

**United Nations Economic Commission for Europe**

United Nations Centre for Trade Facilitation and Electronic Business

# **Recommendation No. 49**

## ***Transparency at Scale***

Interim Draft, Version 1.6 Secretariat Review



**United Nations**  
**Geneva, 2025**

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40 **Foreword**

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[to be signed by the ES]

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49 **The United Nations Centre for Trade Facilitation and Electronic Business**  
50 **(UN/CEFACT)**  
51 **Simple, Transparent and Effective Processes for Digital and Sustainable Global**  
52 **Commerce**  
53

54 UN/CEFACT's mission is to improve the ability of business, trade and administrative  
55 organizations, from developed, developing and transitional economies, to exchange products  
56 and relevant services effectively. Its principal focus is on facilitating national and international  
57 transactions, through the simplification and harmonization of processes, procedures and  
58 information flows, and so contribute to the growth of digital and sustainable global commerce.  
59

60 Participation in UN/CEFACT is open to experts from United Nations Member States,  
61 Intergovernmental Organizations and Non-Governmental Organizations recognised by the  
62 United Nations Economic and Social Council (ECOSOC). Through this participation of  
63 government and business representatives from around the world, UN/CEFACT has developed  
64 a range of trade facilitation recommendations and e-business standards, and tools that are  
65 developed and adopted within a broad intergovernmental process, and implemented globally.  
66

67 UN/CEFACT operates using the following principles to define the value of its outputs:

- 68 A. Inclusiveness – The UN/CEFACT Open Development Process is consensus-driven,  
69 collaborative, open and transparent.
- 70 B. Strategic alignment – The UN/CEFACT activities are aligned with the United Nations  
71 2030 Agenda for Sustainable Development, the United Nations Pact for the Future and  
72 its Digital Compact, and the ECE cross-cutting priority objectives focusing on the  
73 circular economy, sustainable use of natural resources, and the digital and green  
74 transformations for sustainable development.
- 75 C. Accessibility – All UN/CEFACT deliverables, developed and maintained by its  
76 community of experts, under the guidance of the Bureau and the secretariat, are  
77 publicly available, free of charge.
- 78 D. Practicality – UN/CEFACT strives to define and deliver practical, useful ways to add  
79 value. It builds usable tools that facilitate global implementations.
- 80 E. Collaboration – Whenever appropriate, UN/CEFACT will utilize and build upon related  
81 standards already completed or under development by UN/CEFACT and other  
82 organizations and initiatives.
- 83 F. Effectiveness and impact – UN/CEFACT attempts to measure and report its  
84 performance against meaningful key performance indicators (KPIs), including  
85 quantitative and qualitative information gathered on the use and impact of its  
86 deliverables; and
- 87 G. Equity – UN/CEFACT strives to integrate emerging and transition economies into  
88 regional and global supply and value chains and create instruments that are also viable  
89 for medium and small economic actors .

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# 107 1 Recommendation No. 49: Transparency at Scale

## 108 1.1 Introduction

109 Product sustainability claims and corporate sustainability disclosures form the basis for  
110 evaluation of progress against sustainability targets. Therefore,, if the trustworthiness of such  
111 claims and disclosures cannot be relied upon, any perceived progress may be false, and  
112 ineffective practices may be rewarded without merit.

113 Recommendation No. 49 has emerged in response to an increasing demand for policy action  
114 to enhance the trustworthiness, accuracy, and verifiable integrity of such claims and  
115 disclosures. The international nature of value chains requires this response to make  
116 sustainability information accessible across different jurisdictions, industries, product  
117 segments, and steps in the value chain, to create transparency at scale.

118 The development of this recommendation was motivated by the practical challenges<sup>1</sup> that  
119 United Nations Member States face in advancing implementation of the Sustainable  
120 Development Goal (SDG) 12 of the United Nations 2030 Agenda for ensuring sustainable  
121 consumption and production patterns through traceability in value chains. In particular, target  
122 12.6 to encourage companies to adopt sustainable practices and sustainability reports, and  
123 target 12.8 to promote universal understanding of sustainable lifestyles.

124 Its development was mandated by member States to contribute to the United Nations  
125 Economic Commission for Europe (ECE)'s cross-cutting objectives focusing on advancing the  
126 circular and digital transformations for sustainable development<sup>2</sup>. These themes reflect the  
127 growing consensus among governments and industries about the importance of responsible,  
128 equitable and interoperable data governance approaches, which are recognized as essential  
129 for development objectives, the protection of human rights, and innovation and economic  
130 growth, as reflected in the Global Digital Compact of the United Nations Pact for the Future in  
131 its objective 4<sup>3</sup>.

132 The measures and approaches recommended here seek to align with relevant international  
133 and regional policies and legal instruments, including, but not limited to: the United Nations  
134 Guiding Principles on Business and Human Rights;<sup>4</sup> the International Labour Organization  
135 (ILO) Declaration on Fundamental Principles and Rights at Work, relevant ILO conventions  
136 and recommendations, and the ILO Tripartite Declaration on Principles concerning  
137 Multinational Enterprises and Social Policy;<sup>5</sup> the Paris Agreement on Climate Change; the

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<sup>1</sup> In particular, these difficulties relate to providing assistance in implementing at scale Recommendation 46: Enhancing Traceability and Transparency of Sustainable Value Chains in the Garment and Footwear Sector, Geneva, 2022. (Available at <https://unece.org/sites/default/files/2023-10/Rec46-ECE-TRADE-463E.pdf>).

<sup>2</sup> Such mandate is outlined in the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) Programme of Work for 2023-2024 (ECE/ TRADE/C/CEFACT/2022/21/Rev.1): and 2025-2026 (ECE/TRADE/C/CEFACT/2024/7).

<sup>3</sup>United Nations, Pact for the Future, Global Digital Compact and Declaration on Future Generations, September 2024 (Available at [Pact for the Future, Global Digital Compact and Declaration on Future Generations](#) )

<sup>4</sup> United Nations Human Rights Office of the High Commissioner, Guiding Principles on Business and Human Rights, HR/PUB/11/04, New York and Geneva, 2011. ( Available at [https://www.ohchr.org/Documents/Publications/GuidingPrinciplesBusinessHR\\_EN.pdf](https://www.ohchr.org/Documents/Publications/GuidingPrinciplesBusinessHR_EN.pdf).)

<sup>5</sup> 1 ILO, Tripartite Declaration on Principles concerning Multinational Enterprises and Social Policy, sixth edition, Geneva, 2022 (Available at

138 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES);  
139 the Organisation for Economic Co-operation and Development (OECD) Guidelines for  
140 Multinational Enterprises,<sup>6</sup> the OECD Due Diligence Guidance for Responsible Supply Chains  
141 in the Garment and Footwear Sector,<sup>7</sup> and the OECD/Food and Agriculture Organization  
142 (FAO) Guidance for Responsible Agricultural Supply Chains<sup>8</sup>; and the UNECE Convention on  
143 Access to Information, Public Participation in Decision-making and Access to Justice in  
144 Environmental Matters (Aarhus Convention).

145 This recommendation provides guidance to national and regional policymakers on principles  
146 for action in order to:

- 147 I. Demonstrate the increased sustainability of their economies' products through greater  
148 transparency, where transparency can be achieved by trustworthy product  
149 sustainability claims and corporate sustainability disclosures supported by value chain  
150 traceability. Such sustainability information can be made available to value chain  
151 actors through digital product passports.
- 152 II. Support responsible business conduct by facilitating risk-based due diligence in value  
153 chains.
- 154 III. Create a level playing field for law abiding actors.
- 155 IV. Maintain or improve export market access and competitiveness for products produced  
156 in their countries in the context of increasing technical barriers to trade due to product  
157 sustainability concerns.
- 158 V. Reduce the complexity, time and cost associated with data exchange for validating the  
159 conformity of products with national or regional sustainability requirements.

160 The recommendation can also serve as a reference for other stakeholders committed to  
161 advancing sustainable consumption and production patterns (SDG12), and other relevant  
162 goals of the 2030 Agenda, from upstream production and manufacturing to the consumption  
163 and disposal of end-of-life products and/or recovery of materials.

164

165 Sustainable practices, such as those supported by Recommendation No. 49, will create a  
166 profound shift in the way organizations communicate their commitments and actions regarding  
167 the implementation of sustainability and will lay the foundation for a possible future where:

- 168 I. Products are accompanied by digital product passports that include digital,  
169 cryptographically verifiable sustainability information that uses unambiguous  
170 terminology.
- 171 II. These product passports are easily retrievable by consumers, supply-chain actors and  
172 authorities, e.g. without needing to login to a system.
- 173 III. Greenwashing and social washing is rare due to easier detection.
- 174 IV. Sustainable products outperform non-sustainable ones in market access and price.

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[https://www.ilo.org/sites/default/files/wcmsp5/groups/public/%40ed\\_emp/%40emp\\_ent/%40multi/documents/publication/wcms\\_094386.pdf](https://www.ilo.org/sites/default/files/wcmsp5/groups/public/%40ed_emp/%40emp_ent/%40multi/documents/publication/wcms_094386.pdf)

<sup>6</sup> OECD (2023), OECD Guidelines for Multinational Enterprises on Responsible Business Conduct, OECD Publishing, Paris. (Available at <https://doi.org/10.1787/81f92357-en>)

<sup>7</sup> OECD (2018), OECD Due Diligence Guidance for Responsible Supply Chains in the Garment and Footwear Sector, OECD Publishing, Paris. (Available at <https://doi.org/10.1787/9789264290587-en>)

<sup>8</sup> OECD/FAO (2016), OECD-FAO Guidance for Responsible Agricultural Supply Chains, OECD Publishing, Paris. (Available at <https://doi.org/10.1787/9789264251052-en>)

- 175 V. Counterfeit products are rare, as they are easily detected and prevented from entering  
176 the market.
- 177 VI. National and regional policy makers, manufacturers, consumers and circular economy  
178 actors trust established sustainable business practices and data.
- 179 VII. A product’s regulatory compliance documents, including due diligence certificates, are  
180 fully digitalized.
- 181 VIII. Customers, policy makers, market surveillance authorities, recyclers and other  
182 stakeholders can verify a product’s sustainability compliance with a single click.

