for additional capacity building. However, the DPP as outlined by the ESPR addresses a completely different scope compared to SCIP (products vs. articles), which is why it is

[26] See https://www.proactive-alliance.info/mission-goals.

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uncertain how and to what extent SCIP will be interlinked. Furthermore, the introduction of a digital tool always entails certain capacity-building needs.

In the end, participants agreed on a moderate influence of the vision for capacity building policy on the visions of the other instruments, except for SCIP, where they even saw a high influence. Figure 8 shows the scores for the influence of Capacity building (policies) on the other instruments.

	1	2	3	4	5	6	7
0 no influence at all 1 weak influence 2 moderate influence 3 strong influence	Enhanced Data Sheet	ESPR product requirements	Phase-out of the most hazardous substances	SCIP	Capacity building (policy	Sector harmonized approaches	Digital Product Passport
5 Capacity building (policy	2	2	2	3	x	2	2

Figure 8 Influence of the capacity building (policies) on the other instruments

4.3.6 Sector-harmonised approaches / standardisation

Concerning the influence of the vision for the sector-harmonised approaches on reaching the vision for the **EDS**, the participants decided on a moderate influence. It must be taken into account that sectors establish standards, whereas legislation defines the requirements for the EDS. Bearing this in mind, the question arises as to how far these sector-developed approaches can influence the development of the EDS. However, the vision for the EDS is not only to have a data sheet policy but also to comply with this. In this context, reaching the vision of sector-harmonised approaches has an influence on achieving the vision of the EDS. Different approaches for the EDS would hamper the upstream actors' ability to provide the relevant information, which makes the implementation of the EDS difficult. However, if all industry actors ask for the same level of information due to sector harmonised approaches, pressure on the chemical sector increases, because it could perceive a de facto "obligation" to the EDS. This could be a lever for the successful implementation of the EDS.

Looking at the influence of the vision for the sector-harmonised approaches on reaching the vision for the **ESPR**, participants decided on a moderate influence. The ESPR creates the impetus for the development of initial sector-harmonised approaches. Nevertheless, those standards also strongly affect the successful implementation of its product requirements. In addition, the proposal for the ESPR already provides enough hints to start with the process for harmonised approaches.

Participants agreed that sector-harmonised approaches help to raise awareness and support actors in **phasing out hazardous substances**. Thus, in this respect, they decided on a moderate influence of the vision on sector harmonisation.

As for **SCIP,** participants agreed on a strong influence because standardised approaches facilitate fulfilling SCIP requirements and thus make SCIP successful.

Standards are normally developed by the big players and the frontrunners of an industry. Small companies then need to adapt to this development, which raises the need for **capacity-building** (policies). Therefore participants decided on a moderate influence of the vision of sector-harmonised approaches on reaching the vision of capacity-building.

Regarding the **DPP**, participants saw a strong influence. They agreed that sector harmonised approaches are necessary to reach the vision for the DPP. There is a strong need for standards to pass

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on the necessary information along the supply chain, which is essential for establishing a successful tracking system in supply chains. Figure 9 gives an overview of the agreed values for instrument 6.

0 no influence at all
1 weak influence
2 moderate influence
3 strong influence

		1 Enhanced Data Sheet	2 ESPR product requirements	3 Phase-out of the most hazardous substances	4 SCIP	5 Capacity building (policy	6 Sector harmonized approaches	7 Digital Product Passport
6	Sector harmonized approaches	2	2	2	3	1/2	x	3

Figure 9 Influence of sector harmonized approaches on the other instruments

4.3.7 Digital Product Passport (DPP)

Participants concluded that the DPP's vision has a moderate to strong influence on achieving the vision of the **EDS**. If industry has to provide information on chemicals other than those covered by the Candidate List or listed in the SDS, as is foreseen for the DPP, there is a strong need for the EDS.

As for the **ESPR** product requirements, participants only saw a low influence of the DPP. In contrast, the ESPR has a big influence on the DPP as it sets the requirements and defines the minimum content of the DPP. The passport will then only have an impact on the successful implementation of the delegated acts.

