

[Series Title]

Better Borders: Trade, Traceability and Enforcement



Foreword

This report provides an integrated perspective on how the OECD's long-standing work on trade facilitation and trade costs relates to a new generation of information-intensive trade-related requirements at the border. It explores how trade facilitation frameworks can continue to reduce unnecessary trade costs while adapting to a world in which trade depends on the collection, transmission, verification and reuse of information.

Findings demonstrate the merits of an integrated approach to trade facilitation and traceability structured around five complementary functions: **transmit** relevant information; **track** products and supply chain attributes; build **trust** in the information shared; **target** controls according to risk; and **tackle** the frictions that can impede implementation. These “5Ts” can provide a practical lens for translating increasingly information-intensive traceability requirements into more efficient and secure border processes.

These findings are derived from OECD Trade Committee work on trade facilitation policies and their role in reducing trade costs, including analysis of how evolving trade-related requirements are reshaping border processes and the information needed to move goods across borders. This programme of work has covered areas including trade facilitation indicators, paperless trade, carbon-intensity requirements, product environmental lifecycle requirements, environment-related trade facilitation indicators, and mutual recognition instruments. Collectively, these strands of research highlight how trade facilitation is ever more reliant on the availability, transmission and use of information accompanying traded goods throughout their lifecycle and across supply chains, bringing questions of traceability more clearly into focus.

Building on this body of analysis, this publication brings together the main insights from a series of papers discussed and declassified by Members of the OECD Trade Committee. A consistent finding emerges: border systems are becoming a central point at which traceability-related requirements are operationalised, monitored and enforced. As a result, trade facilitation reforms are being put to the test in new ways. Their effectiveness is no longer measured solely by their ability to reduce costs and delays, but also by their capacity to accommodate more complex information requirements while preserving transparency, predictability and enforcement. For businesses, this means demonstrating compliance through reliable information that can move efficiently across borders, reducing unnecessary duplication while supporting trusted participation in international supply chains.

Together, these contributions also reveal a broader story about the enhanced strategic role of trade facilitation in the global economy. Economies that succeed in integrating new information requirements into modernised border processes may be better placed to support regulatory objectives while maintaining the smooth flow of trade. This includes the ability of border and other competent authorities to identify potential risks of non-compliance and circumvention. In this context, shortcomings in transparency, digitalisation, interoperability, risk management or inter-agency co-operation can become more visible as enforcement requirements grow more information intensive. The relevance of these challenges increases as governments seek to ensure greater coherence between trade-related measures and broader objectives related to supply chain resilience and economic security, relying ever more on information generated across supply chains.

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Abbreviations

AEO	Authorised economic operator
AI	Artificial Intelligence
BCA	Border carbon adjustment
CAB	Conformity assessment body
CBAM	Carbon Border Adjustment Mechanism
Env-TFI	Environmental Trade Facilitation Indicator
FTZ	Free Trade Zone
HS	Harmonized System
IEA	International Energy Agency
IRC	International Regulatory Co-operation
MRI	Mutual recognition instrument
NPD	Non-personal data
NPR-PPM	Non-product related process and production method
OECD	Organisation for Economic Co-operation and Development
PIC	Prior informed consent
SME	Small and medium-sized enterprise
TFA	WTO Trade Facilitation Agreement
TFI	Trade Facilitation Indicator
WCO	World Customs Organization
WTO	World Trade Organization

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Executive Summary

Trade increasingly depends on detailed supply chain information. Governments are placing greater emphasis on managing supply chain risks, diversifying sourcing strategies, enhancing economic security, addressing risks linked to transshipment and trade circumvention, and strengthening coherence between trade-related measures and broader social and environmental objectives. These developments are increasing demand for information about how goods are produced, sourced and moved across supply chains. As a result, border processes are no longer expected only to facilitate the efficient movement of goods. They are progressively called upon to support more information-intensive regulatory requirements while preserving the speed, predictability and efficiency of cross-border trade.

Systems modernisation and traceability must advance hand-in-hand. The first is the continued modernisation of trade facilitation systems to simplify border procedures and reduce trade costs. The second is the growing importance of traceability across global supply chains, driven by the need to generate, verify and transmit ever more complex information. This report examines how these developments are interconnected and how greater operational integration between trade facilitation and traceability can strengthen regulatory compliance, supply chain resilience and economic security while minimising unnecessary costs for businesses.

Traceability is a critical component of supply chain resilience. Traceability is the ability to track and verify product and supply chain attributes relevant in a given policy or commercial context. Diversification strategies often privilege partners pursuing similar environmental and social standards to support a level playing field. In key sectors such as critical minerals, medical goods, advanced technology products and agri-food, the ability to generate, verify and transmit this information is therefore growing in importance for both compliance and resilient supply chains.

Supply chain traceability is operationalised to a growing extent at the border when supply chains operate internationally. This creates new demands for governments and businesses alike. Customs and other border authorities must process more complex information, co-ordinate across a wider range of agencies and integrate new forms of verification into border procedures. Firms, in turn, face growing requirements to collect, manage and report supply chain information across multiple jurisdictions. Digitalisation and trade facilitation are therefore becoming more and more vital for managing these demands while limiting costs and delays.

Against this backdrop, this report assesses the preparedness of OECD economies in using trade facilitation systems to support evolving traceability requirements while minimising costs and complexity for businesses.

Key findings

Trade facilitation is a key enabler of supply chain diversification and resilience. Since the entry into force of the WTO Trade Facilitation Agreement (TFA), reforms have improved the efficiency of border procedures. Building on this, recent efforts have centred on digitalisation and greater co-ordination across

border agencies. Since 2022, 23% of economies covered by the OECD Trade Facilitation Indicators (TFIs) have improved elements of border automation, while 68% and 21% have enhanced domestic and cross-border agency co-operation, respectively. These reforms help make diversification strategies operational by enabling firms to connect with a broader range of suppliers and markets while maintaining efficient cross-border flows. Analysis based on the OECD TFIs shows that a 10% improvement in trade facilitation performance is associated, on average, with more than a 6% increase in the number of export markets served and, in some regions, with nearly a 15% increase in the number of sectors reached.

Fewer than 20% of new environmental and social-related requirements reviewed are designed with comprehensive border implementation in mind. While trade facilitation can help economies manage supply chain diversification and complex compliance requirements, many recently introduced measures provide limited guidance on how they should be operationalised at the border. The number of such requirements is increasing rapidly: for instance, notifications of environment-related technical requirements have grown by more than 60% over the past decade, while around 86% of identified social and environmental due diligence measures have been introduced since 2015. Yet many measures linked to social or environmental performance and production methods, including carbon-intensity requirements, often treat compliance at the border as a downstream implementation issue rather than a core design consideration. Guidance is weakest on data platforms and border agency co-operation (included only in 19% and 17% of measures reviewed, respectively) and appears particularly limited for carbon-intensity requirements. Overall, less than 40% of the measures reviewed provide clear guidance on one or more key border implementation dimensions, including new documentation requirements, border procedures, data sharing mechanisms and platforms, and border agency co-operation, creating risks of frictions and, in some cases, de facto barriers to trade.

Only 55% of environmental lifecycle requirements are addressed by OECD economies. Trade facilitation systems are beginning to adapt to requirements that depend on information generated across product lifecycles and complex supply chains, but gaps remain. The OECD environment-related TFIs assess how documents, procedures, agencies and data related to environmental requirements are integrated into border management systems and ultimately support environmental objectives. TFI analysis in this report indicates that OECD economies currently address just over half (55%) of the border-related challenges associated with environmental lifecycle requirements, reflecting meaningful progress but also substantial room for improvement. This remaining gap partly highlights the fact that border processes do not yet fully account for the complexity of the supply chains through which compliance information is generated, transmitted and verified.

Operational readiness lags behind regulatory ambition, putting trade facilitation gains at risk. The environment-related TFIs reveal a 25 percentage-point gap between the existence of regulatory frameworks and their effective implementation across border systems and institutions. This matters because trade facilitation reforms have already helped reduce trade costs by up to 5% over the past decade, while further ambitious reforms could deliver additional reductions of up to 12 percentage points in some regions. As traceability-related requirements expand, preserving these gains will depend on integrating new compliance obligations into streamlined, digital and risk-based border processes that lower costs for businesses.

Risk is increased by uneven whole-of-government co-ordination and fragmented technical interoperability. Traceability-related requirements frequently involve customs authorities, environmental agencies, market surveillance bodies, conformity assessment institutions and sector regulators, yet responsibilities, procedures and information flows are not always clearly aligned across them. A deep dive into carbon-intensity measures points to persistent gaps in inter-agency co-ordination, verification arrangements, data-sharing mechanisms and the integration of environmental traceability-related information into risk management processes.

USD 4.8 trillion of global trade can benefit from trusted compliance mechanisms. Analysis of tools such as mutual recognition instruments points to a gap between the existence of formal regulatory frameworks and their practical integration with border processes. This matters because such instruments are potentially relevant to key sectors and around one-fifth of global trade, representing approximately USD 4.8 trillion in value. However, operational challenges, limited awareness, fragmented institutional implementation and difficulties integrating recognised information into border systems can constrain their practical use. As strategic sectors such as critical minerals, medical goods and advanced tech goods face growing traceability and compliance demands, better use of trusted compliance tools and reliable information represents one such opportunity to reduce duplication and costs, facilitate trade with trusted partners, strengthen economic security, and support more resilient and diversified supply chains.

Key considerations

A key lesson is that the design of new requirements cannot be separated from the systems that will implement them. Requirements that pursue legitimate policy objectives can nevertheless create implementation challenges if they are not translated into clear procedures, usable data requirements and operational processes at the border.

The report identifies three priorities for strengthening the relationship between trade facilitation and traceability.

- **Improve technical interoperability.** Making greater use of existing trade facilitation tools can help avoid duplicative reporting requirements and can enable information to be reused across systems, where appropriate arrangements are in place to support trust, data protection and information security.
- **Strategic use of traceability can strengthen risk management.** This would require better integration of traceability-related data into automated border processes, Single Windows, interoperable data platforms and Artificial Intelligence tools, supported by effective inter-agency co-operation. These systems could help relevant authorities identify, assess and target compliance, supply chain and economic security risks more effectively, including risks of trade circumvention.
- **Invest in domestic and international co-operation.** Because traceability-related requirements span multiple agencies and supply chains extend across multiple economies, closer co-operation on standards, data sharing and regulatory practices could be important in supporting effective compliance and efficient cross-border trade.

1

New supply chain realities are bringing trade facilitation and traceability together

This chapter situates trade facilitation within an evolving global trade environment characterised by increasingly information-intensive supply chains and expanding traceability requirements. It identifies five key shifts reshaping trade processes and bringing trade facilitation and traceability into closer interaction. It also introduces the report's conceptual framework and highlights why greater integration between these agendas is growing in importance.

This chapter addresses the growing policy challenge of facilitating trade in a global environment characterised by recurrent supply chain disruptions and more complex regulatory requirements. Supply chain trade requires real-time co-ordination between highly specialised businesses located in different parts of the world, increasing the sensitivity of production networks to disruptions affecting transport, logistics or key suppliers ((WTO, 2021^[1]); (UNCTAD, 2024^[2])). These challenges are further intensified by concerns around security of supply in key sectors, prompting governments and firms to pursue diversification strategies to manage supply chain risks and reduce what might be considered overconcentration ((Baldwin and Freeman, 2021^[3]); (Ahn and Tan, 2025^[4]); (OECD, 2025^[5])). Against this backdrop, traceability is evolving from a largely voluntary firm-level tool into an important mechanism for generating, verifying and exchanging information about products, production processes, supply chain movements and conformity assessment. This information is becoming crucial for meeting regulatory requirements related not only to product characteristics, but also to how goods are produced, sourced and move through global supply chains ((UNECE, 2022^[6]); (UNCTAD, 2024^[2])).

The chapter explains how these developments are bringing trade facilitation and traceability into close interaction, and introduces the analytical framework that underpins the report. In doing so, it draws together analytical insights from OECD work on trade facilitation, environmental lifecycle requirements, digitalisation, trusted compliance mechanisms and conformity assessment to highlight how these strands contribute to understanding the growing operational integration between trade facilitation and traceability. The following chapters examine each of these areas in greater detail.

1.1. Trade facilitation as a growing policy priority in a changing global landscape

Trade facilitation has evolved from a primarily technical customs agenda into a central pillar of trade policy in an ever more complex global economy. As supply chains become more exposed to disruptions and subject to more demanding regulatory requirements, the efficiency and governance of border processes play more than ever a critical role in shaping trade outcomes. While long recognised as a driver of cost reduction ((WTO, 2015^[7]); (OECD, 2018^[8])), trade facilitation is now drawing nearer to broader policy objectives, including resilience, social and environmental performance, and economic security. Recent global shocks have further reinforced its importance, accelerating reforms and expanding scope beyond traditional border procedures towards a more integrated approach to managing cross-border flows of goods ((OECD, 2025^[9]); (WCO/WTO, 2022^[10])). In this evolving context, trade facilitation is not only about reducing frictions for businesses, but also about enabling greater transparency, adaptability, enforcement and the effective functioning of interconnected supply chains.

1.1.1. The WTO Trade Facilitation Agreement provides a global baseline for modern border management

The entry into force of the World Trade Organization's (WTO) Trade Facilitation Agreement (TFA) in 2017 established a global baseline for modernising and harmonising border procedures. By setting commitments on transparency of trade-related information, advance rulings, risk management, and border agency co-operation, the TFA has provided a common framework for reform across countries at different levels of development ((WTO, 2015^[7]); (IMF, OECD, UNCTAD, World Bank, WTO, 2023^[11])). In addition, the TFA introduced a specific implementation structure through its categorisation system (Categories A, B, and C)¹, allowing developing and least developed countries to align commitments with their capacities. This has

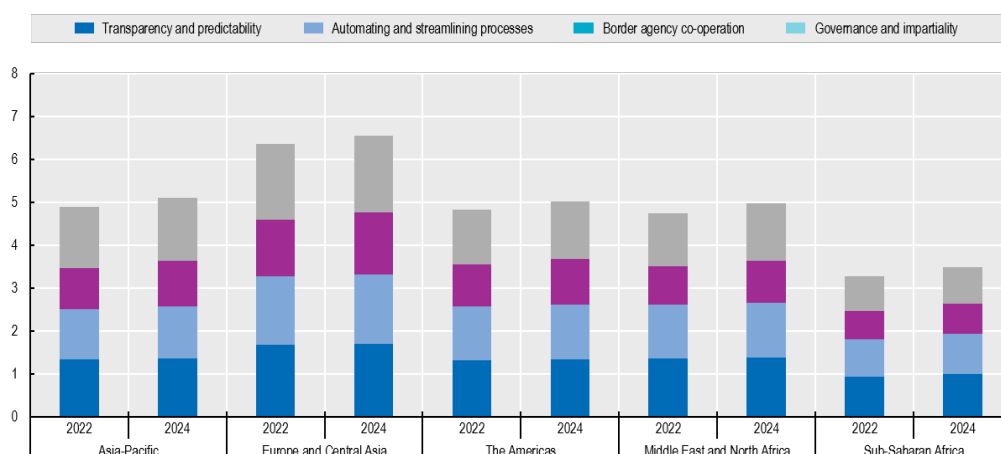
¹ The TFA implementation categories provide flexibility by allowing developing and least developed countries to schedule implementation according to their capacities: Category A commitments are implemented upon entry into force (or accession), Category B commitments after a transitional period, and Category C commitments after a transitional period and upon receipt of the capacity-building support required for implementation.

supported gradual but steady progress in implementation worldwide while fostering international co-operation and technical assistance (OECD/WTO, 2024^[12]).

In this sense, the TFA has been functioning both as a foundational reference point and a catalyst: a minimum standard for efficient border management and a platform upon which all countries can build more advanced, digitally enabled trade facilitation systems. The OECD Trade Facilitation Indicators (TFIs)² show that border bottlenecks and red tape have been reduced on average by 3%-7% across regions since 2022: Asia – Pacific (4.4%), Europe and Central Asia (3.1%), The Americas (4.4%), Middle East and North Africa (4.7%), and Sub-Saharan Africa (6.5%) (OECD, 2025^[13]). Important progress has been achieved in areas such as inter-agency co-operation, transparency, and automation (Figure 1.1). Over the same period, 23% of the economies covered by the TFIs database improved elements of border automation, while 68% and 21% improved domestic and cross-border agency co-operation, respectively, reflecting a shift towards more integrated and data-driven facilitation frameworks (OECD, 2025^[13]).

Figure 1.1. Progress in trade facilitation is occurring in all regions

Two is the maximum performance that can be achieved for each policy area



Note: “Transparency and predictability” policy area is the average of TFIs (A) Information availability, (B) Involvement of the trade community, (C) Advance rulings, (D) Appeal procedures, (E) Fees and charges. “Automating and streamlining processes” policy area is the average of TFIs (F) Documents, (G) Automation, and (H) Procedures. “Border agency co-operation” policy area is the average of TFIs (I) Domestic border agency co-operation and (J) External border agency co-operation. The Americas region includes economies in North America, Central America, and South America. Regional groups based on World Bank regional classifications.

Source: (OECD, 2025^[14]).

Analysis using the OECD TFIs also points to tangible impacts on the ground. More efficient border processes are estimated to have reduced trade costs by up to 5% over the last decade, while ambitious reforms could deliver additional reductions of up to 12 percentage points in some regions (Figure 1.2). And potential impacts from reductions in border bottlenecks and red tape are strongest for developing countries, particularly low-income and lower-middle income economies for which trade costs remain the highest, and for manufacturing sectors as chemicals, electrical equipment, machinery, paper and wood products, and textiles (OECD, 2025^[13]). However, sustaining these gains may become more challenging as border

² The 11 TFIs take values between 0 and 2, with two indicating the best trade facilitation policy environment which can be achieved. TFIs cover four main policy areas: (1) transparency and predictability (information availability, involvement of the trade community – consultations, advance rulings, appeal procedures, fees and charges); (2) streamlining and automation of trade-related documents and processes (formalities – documents, automation, procedures); (3) border agency co-operation (domestic and cross-border); and (4) governance and impartiality.

processes are expected to accommodate more complex information and compliance requirements while continuing to facilitate efficient trade (Pauwelyn, 2024^[15]); (OECD, 2025^[5])).

Figure 1.2. Trade facilitation reforms have already seen reductions in the cost of trade, with potential for more



Note: The figure presents the cost reduction implications of fully implementing trade facilitation reforms as measured by the TFIs, as well as the cost reductions already achieved. Analysis using trade costs (for manufacturing and agriculture sectors) from the UNESCAP – World Bank database for the period 2012-22.

Source: (OECD, 2025^[13]).