## 183 1.2 Purpose

184 The purpose of Recommendation No. 49 is to **help national and regional policy makers**  
185 **demonstrate the improved sustainability of their economies** in those areas related to the  
186 production, purchase, consumption, re-use, recycling and disposal of products.

187 It aims to do so by helping make **the sustainability information about products complete,**  
188 **trustworthy, and comparable**, while also helping make the publishers of such information  
189 (e.g. in digital product passports) **more accountable for the quality of their data**.

190 In addition, the recommendation looks to support value-chain participants, and particularly  
191 SMEs, **by lowering costs and complexity and facilitating their ability to conform with**  
192 **laws and regulations that require sustainability reporting**.

193 This can be accomplished through transparency at scale, i.e., transparency regarding  
194 sustainability in global value chains from the origin of raw materials to finished products, to  
195 their use, reuse, and eventual end-of-life processing, including the recovery and reintegration  
196 of materials into new value chains.

197 Many national and regional policy makers in middle- and high-income countries have realized  
198 the need for value chain transparency and have started to create related legislative and  
199 regulatory requirements. Unfortunately, the resulting patchwork of sustainability  
200 requirements<sup>9</sup>, and the related costs for multiple conformity processes and systems, risks  
201 reducing the participation of many SMEs and low-income countries in global markets.

202 Therefore, another purpose of this recommendation is to **help national and regional policy**  
203 **makers reduce the compliance burden** that transparency at scale can place on businesses  
204 and, especially, SMEs. In addition, it looks to ensure that the international discussion on global  
205 transparency at scale takes into consideration the implementation conditions faced by SMEs  
206 and lower-income countries.

207 The above is accomplished by identifying the digital capacities needed for accountability and  
208 governance at scale and through access to implementation standards and instruments that  
209 provide those capacities.

## 210 1.3 Scope

211 The following areas are within the scope of Recommendation No. 49:

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<sup>9</sup> Krueger, Philipp, Zacharias Sautner, Dragon Y Tang, and Rui Zhong, The Effects of Mandatory ESG Disclosure around the World, OSF. 8 September 2024. Available at ([osf.io/syn8t/](https://osf.io/syn8t/))



212 **The exchange of product sustainability information at all levels in a value chain:**  
213 Including raw materials, parts, components, sub-assemblies and final, reused and recycled  
214 products as well as packaging.

215 **Transparency at scale:** Having sustainability information accessible across different  
216 jurisdictions, industries, product segments, and steps in the value chain to reach sustainability  
217 objectives.

218 **Circular economy models**<sup>10</sup>: Supporting practices that foster the exchange of material and  
219 product data for circular-economy processes and thus enable the better recycling and re-use  
220 of resources.

221 **Value chain resilience:** Strengthening the resistance of value chain processes to disruptions  
222 by ensuring a clear understanding and visibility of the entire value chain.

223 **Data Sovereignty:** Ensuring that product, facility, and company information remain under the  
224 control of the value chain actors that are owners of this information.

225 **Trust in sustainability information:** Increasing the trustworthiness and reliability of  
226 sustainability claims (for products) and disclosures (for companies) with the help of security  
227 technology (verifiable credentials) and the involvement of trustworthy actors, such as  
228 ministries and accredited bodies.

229 **Ad-hoc data discovery:** Facilitating the ad-hoc discovery of product and company  
230 sustainability information related to claims and disclosures.

231 **Value chain traceability:** Enabling tracking and tracing of products, components, and  
232 processes along their value chain.

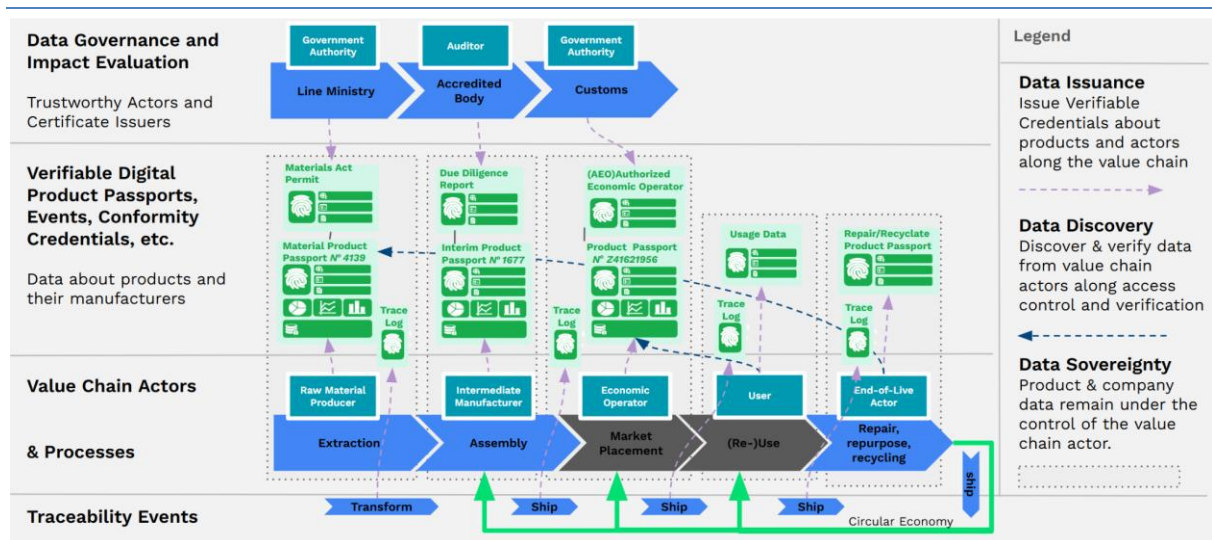
233 Figure 1.3.1 shows the scope of Recommendation No. 49. It advocates building supporting  
234 instruments with which verifiable sustainability information is issued, discovered, and  
235 exchanged by different actors along the value chain to facilitate the circular economy and  
236 value chain resilience. This allows users to discover digital product passports and recyclers to  
237 access material compositions. Trust is established by the ability to differentiate between  
238 trustworthy and non-trustworthy information and actors. As the data remains under the control  
239 of the owner, data quality and sovereignty is ensured.

240 *Fig. 1.3.1 Scope of Recommendation No. 49*

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<sup>10</sup> Wikipedia Contributors. 2025. "Circular Economy." Wikipedia, The Free Encyclopedia. Last modified 25 January 2025. Accessed 5 February 2025. (Available at [https://en.wikipedia.org/wiki/Circular\\_economy](https://en.wikipedia.org/wiki/Circular_economy)).

## ECE Recommendation No. 49 – Transparency at Scale



241  
242

Source: UNECE, 2025

243 Because this recommendation should be industry and vendor agnostic, the following aspects  
244 are not within the scope of Recommendation No. 49 and its supporting instruments:

245 **End-consumer interaction:** Data exchange that is *specific* to end-consumers, such as  
246 technology for better user experience

247 **Data carriers:** Physical data carriers for product identifiers, such as QR codes, RAIN or NFC  
248 tags and their use to access sustainability information. Within scope is to allow the usage of  
249 any relevant data carrier scheme related to Recommendation No. 49 .

250 **Hardware development:** Creation and design of physical devices.

251 **Software development:** Except for core definitions and the verification of (open source)  
252 software implementations of the instruments covered by this recommendation.

253 **Data backup:** Value chain and product data storage solutions.

254 **Industry-specific vocabulary and requirements:** Regional- or Industry-specific  
255 terminologies and data requirements for specific use cases or regulations, will be provided by  
256 industries themselves or by national and regional policy makers. For example, the data  
257 attributes of a battery passport<sup>11</sup> that complies with the new EU battery regulation<sup>12</sup>, was  
258 defined by the battery industry and many relevant stakeholders. Within scope is the definition  
259 of a common core that can reference the vocabularies and requirements of sustainability  
260 claims or disclosures that are published by the standard owner or regulator.

## 261 1.4 Benefits

### 262 1.4.1 Direct Benefits

263

<sup>11</sup> DIN DKE SPEC 99100:2025-02, Requirements for data attributes of the battery passport, February 2025, (Available at <https://www.dinmedia.de/en/technical-rule/din-dke-spec-99100/385692321>)

<sup>12</sup> Regulation (EU) 2023/1542 of the European Parliament and of the Council of 12 July 2023 concerning batteries and waste batteries, (Available at <http://data.europa.eu/eli/reg/2023/1542/2024-07-18j>)

264 The implementation of Recommendation No. 49 and its supporting instruments by national  
265 and regional policymakers around the globe has the potential to directly benefit multiple value  
266 chain actors in sectors that are critical for the green and digital transformation. Main  
267 beneficiaries include, but are not limited to, authorities (in particular border control and market  
268 surveillance agencies), intermediate product and product manufacturers, retailers, logistics  
269 companies, auditors, consumers, recyclers, and any other stakeholders reliant on trustworthy  
270 product information.

271 **Implementation of this recommendation and its supporting instruments** can help these  
272 actors to:

273 **Share digital, reliable, high-integrity data with clear terminology:** by supporting product-  
274 related data that is accurate, trustworthy, and easily understood across the value chain. The  
275 structure for product-related data is provided by this recommendation's supporting  
276 instruments, while the industry-specific vocabularies are defined by the respective industries.

277 **Increase the trust** of supply chain actors in claims and disclosures, by **making them**  
278 **verifiable:**

- 279 I. **Verify claim integrity:** by ensuring that claims have not been altered after issuance.  
280 II. **Verify claim issuers:** by confirming the identity of the claim's issuer. In other words,  
281 any value chain actor can reliably identify a company or person that has issued a claim  
282 and e.g. the company's name, address, and business registration. At the same time  
283 the company cannot deny it issued the claim (non-repudiation) and this will foster a  
284 culture of accountability and increase that company's utility to society.  
285 III. **Verify the authority and accreditation of a certification issuer:** by checking if the  
286 issuer is authorized and accredited by the appropriate authority to legitimately issue  
287 the certification. For example, only accredited auditors of the Aluminium Stewardship  
288 Initiative (ASI) can certify members against the ASI standards.<sup>13</sup>  
289 IV. **Verify the legitimacy of claim holders:** by ensuring the presenter is entitled to hold  
290 and present the claim.