A DPP could also speed up the **phase-out process for the most hazardous substances**. A DPP shows if a product contains SoC, thus creating pressure to start finding alternatives. In this regard, it can be an incentive for "greener chemistry"[27] and substitution. Participants therefore agreed on a moderate influence.

Feedback on the influence of the DPP's[28] vision on that of the **SCIP** database was unanimous to the extent that the two instruments are interconnected. This depends on whether DPP data is used as input for SCIP or vice versa. On the one hand, the DPP can serve as a tool to transfer the data through the supply chain and thus fulfil the requirements of SCIP. On the other hand, the incentives to submit high-quality data to SCIP increases if data from SCIP is used as input to the DPP. At the same time, the participants agreed that the DPP data addressed another scale compared to SCIP. The DPP will include sector-specific requirements for different product groups and should thus not be overestimated in its influence on SCIP, which applies to all sectors. In the end, most assessments were of a moderate or strong impact.

For **capacity building** most replies indicated a low to moderate influence of the DPP. Capacity building will be quite significant for the correct implementation of the DPP. In addition, through the DPP, more people will understand the basic problems with chemicals in products, which creates the need for capacity building processes on how to avoid them.

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27 "Green chemistry is the utilisation of a set of principles that reduces or eliminates the use or generation of hazardous substances in the design, manufacture and application of chemical products." (Anastas and Warner, 1998, 11). In this regard, the CSS promotes chemicals that are "safe and sustainable-by-design" that foster "safe products and non-toxic material cycles" (European Commission 2020b, 4).

28 Due to time constraints, the deliberations on the final three impact relationships took place after the workshop in a written procedure and online meeting.

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Replies expected that when the DPP is implemented, it will provide strong incentives for the affected value chains/sectors to develop **harmonised approaches** to ensure compliance with the DPP. At the same time, the DPP provides a framework fostering and speeding up the harmonisation processes. Ultimately, the replies mostly voted for a moderate to strong influence. Figure 10 shows the scores for the influence of the DPP on the other instruments.

0 no influence at all 1 weak influence 2 moderate influence 3 strong influence	1 Enhanced Data Sheet	2 ESPR product requirements	3 Phase-out of the most hazardous substances	4 SCIP	5 Capacity building (policy	6 Sector harmonized approaches	7 Digital Product Passport
7 Digital Product Passport	2/3	1	2	2/3	1/2	2/3	x

Figure 10 Influence of the Digital Product Passport on the other instruments

4.3.8 Driving and driven factors

After completing the cross-impact analysis, the impact direction of the individual instruments can be read by dividing the row sum by the column sum. Since the participants could not always agree on one value per impact ratio, the facilitation team created two scenarios. The first scenario (see Figure 11) shows the higher assumed values, whereas the second scenario (see Figure 12) shows the lower values.

1st "higher influence" Scenario

		1 Enhanced Data Sheet	2 ESPR product requirements	3 Phase-out of the most haz subs	4 SCIP	5 Capacity building (policy)	6 Sector harmonization	7 Digital Product Passport	Row sum	**Impact direction** (Row sums / Column sums)
1	Enhanced Data Sheet	x	2	3	2	2	1	2	12	1,33
2	ESPR product requirements	0	x	2	3	1	3	3	12	1,09
3	Phase-out of the most haz. substances	0	2	x	2	1	1	1	7	0,54
4	SCIP	2	2	2	x	2	2	3	13	0,81
5	Capacity building (policy)	2	2	2	3	x	2	2	13	1,30
6	Sector harmonized approaches	2	2	2	3	2	x	3	14	1,17
7	Digital Product Passport	3	1	2	3	2	3	x	14	1,00
	Column sum	9	11	13	16	10	12	14		