1.1.2. Supply chain disruptions have given rise to a new resilience agenda

In response to recent supply chain disruptions, the urgency of trade facilitation has markedly gained momentum. Since 2020, shocks such as the COVID-19 pandemic, extreme weather events, and rising geopolitical tensions have exposed structural vulnerabilities in global supply chains, particularly the fragility of highly optimised, just-in-time production systems. These episodes have highlighted how disruptions can rapidly affect across border processes and different sectors, drawing attention to the critical role that border bottlenecks play in the transmission of shocks. Whether arising through administrative delays, limited digitalisation, or infrastructure constraints, weaknesses in the border governance can amplify supply chain stresses well beyond their immediate point of origin (OECD, 2025^[5]).

These recent disruptions have also demonstrated the value of effective trade facilitation reforms in mitigating disruptions and supporting adjustment. Where border processes are streamlined, digitally enabled, and supported by co-ordination among authorities, countries have been better able to prioritise the movement of essential goods, adapt procedures in real time, and maintain continuity in trade flows (WTO, 2021^[11]); (OECD, 2022^[16])). Advances in areas such as electronic documentation, pre-arrival processing, risk-based controls, and inter-agency co-operation have helped reduce delays, improve transparency, and provide firms with greater predictability in periods of heightened uncertainty. In this context, trade facilitation has evolved beyond a cost-reduction tool towards a core component of supply chain resilience: efficient and predictable border processes enable firms to re-route shipments, adjust more rapidly to shocks, and maintain continuity in production networks, while inefficiencies risk exacerbating disruptions precisely when systems are under greatest pressure (OECD, 2025^[5]).

Diversification strategies also rely on the development of alternative trade routes and logistics corridors. However, the effectiveness of these corridors depends not only on transport infrastructure but also on the ability of border agencies to transmit information, co-ordinate controls and ensure the interoperability of procedures across jurisdictions. As supply chain information requirements grow, weaknesses in cross-

border co-operation can become an additional source of delay and uncertainty, limiting the resilience benefits that alternative corridors are expected to provide (Rey-Bellet, 2024^[17]).

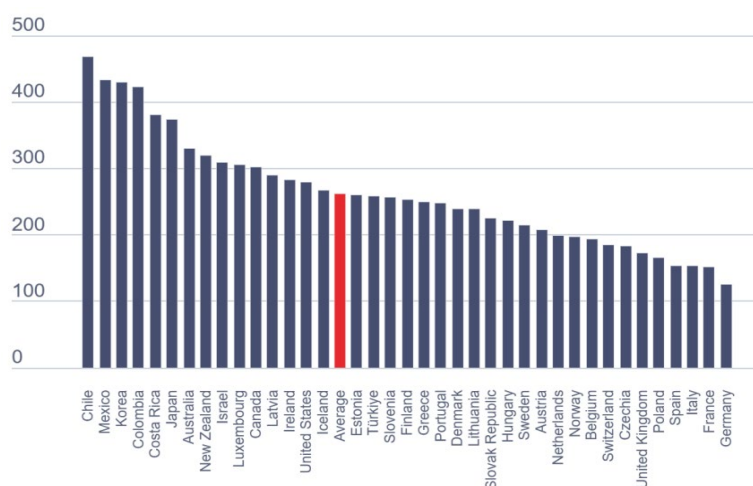
1.1.3. Trade facilitation can offer a competitive edge

If recent crises have shown that effective trade facilitation helps economies absorb shocks, they have also revealed its value as a competitive edge in a more volatile global economy where regulatory measures are increasingly being enforced at the border. For firms, fast, predictable, and digitally enabled border processes can reduce time-to-market, supporting expedited supplier diversification and improving reliability across dispersed value chains. For governments, effective trade facilitation can ensure the good functioning of key supply chains, strengthening economic security objectives and enhancing the attractiveness of the country as a trading and investment partner. These advantages can be particularly pronounced in strategic sectors such as critical minerals, semiconductors, and essential goods, where delays and uncertainty can have economy-wide consequences (OECD, 2024^[18]); (OECD/IEA, 2025^[19]).

Trade facilitation is also particularly relevant where trade patterns appear highly concentrated. Across OECD economies, a significant number of products (measured at the 6-digit level of the Harmonized System, HS6) show high import or export concentration, pointing to areas where firms and governments may have fewer readily available alternatives if supply routes are disrupted or demand changes unexpectedly (OECD, 2025^[5]) (Figure 1.3). Trade facilitation cannot by itself diversify supply chains, but it can make diversification strategies more operational by reducing processing time, uncertainty and administrative costs involved in shifting towards alternative suppliers and markets.³

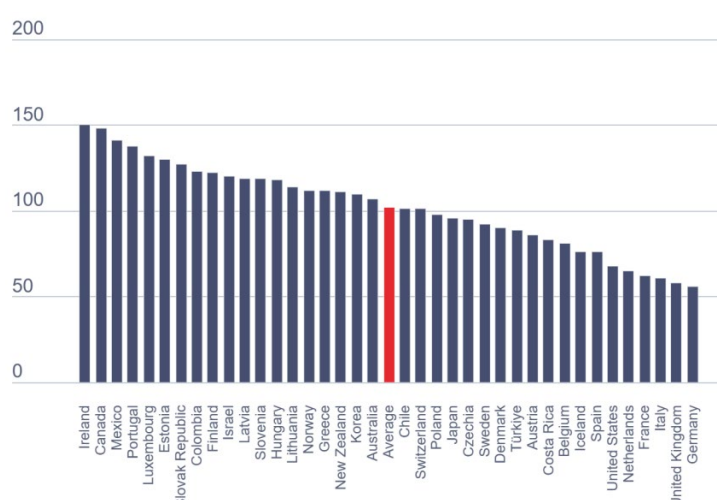
Figure 1.3. More concentrated trade patterns point to where trade facilitation could help support diversification

Panel A. Number of imported HS6 products with significant import concentration (average of the periods 2017-19 and 2020-22)



Panel B. Number of exported HS6 products with significant export concentration (average of the periods 2017-19 and 2020-22)

³ (OECD, 2026 forthcoming^[118]) suggests that trade facilitation matters for diversification, particularly when combining the TFIs of the exporter and importer.



Note: Significant import (or export) concentration is designated for cases of bilateral trade links at the product level where the value of the country-level Herfindahl-Hirschman Index (HHI) (a measure of market concentration) for imports (or exports) is more than double the value of the corresponding HHI for global exports (or imports). To further constrain the spectrum of cases of significant concentration, an additional minimum cut-off value of the HHI calculated for global product-level exports (or imports) was set at 0.2. This means that only products with a global export HHI (or import HHI) of at least 0.2 and products with country-level imports HHI (country-level exports HHI) of at least 0.4 were considered. The concentration indices are calculated across all trading

partners, including intra-EU trade for EU Members.

Source: (OECD, 2025^[5]).

Trade facilitation reforms can support supply chain diversification: on average, a 10% improvement in trade facilitation policies is associated with more than a 6% increase in the number of export markets and, in some regions, an almost 15% increase in the number of sectors reached, while also strengthening existing trade relationships (OECD, 2025^[5]). Trade facilitation can also help economies make fuller use of their regional trade agreements and economic partnerships as instruments for supply chain diversification (Lee, Rocha and Ruta, 2021^[20]). Preferential access to a wider range of markets and suppliers creates valuable sourcing options, but these opportunities are only commercially meaningful if firms can use them rapidly and with confidence. For critical inputs in particular, such measures can increase the value of trade agreements by improving access to alternative suppliers when established supply routes are disrupted or when demand shifts unexpectedly.

As policy objectives expand, such a competitive edge depends more on the ability to manage complexity efficiently. This places a premium on border systems that can facilitate compliant trade at scale while targeting controls where they are most needed. Trade facilitation is therefore emerging as a strategic asset – one that would be able to support resilience, diversification and competitiveness simultaneously in a more demanding global trade landscape.

1.2. From trade facilitation to traceability: Five forces reshaping border processes

In parallel to the developments described above, traceability is becoming tightly embedded within global supply chains. Long used by businesses as a supply chain management tool to monitor the origin, movement and transformation of products, traceability has also supported customs administration by helping establish the origin of goods for tariff treatment and compliance with rules of origin. As regulatory and market expectations evolve, its role is expanding beyond these traditional functions to generate, verify and share information not only on the origin and content of goods, but also on how they are produced across supply chains, and whether they comply with relevant safety, social and environment-related

requirements (UNCTAD, 2022^[21]); (UNECE, 2022^[6]); (Jaax and van Lieshout, 2025^[22]); (OECD/IEA, 2025^[19]); (OECD, 2025^[5]); (OECD, 2025^[23])).

Reflecting this evolution, definitions of traceability have also broadened. The International Organization for Standardization (ISO) defines traceability as the ability to trace the history, application or location of an object, including the origin of materials, processing history and distribution (ISO, 2011^[24]). More recent work, particularly in sectors such as critical minerals, extends this concept to encompass information on geographical path, chain of custody, physical transformation, and, where relevant, environmental, social and governance characteristics of products and their supply chains (OECD/IEA, 2025^[19]).

Systematic statistics on the growth of traceability-related requirements remain scarce, partly because many of these measures are recent and are not consistently classified as traceability obligations. Available datasets also rarely indicate clearly whether compliance is checked at the border, through post-entry market surveillance, or elsewhere along the supply chain, making it difficult to assess their direct implications for border processes. The available indicators nevertheless point to a substantial increase from a very low base, as many such requirements did not exist in comparable form a decade ago. For instance, notifications of environment-related technical requirements have grown by more than 60% over the last decade, while around 86% of social and environmental due diligence measures have been adopted since 2015. Although these indicators extend beyond traceability and measures enforced at the border alone, many of the measures appear to require firms to identify origins, map supply chains and provide verifiable information on products and production processes (UNCTAD, 2024^[2]); (OECD, 2026^[25]); (OECD, 2026^[26])).

Traceability is therefore progressively associated with practical arrangements that connect a broad range of policy considerations – including resilience, social and environmental performance, responsible sourcing, circularity and economic security – to inputs and final goods crossing borders. This is reflected in several developments in the landscape of trade-related processes (UNCTAD, 2024^[2]); (OECD, 2026^[25]); (OECD, 2026^[26])):

- The range of policy considerations associated with traded goods is extending beyond those traditionally addressed through border measures.
- The volume, granularity and types of information associated with trade-related measures are changing.
- Authorities are increasingly drawing on such information to support implementation, assess compliance and address risks of circumvention.
- Implementation and enforcement may also involve a wider range of public and private actors, particularly as some traceability-related requirements move from voluntary approaches towards mandatory requirements.
- Some key sectors can face more complex conformity assessment needs.

While these developments offer important opportunities to enhance the transparency and the environmental and social performance of supply chains, they can also introduce new complexities and potential risks for trade facilitation systems. In particular, the need to generate, verify, and transmit detailed product-level information is reshaping the way goods move across borders and how compliance is assessed, placing greater emphasis on the effective integration of data, processes, and regulatory frameworks (UNCTAD, 2024^[2]); (OECD, 2026^[25]); (OECD, 2026^[26])).

1.2.1. Policy considerations are expanding beyond traditional objectives of border control

As governments pursue a broader range of economic, social and environmental objectives, trade-related measures progressively interact with policy priorities that extend beyond traditional goals such as revenue

collection, market access and border control. Such priorities can include responsible sourcing, deforestation, forced labour, carbon intensity, circular economy, product safety and supply chain resilience. While they differ in scope and design, they point to a common trend: trade-related measures are becoming linked to a growing extent to a wider set of strategic objectives (WTO, 2023^[27]; (OECD, 2025^[5])).

Fiscal and excise-control measures provide another example of the growing interaction between product identification, information management and enforcement. Governments have traditionally used tax stamps and fiscal markings to support revenue collection and compliance monitoring, increasingly complemented by digital identifiers and reporting systems. While these tools may be used together, fiscal verification, authentication and supply-chain traceability serve distinct policy objectives and should not be treated as interchangeable.

This expansion is changing the context in which trade facilitation operates. Border agencies and firms are navigating new requirements that originate outside traditional customs policy, yet directly affect the conditions under which goods enter, circulate or leave markets. The result is a more complex policy landscape, intertwining customs procedures, regulatory compliance, social and environmental objectives and supply chain due diligence (WCO, n.d.^[28]).

1.2.2. Information requirements for trade-related measures are changing

Expanding policy objectives are making border crossing more information intensive. Beyond traditional metrics showing what products are being traded and where they come from, compliance now equally depends on information generated across the supply chain. This can include data ranging from production methods, input sourcing, processing stages and facilities, to emissions, labour conditions, recycled content, certification status and chain-of-custody arrangements.⁴ In many cases, the relevant information is not contained in the customs declaration itself, nor can it be inferred from the physical characteristics of the product at the border. It must be gathered from firms, suppliers, auditors, certification bodies or other competent authorities along the value chain (Pauwelyn, 2024^[15]).

As a result, the central implementation challenge is no longer only whether such information is relevant for trade policy, but how it can be generated, collected, verified, shared and reused efficiently without creating unnecessary trade frictions (Pauwelyn, 2024^[15]). This places traceability at the centre of policy implementation, providing the mechanisms through which information can accompany products across supply chains and supporting more proportionate, interoperable and risk-based approaches to compliance.

1.2.3. Information is increasingly supporting implementation and compliance

An important reason why trade-related policies depend to a larger extent on supply chain information is that, without it, they may not operate as intended and may be vulnerable to circumvention. This could be particularly the case where market access, regulatory obligations or preferential treatment depend on how or where a product was produced, which inputs were used, or whether goods have passed through particular firms, facilities or jurisdictions. Measures related to responsible sourcing, strategic supply policies or emerging approaches to critical minerals (OECD, 2026 forthcoming^[29]) can therefore rely not only on substantive requirements, but also on the ability to distinguish genuine compliance from incomplete disclosure, misclassification or deliberate circumvention.

The risk of circumvention can be particularly important where compliance affects market access, tariff treatment, pricing or other regulatory obligations (Box 1.1). Firms may have incentives to reroute goods through third countries, alter documentation, split consignments or rely on complex intermediary structures

⁴ This shift is particularly evident for measures linked to non-product-related processes and production methods (NPR-PPMs), where compliance depends on how a product was produced rather than solely on its physical characteristics.

to mask production history or origin. In these circumstances, authorities need to look beyond the immediate exporter or country of shipment and assess whether declared origin, production history, input sourcing, ownership links, routing, supplier networks and supporting documentation are mutually consistent (WCO, 2025^[30]); (WCO, 2026^[31])).

Traceability can strengthen this process by providing a more robust evidence base for customs risk management and regulatory enforcement. By connecting information generated across supply chains, it can help authorities identify inconsistencies indicative of circumvention while enabling legitimate trade to move with fewer unnecessary interventions.

Box 1.1. Transshipment risks and practical challenges for border agencies

When part of legitimate global logistics and supply chains, transshipment implies transferring goods from one vessel, truck, or aircraft to another during transport (often at an intermediate port or hub). This type of transit through logistics hubs has a potential to reduce trade costs, improve connectivity and support access to intermediate inputs. Recent work on transit hubs finds that the use of transshipment networks is highly concentrated. For instance, drawing on available data for bills of lading in the United States during 2008-17, Do et al. (2025^[32]) find that around 70% of US containerised imports transit through an intermediate jurisdiction and that the top five hub countries account for more than half of all transit through an intermediate jurisdiction.

Transshipment risks arise when large differences in tariff treatment, trade remedies or rules of origin create incentives to misstate the economic origin of goods. Analysis of tariff measures introduced by the United States on imports from China in 2018-19 suggests that third countries increased their exports in products affected by those measures. Fajgelbaum et al. (2023^[33]) estimate an average export increase of 6.5% among countries not directly subject to the bilateral tariff measures, with substantial cross-country variation, 80.5% of which is explained by country-specific responses rather than initial specialisation alone. Using detailed US 10-digit import data, Freund et al. (2023^[34]) highlight that countries replacing China as the origin in US imports tended to be more integrated into Chinese supply chains; a move from the 25th to the 75th percentile of intra-industry trade with China is found to be associated with around 3 percentage points higher export growth to the US for tariffed products and 4.5 percentage points for goods considered strategic.

Transaction-level analysis illustrates the importance of granular data to analyse transshipment risks and by extension, the role of traceability. For instance, Iyoha et al. (2025^[35]) estimated that, depending on the level of geographic aggregation at which rerouting was measured (country, province or firm), between 1.7% and 16.5% of Viet Nam's exports to the United States in 2021 (or approximately between USD 1.6 billion and USD 15.9 billion) could potentially be rerouted from China.

At a sectoral level, drawing on import data from the United States, Freund (2025^[36]) estimates that the largest concentrations of tariff evasion through transshipment lie potentially in categories such as machinery and equipment, metals, plastics and rubber.

For border agencies, one key challenge lies in determining whether goods have undergone sufficient transformation to acquire a new origin. Rules of origin are the criteria used to determine the national source of a product, and they matter for duties, quotas, trade remedies and other origin-based measures. In practice, origin determination depends on product-specific rules and usually interacts with classification, valuation, production records, supplier declarations and transport documentation. This makes enforcement information-intensive, especially where firms use multi-country supply chains, imported intermediates, subcontracting or processing operations in third countries (WCO, 2025^[30]).

This requires overall enforcement to be risk-based, proportionate and supported by better information-

sharing. Higher-risk cases are likely to arise where there are large tariff differentials, rapid shifts in trade flows, limited local production capacity, high import content from targeted economies, or product categories where origin rules are complex. At the same time, overly broad controls can impose costs on legitimate trade, particularly where transit is simply part of efficient logistics or where third-country production involves genuine domestic value added. The evidence therefore points to the importance of making better use of pre-arrival data, targeted risk management, post-clearance audit systems, inter-agency co-operation, and firm-level documentation.

1.2.4. Implementation and enforcement are involving a wider range of actors

Traceability requirements and tools began to develop as voluntary corporate sustainability schemes, private standards or sectoral initiatives. The OECD's Responsible Business Conduct (RBC) standards provide a useful reference point for this transition, as they highlight how supply chain due diligence has developed through risk-based, sector-specific and multi-actor approaches before being gradually reflected in regulatory requirements (Box 1.2) (OECD, 2018^[37]; (OECD, 2023^[38]); (OECD/ITC, 2024^[39]); (UNECE, 2026^[40])). Traceability is now embedded in mandatory regulatory frameworks (Jaax and van Lieshout, 2025^[22]). This raises the stakes for enforcement, legal certainty and proportionality, particularly where non-compliance can affect market access, customs clearance or post-market surveillance.