291 **Reduce reporting efforts by digitizing sustainability information:** by streamlining  
292 compliance and reporting processes through digital data management.

293 **Ensure data sovereignty:** by supporting instruments that give each actor in the value chain  
294 the autonomy to decide what information to share while protecting their privacy and trade  
295 secrets.

296 **Improve the credibility of certification schemes:** by encouraging their alignment with the  
297 Principles for Good Governance in the OECD Due Diligence Guidance for Responsible  
298 Business Conduct (RBC)<sup>14</sup> and ISEAL Credibility Principles<sup>15</sup>.

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<sup>13</sup> Aluminium Stewardship Initiative. Accredited Auditing Firms. Aluminium Stewardship Initiative. <https://aluminium-stewardship.org/get-certified/accredited-auditing-firms>. Accessed February 6, 2025..

<sup>14</sup> See OECD (2018), OECD Due Diligence Guidance for Responsible Business Conduct, OECD Publishing, Paris, February 2018. (Available at <https://doi.org/10.1787/15f5f4b3-en>)

<sup>15</sup> ISEAL Alliance. ISEAL Credibility Principles. ISEAL Alliance. (Available at <https://www.isealliance.org/defining-credible-practice/iseal-credibility-principles>). Accessed 6 February, 2025.

299 1.4.2 Indirect Benefits

300

301 Implementation of the recommendation and its supporting instruments also has the potential  
302 to indirectly impact multiple actors and sectors. Following are only some of the potential  
303 indirect benefits of implementation:

304 **Increased consumer trust:** by enabling the transparent verification of sustainability claims  
305 and disclosures. It gives clear traceability and verifiable data about a product's origins, raw  
306 materials, and production process thus assisting consumers in making informed choices.

307 **Expose discrepancies:** Workers, trade unions, and civil society can more quickly identify  
308 discrepancies in manufacturing conditions and effectively implement mitigation strategies.

309 **Simplified access to global markets:** by allowing seamless exchanges of digital claims  
310 across borders and simplifying manufacturers and suppliers entry into new markets by  
311 enabling cross-border interoperability and adherence to international best practices in the  
312 exchange of sustainability information.

313 **Enforce trade-based policies:** by improving the verification of product sustainability  
314 information, border agencies will be able to differentiate those products that are more  
315 sustainable than the industry average and thus better enforce trade-based policies to promote  
316 sustainability.

317 **Increase the value of sustainable products:** Consumers and regulators increasingly value  
318 sustainability; thus products with verifiable sustainability disclosures can command higher  
319 market prices.

320 **Unveil unsustainable behaviour:** The verifiable nature of sustainability disclosures ensures  
321 that they are supported by evidence enabling regulatory bodies and consumer watchdogs to  
322 detect unsustainable behaviour, such as greenwashing<sup>16</sup>.

323 **Risk mitigation:** Value chain transparency can help mitigate value chain disruptions and  
324 strengthen responses to future economic crises.

325 **Improve access to capital, insurance, and financial services:** The implementation of  
326 Recommendation No. 49 provides businesses with robust, easier to discover sustainability  
327 claims about their products, improving access to capital, insurance, and financial services and  
328 can improve the reputation of a value chain actor.

329 **Establish accepted sustainable business practices:** Reliable, digital sustainability  
330 information based on clear standards will help policy makers and industries set up benchmarks  
331 for what constitutes “sustainable business practices” to allow corporations to align with best  
332 practices and maintain competitiveness in international markets.

333 **Establish reliability for non-financial reporting:** A supporting instrument eases reporting  
334 by providing digital, traceable, verifiable data on product sustainability. This improves the

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<sup>16</sup> European Parliament, Stopping Greenwashing: How the EU Regulates Green Claims, 21 March 2024. (Available at <https://www.europarl.europa.eu/topics/en/article/20240111STO16722/stopping-greenwashing-how-the-eu-regulates-green-claims>)

335 quality and reliability of sustainability disclosures, helping businesses to meet regulatory  
336 obligations, and avoid non-compliance penalties.

337 **Interoperable implementations:** As regulations on sustainable production increase,  
338 Recommendation No. 49 and its supporting instruments will provide tools for testing and self-  
339 evaluation of compliance with the standards for transparency at scale as well as a register for  
340 due diligence schemes, open-source examples, and existing industry implementations.

341 **Create a basis to build a due diligence enforcement framework:** Traceability and  
342 conformity verification provides a strong foundation for building due diligence enforcement  
343 frameworks as authorities can use data from Digital Product Passports (DPPs)<sup>17</sup> to ensure  
344 businesses comply with sustainability laws and risk-based due diligence for responsible  
345 business conduct.

346 **Unveil counterfeit products and enable efficient product recalls:** The use of sustainability  
347 disclosures and traceability events linked to product identifiers ensures that counterfeit  
348 products are more easily detected. Digital Product Passports provide a record of the product's  
349 lifecycle, enabling authorities and brands to identify counterfeit items and facilitate targeted,  
350 efficient product recalls.

351 **Innovation and new business opportunities:** The supporting instruments will open avenues  
352 for innovation and new revenues across sectors, e.g. by implementing new business models  
353 based on data from sustainability disclosures and trustworthy product data.

354 **Real-time data access:** Exchanging and verifying product, sustainability, and tracing  
355 information in an automatically processable format can bring many different efficiencies, such  
356 as speeding up customs processes, reducing cargo delays, optimising logistics, and reporting  
357 efforts.

## 358 1.5 International Standards

359 The creation and development of supporting instruments for Recommendation No. 49 shall be  
360 based on international recommendations and standards, including those recommended by  
361 UN/CEFACT such as the UN/CEFACT Buy-Ship-Pay Reference Data Model (BSP-RDM)<sup>18</sup>,  
362 UNECE Recommendation No. 46<sup>1</sup> UN/CEFACT e-CERT<sup>19</sup>, and UN/LOCODE<sup>20</sup>, to support the  
363 key principles, which are outlined in the Guidelines in Section 2 of this recommendation, e.g.  
364 2.2.3 Open Standards, 2.2.4 Interoperable Protocols, 2.2.11 Inclusive Governance and 2.2.12  
365 Permissionless Participation.”

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<sup>17</sup> United Nations Economic Commission for Europe, Digital Product Passport. (Available at <https://uncefact.github.io/spec-untf/docs/specification/DigitalProductPassport>). (Note: Final hyperlink is still to be established.) Accessed 9 February 2025. (web content partially available at time of publication).

<sup>18</sup> United Nations Centre for Trade Facilitation and Electronic Business, Business Requirements Specification Buy-Ship-Pay Reference Data Model, UN/CEFACT Bureau, August 2019. (Available at [https://unece.org/fileadmin/DAM/cefact/brs/BuyShipPay\\_BRS\\_v1.0.pdf](https://unece.org/fileadmin/DAM/cefact/brs/BuyShipPay_BRS_v1.0.pdf))

<sup>19</sup> United Nations Economic Commission for Europe, e-CERT: Electronic SPS Certificate. (Available at <https://unece.org/trade/uncefact/ecert>). Accessed 9th February 2025.

<sup>20</sup> United Nations Economic Commission for Europe, UN/LOCODE Code List by Country and Territory, 17th January 2025. (Available at <https://unece.org/trade/cefact/unlocode-code-list-country-and-territory>)



## 366 1.6 Recommendations

367 The United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT)  
368 agrees to recommend that national and regional policy makers take the actions listed below:

369

370 a. **Develop a national policy for transparency at scale**

371

372 National and regional policy makers should establish a national traceability and  
373 transparency framework in a way that aligns with risk-based due diligence for  
374 responsible business conduct, to support their national sustainability commitments and  
375 improve their export market competitiveness.

376

377 The policy should strike a balance between cost considerations and the logistical  
378 complexities of full supply chain traceability, all while striving to enhance overall  
379 sustainability. Some high-risk supply chains might warrant a more detailed, intensively  
380 structured traceability or chain of custody system, for example due to the risk of  
381 fraudulent misrepresentation of the origin of commodities, such as cotton, leather or  
382 minerals, while a community audit system could be considered sufficient in other  
383 cases.

384

385 b. **Implement supporting instruments for the national policy on transparency at**  
386 **scale**

387

388 To enable implementation of their national traceability and transparency framework  
389 and to address the challenges of trust, complexity, scalability, interoperability, stability,  
390 confidentiality, costs, and resistance to change in data exchange practices, value chain  
391 actors, both private and public, should use supporting instruments.

392

393 In this context, policy makers, legislators and value chain actors should undertake to  
394 implement supporting instruments for transparency at scale that:

395

396 I. Address all of the challenges and mitigation strategies, outlined in Section 2.1  
397 in the Guidelines.

398 II. Conform to the supporting instrument principles, outlined in Section 2.2 in the  
399 Guidelines.

400 III. Implement the supporting instrument concepts, outlined in Section 2.3 in the  
401 Guidelines.

402

403 The United Nations Centre for Trade Facilitation and Electronic Business  
404 (UN/CEFACT) is developing and will be maintaining a supporting instrument for  
405 transparency at scale, called the United Nations Transparency Protocol (UNTP)<sup>21</sup>.  
406 National and regional policy makers can use UNTP or any other equivalent supporting  
407 instrument, that mitigates the listed challenges and follows the implementation  
408 principles and concepts provided in the Guidelines in Section 2 of this  
409 recommendation.

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<sup>21</sup> United Nations Economic Commission for Europe, UN Transparency Protocol. (Available at <https://uncefact.github.io/spec-untp/>). (Note: Final hyperlink is still to be established.) Accessed 9 February 2025.

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By adopting a widely used supporting instrument for transparency at scale, such as the UNTP, national and regional policy makers can reuse a rich and tested body of work while better aligning efforts with international best practice and requirements.