Figure 11 Impact-matrix "higher influence" scenario

2nd "lower influence" Scenario

		1 Enhanced Data Sheet	2 ESPR product requirements	3 Phase-out of the most haz subs	4 SCIP	5 Capacity building (policy)	6 Sector harmonization	7 Digital Product Passport	Row sum	**Impact direction** (Row sums / Column sums)
1	Enhanced Data Sheet	x	2	3	1	0	1	2	9	1,13
2	ESPR product requirements	0	x	2	2	1	3	3	11	1,10
3	Phase-out of the most haz. substances	0	1	x	2	1	1	1	6	0,50
4	SCIP	2	2	1	x	2	2	3	12	0,92
5	Capacity building (policy)	2	2	2	3	x	2	2	13	2,17
6	Sector harmonized approaches	2	2	2	3	1	x	3	13	1,18
7	Digital Product Passport	2	1	2	2	1	2	x	10	0,71
	Column sum	8	10	12	13	6	11	14		

Figure 12 Impact-matrix "lower influence" scenario

Looking at the two Figures, they reveal a similar picture, which means that the Figures gathered during the discussion are rather robust. Notably, it is less likely that the change of one number will lead to a totally different outcome. In both scenarios, the same four instruments scored the highest: EDS, ESPR, Capacity-building, and Sector harmonised approaches. However, the EDS got the highest score in the first scenario, and was only third highest in the second scenario, where Capacity building had the highest score and Sector harmonised approaches the second highest.

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In the first scenario, the DPP is seen as a factor that can either drive or be driven, depending on the context. In contrast, in the second scenario DPP is seen rather as being driven by other developments. ESPR is also a factor that can be driving or driven, depending on the context.

The participants saw the phase-out of the most hazardous substances and SCIP rather to be driven in both scenarios.

5 Conclusions and way forward

The impact matrix shows the driving and driven instruments with regard to the developed 2035 traceability vision. It indicates which instruments should be prioritized, according to the views of the participants, to contribute to the 2035 vision. The deliberations also revealed possible steps that some actors relevant to the transformation need to take. This chapter summarises those steps (Section 5.1), points to general conclusions as regards traceability of chemicals (Section 5.2), and reflects on the methodology (Section 5.3).

5.1 Steps to implement the vision

It is for the legislators and industry, in particular, to set frameworks that assure the information flow throughout the entire circular value chains and that in each step information is collected and provided targeted to specific needs of the respective actors, ranging from downstream businesses over consumers to authorities. In this view, implementation steps are defined for legislators (Section 5.1.1), industry (5.1.2), and also for R&D (5.1.3) and civil society (5.1.4).

Table 2 (at page 3) summarises the key points.

5.1.1 Legislators

Since **capacity building** policies turned out to be comparatively the strongest driver, one result is that legislation is needed to stimulate capacity building. To support actors in the transformation, three perspectives are relevant: (i) they need willingness linked to a perceived need to act and a sense of feasibility, (ii) they need individual capabilities (knowledge, skills, other resources), as well as (iii) access to external opportunities (technology, infrastructure, standards) to implement the change.[29] Therefore, the legislator has to assess the status quo situation: What capacity-building measures are already in place? What is planned for the future? How can policies be designed that stipulate and support capacity-building measures in the direction of the vision? Furthermore, the results also show the need for legislation that is very clearly addressed and coherent, avoiding double or triple work with different definitions, reporting systems, calculation tools, etc. and, therefore, requires less capacity building. In this respect, it is crucial that the legislator clearly defines the concepts and terminologies, e.g. when it comes to products and chemicals in products,[30] in a way that is coherent across legislations and without loopholes.

Looking at the **DPP** and SCIP, the analysis shows that such digital solutions have their limits and should not be overloaded with too high expectations. For the tools to become effective, they have to be embedded in a supporting institutional framework, ranging from

[29] On this approach, see Ashford 2000 and 1993.

[30] E.g. it does not seem reasonable that REACH Art. 33 does not oblige the supplier of a felt-tip pen to inform about SVHCs in the ink, cf. Führ and Schenten 2020, 24 et seq.