This shift also changes the range of actors that need to be involved. First, it requires customs to play a stronger role than before. Second, it requires closer co-ordination between border agencies, environmental authorities, labour inspectors, market surveillance bodies, conformity assessment bodies, licensing agencies, logistics operators, and auditors. Effective implementation depends not only on collecting information through tighter traceability, but also on ensuring that these actors can transmit data, recognise supporting documentation, and rely on the systems through which compliance is demonstrated.

Box 1.2. OECD Responsible Business Conduct (RBC) and traceability across sectors

RBC standards, notably the OECD Guidelines for Multinational Enterprises on Responsible Business Conduct, set out expectations for businesses to conduct due diligence to assess and address any adverse impacts on people, the environment and society associated with their operations, their products and services, including across their supply chains. While traceability is not an objective in itself, it can support companies in this process. Risk-based traceability, applied where conditions warrant it (for instance, in higher-risk supply chains or where regulatory or strategic access considerations apply), together with transparency tools such as traditional chain-of-custody records, can support companies in uncovering and responding to harms occurring upstream of their direct suppliers (OECD, 2026^[41]).

Companies in different sectors will be associated with different risks and impacts and may therefore need to prioritise different sets of RBC issues, as well as traceability issues, when conducting due diligence. This is reflected in OECD sectoral due diligence guidance, for example in the minerals, agriculture, and garment supply chains.

These approaches provide two helpful lessons for the design of traceability-related requirements. First, traceability-related requirements are potentially more effective when they are risk-based rather than designed as a uniform requirement across all products and firms. Second, implementation depends on a broader ecosystem of actors: producers, suppliers, buyers, auditors, certification schemes, financial institutions, civil society, competent authorities and, where relevant, customs and market surveillance bodies. Third, digital tools become a key element underpinning these actors' coordination. As traceability moves from voluntary schemes to binding requirements, aligning these actors around common expectations, interoperable information and credible assurance mechanisms becomes

essential to avoid duplication and manage compliance costs.

Source: (OECD, 2018^[42]); (OECD, 2018^[37]); (OECD, 2018^[43]) (OECD, 2023^[38]); (OECD, 2023^[44]); (OECD-FAO, 2023^[45]); (OECD, 2026^[41]).

1.2.5. Conformity assessment needs are becoming more complex in key sectors

Many sectors that are central to resilience, diversification and economic security are facing growing regulatory scrutiny. These include critical minerals and batteries, medical goods, pharmaceuticals, machinery, electrical and electronics equipment and advanced tech goods, and agri-food. Demonstrating conformity in these sectors progressively requires more evidence from multiple points across the supply chain, including product composition, origin of inputs, production processes, testing results, certification status, and social and environmental footprint (World Bank, 2025^[46]).

This links back to the fact that regulatory expectations are no longer limited to the final product. This is also reinforced by the transition towards a more circular economy, where used products, components and materials, and sometimes waste may move across borders several times during their life cycle (WCO, 2023^[47]; (WEF, 2026^[48])).

1.3. Areas of operational integration between trade facilitation and traceability

The discussion above points to two related shifts. On the one hand, trade facilitation seeks to reduce trade costs of regulations that are central to resilience, diversification and the ability of firms and governments to manage supply chain disruptions, while supporting more socially or environmentally performing supply chains. On the other hand, traceability is no longer only a sectoral or firm-level tool for documenting product origin or characteristics in the context of supply chain management; it is now equally essential for demonstrating compliance, managing risks and supporting broader policy considerations.

Trade facilitation and traceability therefore serve distinct but increasingly interconnected purposes. Trade facilitation aims to make cross-border trade more efficient, predictable and transparent, while traceability seeks to generate, verify and communicate information about products and supply chains. The relationship between them thus reflects a growing need to integrate traceability requirements into the operational systems that support international trade.

Traditionally, these areas evolved along separate tracks: trade facilitation focused on the simplification, harmonisation and digitalisation of border procedures, while traceability developed primarily through sectoral and firm-level systems designed to document product and supply chain information. Today, however, a growing number of policy objectives depend on reliable information about how goods are produced, sourced, moved and verified across complex supply chains. As a result, traceability is becoming more closely integrated into the processes through which goods are documented, assessed and controlled in cross-border trade.

1.3.1. Operational integration matters for co-ordination, compliance cost reduction and flexibility

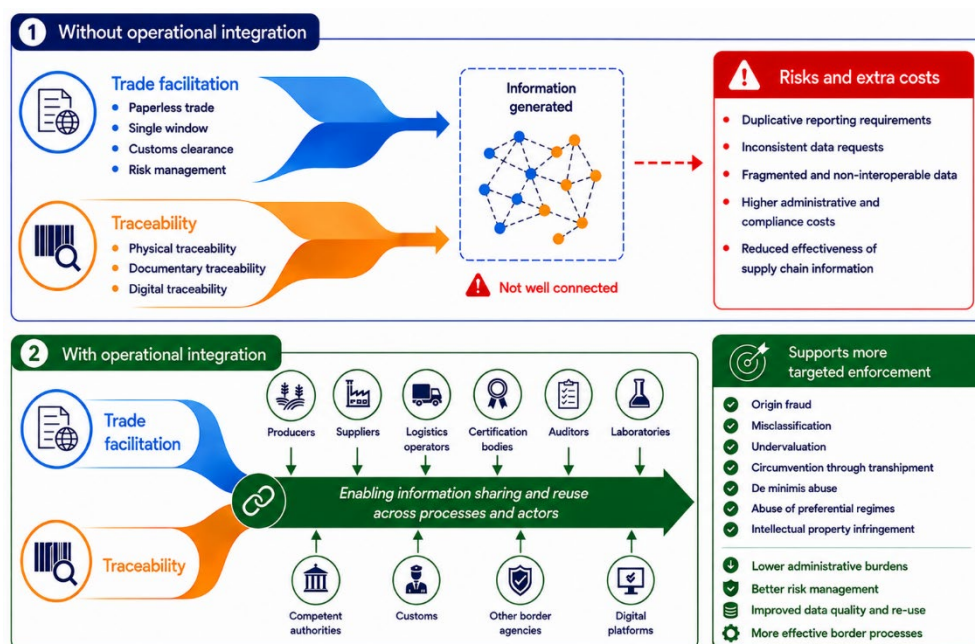
The expansion of data and compliance requirements is driving operational integration between trade facilitation and traceability objectives, underscoring the importance of a more co-ordinated approach to their design and implementation (Figure 1.4). This integration is occurring across several complementary dimensions of traceability. Physical traceability can support customs risk management and targeted border controls by linking goods to their movement, location or production history through identifiers, tracking technologies or chain-of-custody mechanisms. Documentary traceability progressively benefits from

paperless trade initiatives, electronic certificates and Single Windows that facilitate the submission, transmission and recognition of compliance information. Digital traceability relies on interoperable data systems that enable information generated by firms, conformity assessment bodies and competent authorities to be shared, verified and reused throughout customs clearance, risk management and post-clearance processes.

Without co-ordination, new requirements can create duplicative reporting obligations, inconsistent data requests and additional administrative burdens for firms. Governments may also find it more difficult to use supply chain information effectively where data are fragmented, not interoperable or not easily connected to operational procedures ((ICC Digital Standards Initiative, 2024^[49]); (OECD, 2025^[9])).

A more co-ordinated approach can help address these risks by making information generated across supply chains usable, where appropriate, within clearance, risk management and post-clearance processes (Figure 1.4). This does not imply that all traceability-related checks should take place at the border. Rather, it means connecting information generated by producers, suppliers, logistics operators, certification bodies, auditors, laboratories, competent authorities and digital platforms with the procedures through which customs and other border agencies assess compliance and manage risk. Such integration can help authorities access the more granular information needed to address risks such as origin fraud, misclassification, undervaluation, circumvention through transshipment, manipulation of de minimis thresholds and abuse of preferential regimes, without unnecessarily duplicating data collection or verification.

Figure 1.4. How co-ordination connects trade facilitation and traceability



Note: The actors, processes, risks and enforcement applications presented are illustrative and non-exhaustive. The figure does not imply that all traceability-related checks should take place at the border; rather, it illustrates how relevant supply chain information can be connected to clearance, risk-management and post-clearance processes.

Source: Authors.

Ensuring that the relevant actors can participate at reasonable cost also becomes central to effective operational integration. For governments, coherent and interoperable information flows can support more effective enforcement while reducing administrative complexity and resource demands. For firms,

especially smaller traders and suppliers in developing economies, reducing multiple data requests, overlapping documentation requirements and non-interoperable systems can lower compliance costs and support broader participation in international markets (OECD, BIAC, WEF, 2023^[50]).

The border is increasingly the point of enforcing traceability-related requirements

Recent policy developments demonstrate that borders are becoming a key point for the enforcement of traceability-related requirements (Box 1.3). This reflects a broader shift in which customs administrations are viewed not only as authorities responsible for revenue collection and the clearance of goods, but also as important actors in economic security, responsible for identifying supply chain risks and supporting resilience, regulatory enforcement and the integrity of domestic markets. For example:

- In the European Union (EU), the new Steel Regulation introduces a “melt and pour” requirement under which importers must provide documentary evidence of the country where steel was originally melted and poured (European Commission, 2026^[51]). In June 2026, the European Commission launched a consultation on the practical and reliable documentation needed to verify this information at importation. More broadly, the EU Customs Reform agreed by the European Parliament and the Council in March 2026 embeds supply chain visibility and resilience within customs modernisation: the upcoming EU Customs Data Hub⁵, together with the EU Customs Authority, is intended to give authorities a real-time overview of trade flows and supply chains, strengthen common risk management and support economic security while facilitating legitimate trade.
- In the United States, a June 2026 Executive Order refers to customs enforcement as essential to national security and the economy and calls for heightened importer disclosure and certification requirements, including detailed information on supply chains, production methods, product identifiers and key specifications, alongside stronger action against misclassification, undervaluation and illegal transshipment.⁶
- In the United Kingdom, a June 2026 call for evidence on customs modernisation similarly examines whether customs processes should make greater use of data already generated in commercial and supply chain systems to support risk assessment and compliance and potentially lessen reliance on traditional customs declarations (HM Revenue & Customs/HM Treasury, 2026^[52]).
- In Japan, the SMART Customs Initiative explicitly links customs modernisation with digital transformation, supply chain visibility and economic security. The initiative seeks to make greater use of data, advanced technologies and integrated customs systems to improve risk management, facilitate legitimate trade and respond to emerging economic security challenges (Japan Customs, 2020^[53]).
- In Singapore, initiatives such as TradeTrust and SGTraDex are helping to embed traceability information into cross-border trade processes. TradeTrust provides a framework for the secure exchange and verification of electronic trade documents across jurisdictions and digital platforms, while supporting the authentication, provenance and transfer of information accompanying traded goods. The SGTraDex initiative seeks to strengthen supply chain visibility through trusted data sharing across logistics, trade and financing networks (PWC, 2025^[54]); (GovTech Singapore, 2026^[55]).

⁵ More information is available at: https://taxation-customs.ec.europa.eu/customs/eu-customs-reform_en.

⁶ More information is available at: <https://www.whitehouse.gov/presidential-actions/2026/06/strengthening-customs-enforcement/>.

Box 1.3. How traceability can work at the border: The example of an electric vehicle battery

The growing use of traceability requirements does not necessarily imply more inspections or slower border procedures. In practice, the objective is often to allow authorities to make better use of information that has already been generated along the supply chain.

Consider a shipment of electric vehicle batteries entering a country. The importer may need to demonstrate where key minerals originated, whether environmental or carbon-intensity requirements have been met, and whether the battery complies with applicable product regulations.

Without integrated traceability systems, multiple authorities may need to rely on multiple paper documents, request additional information from traders, or perform manual checks. This can increase clearance times and compliance costs for businesses.

With traceability integrated into more efficient trade facilitation systems, information collected upstream can be linked to the shipment before it reaches the border. For example:

- Production and sourcing information is collected along the supply chain, including information on mineral origin, processing facilities, emissions data or conformity assessment certificates.
- The importer submits this information electronically through existing customs or Single Window systems before the goods arrive.
- Border agencies automatically verify key elements by connecting customs systems with relevant registries, certification databases or competent authorities.
- Risk management systems use the information to identify higher-risk shipments that may require additional checks, while compliant shipments can be cleared more quickly.
- The same information can be reused by customs, environmental authorities and market surveillance bodies, avoiding duplicate reporting requirements.

In this example, traceability does not replace trade facilitation. Rather, trade facilitation tools such as digital documentation, Single Windows, interoperability and risk management make traceability operational at the border. Well-designed systems can therefore support compliance with ever more complex requirements while helping to limit unnecessary delays and costs for businesses.

Note: This example is meant to be illustrative.

Source: Based on (OECD, 2026 forthcoming^[56]) and (Moisé and Rubinova, 2023^[57]).

Operational integration can make compliance workable

The growing need to integrate traceability information into trade facilitation systems is also driven by changing compliance risks. Customs and other border authorities require more granular information to address the risks related to origin fraud, misclassification, undervaluation and circumvention through transshipment (Box 1.1), manipulation of de minimis thresholds and abuse of preferential regimes. These risks cannot always be assessed from the immediate transaction alone.

Addressing them requires visibility across upstream production stages, transformation processes, ownership links, supplier relationships and logistics pathways. Traceability can strengthen the evidence base for risk analysis by helping authorities assess whether declared origin, commercial documents, transport routes and supporting regulatory documentation are coherent and consistent. For traders, this increases the importance of internal data governance and the ability to substantiate origin, value and compliance claims across jurisdictions.

This illustrates how trade facilitation and traceability rely more and more on shared operational foundations,

including information sharing, risk management, digital systems and trusted compliance mechanisms. Integrating traceability-related information into these systems can help authorities manage compliance risks more effectively while supporting efficient border procedures and reducing unnecessary burdens on low-risk traders.

Lessons from existing compliance systems are also relevant. The implementation of long-standing product-related requirements, such as technical regulations, conformity assessment, product safety and sanitary and phytosanitary measures, has generated practical experience in managing information-intensive compliance obligations at the border. These systems rely on many of the same operational foundations progressively required for traceability-related requirements, including risk-based controls, co-ordination between customs and specialised agencies, reuse of trader data, and reliance on trusted conformity assessment. Regulatory co-operation tools, including mutual recognition arrangements, can provide further insights into how trust in foreign testing and certification could impact compliance costs while preserving regulatory objectives.

Operational integration can balance de-risking and compliance for flexible supply chains

Traceability also has a strategic role in supporting more resilient and diversified supply chains. Firms that need to switch suppliers, reroute shipments or access alternative markets at short notice must still be able to demonstrate that goods comply with relevant requirements related to origin, safety, social or environmental performance, and customs.

Well-designed traceability systems could therefore support both compliance and resilience. They can help firms identify compliant suppliers, maintain confidence in goods moving through alternative routes, and reduce the risk of delays or refusals at the border. Traceability-related requirements would need to remain both proportionate and interoperable, so that they do not make supplier switching, market diversification or emergency sourcing unnecessarily difficult (WEF, 2021^[58]).

1.3.2. Digital readiness and interoperability are shared foundations of trade facilitation and traceability

Digital readiness and interoperability become the backbone that makes the operational integration between trade facilitation and traceability workable in practice. Traceability only generates value if information can move securely, reliably and efficiently through the systems used by firms, border agencies and other competent authorities. Trade Single Windows, electronic documentation, interoperable data models and secure information-sharing arrangements provide the connective infrastructure for this process. They allow traceability information to be transmitted, verified and reused securely across agencies and borders, rather than collected repeatedly through fragmented procedures.

Digital readiness can also make more targeted enforcement possible. By integrating more supply chain information into risk management systems, authorities can better identify high-risk consignments, firms or routes, while allowing compliant trade to move with fewer unnecessary checks. In this sense, digital tools do not matter only for efficiency; they are essential for reconciling facilitation and control in a more data-intensive trade environment (WCO/WTO, 2022^[10]).

In turn, fragmented systems, limited digitalisation and weak interoperability can amplify administrative burdens and undermine both facilitation and traceability objectives. The challenge is therefore to ensure that emerging traceability-related requirements are designed with trade facilitation principles in mind: transparency, proportionality, interoperability, risk management and efficient use of data. This also links to the policy environment for non-personal trade data, pointing to the importance of greater clarity on data access, sharing, confidentiality, reuse and cross-border transmission, so that supply chain information can support compliance and risk management without creating unnecessary burdens or exposing commercially sensitive information (Lopez-Gonzalez, Del Giovane and Ferencz (2025^[59]); OECD (2025^[9])).

1.3.3. Critical minerals and other strategic sectors illustrate the growing integration of trade facilitation and traceability

The shared operational foundations of trade facilitation and traceability are particularly visible in strategic sectors such as critical minerals (Box 1.4). As traceability-related expectations evolve from voluntary frameworks and policy guidance into binding regulatory requirements, this requires customs authorities to access and verify additional datasets – often sourced from upstream actors or third-party systems – at the point of import or transshipment. These procedures also extend to trade in scrap and secondary raw materials, which are now more important for security of supply strategies and circular economy objectives. Here, traceability requirements related to material composition, waste status, and conformity with environmental and shipment rules interact directly with border procedures governing classification, licensing and risk controls (WEF, 2026^[48]).

Box 1.4. Why traceability is emerging as a strategic issue in critical mineral supply chains

The International Energy Agency (IEA) and the OECD recently conducted a joint survey of traceability involving more than 80 respondent companies active in critical mineral supply chains. The survey shows that while traceability systems are being implemented across mineral supply chains, uptake remains uneven. Around two-thirds of companies surveyed report having some form of traceability, although only about 30% have full coverage of their operations. Adoption is highest among upstream actors and is most advanced in cobalt supply chains, with more limited progress in lithium, nickel and rare earths.

Despite relatively widespread adoption, traceability is found to remain shallow. Most companies collect basic country-of-origin data, and only a minority of firms gather detailed provenance, environmental or corporate transparency information. End-to-end traceability is limited, with coverage typically dropping beyond direct suppliers.

Drivers of adoption vary across the value chain. Companies are primarily motivated by reputational concerns, customer demand and regulatory compliance, with downstream firms responding more to market pressures and upstream firms to regulatory requirements. Traceability is also progressively used to manage geopolitical risks and attract investment.

However, market incentives appear to remain weak. Only a minority of companies covered by the IEA-OECD survey report receiving price premiums for traceable or responsibly produced materials, limiting the role of traceability in driving sourcing decisions. Significant barriers are reported at the same time, including high implementation costs, lack of interoperability between systems, confidentiality concerns and weak incentives for data sharing, particularly among midstream actors. These challenges are compounded by fragmented regulatory requirements across jurisdictions.