**c. Develop government services in support of the national policy for transparency at scale**

National and regional policy makers generally define rules, issue permissions and manage compliance. This role is enhanced when governments act as digital trust anchors and especially if this role can be recognized across systems by implementing verifiable credentials<sup>22</sup> (VCs) based on an internationally agreed implementation of the globally recognized W3C standard for VCs, such as that provided by UNTP. “

Governments and their designated representatives act as a digital trust anchor (also called a “root of trust”), by implementing verifiable government credentials such as permits, licenses, certifications, and test/lab results. This allows the party receiving the verifiable credential to independently verify its integrity and authenticity, and thus to have confidence in the veracity of the claim. Regulators are already performing this role in their economies, but usually not in a digitally verifiable way. Regulators, such as the following, should be equipped to act as digital trust anchors:

- I. Government entities, border-control, and market surveillance agencies with strong business identity verification processes (e.g. company registers, tax authorities) should issue registration documents as digital verifiable credentials<sup>23</sup> linked to globally unique identifiers.
- II. Competent authorities, such as departments of agriculture, environment, energy and resources, should issue all permits and certificates as verifiable credentials.
- III. Land registration authorities should issue geolocated land titles and cadastral boundaries as verifiable credentials.
- IV. Export regulators should consider extending existing export certificate schemes such as certificates of origin and phytosanitary certificates to include verified sustainability conformity attestations<sup>24</sup> such as those for carbon intensity.
- V. Customs authorities should issue customs clearance documents as well as other official documents such as Authorized Economic Operator (AEO) permits as virtual credentials.
- VI. Governments should authorise trusted organisations, such as government agencies, accredited conformity assessment bodies, notified bodies and other

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<sup>22</sup>W3C, Verifiable Credentials Data Model V2.0, World Wide Web Consortium, 27 January 2025. (Available at <https://www.w3.org/TR/vc-data-model-2.0/>) and United Nations Economic Commission for Europe, Verifiable Credentials. (Available at <https://uncefact.github.io/spec-untf/docs/specification/VerifiableCredentials/>) (Note: Final hyperlink is still to be established.) Accessed 9 February 2025.

<sup>23</sup> United Nations Economic Commission for Europe, White Paper on eDATA Verifiable Credentials for Cross Border Trade, 20 October 2023. (Available at <https://unece.org/trade/documents/2023/10/white-paper-edata-verifiable-credentials-cross-border-trade>).

<sup>24</sup> Food and Agriculture Organization of the United Nations, Requirements for Phytosanitary Certificates. (Available at <https://www.fao.org/4/y3241e/y3241e06.htm>). Accessed 9th February 2025. and Government of the United Kingdom, Get Proof of Origin for Your Goods, 6 November 2024. (Available at <https://www.gov.uk/guidance/get-proof-of-origin-for-your-goods>)

450 trusted entities to issue verifiable credentials on their behalf. This establishes  
451 a trust chain between the receiver of a verifiable credential and the government.

452

453 **d. Promote the uptake of the national policy for transparency at scale**

454 National and regional policy makers should:

455 **Engage** their technical and business experts to participate in the development and  
456 maintenance of supporting instruments for Recommendation No. 49, such as the  
457 UNTP, and start building capacity to use and understand those.

458 **Foster** an understanding of benefits from implementing Recommendation No. 49 and  
459 its guidelines through education and training.

460 **Develop** and maintain these supporting instruments, such as translations into local  
461 languages and implementation guidelines.

462 **Define** requirements<sup>25</sup> for and establish mutual recognition of electronic signatures to  
463 create clear rules for cross-border trust<sup>26</sup>, ensuring that an electronic signature holds  
464 the same legal value as a handwritten one.<sup>27</sup>

465 **Improve** the quality of national security infrastructure (e.g. in the field of qualified digital  
466 signatures) by aligning national and regional legislation and implementing global  
467 standardization.

468 **Help** establish trust in verifiable credentials and encourage their acceptance for  
469 documents such as governmental permits, licences, digital product passports,  
470 conformity credentials, tracing events, certifications, lab results, etc. as a replacement  
471 for analog documents.<sup>28</sup>

472 **Legally** and technically enable customs authorities to leverage verifiable digital  
473 product passports to increase import and export border compliance, improve risk  
474 analysis, and facilitate trade. In this context, a digital product passport could eventually  
475 become for product consignments what a national passport is for human travelers.

476 **Incentivise** industries to share and potentially register their certification schemes, and  
477 related segment, jurisdiction, or industry specific vocabulary with UN/CEFACT.

478 **Incentivise** industry to use verifiable, primary data instead of secondary data when  
479 making sustainability claims and disclosures.

480 **Establish** sustainability benchmarks to be able to increase sustainability over time.

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<sup>25</sup>European Commission, eIDASRegulation, 4 April 2024. (Available at <https://digital-strategy.ec.europa.eu/en/policies/eidas-regulation>)

<sup>26</sup>Economic and Social Commission for Asia and the Pacific, Trust Services for Cross-Border Paperless Trade, 3 October 2024. (Available at <https://www.unescap.org/events/2024/trust-services-cross-border-paperless-trade>)

<sup>27</sup>United Nations Commission on International Trade Law, UNCITRAL Model Law on the Use and Cross-Border Recognition of Identity Management and Trust Services, United Nations, Vienna 2023. (Available at [https://uncitral.un.org/sites/uncitral.un.org/files/media-documents/uncitral/en/mlit\\_en.pdf](https://uncitral.un.org/sites/uncitral.un.org/files/media-documents/uncitral/en/mlit_en.pdf))

<sup>28</sup>United Nations Commission on International Trade Law, UNCITRAL Model Law on Electronic Transferable Records, New York, 2018. (Available at [https://uncitral.un.org/sites/uncitral.un.org/files/media-documents/uncitral/en/mletr\\_ebook\\_e.pdf](https://uncitral.un.org/sites/uncitral.un.org/files/media-documents/uncitral/en/mletr_ebook_e.pdf))



481 **Engage** with various stakeholder groups, such as government employees, economic  
 482 operators, consumers, second-market actors, and solution providers to understand  
 483 their requirements with regard to Recommendation No. 49.

484 **Support** participation by small and medium sized enterprises (SMEs) and, to keep  
 485 costs low, fund contributions to the development of supporting instruments, and the  
 486 implementation of open-source technologies. Also incentivise professional service  
 487 providers to help data owners, claim and certification issuers, and certification holders  
 488 to participate in the ecosystem

489 **Consider** joining the UNECE Call to Action - The Sustainability Pledge<sup>29</sup> for traceability  
 490 and transparency of sustainable value chains, and its Community of Practice, and  
 491 encourage value chain actors in their economy to do the same.

492  
 493 Section 2 of this document contains the Guidelines for Recommendation No. 49 with  
 494 information about implementation challenges and how they can be mitigated, implementation  
 495 principles as well as a high-level description of the main concepts for supporting instruments  
 496 to implement Recommendation No. 49, and an overview of the UNTP. This information should  
 497 be useful for all concerned parties, including policy makers, regulators and value-chain actors.

## 498 2 Guidelines for Recommendation No. 49 on 499 Transparency at Scale

500 This part describes the challenges to transparency at scale and strategies for their mitigation,  
 501 implementation principles and concepts for supporting instruments that help implement the  
 502 actions recommended by Recommendation No. 49.

### 503 2.1 Implementation Challenges and Mitigation Strategies

504 There are significant challenges in the implementation of value chain transparency at a global  
 505 scale and in achieving the benefits described above. To solve these challenges, the  
 506 UN/CEFACT is developing and maintaining supporting instruments, leveraging and building  
 507 upon existing open standards.

508  
 509 The following table outlines the challenges for transparency at scale and mitigation strategies.  
 510 Recommendation No. 49 and its supporting instruments are being developed and maintained  
 511 to comply with implementation of these mitigation strategies. These challenges and mitigation  
 512 strategies are the basis for the principles described in subsequent sections. At the same time,  
 513 all or some of these mitigations' strategies may also be met by other means.

514

<i>Challenge description</i>	<i>Mitigation</i>
<b>2.1.1 Complex dependencies and scalability</b>	

<sup>29</sup>United Nations Economic Commission for Europe, Sustainability Pledge, Italy, 2024. (Available at <https://thesustainabilitypledge.org/>). Accessed 9 February 2025.

<p>The world’s value chains involve millions of independent actors that exchange billions of product shipments in complex and dynamic value chains that cross industry and national boundaries. Any solution that depends on different actors agreeing to use common and/or centralized systems cannot scale to meaningful volumes.</p>	<p>To achieve interoperability at a data level between information exchanges, a core set of standards and guidelines need to be established and implemented across all industries and regulatory regimes, with a clear governance for extending the standards to cover different industry and regulatory requirements. Data should be held decentrally, i.e. remain under the control of the data owner, exchange protocols need to be defined to discover, receive and verify decentrally stored data, and each actor should be able to implement the relevant standards without depending on others.</p>
<p><b>2.1.2 Interoperability across industry and national boundaries</b></p>	
<p>Various national or regional regulations are emerging that impose digital data requirements, including digital product passports, for goods sold into their market(s). Industry-specific regulations mandating product passports for batteries, textiles, steel, chemicals, detergents, buildings, toys, (used) vehicles, cosmetics, bed mattresses, plastic and paper products are evolving.</p> <p>Since almost every value chain crosses industry boundaries and jurisdictional boundaries, there are interoperability challenges at each boundary.</p>	<p>Interoperability requires a generic cross-industry and cross-border standard that can be extended to meet specific industry or jurisdictional needs while maintaining cross-industry and cross-border interoperability.</p> <p>In other words, the data in a product passport for leather originating from a country, like Brazil, should be able to be read and correctly interpreted by customers in both the automotive and clothing industries and customers in Africa, Asia, Europe and North America.</p> <p>To be successful, interoperability tools need to complement and not compete with regulated product passports and industry-specific product passports.</p>
<p><b>2.1.3 Trust in claims / disclosures</b></p>	
<p>Due diligence regulations represent significant opportunities to reduce adverse impacts on people, the planet and society. Non-compliance penalties and reputational damage present increasingly severe consequences if/when supplier sustainability claims/ disclosures are found to be untrue. To mitigate these risks, buyers need mechanisms to verify the sustainability disclosures made by their suppliers.</p>	<p>The verifiability of sustainability information is essential for providing 1) auditable evidence of trustworthy assessments that substantiate sustainability claims / disclosures and 2) verification of relevant identities (i.e. products, facilities and business entities).</p> <p>In addition, a classification scheme for sustainability information is needed that will enable buyers to align the products and services that they procure with corporate disclosure requirements.</p> <p>Taken together, these two measures will support businesses with trustworthy due diligence reports.</p>