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- A "tailor-made" legislative framework on the macro level, responding to the incentives and impediments of the value chain actors over
- Sectoral and cross-sectoral standardisation efforts on the meso-level to
- Stipulating organisational innovations within companies and their contractual interactions with suppliers and customers on the micro-level.

The legislator should keep in mind that a close link between the DPP and SCIP could reduce complexities and increase their effectiveness. Examples include integrating SCIP into the DPP or linking the DPP's chemical information with SCIP. However, depending on the specific link scenario (e.g. SCIP as central place for chemicals related information) it could presuppose fundamental improvements to **SCIP** which so far only has limited use for consumers and EoL actors.

As for SCIP, it should be noted that the 2035 vision for this instrument assumes it "covers more SoCs besides SVHCs" – a development already envisaged in its full name, which explicitly includes "Substances of Concern". The enactment of the ESPR, formally introducing a concept of SoC into the EU legislative framework, could be the right timing to extend the scope of SCIP.

According to the evaluation, the **ESPR** is a factor that can be both driving or rather driven, depending on the context. It thus should have an active role in the transition by addressing products or product groups through delegated acts that could have a positive impact on the other instruments (e.g. products deemed to contain hazardous substances so that the tracking obligations and related transparency gains contribute to the improved SCIP, DPP, and the phase-out).

Regarding the **EDS**, the Commission should assess the need for and feasibility of this instrument and take the appropriate measures, such as initiating legislative procedures. In the workshop, it became clear that the EDS could provide a (data) foundation that positively affects all the other instruments, calling for very timely implementation of this new legal instrument.

The legislators should also assess capacity building needs from sectors to support their elaboration of **sector-harmonised approaches.**

Furthermore, considering the mere number and interlinks of policies currently prepared under the Green Deal with relevance for traceability, the European Commission should consider performing a "systemic" impact assessment as opposed to the current patchwork approach: How do the various initiatives contribute to the traceability vision? Which elements are missing? Which proposed elements are not necessary? The ToC workshop might serve as role model.

Lastly, it is paramount that the legislator builds upon existing concepts,[31] guidelines (e.g. OCED), and multi-stakeholder-initiatives,[32] and continues to include all relevant actors in the further development of policies. In particular, cooperation with companies is necessary to make sure legal requirements and tools (SCIP, DPP) are designed in a way that allows for both effective and manageable implementation. At the same time, civil society must be involved on an equal footing to ensure that environmental and social goals are not neglected.

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31 E.g. European Commission 2020c.

32 See e.g. the UNECE project on Traceability for Sustainable Garment and Footwear which does not address reporting of chemicals at substance level, but provides recommendations on other relevant aspects of traceability related to cotton and leather, and maps existing standards and tools.

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5.1.2 Industry

Downstream industry and EoL actors have to increase their knowledge about the chemical contents of their products, and related hazards and risks. They need to keep themselves informed about chemical data in their supply chains, i.e. collect information from their own processes and ask suppliers for data.

Following the example of the organisations participating in this learning process, all industry players need to shed their prejudices against the traceability approach (too expensive, too burdensome, no use, etc.) and open up for the chances it may offer. This includes an honest assessment of short-term costs vis-á-vis mid-term benefits. Industry needs to engage by developing **sector-harmonised approaches**, i.e. standards on the language, granularity, and quality control of substances in product reporting along supply chains thereby preparing the ground for the successful implementation of DPP or SCIP as well as future instruments. If a sector agrees on a common standard, the IT systems and tools used by companies, whether available on the market or yet to be developed, could remain pluralistic while ensuring interoperability with the standard.

Internal FMD: Balancing requirements of different sectors and related target conflicts

Full material declaration (FMD) usually stands for a 100% declaration of material compositions, i.e. of the substances present therein. Suppliers are concerned that this approach is in conflict with their justified needs to protect confidential business information. FMD is employed to put customers in the position to identify those chemical substances subject to regulatory requirements. Regulated substances are not confidential, and at the same time, customers do not need to identify chemicals that are not regulated. The workshop participants discussed an adapted "internal" FMD approach that could allow suppliers to insert FMD data into a reporting system (e.g. administered in-house or hosted by a trustee) from which suppliers can retrieve only information on the regulated substances. Data on unregulated substances would remain undisclosed until the moment their status becomes regulated, e.g. because of inclusion on the Candidate List.