Specific survey results for lithium and nickel further highlight that critical minerals traceability should be understood as a spectrum rather than a single model. Full end-to-end traceability remains uncommon in practice. Instead, companies typically rely on a combination of supply chain mapping, chain-of-custody systems, due diligence processes and mass balance approaches. Mass balance – the most widely used traceability model across all supply chain segments surveyed – reconciles the volume of material entering and leaving a facility while allowing blending of materials from different sources. This provides greater visibility than simple documentation-based systems while avoiding the costs associated with identity-preservation systems that require physical segregation of material throughout the supply chain. Survey results highlight such hybrid approaches as a means of strengthening transparency where full traceability is technically difficult or economically prohibitive.

Lithium supply chains are generally more conducive to traceability because production is concentrated among a relatively small number of large operators and supply chains are largely formalised. However,

uptake remains at an early stage, with major challenges stemming from the concentration of refining in China and limited visibility in downstream manufacturing, battery production and recycling. By contrast, nickel supply chains are significantly more difficult to trace due to ore blending, multiple processing pathways and complex ownership structures.

The analysis emphasises that policy efforts should focus on strengthening incentives for the collection and sharing of verified traceability data, supported by a combination of regulatory and market-based measures. It also highlights the importance of providing targeted financial support to reduce implementation costs, particularly for upstream and smaller actors. In addition, the analysis underscores the need to promote international harmonisation of standards to improve interoperability, comparability and trust across jurisdictions, alongside enhanced co-operation between upstream and downstream countries through technical assistance and shared platforms. The survey draws particular attention to strengthening the traceability of mineral flows through key transit points, including ports, consolidation centres and processing hubs. Improved co-ordination between customs, mining and trade authorities, combined with stronger logistics tracking, could help address existing gaps in visibility over the geographic movement of minerals across supply chains. A phased and pragmatic approach is recommended based on the survey results, starting with simpler supply chains and a limited set of core data elements, and gradually expanding to more complex systems and broader data requirements.

These findings suggest that, where such measures are embedded in regulatory frameworks, they would have direct implications for border processes and trade facilitation systems. More specifically, they could shape data requirements at the border and influence risk assessment, verification procedures and clearance processes.

For a discussion of recent international initiatives seeking to strengthen critical minerals traceability through standards and international co-operation, see Box 5.2.

Note: The survey in (IEA, 2026^[60]) includes responses from 80 companies between October and December 2025. The survey in (OECD, 2026 forthcoming^[61]) draws on 10 additional responses provided by early 2026. The critical minerals covered include copper, nickel, lithium, cobalt, gold, aluminium, tin, tantalum, tungsten, silver, graphite, and rare earth elements.

Source: (IEA, 2026^[60]); (OECD, 2026 forthcoming^[61]).

Similar dynamics can arise for essential goods such as pharmaceuticals and medical products, where traceability becomes indispensable for ensuring product safety, quality, and authenticity. Requirements to identify products at the level of batch or serial number, verify manufacturing and distribution authorisations, and enable targeted recalls interact directly with border procedures, particularly for time- and temperature-sensitive goods (OECD, 2024^[18]).

For technology-intensive goods, such as semiconductors and other advanced electronic products, the operational integration of trade facilitation and traceability is shaped by highly globally integrated supply chains, frequent cross-border movements and widespread export and import measures affecting their movement. Border authorities depend more and more on detailed product descriptions, end-use and end-user information, and licensing data to enforce specific regulations, often across transit routes that can mask origin, destination or production stages. Trade facilitation also plays a growing role in addressing challenges related to electronic waste, repair and reuse, where border procedures must distinguish between waste shipments subject to strict controls and legitimate movements of used, repaired or refurbished goods intended for further use (WCO, 2023^[62]; (WEF, 2026^[48])).

1.4. A framework for analysing the operational integration challenge

The discussion above has shown that trade facilitation and traceability serve distinct purposes but rely to a growing extent on common operational foundations, including digitalisation, information sharing, risk management and trusted compliance mechanisms. As regulatory requirements become more information-

intensive, the challenge is no longer simply whether border procedures exist, but whether they can effectively accommodate, verify and use complex supply-chain information while preserving efficient trade.

Against this backdrop, this report examines how trade facilitation systems can support evolving traceability-related requirements and explores the conditions under which the two can be integrated in a mutually reinforcing manner. The analysis seeks to address three questions:

1. How can trade facilitation policies and systems accommodate more granular, dynamic and supply chain-based information necessary for enhanced traceability?
2. How can border processes support compliance with expanding regulatory requirements without creating unnecessary frictions for legitimate trade?
3. Where do gaps remain between objectives and operational reality – in particular, between the information that trade-related measures increasingly require and the capacity of border systems to collect, transmit, verify and use that information in practice?

To answer these questions, the report combines evidence from the OECD Trade Facilitation Indicators (TFIs), environment-related TFIs, OECD work on the digitalisation of trade processes and analysis of trusted compliance mechanisms and regulatory co-operation tools.

Chapter 2 examines how evolving traceability-related requirements translate into concrete border processes and implementation challenges. Chapter 3 assesses the preparedness of OECD economies to manage environmental lifecycle- and supply chain-related information through existing trade facilitation systems. Chapter 4 explores the role of digitalisation. Chapter 5 examines mechanisms that can address conformity assessment challenges and strengthen trust in compliance information across jurisdictions. Chapter 6 then concludes with key findings and potential considerations.

2 Many traceability requirements overlook the practical role of border processes

This chapter examines how evolving traceability-related requirements translate into practical challenges for border management and trade facilitation. It situates these requirements within an evolving trade landscape, where a growing range of measures depends on information about how goods are produced, processed and sourced. Using carbon-intensity requirements as an illustrative case, it examines the institutional and operational settings needed to manage increasingly information-intensive border processes and draws broader lessons for implementing traceability-related requirements.

Traceability-related requirements are increasingly shaping how goods move across borders. Among the most prominent examples are emerging carbon-intensity requirements, which rely on information generated throughout a product's lifecycle and across complex international supply chains. As governments seek information not only about products themselves but also about how they are produced, sourced and transported, businesses are required to generate, collect and transmit this information across supply chains and jurisdictions. As a result, border processes are being asked to handle more complex and supply chain-based information.

This chapter examines how evolving traceability requirements translate into concrete border procedures and implementation challenges. Using carbon-intensity requirements as a case study, it analyses the types of information required at the border and identifies the operational implications for customs authorities, other border agencies and traders. In doing so, it illustrates broader challenges that arise whenever compliance depends on information generated and verified across supply chains rather than at the point of transaction alone.

2.1. From carbon-intensity to broader supply chain traceability requirements

As traceability-related requirements move from concept to implementation, their implications for international trade depend on the information needed to demonstrate compliance. Many of these requirements are linked to non-product-related process and production methods (NPR-PPMs), which refer to the conditions or methods under which a product is produced, without affecting its physical characteristics or functional performance (OECD, 2011^[63]). While the use of NPR-PPMs in trade regulation is not new,⁷ growing demands from consumers, investors and regulators are increasing the range and complexity of related compliance requirements. These requirements now arise across a broad set of policy areas, including labour rights,⁸ deforestation, environmental performance, carbon intensity, product lifecycle information and circular economy objectives (Jaax and van Lieshout, 2025^[22]; OECD, 2025^[64]).

Although these measures cover different policy areas, they share a common feature: demonstrating compliance requires information that extends beyond the product itself and into its upstream production and supply chain. As a result, traceability information is becoming an important component of trade-related compliance. Unlike traditional border controls, which focus primarily on the characteristics of the product being traded, NPR-PPM measures require information about how goods were produced, processed or sourced. This may include information on carbon emissions generated during production, labour conditions in upstream facilities, land-use practices associated with commodity production, or the circularity of materials used in manufacturing.

Such information is often more complex, more sensitive and harder to obtain and verify than traditional customs data such as classification, origin, value or quantity. A further challenge is that NPR-PPM measures frequently rely on information generated in other jurisdictions and at multiple points along international supply chains. This can create practical difficulties for enforcement, as authorities may need to rely on information produced by foreign suppliers, third-party verification systems or other actors beyond their direct regulatory reach. The information involved may also include commercially sensitive details

⁷ The analytical distinction between product-related and non-product-related PPMs emerged in the late 1980s and early 1990s. It was shaped by early General Agreement on Tariffs Trade (GATT) panel practice and later refined through WTO jurisprudence, including US – Shrimp (1998) and subsequent interpretations under GATT Article XX and the TBT Agreement (Conrad, 2011^[107]). The objectives of NPR-PPM measures vary across economies. They can include market-based incentives, regulatory thresholds, and eligibility criteria for public support (OECD, 2011^[63]).

⁸ OECD/EUIPO work on illicit trade has similarly highlighted the growing importance of supply chain transparency and traceability in addressing risks associated with forced labour and strengthening due diligence across global value chains (OECD/EUIPO, 2026^[119]).

about production processes or supplier relationships and require risk-based approaches where full traceability is not feasible.

In addition, some supply chains involve activities that are inherently difficult to document and assess. For example, critical mineral supply chains used in battery production often span multiple jurisdictions and may involve artisanal or informal mining activities, creating particular challenges for the collection and verification of upstream information (OECD/IEA, 2025^[19]). In this context, traceability is evolving from a voluntary firm-level tool into a practical instrument for linking policy objectives to goods crossing international borders.

This broader evolution is reflected in a diverse landscape of measures being considered and implemented by governments. Economies worldwide have introduced or are developing binding measures that condition market access on how goods are produced. These span across forced labour and supply chain due diligence, responsible sourcing of raw materials, deforestation and land use requirements, and carbon-intensity and environmental performance. Measures differ widely in their product scope, legal design, institutional arrangements, and enforcement modalities.⁹ While some set solely reporting obligations for firms, others create rebuttable presumptions or outright import prohibitions. Still, others condition market access on verified environmental or carbon performance data.

Among these developments, carbon-intensity requirements provide a particularly useful illustration of how traceability is becoming central in trade contexts. Border carbon adjustments (BCAs) are a relevant example of policy instruments that requires enforcement of carbon-intensity requirements at the border. Under these regulations, in most cases charges are levied on the emissions embedded in imported products at a level equivalent to the carbon price that would have applied had those goods been produced under the importing jurisdiction's carbon pricing policies. BCAs can take different forms, including border taxes linked to domestic carbon taxes or certificate-based systems aligned with emissions trading schemes (ETS) (WEF, 2025^[65]). A growing number of jurisdictions are exploring or developing BCA-type instruments, often alongside broader carbon pricing initiatives. Since 2026, the European Union's Carbon Border Adjustment Mechanism (CBAM), the first operational BCA globally, requires importers to present certificates priced in line with the EU Emissions Trading System. Serbia has adopted a Law on Tax on the Import of Carbon-Intensive Products, also in force since 2026 – alongside a domestic emissions tax – as part of a broader effort to align with the EU CBAM. The United Kingdom plans to implement a CBAM from 2027, while economies such as Canada and Australia are examining border-related or carbon-leakage measures. Other economies, such as Türkiye and Japan, have included import-related carbon provisions in environmental legislation or announced plans for carbon levies (Table 2.1 maps existing regulations and policy proposals) (OECD, 2026 forthcoming^[66]).

Table 2.1. A number of economies have, or are considering, carbon-intensity border policy measures

Economy	Measure	Status	Product coverage	Emissions coverage	Threshold	Framework
Australia	Border carbon measure	Under consideration	Cement, clinker (possible extension to steel, glass, fertilisers, lime)	Scope 1	Likely aligned with United Kingdom approach	No formal framework yet
Canada	Border carbon adjustment	Under consideration	Not specified	Not specified	Not specified	No formal framework yet
Chinese Taipei	Border carbon adjustment	Draft regulation in development	Not specified	Not specified	Not specified	No formal framework yet

⁹ Examples include: the UK Modern Slavery Act (2015), Australia's Modern Slavery Act (2018), the US Uyghur Forced Labor Prevention Act (2021), the EU Deforestation-free Products Regulation (2023), and the EU Carbon Border Adjustment Mechanism (2023) (Jaax and van Lieshout, 2025^[22]).

European Union	Carbon Border Adjustment Mechanism (CBAM)	In force (full implementation since 2026)	Aluminium, cement, fertilisers, hydrogen, iron & steel, electricity	Scope 1; Scope 2 (some); upstream Scope 3 for precursors	50 tonnes imports/year (excl. hydrogen & electricity)	CBAM certificates linked to EU ETS; adjustment for carbon price paid overseas
European Union	Ecodesign for Sustainable Products Regulation	In force since 2024	Steel, textiles, tyres, furniture, aluminium, mattresses	Scope 1–3 (LCA-based carbon footprint)	None	Mandates Digital Product Passports including carbon footprint information as of 2027 for EU market access
Japan	Carbon levy on fossil fuel imports	Planned for 2028, linked to the Green Transformation (GX) Policy	Fossil fuels (power, gas, oil)	Not specified	Not specified	No formal framework yet
Norway	Carbon Border Adjustment Mechanism (CBAM)	Preparing implementation in 2027	Same as EU CBAM	Same as EU CBAM	Same as EU CBAM	Aligned with EU CBAM
Serbia	Tax on imports of carbon-intensive products	In force since 2026	Aluminium, cement, fertilisers, iron & steel	Direct production emissions	5 tonnes imports/year	Linked to national GHG tax
Türkiye	Border carbon adjustment	Possible introduction included in the 2025 Climate Law	Not specified	Not specified	Not specified	No formal framework yet
United Kingdom	Carbon Border Adjustment Mechanism (CBAM)	Preparing entry into force January 2027	Aluminium, cement, fertiliser, hydrogen, iron & steel	Scope 1; indirect emissions possible from 2029	Registration threshold GBP 50 000 imports/year	Tax-based; rate linked to UK ETS; adjustment for carbon price paid overseas
United States	Foreign Pollution Fee Act	Legislative proposal (2025)	Aluminium, cement, iron and steel, fertiliser, glass, hydrogen, solar products, battery inputs	Scope 1–3	Not specified	No formal framework yet
United States	Clean Competition Act	Legislative proposal (2025)	Aluminium, cement and asphalt, chemicals and fertilisers, iron and steel, pulp and paper, coal, hydrogen, natural gas, petroleum and refined petroleum products	Scope 1–3	Not specified	No formal framework yet

Note: The table reflects regulations and legislative proposals identified as of May 2026. Measures adopted, amended or proposed after this cut-off date are not covered. The policy proposals identified for Canada, Chinese Taipei, Japan and Türkiye are not included in the analysis below given the limited public information available at this stage.

Source: (OECD, 2026 forthcoming^[66]) drawing on [Australia Carbon Leakage Review](#), [EU CBAM](#), [EU ESDR](#), [Norway CBAM](#), [Serbia Tax on Imports of Carbon-Intensive Products](#), [UK CBAM](#), [US Clean Competition Act of 2023](#), [US Foreign Pollution Fee Act of 2025](#), (WEF, 2025^[65]; IISD, 2024^[67]).

Existing and proposed measures differ markedly in their product and emissions coverage, the use of thresholds, and their legal and operational design. They range from tax-based approaches and import levies to regulatory schemes linked to domestic carbon pricing systems. Most initiatives focus initially on a narrow set of energy-intensive sectors and on direct production emissions, although several frameworks envisage broader product and emissions scopes or lifecycle-based approaches over time. Taken together, this mapping points to a broader uptake of requirements based on carbon-intensity metrics in trade-related contexts, alongside substantial variation in implementation choices and levels of regulatory maturity, with important implications for border authorities and traders operating across multiple jurisdictions.

Beyond BCAs, mandatory product labelling and sustainable production schemes may constitute market access requirements. In this context, carbon-intensity metrics serve as measurement tools for implementing and enforcing those requirements. Economic operators must provide carbon-intensity metrics, alongside other environmental attributes, as part of the information required to place products on the market. In contrast to BCAs, these labelling or sustainable production schemes do not attach a price or charge to embedded emissions. Instead, carbon-intensity metrics function as informational or compliance parameters, for example to support traceability, comparability, or eligibility under regulatory standards (OECD, 2026 forthcoming^[66]).

2.2. Traceability implications for border implementation

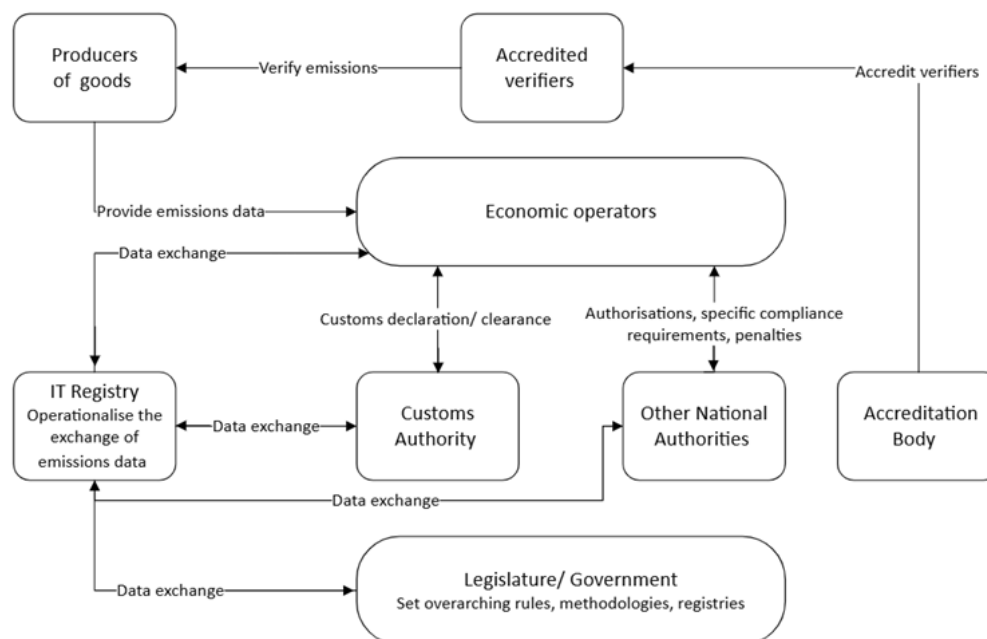
2.2.1. Border implementation can be more complex, as illustrated by carbon-intensity requirements

The case of carbon-intensity requirements brings to the fore a set of distinct challenges. First, compliance cannot be verified through physical inspection at the border – as is also the case for other non-observable product attributes – and enforcement relies on access to the information on embedded emissions. Second, such quantification of emissions is both technically complex and novel and goes beyond binary yes-or-no compliance checks. As a result, effective enforcement depends on systems of trust built around data verification, certification and declaration processes, as well as secure data movement mechanisms involving multiple public and private actors along supply chains operating within a broader compliance ecosystem (OECD, 2026 forthcoming^[66]).