<p><b>2.1.4 Business incentives for implementation</b></p>	
<p>For value chain actors to invest in being more sustainable or more transparent, material incentives need to exist. Today, for most suppliers, and especially those that are upstream, there are few incentives because the data and benchmarks to hold them accountable do not exist.</p> <p>Also, buyers, and especially those closer to the finished-products end of value chains, often use industry averages (secondary data) to estimate the sustainability performance of their value chain (and thus their products).</p> <p>This use of secondary data removes any incentive for suppliers to compete on sustainability performance. Buyers also lose a key lever to improve their own sustainability performance based on differentiated supply.</p>	<p>Relevant ways to create economic incentives for sustainable behaviour and greater transparency regarding sustainability are:</p> <ol style="list-style-type: none"> <li>1) Increase consumer demand. This demand may result in premium pricing and/or higher sales volumes for products where there is a high degree of confidence in their sustainability.</li> <li>2) Establish regulations. Regulatory sustainability requirements can cause losing the right to do business in the regulated market or cause higher (import) taxes. Regulations should also foster the increasing use of primary data in sustainability claims and disclosures.</li> <li>3) Increase process efficiency. Greater operational efficiency can be achieved based on the data that transparency provides. These cost savings have the potential to make sustainable products cheaper than non-sustainable products.</li> <li>4) Make surveillance tools, including a Digital Product Passport (DPP) mandatory that is designed to carry sustainability information about each products' shipment at each step of the value chain. DPPs provide a mechanism for suppliers to differentiate their products based on sustainability performance. This in turn provides buyers with the ability to select products that have a precise sustainability profile in support of their own sustainability disclosures.</li> </ol>
<p><b>2.1.6 Digital maturity and unequal adoption</b></p>	
<p>Every value chain has actors with diverse levels of digital maturity and capacities for change. Any traceability or transparency framework that requires the same level of digital maturity from all actors in a value chain is unrealistic and bound to fail.</p>	<p>To mitigate this challenge, tools, infrastructure and services need to be made available that do not need deep technical expertise. Using the supporting instruments must be as easy as using an online service with an intuitive user interface. Any data that is exchanged needs to have a human readable rendering.</p>

<p><b>2.1.7 Business confidentiality, data sovereignty and privacy</b></p>	
<p>While value chain transparency regarding sustainability is a powerful instrument to counter greenwashing, it must be balanced against the risk of leaking commercially sensitive information.</p> <p>In general, value chain actors will withdraw participation rather than risk the loss of commercially sensitive data.</p> <p>To further complicate this challenge, there is a wide variation across industries and between different actors regarding what data they consider to be commercially sensitive.</p>	<p>To meet this challenge, supporting instruments need to implement a confidentiality and privacy-preserving model for data sharing that empowers each actor to keep control over which parts of their product and sustainability information they share with whom. In other words, they should be able to manage what information is public, what data is accessible to certain authorised roles, and what data is accessible only to the buyer / user / recycler of the specific product.</p>
<p><b>2.1.8 Implementation costs must be kept to a minimum</b></p>	
<p>For a viable business case to exist, the costs to implement and operate digital traceability and transparency systems must be lower than the value derived from the data. Although it is expected that market price signals for more sustainable products will provide some incentive, the evidence to date is that the price margins are low. Therefore, the cost must be even lower.</p>	<p>Minimizing implementation costs and supporting innovation that results in lower costs requires</p> <ol style="list-style-type: none"> <li>1) Standards that have the following characteristics: <ul style="list-style-type: none"> <li>• They are open, available free of charge and with open participation in their maintenance.</li> <li>• Designed to minimise unnecessary change. For example, by supporting existing product identifiers and data carriers.</li> <li>• Are as simple and cheap as possible</li> <li>• Avoid vendor lock-ins.</li> </ul> </li> <li>2) Access to free, open-source reference implementations, created and based on international open standards.</li> <li>3) Standardised, easy access to production data.</li> <li>4) Standardised, cost efficient means to collect data from across the value chain.</li> <li>5) Standardised cost efficient means for risk-based due diligence reporting.</li> </ol>
<p><b>2.1.9 Lack of familiarity with systems that support transparency at scale</b></p>	
<p>Many national and regional policy makers, government agencies and enterprises are not familiar with the systems and technologies that can be used to meet the</p>	<p>To create a better knowledge and understanding of the required technologies and related systems, there is a need to document and highlight, in credible reports,</p>

<p>challenges described here – and therefore may be reluctant to use them. .</p>	<p>ongoing and completed industry implementations of solutions that support transparency at scale. This will support confidence among government and industry stakeholders.</p>
<p><b>2.1.10 Lack of regulatory alignment regarding data exchange</b></p>	
<p>Countries may have varying rules regarding data hosting, data sovereignty and the balance between national security and data privacy. When there is a lack of clarity regarding cross-border trade data flows, it may hinder the implementation of transparency at scale, which will often require the exchange of data across borders.</p>	<p>It is important to educate national and regional policy makers and implementers on the ways that transparency systems which meet the requirements outlined in this table can be tailored to meet many jurisdictional requirements. It is also important to foster international cooperation on trade data flows and ensure that data exchange rules can be compatible with transparency at scale.</p>
<p><b>2.1.11 Resistance to change</b></p>	
<p>Change is always difficult to implement because doing things differently always contains an element of perceived, and sometimes real risk.</p> <p>The risks that organizations perceive often fall under one of the following categories:</p> <ul style="list-style-type: none"> <li>• Costs</li> <li>• Competitiveness</li> <li>• Reputation</li> <li>• Liability</li> <li>• Fear of failure or making mistakes</li> </ul> <p>Most or even all of these can be addressed and have been covered by the responses to other challenges in this table.</p> <p>In addition, international, cross-border initiatives, by their nature, are voluntary.</p> <p>One inevitable result of these factors is that implementation will be uneven across and within value chains.</p> <p>.</p>	<p>As mentioned, cross-border transparency at scale, by its nature, must be voluntary.</p> <p>This means that supporting solutions must improve the sustainability performance of value chains even when it is not adopted by every value chain, or every actor within any one value chain. Once participating networks (small or large) can be seen to derive benefits it can be expected that this will serve to drive implementation by others.</p> <p>Ultimately, national and regional policy makers will determine whether improvements in sustainability are occurring at a rate that will allow them to meet their sustainability policy objectives. If not, they will need to consider whether additional incentives are needed, such as tax concessions, preferential consideration for public tenders or regulatory requirements.</p>

515  
516 The guidelines define implementation principles and implementation concepts for any  
517 instruments supporting Recommendation No. 49 and introduce the United Nations  
518 Transparency Protocol that has been initiated by the UN/CEFACT Bureau in adherence to  
519 these principles.

## 520 2.2 Supporting Instrument Principles

521 The following are the basic principles that supporting instruments need to fulfil in order to  
522 comply with Recommendation No. 49. These principles are designed to guide the  
523 development of interoperable, accessible, and inclusive instruments that address diverse  
524 stakeholder needs. Supporting instruments must respect and follow those principles.

### 525 2.2.1 Voluntary and Incentive-Based

526 Any implementation of Recommendation No. 49 should remain voluntary, leveraging  
527 incentives to encourage participation rather than mandatory regulations at the regional or  
528 national level. Compared to mandatory regulations, this approach allows flexibility for  
529 businesses and organizations to adopt solutions tailored to their unique operational and  
530 jurisdictional contexts. Voluntary systems can drive adoption by demonstrating clear benefits  
531 such as those defined in Part 1. Aligning incentives between multiple stakeholders to bridge  
532 both business interests and social wellbeing ensures sustainable adoption and frequent use,  
533 resulting in more accurate, complete, and up-to-date information.

### 534 2.2.2 Global Standardization

535 A key principle is the development of a global standardization effort to identify common  
536 principles across jurisdictions. This ensures that implementation frameworks harmonize  
537 diverse regulatory and industry-specific requirements while reducing fragmentation, enabling  
538 solutions to be adopted seamlessly across borders and industries.

### 539 2.2.3 Open Standards

540 Supporting instruments should be based on open standards that are free of charge. This  
541 reduces barriers to entry and enables participation from organizations of all sizes, particularly  
542 small and medium-sized enterprises (SMEs) and stakeholders in developing regions.  
543 Exceptions to this principle can be made, where the use of paid standards is cheaper for an  
544 industry due to previous investments. Supporting instruments should be licensed to reflect  
545 these open standards.

### 546 2.2.4 Interoperable

547 Supporting instruments should incorporate local, regional, and industry standards to enable  
548 interoperability. Interoperability must be guaranteed in many different areas, such as  
549 vocabularies, exchange protocols, security, identity and storage. This ensures that  
550 stakeholders can adopt solutions that align with their specific needs while remaining  
551 compatible with global systems, facilitating cross-industry, cross-sector and cross-border data  
552 exchange.

### 553 2.2.5 Customizable and Modular

554 Flexibility is essential for addressing diverse stakeholder needs. Supporting instruments must  
555 allow interest groups to define their own vocabularies, terminology, and governance. A  
556 modular approach ensures that stakeholders can adopt specific components incrementally,



557 reducing complexity and resource burdens, and make updates or changes to their own  
558 systems without needing to delay for the consensus of the umbrella system. This also allows  
559 for independent innovation in system improvements or specialized use cases as needed and  
560 adapt for new or niche edge cases in the future.

561 By adhering to these principles, Recommendation No. 49 provides a foundation for  
562 implementing scalable and accessible supporting instruments that enable global value chain  
563 transparency and the UN Transparency Protocol (UNTP) and other supporting instruments  
564 can build on these principles. These principles aim to simplify adoption while fostering  
565 inclusivity and trust, creating a robust path forward for value chain transparency and due  
566 diligence.