As long as the legislator does not clarify the structure of the **DPP** and provide details as to the interactions desired from supply chain actors, industry will be reluctant to invest in DPP implementation. There is particular uncertainty as regards the legal requirements and practical implementation of shared responsibilities of supply chain actors when long-lasting products, such as furniture, are modified during their service life which should trigger the need to update the DPP. At the same time, the workshop participants agreed that industry should get started and should not wait for the legal requirements to send them on their way. In this respect, the participants found that the **ESPR** proposal already provides some hints as to what harmonised approaches should be capable of. Industry could at least intensify internal awareness building and start to prepare for the development of harmonised approaches, e.g. by defining responsibilities and procedures. Once more detailed information on future requirements becomes available, the sectors could immediately get active using this administrative infrastructure.

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In order to set up harmonised reporting approaches, industry associations must work on standardised reporting formats across sectors (such as ISO 82474, Proactive Alliance, PCDS[33]), and based on that, develop sector-specific support services.

If many industry sectors ask for the same level of information when it comes to chemicals in products, the chemical sector would take note of these new customer needs and refine business models or develop new ones. The proposal of an **EDS** could then be perceived as a welcomed approach to streamline information provisions and create a level playing field, as the mere identification of chemicals in products would then no longer be a competitive factor.

The analysis shows that the transformation towards the 2035 traceability vision depends not only on the right legislative framework and technology. Rather, companies need to profoundly adapt their processes for managing substances in products, implying a change in the daily practises of actors working in those companies. However, as people are reluctant to change behaviour, they must be convinced that these changes are necessary and beneficial.

5.1.3 R&D

Research plays a role with regard to enhanced **capacity building**. However, it must be considered that capacity building in the sense of raising awareness alone is not enough for supply chains to change. In fact, the supply chain actors must engage in learning processes, which enable a shift in perspective and create willingness to invest and rethink processes. In this respect, practical research projects focussing on capacity building could be an important building block to achieve the vision.

Besides, there is a need to develop technical and social innovations, e.g. instruments, tools, and capacities to create and analyse data, to underpin the policies discussed at the workshop. This includes approaches to overcome a lack of trust and to ensure that the provided data is useful for all actors during the product's life cycle.

5.1.4 Civil Society

The main role of civil society will be to exert and maintain pressure on industry, but also on legislators, to actively engage in achieving the 2035 traceability vision: actors working in companies, for example, will perceive "pain" linked to compliance challenges and reputational risks, which the traceability approach could ease. Civil society can draw attention to related risks and chances. To enable it to fulfil this role, capacity building is needed to raise awareness and disseminate relevant knowledge among civil society actors and provide them with the resources needed to recruit and train staff. Another crucial task is making sure that product-related information is communicated in a way that allows consumers to make informed decisions.

5.2 Traceability as one key enabler for the circular economy

Another interesting finding is that all organisations participating in the workshop, i.e. representing many different interests and sectors, agree that traceability of chemicals is a key enabler for the circular economy; however, there are different views concerning the necessary data depth and granularity, with industry arguing for a practical approach for rapid implementation while allowing for

[33] See https://pcds.lu/.

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stepwise enhancements over the time. The participants are willing to support the results of the workshop and to distribute them in their networks.

5.3 Methodological reflection and outlook

At last, this Section briefly reflects in methodological terms on the ToC format employed.

Not unusually, the available time frame turned out to be too narrow. For instance, filling the impact matrix requires the participants to take the rather uncommon future perspective. It takes some time during the process until everybody feels comfortable with this way of thinking. It could mean that when analysing the initial cross-impacts of policy instruments, the group has not reached its peak productivity. However, after having reached that peak, the group were not able to review the first assessments, due to time constraints.