In practice, this means that implementing regulations based on carbon-intensity metrics relies on an ecosystem of key actors operating both *behind* and *at the border*, and combining regulatory, operational, and technical functions. Although legal obligations are typically defined at the central or national level, their application at the border depends on coordinated action across a range of public and private actors who together support the generation, transmission, verification, and enforcement of compliance-related information throughout the trade transaction. These actors can be grouped according to the functions they perform within the compliance ecosystem (Figure 2.1):

- *Producers* of goods, such as operators of installations involved in the production process in various countries, responsible for providing (verified) emissions data.
- *Other economic operators*, such as importers, exporters, direct and indirect customs representatives (e.g., customs brokers), responsible for identifying applicable obligations and submitting required carbon-intensity or product-related data.
- *Customs authorities*, acting as the primary interface at the border, responsible for determining applicability of regulations at importation, verifying authorisations, carrying out clearance-related checks, and exchanging related trade transactions data.
- *Other border agencies* and competent authorities, such as environmental, tax, energy, or market surveillance authorities, responsible for authorisations, registries, compliance assessments, and enforcement actions.
- *Accreditation bodies and third-party verifiers*, supporting the credibility of reported data through accreditation and verification processes.
- *Central or supranational authorities*, where applicable, responsible for coordination, oversight, and the management of shared registries or information systems.

Figure 2.1. The carbon-intensity compliance ecosystem consists of many actors



Note: The categories presented are illustrative rather than exhaustive. They are based on the review of measures in (OECD, 2026 forthcoming^[66]) and reflect the actors most commonly referenced in the measures examined. The specific actors involved may vary across measures, sectors and jurisdictions.

Source: (OECD, 2026 forthcoming^[66]).

2.2.2. Wider traceability needs can reshape the actors and information involved in border processes

The carbon-intensity case points to a broader implication for traceability-related requirements: their implementation can expand the range of actors relevant to border processes and deepen interdependencies between them. Where compliance depends on information generated upstream and on attributes that cannot be directly observed at the border, customs and other border agencies may need to rely on information produced, transmitted or validated by businesses, producers, conformity assessment bodies, accreditation bodies, auditors and other competent authorities. Importers and customs representatives may in turn need to identify applicable obligations and connect product- or shipment-level information with evidence generated elsewhere in the supply chain. The precise allocation of responsibilities will differ across instruments, but the broader pattern is one of an increasingly distributed compliance ecosystem in which effective implementation depends not only on individual actors performing their respective functions, but also on the reliability of the links between them (OECD, 2026 forthcoming^[66]).

The carbon-intensity case also illustrates a second, related feature of traceability requirements: the growing complexity and diversity of the information that these actors may need to manage. Beyond carbon emissions, traceability-related information can encompass other dimensions of environmental performance, including water-use, land-use or satellite-based deforestation information and energy consumption; social dimensions, such as working conditions, wages and compliance with domestic and international labour and human rights standards; and governance-related information, including data relevant to corruption and fraud risks (OECD/IEA, 2025^[19]). As with carbon-intensity metrics, collecting, comparing and exchanging some of these data elements can be challenging due to diverging methodologies, limited data availability, confidentiality concerns and legal constraints (OECD, 2024^[68]).

These challenges can become more pronounced where traceability extends throughout the product life cycle and therefore involves different stages and actors across production, use and end-of-life processes, as discussed in the following Chapter 3 on the environmental product lifecycle.

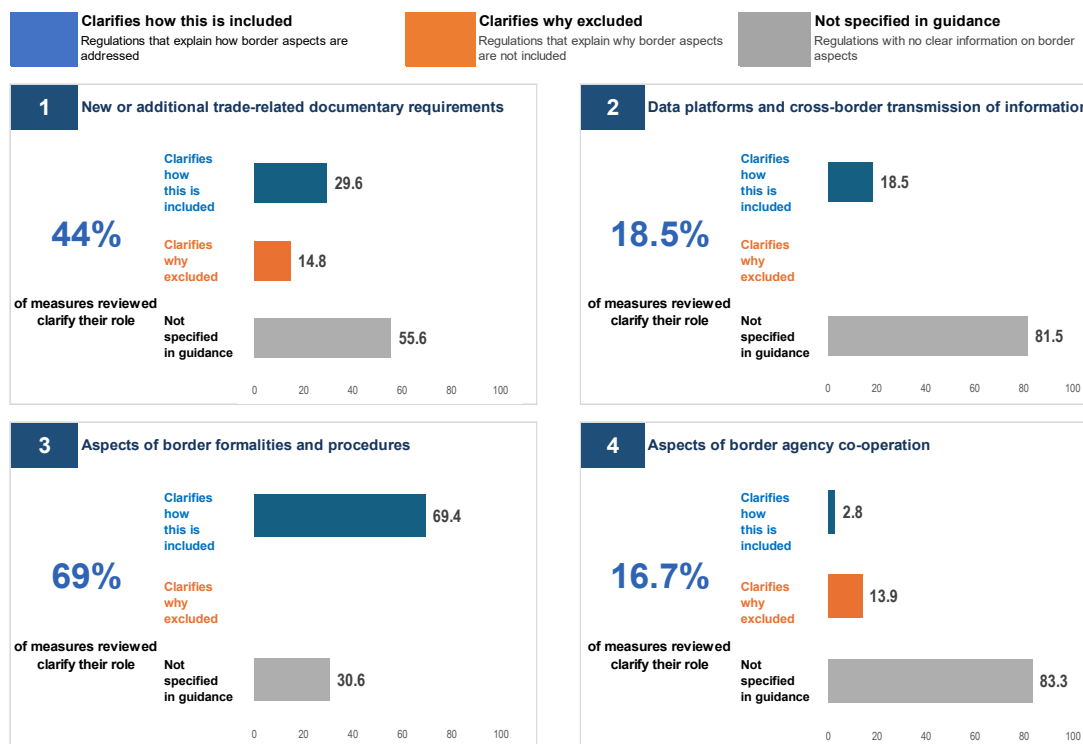
2.2.3. Guidance is limited on how enforcement interacts with customs procedures and trade facilitation tools

Despite the growing number of measures requiring traceability elements, the extent to which new requirements specify operational border enforcement steps remains limited. Analysis of the shift to paperless trade and the digitalisation of trade documents and processes indicates, for instance, that border aspects are rarely fully specified in selected regulations that set specific social and environmental requirements (OECD, 2025^[69]). Figure 2.2 shows that the guidance provided is limited: more than 60% of the measures reviewed do not provide clear guidance on border implementation dimensions – including documentation requirements, border procedures, data sharing, and border agency co-operation.

While 57% of measures reviewed clarify documentary requirements and border formalities, aspects of data platforms for information sharing and border-agency cooperation are rarely addressed (around 19% and 17% of measures clarify their role respectively) (OECD, 2025^[69]). Overall, fewer than 20% of new environmental and social-related requirements reviewed are designed with comprehensive border implementation in mind. This suggests that, across traceability-related requirements more broadly, the connection between substantive compliance obligations and practical border implementation often appears only partially described.

Figure 2.2. Border enforcement guidance is limited for emerging social and environmental-related requirements

Share (%) of social and environmental-related requirements reviewed



Note: Based on the analysis in OECD (2025^[9]) on a set of proposed and in force social and environmental trade-related measures. These include: Australia bill banning imports made using forced labour (2021); US Customs and Border Protection Forced Labour Trade Law (2022); Canada BILL S-211 enacting the Fighting Against Forced Labour and Child Labour in Supply Chains Act (2023); Mexico Forced Labour Law (2023); European Union ban on products made with forced labour (2024); United Kingdom Environment Act (2021); European Union Deforestation-free Products Regulation (2023); European Union Carbon Border Adjustment Mechanism (2023); European Union Ecodesign for Sustainable Products Regulation (2024).

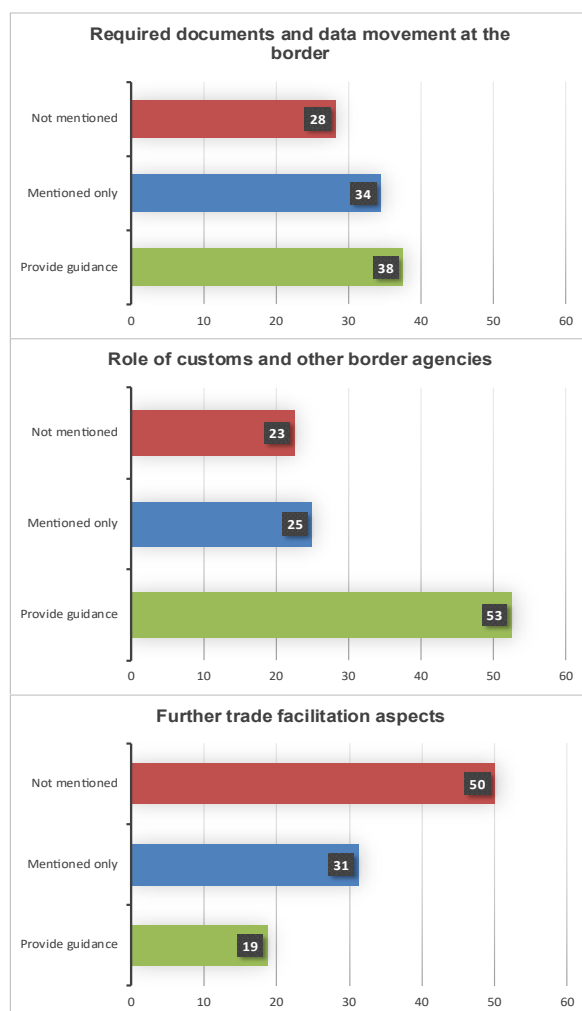
Source: (OECD, 2025^[9]).

A similar pattern is visible for carbon-intensity requirements, where guidance on border-related implementation also varies considerably across existing regulations and policy proposals. This reflects differences in regulatory scope, maturity and legal design, as well as the fact that many measures remain under development and continue to be accompanied by evolving implementation guidance. Among the measures mapped, guidance is most commonly provided on data requirements (38%) and the role of customs and other border agencies (53%) (Figure 2.3). Even in these areas, however, guidance often remains general, with limited detail on operational issues such as the use of digital tools, technical interoperability or the integration of new requirements into existing clearance processes. Other trade facilitation elements are addressed much less frequently, with only 19% of mapped measures referring to aspects such as border agency co-operation, risk management, post-clearance controls or Authorised Economic Operator (AEO) programmes¹⁰. While this does not necessarily imply that such mechanisms will not be used in practice, it suggests that their role is often not yet clearly articulated. As carbon-intensity requirements become operational, greater clarity on how they interact with existing trade facilitation frameworks could support more consistent implementation while helping to minimise unnecessary disruptions at the border.

¹⁰ Authorised economic operators (AEO) are operators who meet specific criteria and who are therefore benefiting from additional trade facilitation measures, such as low documentary and data requirements, low rate of physical inspections and examinations, rapid release time, deferred payment of duties, taxes, fees, and charges, use of comprehensive guarantees or reduced guarantees, a single customs declaration for all imports or exports in a given period, clearance of goods at the premises of the authorised operator or another place authorised by customs. The specified criteria to become an AEO may include an appropriate record of compliance with customs and other related laws and regulations, a system of managing records to allow for necessary internal controls, financial solvency, and supply chain security. See Article 7(7) of the WTO Trade Facilitation Agreement: <https://tfadatabase.org/en/tfa-text/article/7>.

Figure 2.3. Information and guidance on border procedures remains limited for carbon-intensity requirements

Share (%) of measures reviewed



Note: Based on the mapping of carbon-intensity requirements identified in Table 2.1. The policy proposals identified for Canada, Chinese Taipei, Japan and Türkiye are not included in the analysis given the limited public information available at this stage. “Further trade facilitation aspects” include, for example, Authorised Economic Operator (AEO) programmes, border agency co-operation mechanisms, risk management tools and post-clearance controls.

Source: (OECD, 2026 forthcoming^[66]).

The implementation of traceability-related requirements puts technical interoperability at the forefront.¹¹ The case of carbon-intensity requirements highlights how implementation depends not only on the availability of relevant information, but also on the technical interoperability needed to integrate and

¹¹ *Regulatory interoperability* seeks to align the “what” of information requirements across jurisdictions, allowing data collected under one regulatory framework to be reused or recognised under another (OECD, 2025^[104]; OECD, 2025^[105]). *Regulatory interoperability* includes methodological interoperability issues such as how to harmonise greenhouse gas (GHG) accounting and reporting standards Inclusive as highlighted in work carried out by the OECD International Forum on Carbon Mitigation Approaches (IFMCA) (OECD, 2024^[68]). *Technical interoperability* focuses on “how” different actors and digital systems can transmit and process required information, and verify compliance effectively (OECD, 2025^[9]; Stenzel and Waichman, 2023^[106]).

transmit it across border processes in a technically compatible way. This involves, first, combining existing customs data and documentation with new regulation-specific information, such as carbon-intensity data, importer authorisations and supporting compliance documents, in a way that can be incorporated into established clearance procedures. Second, it requires effective data movement between customs, environmental and other competent authorities through interoperable digital systems, including customs risk management tools, Single Windows, carbon registries and other dedicated platforms. Together, these elements enable authorities to apply carbon-intensity requirements efficiently while limiting reliance on manual processes, reducing administrative burdens and supporting consistent, risk-based enforcement (Table 2.2) (OECD, 2026 forthcoming^[66]).

Table 2.2. A range of data elements, documents and data analysis systems are relevant for enforcing carbon-intensity requirements

Data elements	Existing / New
Data included on customs declarations (shipment details, description and classification of goods, origin of goods, quantity, customs value, etc.)	Existing
Authorisation account/ numbers	New
Benchmark data	New
Default values for embedded emissions	New
Emission price developments	New
Documents	
Customs declaration	Existing
Compliance certificates from tax authorities for authorisation	Existing
Financial statements for authorisation	Existing
Commercial contracts and confirmations	Existing
AEO status confirmation	Existing
Documentation of bank guarantees for authorisation	Existing/ New
Information on accredited verifiers (accreditation certificates, etc.)	New
Data analysis systems	
Goods classification systems	Existing
Market surveillance systems	Existing
Customs risk management systems	Existing
Single Windows for trade	Existing
System for inputting and exchanging carbon intensity data (including registries of authorised/ registered importers)	New
System of rules for assessing carbon price adjustments	New

Source: (OECD, 2026 forthcoming^[66]).

2.3. Traceability implications for trade facilitation

The rise of traceability-related requirements and the lack of regulatory guidance on enforcement practices raises questions about how actors must adapt operational steps at the border. Related requirements can cause operational challenges for both public authorities and firms, which need to navigate operational steps at the border. These steps include: understanding and correctly determining which goods are subject to which rules; transmitting relevant data for compliance across actors; verifying authorisations and registrations status; identifying de minimis thresholds; and detecting circumvention risks and taking enforcement action. Implications also arise for processes which go beyond traditional border enforcement, such as collecting, reporting and submitting the correct supply chain data for compliance in time and across different jurisdictions and economic sectors.

The new procedural requirements introduced by traceability-related requirements can challenge the smooth functioning of existing trade facilitation tools. Traceability-related requirements introduce new compliance obligations that may not yet be fully integrated into border procedures and information systems. Without adaptation, this misalignment could result in delays, duplication, or inefficiencies at the border. The rollout of traceability-based regulations can create risks of disruption to particular trade facilitation elements such as information availability to facilitate trader compliance, automated and electronic clearance of import declarations, pre-arrival processing, risk management, Single Window systems, border agency co-operation, post-clearance audits, and AEO programmes. A lack of clear and accessible information may complicate importers' ability to comply with traceability obligations, creating uncertainty across supply chains and increasing the risk of non-compliance, particularly for smaller operators. Traceability procedures could also place specific pressure on automated customs clearance, as additional checks risk increasing administrative burdens and importation times. Limited interoperability of traceability data with existing customs systems and digital platforms could further cause fragmentation, manual handling and delays, especially where traceability frameworks are managed by sectoral or environmental authorities whose systems are disconnected from customs infrastructure. The absence of traceability compliance dimensions within AEO frameworks risks creating a two-track compliance burden that undermines the facilitation benefits these programmes are designed to deliver.

Traceability elements involve new circumvention risks and potentially require adjustments to customs risk management. Customs risk management and related cooperation is an important pillar of modern border enforcement and contributes to the improvement of trade facilitation as also evidenced by the OECD Trade Facilitation Indicators (OECD, 2025^[70]). Where compliance depends on upstream production conditions or other non-observable attributes, circumvention may involve practices such as “origin washing”, false declarations, misclassification or rerouting through third countries, potentially obscuring relevant links across deeper supply chain tiers.¹² Meeting these challenges will likely require customs risk management to evolve towards more data and risk-driven solutions capable of detecting patterns across shipments and supply chain tiers, rather than relying on document checks alone.

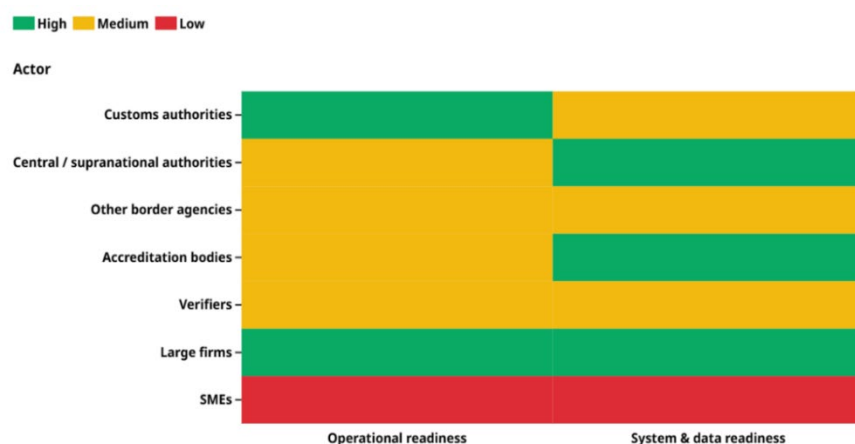
2.4. Uneven readiness for implementing traceability-related requirements

Using a trade facilitation lens helps to analyse implementation readiness for traceability requirements across various actors, sectors and economies. In a trade facilitation context, readiness can be understood for two complementary dimensions: (1) *operational readiness*: the ability to embed new requirements into existing border procedures through appropriate mandates, workflows, staffing, and coordination; and (2) *systems and data readiness*: the availability of the digital infrastructure, interoperable IT systems and structured data environments needed to generate, transmit, and process traceability-related information. The analysis of carbon-intensity requirements suggests that these two dimensions do not always coincide and are unevenly distributed across firm sizes, sectors, and contexts (OECD, 2026 forthcoming^[66]). Large firms may already operate relevant compliance and reporting systems, while small and medium-sized enterprises (SMEs) and firms in developing economies often face resource, data and institutional constraints that limit their ability to meet new requirements (Figure 2.4). Sector-specific factors also play a role: products with complex tariff classifications (such as critical minerals) or non-standard trade flows

¹² Forced-labour measures illustrate some of these challenges. Under the US Uyghur Forced Labor Prevention Act (UFLPA), a rebuttable presumption applies to goods linked to the Xinjiang Uyghur Autonomous Region, with enforcement drawing on risk-based targeting and supply chain documentation. Early evidence suggests that, while direct shipments from the region to the United States had ceased by early 2023 and the value of at-risk imports from China declined, indirect exposure through deeper supply chain tiers remained persistently high, illustrating the challenges of detecting circumvention and tracing relevant links beyond direct suppliers (RAND, 2025^[108]). Experience in other jurisdictions also points to the institutional and resourcing demands associated with operationalising import prohibitions linked to forced labour (OECD/EUIPO, 2026^[115]; (OECD, 2026^[26])).