### 567 2.2.12 Inclusive Governance

568 An open governance system is critical to maintaining transparency and stakeholder trust.  
569 Open participation in the development and maintenance of supporting instruments ensures  
570 that diverse perspectives are incorporated, allowing for solutions that meet the needs of  
571 national and regional policy makers, businesses, and civil society. The governance body of  
572 any supporting instrument should:

- 573 ● clearly define the goals of the supporting instruments.
- 574 ● clearly define the membership criteria and contribution rules.
- 575 ● follow an institutional design, i.e. demonstrate and proactively seek the representation  
576 of relevant stakeholders who are e.g. geographically and industry diverse, multi-  
577 lingual, of varying technical capability, and holding both business and civil society  
578 interests.
- 579 ● follow collaborative, transparent, and consensus-based decision making processes.
- 580 ● make governance mechanisms and election and/or processes broadly available for  
581 review to alter such mechanisms.
- 582 ● clearly define roles and responsibilities for leadership and the procedures to elect  
583 leaders (e.g. procedures that show how to avoid conflict of interest and undue influence  
584 by a single company or stakeholder group).
- 585 ● define a Code of Conduct for the participation of experts in working groups including  
586 dispute resolution.

### 587 2.2.13 Permissionless Participation

588 Supporting instruments should adopt a permissionless approach, meaning that no party is  
589 excluded from participating in its maintenance, continued development, and adoption. This  
590 principle fosters equity and innovation, ensuring that all stakeholders regardless of size,  
591 sector, or location can contribute and benefit. The implications of this principle include an  
592 easier-to-understand instrument that is: accessible to all stakeholders regardless of level  
593 technical capability or expertise; does not have high costs associated with contributing to the  
594 instrument; and has training or other learning materials for easier and accessible onboarding.

### 595 2.2.14 Supports Multi-Stakeholder Due Diligence

596 Supporting instruments must allow due diligence verification of both companies and products  
597 across multiple contexts, including business-to-business (B2B), business-to-consumer (B2C),  
598 and business-to-government (B2G) interactions. This principle ensures that companies can

599 demonstrate compliance with regulatory and market requirements, while products are  
600 assessed for traceability, sustainability, and ethical standards. These capabilities empower  
601 consumers to make informed choices, enable national and regional policy makers to oversee  
602 compliance effectively, and allow companies to ensure that their suppliers across multiple tiers  
603 meet or exceed due diligence expectations. This implies that the interface for data exchange  
604 is usable and takes into consideration the device, platform, technical bandwidth, and familiarity  
605 across consumer, enterprise, and governmental contexts.

## 606 2.3 Supporting Instrument Concepts

607 Supporting instruments need to be developed in line with the above-mentioned principles and  
608 as a minimum additionally provide specifications for the following key concepts:

609 **Digital product passports.** The supporting instruments need to provide a Digital Product  
610 Passport (DPP) concept that is designed to carry sustainability and other data about products  
611 exchanged in the value chain. A product model, batch, or item must be uniquely identified  
612 globally. The Digital Product Passport is issued and decentrally stored by the primary  
613 producer, recycler, or manufacturer of the products. Since almost every value chain crosses  
614 industry boundaries and jurisdictional boundaries, the DPP is a generic cross-industry and  
615 cross-border vehicle that can be extended to meet specific industry or jurisdictional needs  
616 while maintaining cross-industry and cross-border interoperability. The digital product  
617 passport will have the potential to be to trade products what a national passport is to human  
618 travellers.

619 **Digital conformity credentials**<sup>30</sup>. The supporting instruments need to provide a conformity  
620 credential concept that adds auditable trust for sustainability claims (products/facilities) and  
621 sustainability disclosures (companies). These credentials can also prove the identity (of e.g.  
622 products, facilities and business entities) thus reducing identity fraud and counterfeiting<sup>31</sup> as  
623 well as greenwashing and social washing.

624 **Digital traceability events.** The supporting instruments need to provide a concept for  
625 traceability events<sup>32</sup> which are very lightweight collections of credentials that specify the “what,  
626 when, where, why and how” of the products and facilities that constitute a value chain.

627 **Verifiable credentials.** Supporting instruments must focus on ensuring the verifiability of  
628 claims and disclosures stored in decentralized systems. Transparent mechanisms for  
629 validating claims are essential to establishing trust among stakeholders and addressing  
630 concerns like fraud, greenwashing, or counterfeiting. This also implies that any implementation  
631 of claims can be easily verified with commonly used tools and devices, such as a consumer's  
632 mobile phone.

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<sup>30</sup> ECE/Trade, BRS on Digital Product Conformity Certificate Exchange-High Level Process (Version 1.0), 10 July 2024.  
(Available at <https://unece.org/trade/documents/2024/07/session-documents/brs-digital-product-conformity-certificate-exchange-high>).

<sup>31</sup> United Nations Economic Commission for Europe, United Nations Transparency Protocol, Anti-Counterfeiting. (Available at <https://uncefact.github.io/spec-untp/docs/design-patterns/Counterfeiting>). (Note: Final hyperlink is still to be established.) Accessed 9 February 2025. (web content is under development).

<sup>32</sup> United Nations Economic Commission for Europe, United Nations Transparency Protocol, Digital Traceability Events. (Available at <https://uncefact.github.io/spec-untp/docs/specification/DigitalTraceabilityEvents/>) (Note: Final hyperlink is still to be established.) Accessed 9 February 2025. (web content is under development.)



633 The World Wide Web Consortium (W3C) has defined a standard called the Verifiable  
634 Credentials (VC) Data Model<sup>33</sup>. A verifiable credential is a portable digital version of everyday  
635 credentials like education certificates, permits, licences, registrations, etc. VCs are digitally  
636 signed by the issuing party and are tamper proof, privacy preserving, revocable and digitally  
637 verifiable. The United Nations has previously assessed this standard and is recommending its  
638 use for exchanging sustainability claims and disclosure as well as for a variety of cross-border  
639 trade use cases in a recent white paper<sup>34</sup>. VCs are inherently decentralized and, therefore, are  
640 an excellent fit for supporting instruments implementing Recommendation No. 49, i.e. digital  
641 product passports, digital conformity credentials and digital traceability events shall all be  
642 issued as W3C VCs. The supporting instrument shall define a detailed implementation  
643 approach for the use of verifiable credentials.

644 **Terminology.** Supporting instruments need to provide a mechanism that digitally connects all  
645 verifiable credentials (e.g. product passports or digital conformity credentials) with clear  
646 terminology (also called vocabulary or semantics). Supporting instruments shall define what  
647 methods to use for defining clear terminology. Attributes and other terms should be linked  
648 where possible to other widely used vocabularies, such as schema.org, using "exact match",  
649 "broader than" and "narrower than" relationships. This enables the recipients of a verifiable  
650 credential to understand and validate it. The basic terminology for the structure of the verifiable  
651 credential needs to allow industry-specific extensions.

652 For example, digital product passports need a clear definition of their attributes<sup>11</sup> and a  
653 technical schema to validate against. The electronic representation of a claim must always  
654 link to the definition of the claim's attributes and their relation amongst each other (e.g. by  
655 providing an ontology).

656 **Digital identities.** A supporting instrument must provide means to globally, and uniquely  
657 identify product models, product batches, or product items as well as companies and facilities.  
658 When needed it shall be possible to add other globally unique identities, e.g. for humans,  
659 machines, or processes. Any sustainability information must be linked to a globally unique  
660 identity to make it discoverable and verifiable, in other words an identifier must link to all  
661 sustainability information related to it.

662 Digital Identities will bind identifiers of products, facilities, companies or other things to actual  
663 entities in the real world. The supporting instrument shall allow the reuse of existing, widely  
664 used identifier schemes. Any credential (e.g. DPP, Conformity Credential, Traceability Event)  
665 needs to be related to the identity of the issuer. Manifestations of these identities, also known  
666 as digital identity credentials, need to be:

- 667
- Globally unique. That means the ID can only exist once worldwide
  - Ad-hoc discoverable. That means data is easily discoverable by searching the ID online  
668 or scanning a barcode, QR code, RAIN or NFC tag. Supporting instruments must allow for  
669 the ad-hoc discoverability of sustainability information simply by using the globally unique  
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<sup>33</sup>World Wide Web Consortium, Verifiable Credentials Data Model V2.0, 27. January 2025. (Available at <https://www.w3.org/TR/vc-data-model-2.0/>).

<sup>34</sup>United Nations Economic Commission for Europe, White Paper on eDATA Verifiable Credentials for Cross Border Trade, 20 October 2023. (Available at <https://unece.org/trade/documents/2023/10/white-paper-edata-verifiable-credentials-cross-border-trade>).

671 identifiers. Stakeholders should be able to access specific, relevant information, such as  
672 digital product passports whenever it is needed, without requiring system integration. .

673 • Resolvable. That means, given the existence of an identifier, there is a standard way to  
674 find more verifiable data about the identified thing at a single data source, and

675 • Verifiable. That means the company identifier must be verifiable by a trust anchor (see  
676 below) to ensure that it genuinely belongs to the claimed identity in the analog world. .

677 **Trust anchors.** Supporting instruments will issue conformity credentials like emissions  
678 intensity values; but how can a verifier of these sustainability claims be confident that they are  
679 true and that they are made by the genuine party at a verifiable location? To achieve this,  
680 identities that issue conformity credentials can be verified by a trust anchor. Trust anchors are  
681 for example national or international authorities that typically run existing business or product  
682 registration, certification, accreditation, or other high integrity processes. Examples of trust  
683 anchors include national regulators that govern things like land ownership or business  
684 registrations. Another example is the national accreditation bodies that audit and accredit  
685 certifiers to issue third party assessments. The supporting instruments depend on trust  
686 anchors to add digital integrity to sustainability claims and identities by linking them to the  
687 authority under which they are made. In essence, supporting instruments need to define a  
688 protocol for existing trust anchors to continue doing what they have always done, but in a  
689 digitally verifiable way. Note, that trust anchors also can have different levels of credibility.  
690 Supporting instruments should provide the means to attach a risk-score / level of credibility to  
691 a trust anchor.