A separate cross-impact-analysis of the same instruments undertaken by a team of experts from the H&M group came to conclusions as regards the allocation of driving and driven instruments factors (see Figure 13 in the Annex) that are to very similar to Impact Matrix Scenario 1 (see Figure 11). This "control group" thus indicates a solid validity of the results.

Two quotes from the participants:

"This workshop provided a good platform to get better to know the positions of all stakeholders and to discuss them with each other. Therefore, something like this should become a certain normality regarding the elaboration of an issue at an early stage in order to know the different perspectives of the different participants/stakeholders".

"The methodology was demanding but creative. Can be used more! Just to define each important and foreseeable tool, as of 2035, is a good practice. What do we want and what is needed to go there."

The participants appreciated the methodological approach combining visioning and backcasting, embedded in a format encouraging an open exchange of ideas and thereby helping the group build up common perspectives. Moreover, they acknowledged that the multifaceted analysis of the instruments and their future roles proved very insightful.

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6 References

Anastas, P., & Warner, J. C. (1998). Green Chemistry: Theory and Practice. New York: Oxford University Press.

Ashford, N. (1993): Understanding Technological Responses of Industrial Firms to Environmental Problems: Implications for Government Policy, in: Fischer, K, Schot, J. (Eds.), Environmental Strategies for Industry, Washington.

Ashford, N. (2000): An Innovation-Based Strategy for a Sustainable Environment, in: Hemmelskamp, J., Rennings, K., Leone F. (Eds.), Innovation-Oriented Environmental Regulation: Theoretical Approach and Empirical Analysis, Heidelberg, New York.

Belcher, B.; Claus, R. (2020). *Theory of Change*. td-net toolbox profile (5). Swiss Academies of Arts and Sciences: td-net toolbox for co-producing knowledge. DOI: 10.5281/zenodo.3717451.

Belcher, B.; Davel, R.; Claus, R. (2020). *A refined method for theory-based evaluation of the societal impacts of research*, MethodsX, Volume 7, 2020, 100788, DOI: 10.1016/j.mex.2020.100788.

ECHA (2017). *Guidance on requirements for substances in articles, Version 4.0*. Accessible under https://echa.europa.eu/documents/10162/2324906/articles_en.pdf (Last accesses 12.09.2022).

ECHA (2022a). *Extended safety data sheets, ECHA website*. Accessible under https://echa.europa.eu/safety-data-sheets (Last accesses 12.09.2022).

ECHA (2022b). *SCIP, ECHA website*. Accessible under https://echa.europa.eu/scip (Last accesses 12.09.2022).

European Commission (2019). *The European Green Deal*, Communication from the Commission COM(2019) 640 final.

European Commission (2020a). *A new Circular Economy Action Plan - For a cleaner and more competitive Europe*. Communication from the Commission COM(2020) 98 final.

European Commission (2020b). *Chemicals Strategy for Sustainability: Towards a Toxic-Free Environment*. Communication from the Commission COM(2020) 667 final.

European Commission (2020c). *Information flows on substances of concern in products from supply chains to waste operators. Final report (including annexes)*. https://op.europa.eu/en/publication-detail/-/publication/59d9b462-a9f6-11ea-bb7a-01aa75ed71a1/language-en (accessed 1 Nov.2022).

European Commission (2022). *Establishing a framework for setting ecodesign requirements for sustainable products and repealing Directive 2009/125/EC.* Communication from the Commission COM(2022)142.

Life AskREACH

The EU-funded project Life AskREACH helps companies and consumers to apply the "Right to Know" about substances of very high concern in consumer goods.

LIFE AskREACH aims at:

- raising consumer awareness about substances of high concern (SVHCs) in articles,
- enabling consumers to make responsible purchasing decisions,
- raising supplier awareness of their obligation to comply with REACH information duties,
- improving the information flow on SVHCs between consumers and suppliers, and
- improving supply chain communication processes with the aim of substituting SVHCs with safer alternatives.