(such as electricity), can pose enforcement challenges that go beyond standard customs procedures (OECD, 2026 forthcoming^[66]).

Figure 2.4. Actors vary in their readiness for implementing carbon-intensity requirements



Note: Illustrative, derived from (OECD, 2026 forthcoming^[66]).

Source: Based on (OECD, 2026 forthcoming^[66]).

Improving readiness requires targeted capacity building and international co-operation. Technical assistance, coordinated through international organisations and development partners, can help build the administrative infrastructure, digital systems, and human capital needed to comply with and enforce traceability requirements, particularly in developing economies. At the same time, regulators can support smoother implementation by providing clear operational guidance, phased timelines, and harmonised data formats that reduce duplication and lower compliance costs across jurisdictions. For developing economies and SMEs in particular, the costs of complying with traceability-related requirements can be disproportionately high relative to available resources and institutional capacity (OECD, 2026 forthcoming^[66]).

3

Tracing product lifecycles requires trade facilitation adaptations

This chapter examines how trade facilitation can support environment-related requirements across the product lifecycle. Using the OECD environment-related Trade Facilitation Indicators, it assesses how requirements linked to sourcing, production, use, circularity and end-of-life management are integrated into border systems. Results point to progress in transparency of trade-related information and basic digitalisation, but more uneven performance in interoperability, co-ordinated risk management and domestic and cross-border agency co-operation.

The carbon-intensity case examined illustrated a broader shift: border processes need to accommodate more and more information that originates across product lifecycles and complex supply chains. This raises a more fundamental question about the readiness of trade facilitation systems to support such requirements efficiently and at scale.

Using the OECD environment-related Trade Facilitation Indicators (env-TFIs), this chapter assesses how environmental requirements are integrated into border systems across OECD economies. By examining challenges associated with different stages of the product lifecycle, it evaluates the extent to which trade facilitation tools are evolving to support more information-intensive forms of trade and identifies where important implementation gaps remain. While centred on environmental requirements, the findings offer broader insights into the preparedness of trade facilitation systems for a traceability-intensive trading environment.

3.1. Understanding the product environmental lifecycle

Environment-related measures can require traders to provide information on a product's composition, origin, production process, use and end-of-life treatment; obtain permits, licences, certificates and conformity documents; and comply with controls involving customs and specialised agencies. From a trade facilitation perspective, the central question is not the environmental ambition of these measures, but how they are implemented at the border: whether requirements are transparent, data and documents can be submitted efficiently, agencies co-operate, and controls are predictable, risk-based and non-duplicative (OECD, 2026 forthcoming^[56]).

The product lifecycle provides a practical organising lens (Box 3.1). Environmental information may be generated during raw material extraction, input processing, manufacturing, distribution, use, repair, recycling and disposal. A lifecycle approach helps identify what information is needed, where it originates, which authorities must use it, and how it can be transmitted and verified across borders.

Box 3.1. Key segments of a product's environmental lifecycle

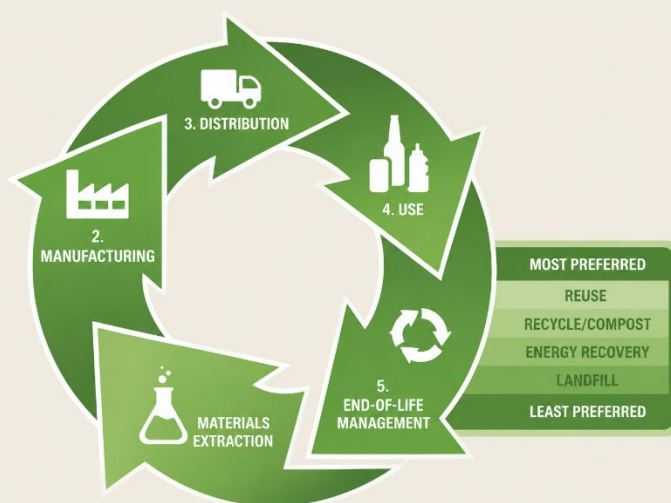
The environmental lifecycle of a product comprises environmental impacts occurring during three main segments: *production*, *use*, and *end-of-life* (Figure 1).

The *production* segment encompasses all activities related to sourcing raw materials, production of inputs, and the transformation of these inputs into intermediate or final goods. It involves actors such as suppliers, farmers, manufacturers, and processors.

In contrast, the *use* and *end-of-life* segments refer to the movement of goods from producers to intermediate and end users - i.e., the distribution, consumption, and disposal or recycling of products (Figure 3.1). In the context of environmental policies, each segment presents distinct challenges and opportunities.

Policies targeting *production* activities often aim to reduce environmental impacts of a product's supply chains. Measures targeting *use* and *end-of-life* stages generally focus on promoting consumption of more environmentally friendly products, end-use efficiency, and responsible waste management (i.e., circularity, recycling, and recovery of reusable inputs).

Figure 3.1. The product lifecycle consists of several segments



Note: The “production” segment, as discussed in the text above, encompasses the materials extraction (1), manufacturing (2), and distribution (3) steps in the figure. The “use” segment aligns with step 4 in the figure, while the “end-of-life” segment aligns with step (5) in the figure.

Source: Based on (OECD, 2026 forthcoming^[56]). Adapted from information made available by: US Environmental Protection Agency (EPA), [Sustainable Materials Management Basics](#) | US EPA; European Commission, [Life Cycle Assessment & the environment Footprint methods](#).

3.2. Mapping lifecycle-related border challenges

3.2.1. Complying with production environmental traceability can be complex for both customs and traders

Trade facilitation can support production-stage environmental objectives by enabling the verification of requirements based on non-product-related process and production methods (NPR-PPMs). As discussed in section 2.1, NPR-PPMs refer to the conditions or methods under which a product is made, but which do not affect the physical characteristics or functional performance of the product itself. Examples of requirements based on NPR-PPMs include border carbon adjustment mechanisms and deforestation-related regulations: they target emissions or land use impacts embedded in production rather than attributes that customs can observe directly in the product (OECD, 2026 forthcoming^[56]).

This creates a fundamental border challenge. Physical inspection cannot establish whether a shipment was produced with a given emissions profile or without recent deforestation. Compliance instead rests on upstream data, declarations, certifications and traceability systems, often involving firms, verifiers and regulators far removed from customs.

The resulting documentation can be complex and heterogeneous. Third-party certificates and prior validations may sit in databases outside customs systems, follow different formats and rely on different verification bodies across jurisdictions. Traders must navigate divergent requirements, while border authorities may lack the mandate, guidance, expertise or digital access needed to interpret the evidence consistently.

Risk management must also adapt. Customs selectivity systems have traditionally focused on revenue, safety and security. Incorporating environmental NPR-PPM criteria requires trusted data sources, new risk indicators and mechanisms for feeding compliance results back into risk profiles.

These requirements rarely fall within the remit of customs alone. Environmental authorities, trade ministries, standards bodies and public or private conformity assessment bodies may all participate in verification and enforcement. Without clear mandates, compatible systems and effective information transmission, multiple agency involvement can lead to duplication, gaps and inconsistent decisions.

3.2.2. Classifying and verifying goods in the use segment can be challenging at the border

In the use segment, trade facilitation supports environmental objectives mainly by reducing the cost and uncertainty of trading environmental goods and technologies. Classification ambiguities, documentary requirements and fragmented conformity assessment can all raise trade costs and slow their diffusion (APEC (2021^[71]); WCO (2023^[72]); Moisé and Tresa (2025^[73]); OECD (2026 forthcoming^[56])).

A first challenge is identifying environmental goods within the Harmonized System (HS). The OECD and Asia-Pacific Economic Cooperation (APEC) reference lists have mapped environmental goods to HS codes, while successive HS revisions have introduced more specific headings for environmental technologies. The HS 2028 amendments further distinguish categories relevant to plastics, recyclable materials and environmentally sensitive waste streams (WCO, 2026^[74]). Initiatives such as the Agreement on Climate Change, Trade and Sustainability (ACCTS) translate these classification efforts into an operational need for shared interpretations and consistent treatment at the border (OECD (2026 forthcoming^[56])).

However, the HS is internationally standardised only at the six-digit level, and many environmental goods share codes with conventional products. Two workarounds are common. First, national “ex-outs” can isolate the environmentally relevant subset of a broader code, but differences in eight- or ten-digit classifications can produce inconsistent treatment across markets. Second, end-use certification can grant targeted treatment to dual-use goods, such as filters used in wastewater treatment. Both approaches depend on clear definitions, credible evidence and consistent implementation. They also create risks of misdeclaration, which may prompt additional controls.

Environmental goods are also frequently subject to authorisations, conformity certificates, importer registration, testing and mandatory labels covering characteristics such as energy use or emissions (Moisé and Tresa (2025^[73])). When exporter certification is not recognised, border verification can generate extensive documentary requirements. Electronic submission, pre-arrival processing and Single Window integration can reduce these burdens; fragmented or manual procedures increase delays.

Some performance characteristics, including energy efficiency and emissions, cannot be verified through simple physical inspection. Effective risk management therefore depends on access to reliable certification data and common targeting systems, so that controls can focus on higher-risk shipments.

Finally, implementation often involves environmental agencies, energy regulators, standards bodies and consumer protection authorities alongside customs. These agencies may hold the relevant databases or technical expertise. Where documentation, IT systems and responsibilities are not aligned, institutional fragmentation can generate overlapping controls, inconsistent decisions and enforcement gaps (OECD (2026 forthcoming^[56])).

3.2.3. The end-of-life segment can create some of the most difficult classification and enforcement problems at the border

Trade facilitation can play an important role in managing cross-border movements of products and materials at the end of their lifecycle. This includes waste, recyclable materials, and products intended for

reuse, repair or remanufacturing. Such movements can support circular economy objectives by allowing recoverable materials to reach specialised facilities and economies of scale in areas such as lithium-ion battery recycling, plastics recovery and other reverse value chains (Moisé and Rubinova (2023^[75]); Moisé and Tresa (2023^[76]); Yamaguchi (2022^[77])). Yet end-of-life flows also create some of the most difficult classification and enforcement problems at the border (OECD, 2026 forthcoming^[56]).

A central challenge is determining what constitutes waste. The HS largely classifies waste and scrap by physical characteristics, while national rules may also consider intended use, processing method, market value, contamination or degree of recovery. The same material may therefore be treated as a recyclable input in one jurisdiction and controlled waste in another. Differences over when waste ceases to be waste add further legal uncertainty (OECD, 2025^[78]).

International controls add another layer. The Basel Convention and the OECD Decision on Transboundary Movements of Waste Destined for Recovery Operations (hereafter “OECD Decision”) use notification and prior informed consent (PIC) procedures (Box 3.2), but differ in coverage, membership and flexibility.¹³ Shipments may require evidence on intended use, destination, material purity, recovery standards and conformity with national or regional rules. The OECD amber control procedure is designed to facilitate recovery movements among OECD countries through general notifications, tacit consent and pre-consented facilities, but national variations can still create inconsistent documentation and treatment (Box 3.3) (OECD (2026 forthcoming^[56])).

Box 3.2. Challenges identified as regards the operation of the PIC procedure under the Basel Convention

A report by the United Nations Environment Programme on challenges in the implementation of the prior informed consent (PIC) procedure by the Parties to the Basel Convention notes that the PIC procedure is facing a set of persistent challenges that undermine its effectiveness and predictability (UNEP, 2024^[79]):

- Delays and lack of timely responses: Many Parties report significant delays in receiving acknowledgements or decisions from importing and transit states. In some cases, there is no response at all, leaving exporters uncertain whether shipments can proceed.
- Inefficient communication channels: Outdated or incomplete contact information for competent authorities, reliance on paper-based systems, and inconsistent acknowledgement of notifications hinder smooth communication.
- Divergent interpretations and definitions: Parties apply different definitions of waste (hazardous and non-hazardous), creating inconsistencies in classification and enforcement. This is particularly problematic for plastics and electronic waste.
- Transit-related difficulties: Growing numbers of transit countries require consent, often with unclear or highly demanding documentation requirements. There is also a lack of harmonisation of what constitutes a “state of transit.”

¹³ A recent case is electronic and electrical waste (e-waste). In June 2022, the Basel Convention was amended to require that transboundary movements of e-waste be subject to the prior informed consent (PIC) procedure, thereby introducing stricter controls. Among OECD members, no consensus was reached on the (automatic) incorporation of this amendment into the OECD Decision. As a result, each OECD member now applies controls to the transboundary movements of e-waste, in conformity with its own domestic legislation and international law. Some members continue to apply the current OECD Decision rules for e-waste, while others have adopted the Basel Convention controls.

- Short permit durations and mismatched timelines: Export permits are sometimes issued with timeframes too short to be practical, while transit consents do not automatically align with the timelines set by importing states.
- Capacity constraints: Many relevant authorities, particularly in developing countries, face resource and technical limitations that hinder efficient implementation of the PIC procedure (Box 3.4).
- Inconsistent risk and compliance monitoring: Weak monitoring mechanisms limit the ability to track shipments and ensure environmentally sound management at their final destination. This also raises risks of illegal traffic.
- Reluctance of carriers: Some shipping lines refuse to transport waste due to uncertainty over regulatory requirements and risks of shipments being blocked in transit.

Overall, these challenges are estimated to result in increased costs, procedural uncertainty, and risks of diversion to informal or illegal trade channels, undermining both trade predictability and environmental protection.

Source: (UNEP, 2024^[79]).

Used goods and secondary materials present a related problem. The Harmonized System does not systematically distinguish new from used products or identify goods by intended use, such as repair or remanufacturing. Items intended for reuse may consequently be classified as waste or scrap, while outwardly similar products may require different treatment depending on condition and destination. National ex-outs and declarations can help, but they are not internationally harmonised and often require supplementary evidence.

Box 3.3. Differences between the Basel Convention and the OECD Decision on Transboundary Waste Movements may affect how waste is processed at the border

The Basel Convention and the OECD Decision both regulate transboundary movements of waste through notification and consent procedures designed to ensure environmentally sound management. While the Basel Convention provides a global framework for hazardous and other controlled wastes, the OECD Decision applies to OECD members and is specifically designed to facilitate waste destined for recovery operations through more streamlined procedures.

Key differences – which may affect how waste shipments are processed at the border – include:

- Scope and membership: The Basel Convention has near-universal membership and covers hazardous and other controlled wastes, while the OECD Decision applies only to OECD members and focuses on waste destined for recovery.
- Procedural flexibility: The OECD Decision provides shorter consent periods, allows tacit consent, permits general notifications covering multiple shipments, and recognises pre-consented recovery facilities.
- Documentary requirements: Both frameworks require core documentation for controlled shipments, including a notification document, movement document, acknowledgement of receipt, consent/refusal decision, and confirmation of recovery or disposal. These documents contain information on the notifier, exporter, importer, waste classification and composition, quantities, transport arrangements, and receiving facility.
- Low-risk waste streams: Under the OECD Decision, green-listed wastes generally move under

simplified requirements, requiring only commercial documentation (e.g. invoice and transport documents), whereas the Basel Convention does not provide an equivalent simplification.

Overall, the OECD Decision largely mirrors the Basel Convention's control architecture but seeks to facilitate legitimate recovery trade within the OECD area through more flexible consent procedures and reduced documentation requirements for lower-risk waste streams.

Source: (OECD, 2026 forthcoming^[56]).

Valuation and inspection add further complexity. Second-hand goods may lack clear transaction values or comparable market prices, requiring depreciation formulas, expert assessments or fallback valuation methods. Circular economy certificates, including evidence on recycled content or reparability, may not be standardised or machine-readable, increasing the risk of duplicative assessments and physical inspection backlogs.

Risk profiling is difficult because shipments vary widely and incentives for misdeclaration can be strong. Goods may be declared as scrap, refurbished products or non-functional items to avoid stricter controls or obtain lower tariffs. Effective enforcement therefore requires customs, environmental regulators, standards bodies and health or safety authorities to co-ordinate data, inspections and risk analysis. Digital technologies can improve tracking and detection, but gaps in data quality, interoperability and access continue to limit their use across agencies and borders (Isarin et al. (2024^[80])).

Box 3.4. Role of customs and inter-agency co-operation under the Basel PIC procedure

Under the Basel Convention, the PIC procedure requires exporting countries to notify and obtain consent from importing countries before hazardous wastes or other controlled wastes are shipped. While the consent process is managed by designated competent environmental authorities, customs administrations are responsible for enforcing these requirements at the border. Their role includes verifying that shipments are accompanied by the correct Basel movement documents, checking that the content matches the approved consent, and preventing shipments that lack authorisation or appear fraudulent. Customs therefore serve as the operational gatekeeper that ensures the legal provisions of the convention are respected in practice.

Customs also play a key role in detecting and stopping illegal traffic, which the convention defines as criminal activity. This often involves identifying mis-declared shipments (e.g., hazardous waste presented as recyclable goods), stopping transits to unauthorised facilities, and seizing shipments that bypass the PIC procedure altogether. To do this effectively, customs aim to apply risk-profiling tools, targeting techniques, and intelligence-led enforcement.

Because customs authorities do not themselves issue consents under the PIC procedure, close co-operation with national environmental authorities is essential. Environmental agencies should provide customs with information on authorised shipments, the scope of consent granted, and any restrictions that apply. Customs, in turn, should report back on shipments intercepted or suspected of being illegal. This two-way flow of information ensures that enforcement at the border is aligned with regulatory approvals.

In turn, the OECD Decision's amber control procedure aims at simplifying the Basel PIC procedure for transboundary movements of wastes destined for recovery within OECD countries. Customs may work with general notifications covering multiple shipments, while the standardised OECD forms can help authorities apply more consistent checks. The use of pre-approved recovery facilities can also reduce the burden on customs at the border.