692 **Trust graphs.** The sustainability footprint of a finished product is the aggregation of the  
693 footprints of all the transformations of the product that took place during the product's life cycle  
694 in the value chain. Verification of sustainability claims therefore involves assessing a bundle  
695 of linked credentials (aka a "Trust Graph") drawn from all or part of a value chain. While each  
696 credential may be valid individually, one challenge is verifying the context of related  
697 credentials. For example, a conformity assessment body that is accredited to test the strength  
698 of structured steel might not be accredited to issue emissions intensity certificates. A  
699 technically valid emissions certificate linked to a technically valid accreditation certificate for a  
700 conformity assessment body that has a different scope would be fraudulent. To address this  
701 problem, the supporting instruments need to define a method to verify the contextual scope of  
702 linked credentials. This provides a mechanism to verify linked data without analysing the  
703 content of the data.

704 **Decentralised storage and scalability.** Verifiable credentials, such as Digital Product  
705 Passports and Digital Conformity Claims, shall be kept in decentralized data storage. In other  
706 words, the data shall stay in the control of the data owner to allow for data sovereignty,  
707 business confidentiality and scalability. However, centralized systems can be used in addition  
708 by an organisation, when this is needed in order to fulfill certain requirements of that  
709 organisation. For example, a customs system that needs to verify and keep additional  
710 information about a product's conformity. In jurisdictions where some or all decentralised data  
711 storage conflicts with the national security strategy, the centralized systems shall be designed  
712 to interoperate with international and national decentralized ecosystems.

713 **Access control and business confidentiality.** Supporting instruments shall provide  
714 implementation concepts to allow for business confidentiality in the decentralised architecture.  
715 There is a trade-off between the demands of transparency (more value chain visibility means  
716 it is harder to hide greenwashing) and confidentiality (share too much data and you risk  
717 exposing commercial secrets). A key principle is that value chain actors must be able to keep  
718 control over their data but shall follow the national and regional policies with respect to the  
719 mandatory types of information to be disclosed in a claim.

720 Supporting instruments need to provide or point to tools for interoperability testing for all  
721 provided technical concepts, such as vocabularies, protocols, and security means (e.g.  
722 verifying digital signatures).

## 723 2.4 The United Nations Transparency Protocol (UNTP)

724 Taking into consideration all of the implementation challenges, principles, and concepts for  
725 supporting instruments for transparency at scale, the United Nations Centre for Trade  
726 Facilitation and Electronic Business (UN/CEFACT) is developing and plans to maintain a  
727 supporting instrument for achieving standardized transparency at scale, named the United  
728 Nations Transparency Protocol (UNTP).

729 UNTP will help implement the recommendations formulated in Section 1.6 of this document  
730 and particularly recommendation 1.6.b. **“Implement supporting instruments for the  
731 national policy on transparency at scale”**; and recommendation 1.6.c. **“Develop  
732 government services in support of the national policy for transparency at scale”**.

733 UNTP will consist of a detailed suite of technical specifications that provide best practice  
734 guidance for achieving transparency at scale. It will leverage and build upon standards from  
735 UN/CEFACT, including the Buy-Ship-Pay reference data model. When not covered by  
736 standards of UN/CEFACT, it also builds on standards from the International Standard  
737 Organization (ISO) and the World Web Consortium (W3C).

738 UNTP plans to include implementation guidance and best practices that allow users and third  
739 parties to independently verify conformance with UNTP specifications and voluntary registries  
740 of implementations and of industry and regulatory extensions.

741 UNTP is designed to undergo a continuous improvement and maintenance process.

### 742 2.4.1 Protocol governance

743 The UNTP development follows the open development process<sup>35</sup> and governance rules<sup>36</sup> for  
744 UN/CEFACT projects and deliverables, meaning it is:

- 745 1. An open standard, free of charge.
- 746 2. Maintained via an open and collaborative, inclusive and consensus-based process.

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<sup>35</sup> UN/CEFACT, Open Development Process, <https://unece.org/trade/documents/2023/12/session-documents/open-development-process>., Accessed 9th February 2025.

<sup>36</sup> UN/CEFACT, Governance, (Available at <https://github.com/uncefact/governance?tab=readme-ov-file#governance>). Accessed 9 February 2025.

747 3. Version controlled and life cycle managed.

748 The latest stable version of UNTP specifications will always be available by default at the  
749 UNTP website<sup>22</sup>.

## 750 2.4.2 A global protocol

751 The basic premise of UNTP is that value chain transparency data is already distributed across  
752 thousands of independent information exchange systems and that a viable and scalable  
753 traceability and transparency framework must expect that the data will remain distributed, but  
754 must become discoverable and linkable.

755 The UNTP is being based on a fully decentralized data architecture that does not depend on  
756 any single technology or platform. Instead, it will define the interoperability standards which  
757 can allow thousands of independent systems to participate in a global value chain  
758 transparency ecosystem.

759 Since almost every value chain or supply chain crosses industry boundaries and jurisdictional  
760 boundaries, the UNTP is designed to be a generic cross-industry and cross-border standard  
761 that can be extended to meet specific industry or jurisdictional needs while maintaining cross-  
762 industry and cross-border interoperability. It will support the implementation of digital product  
763 passports (DPPs).

764 UNTP will maximize reuse of existing investments by building upon existing open standards  
765 from global standards bodies.

## 766 2.4.3 National or industry specific extensions

767 As shown in Figure 2.4.1, UNTP is designed as a common core that is usable by any industry  
768 sector or in any regulatory field and jurisdiction. An extensions methodology<sup>37</sup> describes how  
769 to extend UNTP to meet the specific needs of any specific industry sector or regulated market  
770 in such a way that the extension maintains core interoperability with any other extension. This  
771 cross-industry and cross-border interoperability is a core value of UNTP because almost every  
772 value chain will cross industry and/or national borders. The contents of extensions are  
773 maintained outside of UNTP by their creators.

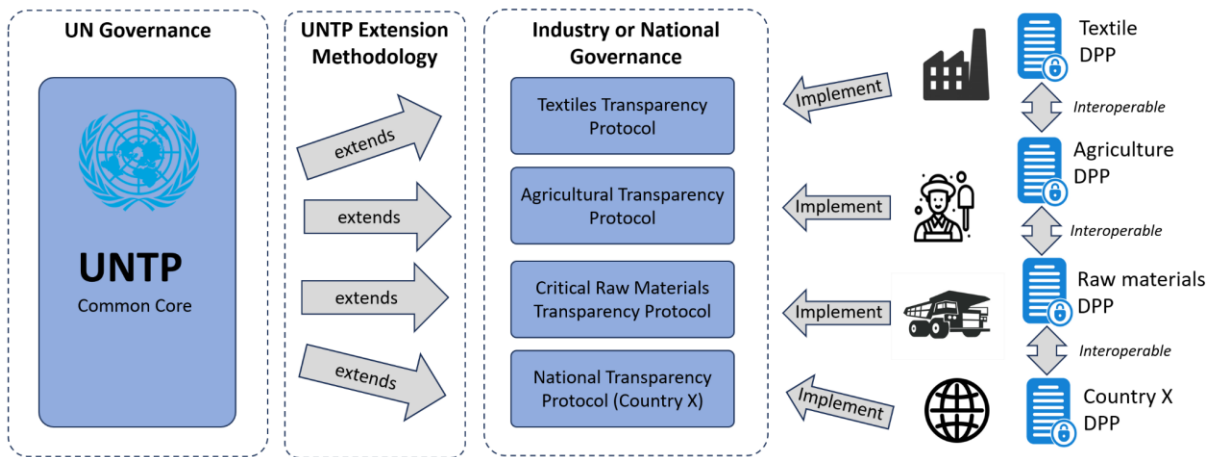
774

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*Figure 2.4.1 Industry specific extensions of UNTP*

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<sup>37</sup> United Nations Economic Commission for Europe, UNTP Extensions Methodology. (Available at <https://uncefact.github.io/spec-untf/docs/extensions/ExtensionsMethodology>). (Note: Final hyperlink is still to be established.) Accessed 9 February 2025.



776  
777

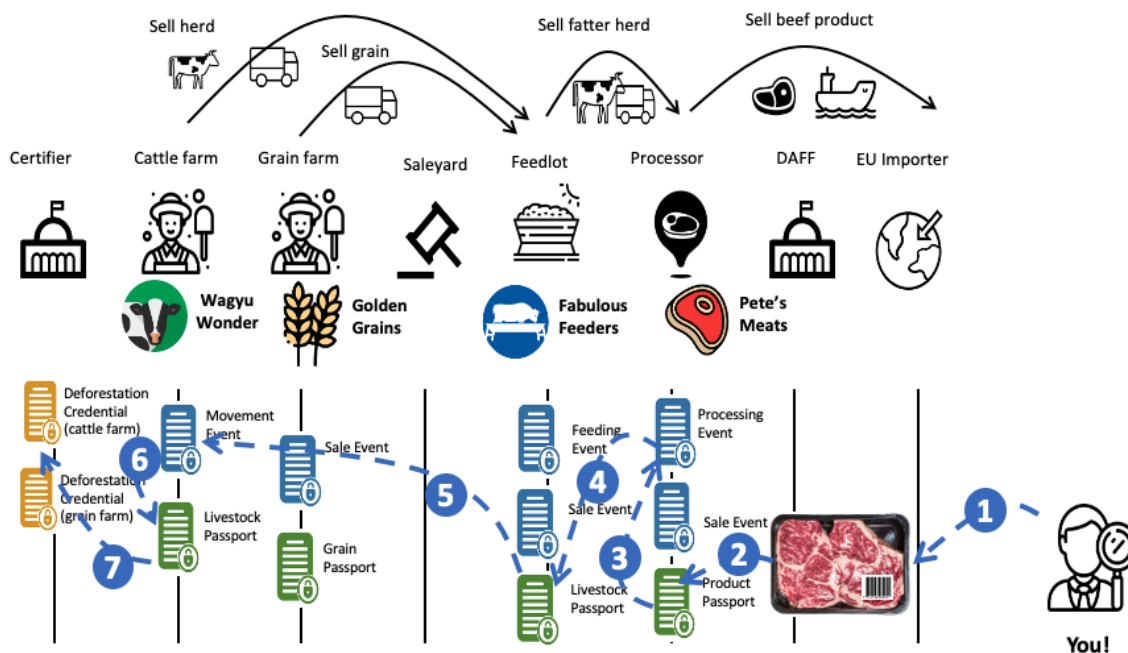
Source: UNECE, 2025

778 2.4.4 Trust graphs in UNTP

779 When each actor in a value chain makes their DPP discoverable based on product identifiers  
 780 and optionally adds conformity credential and traceability events, then it becomes possible to  
 781 follow a trust graph from any entry point (i.e. any product or facility identifier) in order to  
 782 discover the traceability and transparency information necessary to support value chain  
 783 sustainability outcomes, including due diligence and corporate disclosures.