Contact in the project

Heidrun Fammler
heidrun.Fammler@bef-de.org

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Führ, M., Schenten, J. (2020). *Advancing REACH: Substances in Articles. Final report*. Ed. by German Environment Agency, TEXTE 194/2020, Dessau-Rosslau. https://www.umweltbundesamt.de/sites/default/files/medien/5750/publikationen/2020_10_30_texte_194_2020_advancing_reach_articles.pdf (last access 28.11.2022).

Galatola, M. (2022). *Digital Product Passport (DPP)*. Presentation by the chair of the Commission cross-DG Working Group on DPP. Accessible under https://circulareconomy.europa.eu/platform/sites/default/files/michele-galatola-european-commission.pdf (Last accesses 12.09.2022).

Geschka, H.; Hahnenwald, H.; Schwarz-Geschka, M. (2008). *Szenariotechnik*. In: Gassmann, Oliver; Sutter, Philipp (eds.) Praxiswissen Innovationsmanagement. Von der Idee zum Markterfolg. Munich: Hanser, pp. 119-138.

Turner, A. (2018) *Black plastics: Linear and circular economies, hazardous additives and marine pollution – Review article*, Environment International 117 (2018) 308-318.

Proactive Alliance (2021). *Towards a global material reporting standard - Discussion Paper with Technical Recommendations*. Accessible under https://www.proactive-alliance.info/fileadmin/Proactive_Alliance/Proactive_Alliance_Discussion_Paper_with_Technical_Recommendations_January_2021.pdf (Last accesses 12.09.2022).

Regulation (EC) 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC, OJ L 396, 30.12.2006, pp. 1–849.

Schenten, J. and Rehn, J. (2021). *A Theory of Change (ToC) supporting the visioning of a sustainable supply chain*. Swiss Academies of Arts and Sciences. Network for Transdisciplinary Research (td-net). Accessible under: https://naturalsciences.ch/co-producing-knowledge-explained/practical_experiences/theory_of_change (last access 15 February 2022).

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7 Annex

7.1 List of organisations taking part in the workshop

Table 4 List of organisations participating in the workshop

amfori – Trade with Purpose
Baltic Environmental Forum Germany
BUND e.V. (Friends of the Earth Germany)
City of Stockholm (Environment Department)
Darmstadt University of Applied Sciences
EFIC (European Furniture Industries Confederation)
Eurometaux (European non-ferrous metals association)
European Commission (Safe and Sustainable Chemicals, ENV.B.2)
Hazardous Waste Europe
IKEA of Sweden (as member of EuroCommerce)
Inditex S.A.
Luxembourg Institute of Science and Technology (LIST)
Ministère de la Transition Écologique (Direction Générale de la Prévention des Risques) (France)
Orgalim – Europe's technology industries
Republic of Austria, Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (Department V/5 – Chemical Policy and Biocides)
RISE Research Institutes of Sweden
Swedish Chemicals Agency
Umweltbundesamt (German Environment Agency)
VDM (Association of the German Furniture Industry)

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7.2 Cross-impact-matrix by control group

Cross-impact matrix H&M

		1	2	3	4	5	6	7		
		Enhanced Data Sheet	ESPR product requirements	Phase-out of the most haz subs	SCIP	Capacity building (policy)	Sector harmonization	Digital Product Passport	Row sum	**Impact direction** (Row sums / Column sums)
1	Enhanced Data Sheet	x	2	3	3	1	3	3	15	1,36
2	ESPR product requirements	2	x	1	2	2	2	3	12	1,20
3	Phase-out of the most haz. substances	3	1	x	2	1	2	1	10	0,91
4	SCIP	1	1	2	x	2	1	1	8	0,73
5	Capacity building (policy)	1	2	2	1	x	2	1	9	1,00
6	Sector harmonized approaches	2	2	2	2	1	x	2	11	0,92
7	Digital Product Passport	2	2	1	1	2	2	x	10	0,91
	Column sum	11	10	11	11	9	12	11		

Figure 13 Cross-impact-matrix by H&M Group

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