At the international level, customs authorities collaborate with bodies such as the World Customs Organization (WCO), INTERPOL, and the Basel Convention's enforcement networks. Joint operations and information sharing across countries are critical, since illegal waste shipments often involve complex transboundary routes. Such inter-agency co-operation – both domestically and internationally – is therefore the backbone of effective PIC procedures enforcement, ensuring that hazardous waste is managed safely, and that environmental and health risks are minimised.

Source: Basel Convention Guidance Manuals, available at <https://www.basel.int/Implementation/Publications/TrainingManuals/tabid/2364/Default.aspx>.

3.3. Integrating lifecycle requirements into trade facilitation systems through the environment-related TFIs

The env-TFIs build on the economy-wide OECD Trade Facilitation Indicators framework to examine where trade facilitation tools can support the implementation of environment-related requirements in efficient, transparent and non-discriminatory ways. The economy-wide TFIs assess whether core trade facilitation tools exist. The env-TFIs ask whether environment-related requirements are included in those tools. For example, where trade information is published online, the env-TFIs assess whether environmental permits, licences, certificates and procedures are also covered. Where a Single Window or digital customs system exists, they examine whether relevant environmental documents and data are integrated. Where border agency co-operation mechanisms exist, they assess whether environmental and other specialised authorities participate effectively.

The indicators therefore measure operational integration: whether environment-related requirements are visible to traders; whether documents and data can be submitted through streamlined and paperless channels; whether authorities share information and co-ordinate controls; and whether enforcement is predictable and risk-based.¹⁴

A higher env-TFI score does not indicate more ambitious or more effective environmental regulation. It means that existing environment-related requirements are more fully embedded in mainstream border systems. A lower score may reflect manual procedures, fragmented institutional arrangements or requirements managed outside core trade platforms for these specific areas. Nor do the env-TFIs identify environmental or circular economy goods for preferential treatment or evaluate the stringency and environmental impact of particular measures (OECD, 2026 forthcoming^[56]).

The env-TFI framework covers four dimensions:

- **Transparency and predictability.** This dimension assesses whether duties, procedures, forms, permits, licences, certificates, classification decisions, enquiry points, appeal mechanisms, fees and charges are accessible and up to date, and whether traders are consulted on regulatory changes. Higher scores indicate that environment-related requirements are easier to find, understand and anticipate.
- **Automation and streamlining.** This dimension examines whether copies and electronic documents are accepted, documentation follows relevant standards, requirements are periodically reviewed, and procedures can be completed electronically. It also covers Single Window integration, electronic signatures, risk management, post-clearance audit and Authorised Operator

¹⁴ As environment-related procedures rely on the wider trade facilitation infrastructure, an env-TFI score cannot exceed the corresponding economy-wide TFI score.

programmes. Higher scores indicate less reliance on fragmented, duplicative or paper-based processes.

- **Domestic and cross-border agency co-operation.** This dimension covers aligned data requirements, interoperable systems, co-ordinated inspections, shared risk management and co-operation on certified traders, both within countries and across borders. Higher scores indicate that agencies can share information, target controls and reduce duplication.
- **Governance and impartiality.** This dimension assesses whether institutional responsibilities are clearly defined and publicly described, and whether public reporting provides information on environment-related border activities. Higher scores indicate clearer accountability and more consistent implementation.

Together the env-TFIs provide a diagnosis of whether environmental information, documents, agencies and controls are connected to mainstream trade facilitation systems. This becomes important as traceability requirements span the full product lifecycle and depend on reliable information flows among firms, regulators and border agencies (OECD, 2026 forthcoming^[56]).

3.4. Progress and gaps in integrating environment-related requirements into trade facilitation systems

This section presents initial evidence on how environment-related requirements are incorporated into trade facilitation systems across OECD economies and across the product lifecycle. It shows the extent to which these requirements are reflected in border procedures and related trade facilitation tools. The analysis is based on publicly available customs and environmental authority websites, legislation, regulatory portals, Single Window platforms and other border documentation. The results should be interpreted as measures of observable integration of environment-related requirements into trade facilitation systems, not as assessments of environmental policy ambition (OECD, 2026 forthcoming^[56]).

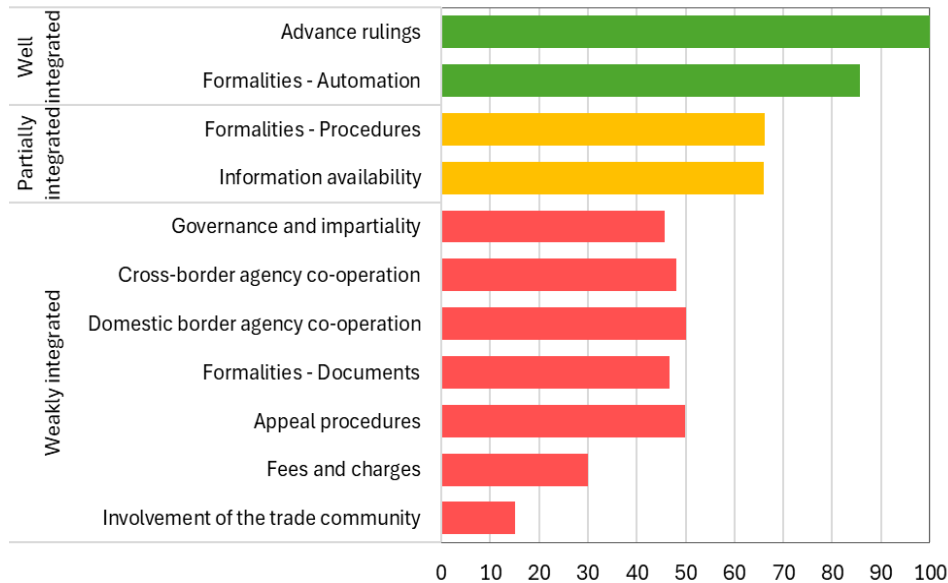
Five broad patterns emerge from the analysis.

1. Environment-related requirements are only partly integrated. In 2024, OECD trade facilitation systems covered, on average, around 55% of the lifecycle-related border challenges captured by the env-TFIs (Figure 3.2).
2. The digital front end is ahead of the institutional back end. Information is increasingly available online and basic documents can often be submitted electronically. Deeper integration - through Single Windows, joint risk management, co-ordinated inspections and cross-border data sharing - remains much less common.
3. Stronger regulatory frameworks do not translate evenly into operational implementation. Advance rulings, appeal procedures and information availability are more strongly embedded in existing trade facilitation systems, while documentary requirements, agency co-operation, fees and consultations with traders are around one-third less embedded, equivalent to an average gap of roughly 25 percentage points. The relatively weak integration of mechanisms for consultation with the trade community is particularly noteworthy, as adapting border procedures to complex traceability requirements depends in part on regular engagement with the businesses responsible for generating, managing and reporting compliance-related information.
4. Progress has been uneven over time. Formalities and basic automation improved strongly, particularly between 2012 and 2017. Information availability also advanced steadily, while domestic and cross-border co-operation show signs of catching up. Appeal procedures, fees and charges, and engagement with the trade community remain weaker and slower moving.
5. End-of-life flows are where trade facilitation systems are tested most severely. Requirements linked to production, usage, reuse and remanufacturing are roughly twice as visible in trade facilitation

systems as those linked to waste treatment. Waste and recyclable-material procedures combine difficult classification, permit and risk management questions with the greatest need for inter-agency and cross-border co-operation.

Figure 3.2. Environment-related border requirements are unevenly integrated into trade facilitation systems

Average env-TFI score as share of the corresponding economy-wide TFIs score (%), 2024



Note: The economy-wide TFIs ask whether core trade facilitation tools exist, while the env-TFIs ask whether environment-related border requirements are included in those tools. A higher env-TFI score implies that environment-related information, documents, agencies and controls are more fully integrated into trade facilitation systems. A lower env-TFI score does not imply weaker environmental regulation. It may mean that environment-related procedures exist, but are handled through separate, fragmented or less visible systems. “Weakly integrated” areas refer to those requirements that on average are handled separately or for which information is hard to find. “Partly integrated” areas refer to those requirements where on average some information or documents are included, but systems remain fragmented. “Well integrated” areas refer to those requirements where on average related information, documents, agencies and controls are integrated into mainstream trade facilitation systems. Based on the compilation of measures for OECD economies drawing on publicly available information.

Source: (OECD, 2026 forthcoming^[56]).

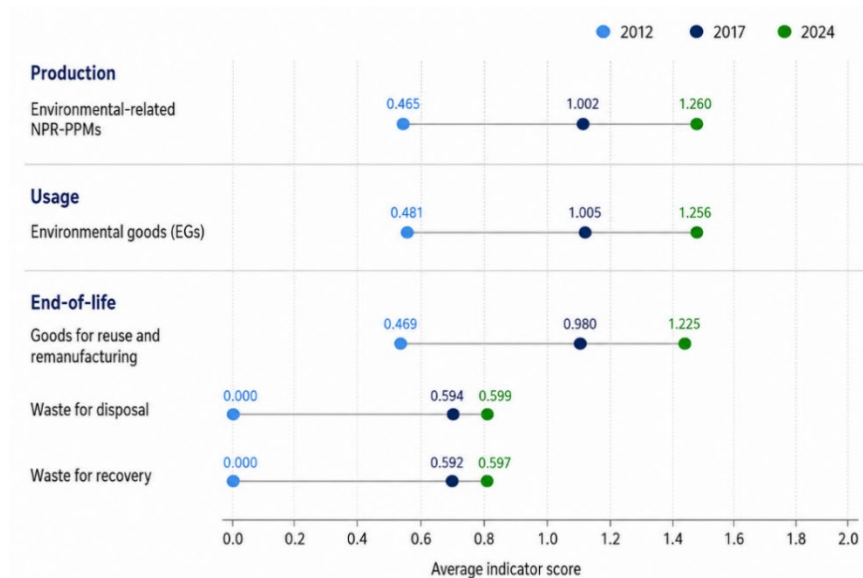
3.4.1. Progress differs sharply across the product lifecycle requirements

All lifecycle segments saw improvement in embedding environment-related requirements in the relevant trade facilitation area between 2012 and 2024, but from different starting points and at different speeds. Production-related measures started from the lowest base and have risen strongly, consistent with growing attention to upstream information and certification. Use-related measures have also improved substantially as countries clarify the classification and treatment of environmental goods and digitalise related procedures (Figure 3.3).

End-of-life segments follow a weaker trajectory. Measures for reuse and remanufacturing improved strongly up to 2017 but then levelled off. Measures for waste, scrap and recyclable materials also rose initially but have shown little subsequent progress. The contrast suggests that reforms advance fastest where information, classification and standard procedures can be added to existing trade systems. Progress slows where implementation depends on resolving waste/non-waste distinctions, aligning permits, linking multiple authorities and exchanging data across borders.

Figure 3.3. Progress across the product lifecycle is slowest for end-of-life segments

Average all OECD economies, 2012-24



Note: A score closer to 2 means that environment-related requirements are more fully embedded in the relevant trade facilitation area. Based on publicly available information compiled across OECD members.

Source: (OECD, 2026 forthcoming^[56]).

3.4.2. Production traceability information is expanding, but is still fragmented

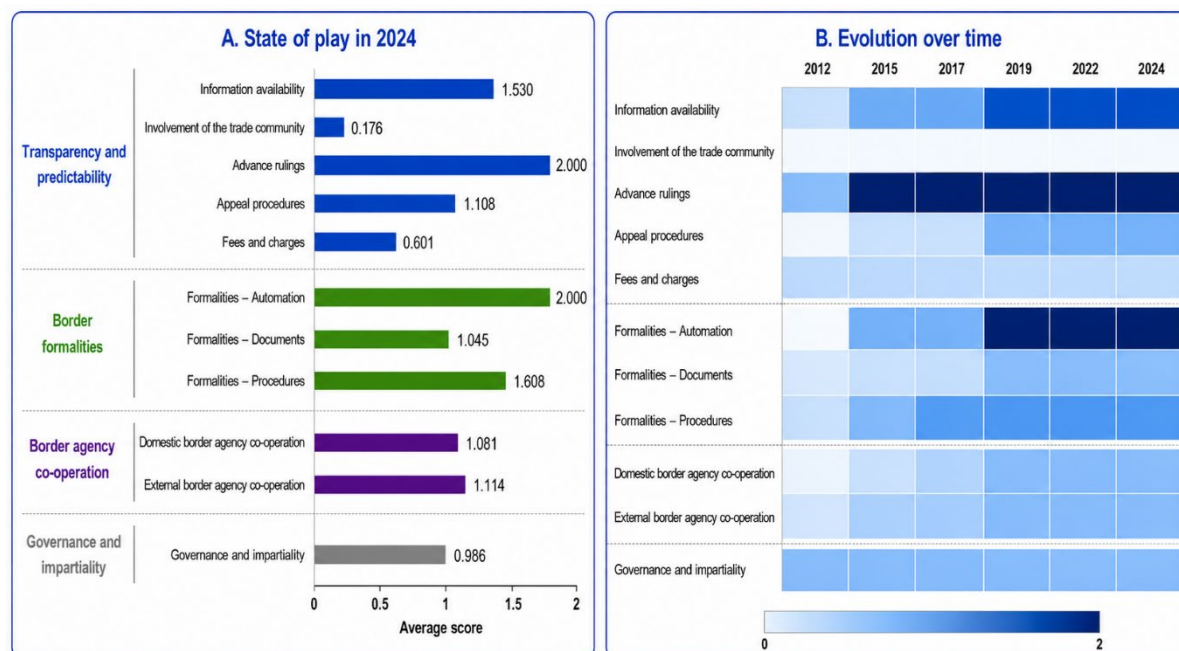
The env-TFIs do not capture the detailed design of individual NPR-PPM measures. They instead indicate whether countries possess the cross-cutting capabilities needed to implement them: accessible information, workable documentation, digital processing, risk management and agency co-operation (Figure 3.4).

Basic transparency of trade-related information is relatively widespread, but guidance is often dispersed across unconnected sources. Consultation mechanisms exist yet rarely address production-stage traceability explicitly. Electronic processing is expanding, but relevant documents are still only partly integrated into Single Windows, limiting data reuse and end-to-end traceability.

Customs risk management systems progressively incorporate environmental criteria, but integration is weaker in other agencies and feedback from controls or post-clearance audits is not consistently used to update risk profiles. The largest constraints arise when requirements span multiple authorities. Domestic co-ordination is improving, but single data entry and interoperable systems remain limited; structured cross-border transmission is rarer still. Institutional fragmentation, rather than the absence of individual digital tools, is therefore the main bottleneck. Public reporting also remains uneven, constraining benchmarking and peer learning (OECD, 2026 forthcoming^[56]).

Figure 3.4. Trade facilitation for production segment requirements is held back by institutional fragmentation

Average OECD economies, 2012-24



Note: A score closer to 2 means that environment-related requirements are more fully embedded in the relevant trade facilitation area. Based on publicly available information compiled across OECD members.

Source: (OECD, 2026 forthcoming^[56]).

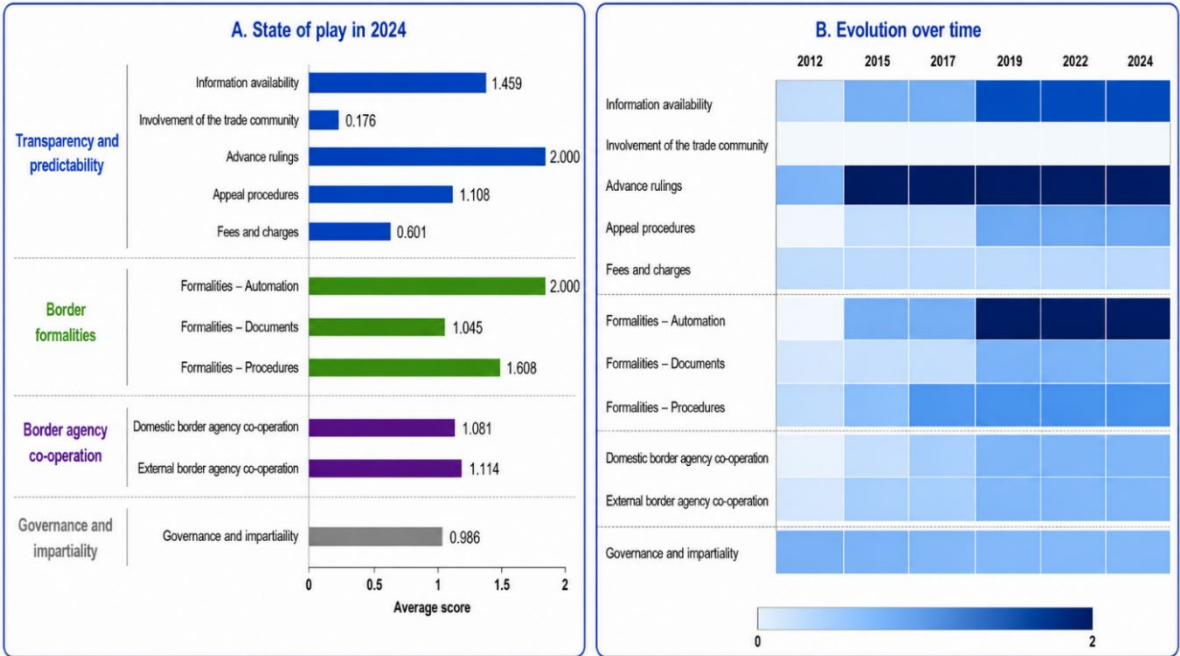
3.4.3. Classification frameworks for the use segment are evolving faster than their implementation

Information on environmental goods is generally available, but often spread across customs, environmental, energy and standards authorities. Traders may therefore need to assemble guidance from several sources to understand classification, conformity assessment and post-clearance obligations. Enquiry channels and consultation mechanisms are common, but specialised expertise and clear service standards remain uneven (Figure 3.5).

Electronic documentation is expanding, yet interoperability between customs and sector-specific systems remains partial. Risk-based controls and post-clearance audits become more important for performance characteristics that cannot be verified at the border, but audit results do not always feed back into common risk management systems. The main remaining challenge is therefore not the absence of information or digital tools, but connecting them across agencies and borders (OECD, 2026 forthcoming^[56]).

Figure 3.5. The use segment requires better interoperability between customs and sector-specific systems

Average OECD economies, 2012-24



Note: A score closer to 2 means that environment-related requirements are more fully embedded in the relevant trade facilitation area. Based on publicly available information compiled across OECD members.
Source: (OECD, 2026 forthcoming^[56]).

3.4.4. End-of-life circular flows expose the deepest operational gaps

Waste destined for disposal is governed by comparatively formal control regimes, but the information needed to comply is often dispersed across customs, environmental authorities and sector regulators. Digital tools support parts of the process, yet are frequently layered onto paper-based permits and consents rather than used to create end-to-end electronic workflows. Risk-based controls are common, but data alignment, co-ordinated inspections and feedback into shared risk profiles remain uneven. Cross-border harmonisation and information sharing appear among the weakest areas (Figure 3.6).