784 In the conceptual example shown in figure 2.4.2, high integrity transparency data is  
 785 discoverable from the processor back to the farm and forward to the packaged meat on a  
 786 supermarket shelf.

787 Fig. 2.4.2 Transparent sustainability information of a meat supply chain



788  
789

Source: UNECE, 2025

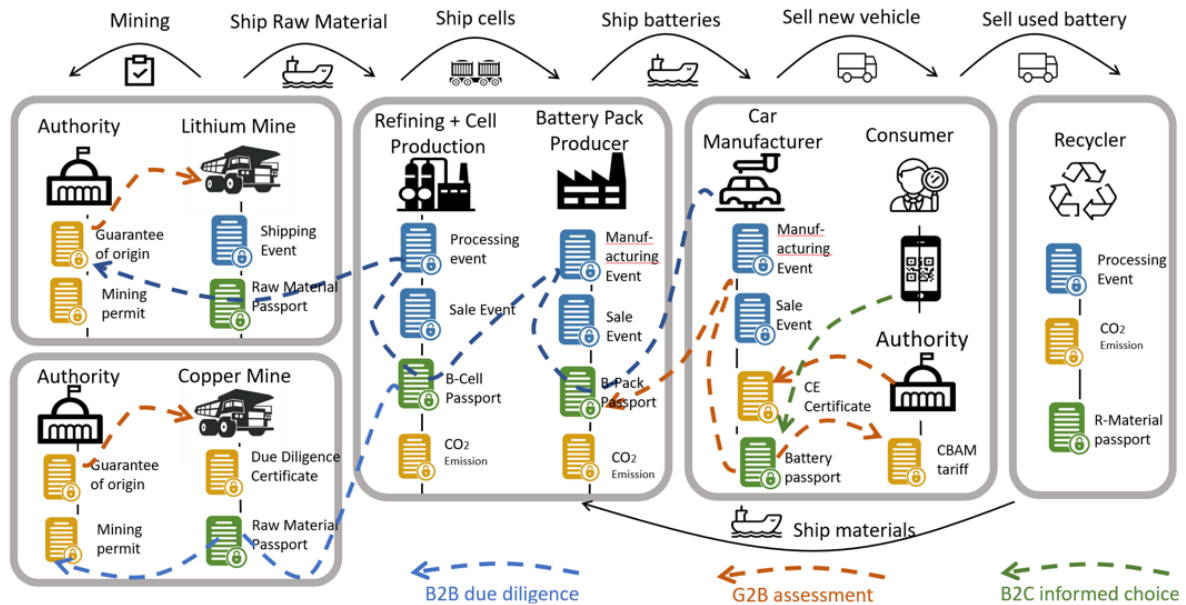


790 In the example shown in figure 2.4.3 high integrity transparency data is discoverable  
 791 from the electric vehicle (car) battery manufacturer back to the mining and refining  
 792 operations that provided the critical minerals<sup>38</sup> as well as forward to consumer use and  
 793 eventual recycling<sup>39</sup>.

794

795 *Fig. 2.4.3 Transparency of a battery supply chain for authorities and consumers*

796



797

798

Source: UNECE, 2025

## 799 2.4.5 Implementation testing

800 Supporting interoperability between different implementations is a fundamental requirement  
 801 of UNTP. Digital product passports issued by one implementer should be readable and  
 802 verifiable by another. For any implementer to have sufficient confidence that their  
 803 implementation will be interoperable, they must complete rigorous interoperability testing.

804 The UNTP website includes a test suite and test tools that can be used by any implementer  
 805 to self-assess their conformance to the UNTP standard. There is a test suite for each version  
 806 of the UNTP. Implementers are expected to test each major version of their software against  
 807 each major version of the UNTP that they wish to support.

808 Industry or jurisdictional extensions of UNTP will also need to provide conformance testing  
 809 capability to support implementers of the extension. Such tests will normally cover industry-  
 810 specific vocabularies (language) and choreographies (processes). UNTP provides best  
 811 practice guidance and examples that show how to extend core UNTP tests to cover the  
 812 requirements of UNTP extensions.

<sup>38</sup> OECD (2016), OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas: Third Edition, OECD Publishing, Paris, 6 April 2016. (Available at <https://doi.org/10.1787/9789264252479-en>).

<sup>39</sup> OECD (2017), OECD Due Diligence Guidance for Meaningful Stakeholder Engagement in the Extractive Sector, OECD Publishing, Paris, 2 February 2017. (Available at <https://doi.org/10.1787/9789264252462-en>)

813 2.4.6 Success measures

814 Although improved product sustainability and reduced greenwashing and social washing are  
815 the ultimate goals of UNTP, the most direct measure of success is uptake of the standard by  
816 implementers and the amount of verifiable, exchanged sustainability information. Therefore,  
817 UNTP will be able to measure uptake by counting the number of pledges (i.e. promises to  
818 implement) and the number of successfully completed conformity tests (i.e. actual  
819 implementations) that are reported. These measures will be tracked on the UNTP website.  
820 For UNTP to achieve its goals, uptake will need to reach tens of thousands of implementations  
821 across various value and supply chain actors (producers, manufacturers, regulators, certifiers,  
822 software developers, etc.).

823 More detailed information on the governance, protocol, extensions, testing and success  
824 measures, are available on the UNTP website<sup>22</sup>.

825 

## 3. Annex

826 

### 3.1 Glossary of terms

Acronym or term	Definition
CBAM	Carbon Border Adjustment Mechanism
Circularity	Circularity of a production process refers to the ability of this process to retain the value of products, materials and resources in the economy for as long as possible and to minimize, to the extent possible, the generation of waste along all the steps of the value chain <sup>1</sup> .
DCC	Digital Conformity Certificate. Conformity credentials are issued by trusted third parties and provide an assessment of product or company ESG performance against credible standards or regulations.
DPP	Digital Product Passport. Digital product passports contain digital, cryptographically verifiable sustainability information about a product that is easy to access and to understand by all interested parties.
Due Diligence	Due diligence is understood as “the process through which enterprises can identify, prevent, mitigate and account for how they address their actual and potential adverse impacts as an integral part of business decision-making and risk management systems <sup>1</sup> .”
EC	European Commission
ESG	Environmental, Social and Governance
ESRS	European Sustainability Reporting Standard
Greenwashing	Mislead the public to believe that a company or other entity is doing more to protect the environment than it is.
Guarantee of origin (GO)	A verifiable credential issued by a trusted authority or their accredited delegate that attests to the origin (provenance) of a product as well as to some, or all, of the sustainability claims. The GO certificate is typically issued by export authorities to add confidence to the claims made by exporters.



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ISO	International Standards Organisation
ISSB	International Sustainability Standards Board
MSME	Micro, Small and Medium-sized Enterprise
NFC	NFC stands for Near Field Communication and is a wireless communication standard that allows smaller amounts of data to be exchanged between NFC devices. That this data exchange can only take place over a short distance of 1-10 cm.
Primary Data	Sustainability data that has been determined from primary sources, i.e. verifiable data points that have been collected from the respective value chain members and not estimated using average data.
QR	Quick Response code
RAIN	RAIN is an acronym derived from RAdio Identification. RAIN refers to RFID at ultra-high frequencies (UHF) as specified by the ISO/IEC 18000-63 air-interface protocol. RAIN is capable of reading many tags simultaneously over a distance of several meters without line-of-sight.
SDG(s)	United Nations Sustainable Development Goal(s)
Secondary Data	Sustainability data that was estimated and comes from secondary sources, such as CO2 emissions average data bases.
Social Washing	Social washing is a strategy used to mislead the public that a company or other entity is doing more to protect social and human rights, than it actually is, for financial gain.
Sustainability Disclosure	A sustainability disclosure is a statement that was made by an actor about an organization’s environmental, social, and governance (ESG) practices, performance, and impacts.
Sustainability Claim	A sustainability claim is a statement that was made by an actor about a product’s environmental, social, and governance (ESG) performance and impacts.
Sustainability	Global goals to eradicate global poverty, protect the planet, and ensure that all people enjoy peace and prosperity are an important reference point in this regard. Sustainability in the context of garment and footwear

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	value chains means that all activities, throughout a product’s life cycle, take into account their environmental, health, human rights and socioeconomic impacts, and their continuous improvement <sup>1</sup> .
Sustainability Information	Sustainability information is an umbrella term that includes, e.g. sustainability disclosure (companies), sustainability claim (products), and traceability information.
Supporting Instrument	Supporting instruments, such as UNTP, help implement the Recommendation No. 49.
Traceability	Traceability is understood as “the ability to trace the history, application or location of an object” in a value chain. In this context, it is defined as the ability to “identify and trace the history, application, transformation, location and distribution of products, parts and materials <sup>1</sup> .”
Transparency	Transparency relates directly to relevant information being made available for all elements of the value chain in a harmonized way, which allows for common understanding, accessibility, clarity and comparison <sup>1</sup> .
Transparency at Scale	Transparency at Scale means having sustainability information accessible across different jurisdictions, industries, product segments, and steps in the value chain to reach sustainability objectives.
Trust Graph	A Trust Graph allows a verifier of a digital product passport to verify also all related intermediary product passports, due diligence certificates, or transparency events.
UNECE	United Nations Economic Commission for Europe
UNTP	United Nations Transparency Protocol
VC	Verifiable Credential
W3C	World Wide Web Consortium