Waste destined for recovery presents a different trade-off: authorities must maintain environmental controls while facilitating legitimate, often time-sensitive circular supply chains. Requirements vary by material, contamination risk and treatment destination. Clear decision support is therefore crucial for distinguishing recovery from disposal, resolving waste/non-waste determinations and assessing documentary sufficiency consistently.

In this segment, information and formal appeal channels often exist but may not be sufficiently granular or fast for recycling markets. Predictable and proportionate fees and documentation are particularly important because burdensome formal channels can divert materials towards inefficient or informal destinations. Electronic workflows, data reuse and multi-agency risk management have considerable potential, but remain underdeveloped.

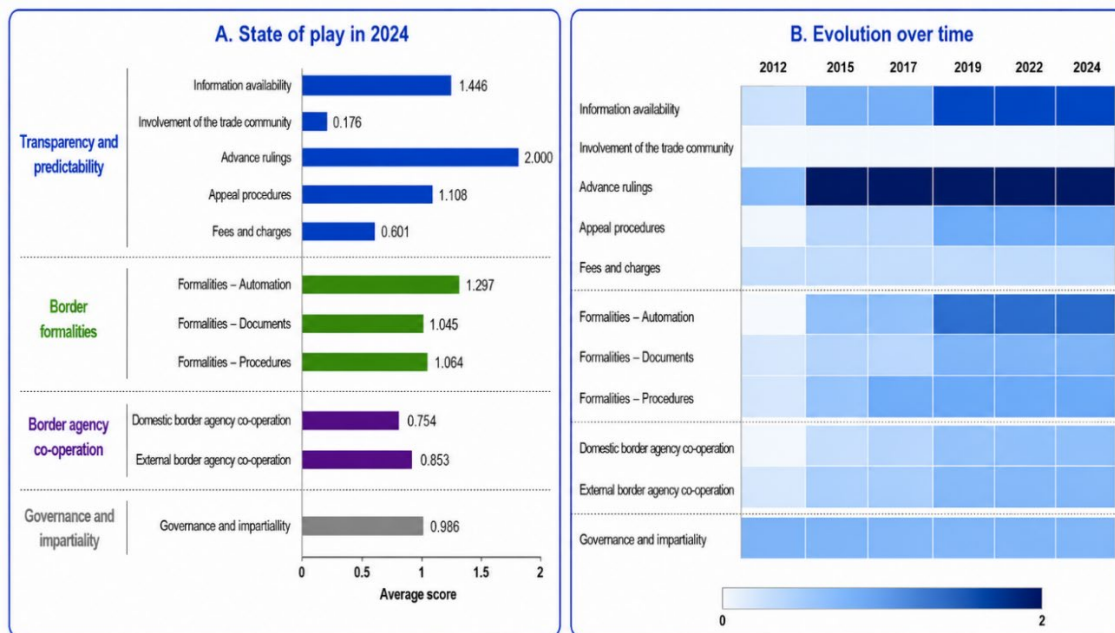
For goods intended for reuse or remanufacturing, the principal frictions arise less from PIC-style permits and more from classification, valuation, origin and evidence of condition or intended use. Guidance is often fragmented and not organised around a clear "used good versus waste" decision path. Advance rulings

can provide valuable certainty, but evidence on their practical use in this area is limited. Repetitive documentation, testing and opaque fees can undermine circular business models.

Across all end-of-life flows, the policy implication is the same: digitalisation alone is insufficient. Effective facilitation depends on common definitions, connected data, co-ordinated risk management and trusted-operator pathways that distinguish legitimate circular trade from high-risk or illegal shipments (OECD, 2026 forthcoming^[56]).

Figure 3.6. Trade facilitation efforts are most needed in the *end-of-life* segment

Average OECD economies, 2012-24



Note: A score closer to 2 means that environment-related requirements are more fully embedded in the relevant trade facilitation area. Based on publicly available information compiled across OECD members.
Source: (OECD, 2026 forthcoming^[56]).

4

Digital readiness enables efficient traceability at scale

This chapter examines how digitalisation supports the operational integration between trade facilitation and traceability. It explores the contributions of tools such as Single Windows, electronic documentation and interoperable data systems to more efficient information sharing, stronger risk management and the implementation of more complex compliance requirements. It also highlights the technical interoperability challenges that remain.

Digitalisation emerges as one of the key operational foundations shared by trade facilitation and traceability. As governments and businesses increasingly rely on information generated across international supply chains, digital systems become essential for collecting, transmitting, processing and verifying compliance-related information. The effectiveness of traceability-related requirements therefore depends not only on the quality of the underlying information but also on the ability of systems to transmit and use it efficiently across firms, agencies and jurisdictions.

This chapter examines the role of digital tools, interoperability and data-sharing mechanisms in supporting traceability-related requirements while facilitating efficient cross-border trade. It explores how digitalisation can support more efficient compliance and stronger supply chain visibility, while also identifying challenges associated with fragmented systems, uneven levels of digital readiness and limited interoperability between relevant platforms.

4.1. Progress towards going paperless

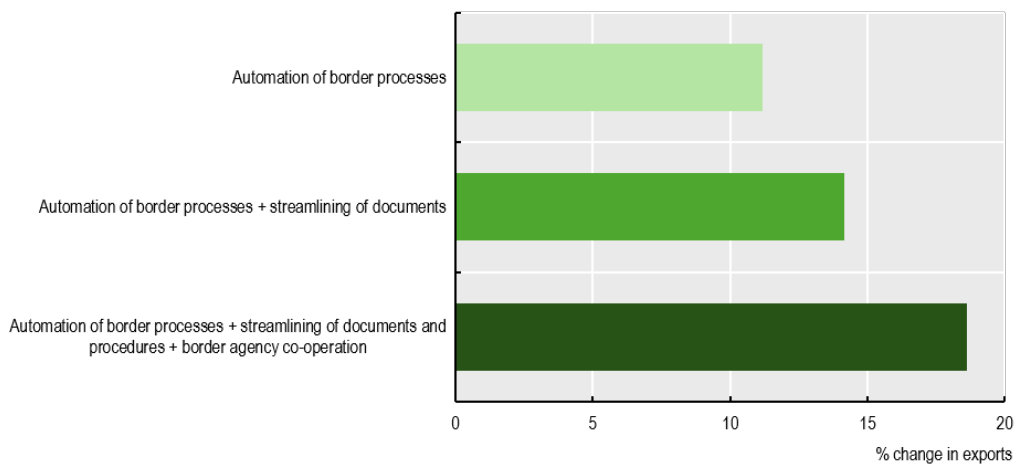
Since the entry into force of the WTO Trade Facilitation Agreement (TFA) in 2017, trade facilitation reforms have emphasised digitalisation, transparency, co-operation and the more effective use of information in border processes. Building on these developments, growing attention is now being paid to paperless trade and the digital infrastructures needed to support more data-intensive forms of trade and regulatory compliance (OECD, 2025^[13]).

International efforts to advance paperless trade span a complex ecosystem of multilateral and plurilateral initiatives, trade agreements, regional frameworks, domestic reforms and private-sector solutions. In addition to the WTO TFA, discussions under the WTO e-commerce agenda have expanded attention to electronic transactions and other enabling frameworks for paperless trade. Trade agreements also incorporate gradually more paperless trade provisions alongside rules on electronic signatures, data flows and privacy, while newer digital economy partnerships promote modular co-operation and interoperability. Regional initiatives focus on practical implementation, including mutual recognition of electronic documents, legal harmonisation and system interoperability, complemented by high-level principles developed in fora such as the G7 and G20. At the domestic level, countries are deploying integrated digital border systems, while private-sector initiatives are advancing the digitalisation and standardisation of commercial documents (OECD, 2025^[81]).

Going paperless is important because it can yield important trade cost reductions. Digitalising border processes significantly boosts trade across all sectors, especially when combined with streamlined procedures, simplified documentation, and enhanced co-operation among border agencies. A 10% global improvement in these areas, as measured by the Trade Facilitation Indicators (TFIs), can lead to an 18% rise in global exports (Figure 4.1). The same analysis also shows that broader domestic digital regulatory conditions matter. Reduction in the barriers affecting e-transactions, e-payments, and connectivity – as measured by the OECD Digital Services Trade Restrictiveness Index (DSTRI) – are associated with a 37% increase in exports. Together, they suggest that both border digitalisation and broader domestic digital frameworks matter for trade performance. Finally, international co-operation is essential. As digital trade barriers grow, aligning global regulations on electronic transactions, data flows, and trust frameworks can further reduce frictions and support the broader transition to paperless trade (OECD, 2025^[9]).

Figure 4.1. Export gains rise with digital and streamlined border procedures

Impacts from a 10% improvement in the TFIs, by areas (%)



Note: The estimations control for border processes (as measured by the OECD TFIs), for domestic barriers to electronic transaction frameworks, e-payments and connectivity (as measured by the OECD Digital Services Trade Restrictiveness Index), as well as for the international trade-related discussions affecting digital trade (as captured through the OECD Index for Digital Trade Integration and Openness).

Source: (OECD, 2025^[9]).

This shift is highly relevant for traceability. Many traceability requirements depend on structured and machine-readable information. For instance, a scanned PDF certificate may be easier to transmit than a paper certificate, but it does not necessarily allow automated checks, cross-referencing with registries, or efficient risk analysis. By contrast, structured data fields, digital identifiers and interoperable systems can allow authorities to verify whether a certificate is valid, whether an issuing body is recognised, whether a product is linked to a specific facility, or whether a shipment corresponds to a previously submitted regulatory declaration. Going paperless is therefore a necessary but insufficient step: the deeper challenge is to make trade-related information usable, reliable and interoperable.

Similar considerations apply to tax stamps and other fiscal markings. Digitizing a stamp or marking does not itself create traceability. Real traceability depends on structured data, unique identifiers and interoperable systems that support verification, information sharing and risk-based enforcement.

4.2. Emerging technologies: New opportunities for trade facilitation and traceability alike

Building on this paperless foundation, emerging technologies create new opportunities to strengthen both trade facilitation and traceability. Artificial intelligence (AI) and advanced data analytics can help authorities detect anomalies, identify high-risk consignments and allocate inspection resources more efficiently. For trade facilitation, this can improve risk management and reduce unnecessary checks on compliant traders. For traceability, the same tools can be used to identify inconsistencies in origin claims, certification records, carbon-intensity declarations, product safety information or supply chain documentation (OECD, 2026^[25]).

AI and machine learning can also support specific customs functions. AI-powered HS classification can use natural language processing and machine-learning algorithms to automate the assignment of tariff codes or regulatory requirements to goods descriptions. Multimodal systems combining textual and visual data are emerging, achieving accuracy rates exceeding 90% in some applications (ADB, 2025^[82]). Beyond classification, AI can be applied to risk profiling, fraud detection, cargo inspection and automated document

processing. By analysing large volumes of structured and unstructured data, models can identify suspicious patterns, flag higher-risk shipments and facilitate faster processing of compliant trade. Examples of early deployments by customs administrations in economies such as Korea, Singapore and the United States illustrate the potential and practical feasibility of these approaches (WCO, 2025^[83]).

Application programming interfaces (APIs) also offer important possibilities. They can allow real-time transmission of information among customs systems, Single Windows, regulatory databases, private platforms and certification bodies. This can reduce repeated manual submissions and allow authorities to verify information closer to its source. For example, instead of requiring traders to upload a certificate, a border agency could query a relevant registry to confirm whether the certificate exists, whether it remains valid and whether it applies to the shipment concerned (WTO (2024^[84]); WCO/WTO (2022^[85])).

Digital certificates, verifiable credentials and electronic signatures can support confidence in trade-related information further. Traceability depends not only on the availability of data, but also on confidence in its source. Digital credentials can make it easier to identify who issued a certificate, whether the issuer is authorised, whether the information has been altered and whether the credential remains valid. This is particularly relevant in sectors such as food and agriculture, chemicals, medical devices and batteries, where compliance often depends on accredited laboratories, inspection agencies, conformity assessment bodies or recognised certification schemes (see Chapter 5 for further insights on this).

Other technologies, including sensors, Internet of Things devices, geospatial tools and distributed ledgers, can support more continuous forms of traceability. Sensors can help monitor cold chains, transport conditions or the movement of sensitive goods. Geospatial data can support verification of production locations or land-use claims. Distributed ledgers may be useful in selected cases where several actors need access to tamper-resistant records of transactions or chain-of-custody events. These tools are not substitutes for sound regulation or institutional arrangements, but they can strengthen the evidence base available to authorities and firms (WTO (2024^[84]); WCO/WTO (2022^[85])).

4.3. Avoiding creating new challenges for trade facilitation through digitalisation

Digitalisation could create new challenges if implemented without sufficient attention to users or if the underpinning regulatory frameworks are fragmented. One risk is that paper-based complexity is simply reproduced in digital form. Traders may be asked to use multiple portals, submit similar information to different agencies, comply with different data formats, or maintain separate accounts for customs, licensing, product safety, environmental and tax authorities. In such cases, digitalisation may reduce the use of paper while failing to reduce the underlying procedural burden (OECD, 2025^[9]).

A second challenge concerns legal recognition. Digital tools only facilitate trade if electronic records, electronic signatures, digital certificates and electronic transferable records are legally accepted by the relevant authorities including in other jurisdictions. Where legal frameworks remain incomplete, firms may be required to submit digital information while still retaining paper documents for official purposes. This can create duplication rather than simplification. Legal recognition also matters across borders: an electronic document issued in one jurisdiction may not be accepted by authorities in another unless there are clear rules, standards or recognition mechanisms.

Cybersecurity and operational resilience are also becoming central trade facilitation issues. As border processes become more dependent on digital systems, outages, cyber incidents or failures in key platforms can disrupt trade flows. This is particularly important for Single Windows, customs management systems, port community systems and digital certification platforms. Because these systems underpin the exchange and verification of trade-related information, disruptions can directly affect customs procedures, compliance checks and cargo clearance. The greater the reliance on digital infrastructure, the greater the

need for contingency plans, resilience requirements, data protection safeguards and clear procedures for maintaining continuity of trade during system disruptions.

Digitalisation can also create level playing field challenges. Large firms may be able to invest in sophisticated compliance systems, integrate their enterprise software with customs platforms and use specialised service providers. Smaller firms may face higher adjustment costs, especially when digital requirements are complex, fragmented or frequently changing. Developing country suppliers may also face difficulties generating, validating and transmitting the data required by foreign markets. Without appropriate support, digitalisation can unintentionally reinforce disparities between firms and countries (UNCTAD, 2022^[86]); (Baker, 2026^[87]).

A further risk is digital compliance burden. Because digital tools make it easier to request, store and process information, governments may be tempted to expand data requirements without sufficient discipline. This can generate new forms of red tape, particularly where data requests are not clearly linked to risk management or regulatory necessity.

4.4. The added digitalisation challenge for traceability

Traceability can intensify many of these challenges because it requires more granular and diverse information than traditional customs procedures. Customs data generally focus on the consignment, trader, tariff classification, value, origin, transport route and applicable duties. Traceability-related requirements may require additional information on production facilities, suppliers, input materials, processing methods, batch numbers, certification schemes, emissions values, recycled content, safety tests or end-of-life pathways (Chapters 2 and 3). This information is often generated far upstream in the supply chain, long before goods reach the border.

Traceability also expands the number of actors involved in trade-related compliance. Beyond traders, customs brokers and customs authorities, relevant actors may include producers, subcontractors, laboratories, certification bodies, conformity assessment bodies, environmental agencies, market surveillance authorities, logistics providers, recyclers, digital platform providers and sector-specific regulators. This creates a more complex compliance ecosystem. Digital tools can help connect these actors, but they also raise questions about who is responsible for generating, validating, transmitting and correcting relevant data (Box 4.1).

Box 4.1. Public and private data platforms for environmental and social-related requirements

Digital platforms for reporting, exchanging and verifying environmental or social-related sustainability information are being developed in parallel by businesses, industry associations and governments. These initiatives can differ substantially in scope, governance, technical architecture and the level of assurance provided. Some establish common data models and technical specifications; others operate sector-specific data spaces; and an increasing number of public systems collect information required for regulatory enforcement. This diversity reflects different sectoral needs and concerns over data protection, confidentiality and trust, but it also creates challenges for interoperability.

Industry-led initiatives generally seek to enable firms to transmit environmental or social-related sustainability information without transferring control of all their data to a central platform. For example:

- The Partnership for Carbon Transparency's PACT Network provides an open, cross-sectoral data model and application programming interface for the secure, peer-to-peer exchange of product carbon-footprint data between compatible software solutions.
- Catena-X applies a governed data space model to the automotive industry, combining common

data standards and rulebooks with mechanisms that allow participants to specify how their data may be used.

- Together for Sustainability provides a more sector-specific model for the chemical industry, combining a product carbon footprint methodology, a common data model and an exchange solution through which companies and their suppliers can share upstream emissions information.

Public regulatory systems are being developed for a different purpose: to receive, verify and make available information required to demonstrate compliance. For example:

- The European Union Deforestation Regulation relies on an information system through which operators submit due-diligence statements containing information such as product classification, quantity, country of production and production-site geolocation. The Regulation provides for an interface with national customs systems through the EU Single Window Environment for Customs. The EU Carbon Border Adjustment Mechanism (CBAM) similarly relies on a central registry through which importers and installation operators manage authorisations, emissions information and reporting obligations; since January 2026, customs authorities verify the importer's CBAM authorisation before releasing covered goods for free circulation. The EU's CATCH system provides a further sector-specific example: since 10 January 2026, EU importers and competent authorities have been required to use CATCH to submit and process digital catch certificates for fishery products entering the EU market; the system aims to enable the paperless sharing of data, documents and certification information among trading parties and control authorities, thus supporting verification of the legal origin of imported products and efforts to prevent illegal, unreported and unregulated fishing. The emerging EU Digital Product Passport system adds another model: a central registry will index product passports while detailed product information may remain in decentralised data sources.
- The United States Customs and Border Protection (CBP) Forced Labor Portal enables importers to submit supply chain tracing evidence for review under forced-labour enforcement procedures, including evidence covering the full supply chain of an imported good or component. The United States CBP has also incorporated the Altana ID into its Global Business Identifier test, which explores the use of common and commercially maintained identifiers to improve the identification of businesses and visibility across international supply chains. These initiatives illustrate how public enforcement systems may increasingly draw on detailed information generated in private supply chain networks.
- Japan's Ministry of Economy, Trade and Industry is supporting the Ouranos Ecosystem, including a project for sharing carbon footprint and due diligence information across automotive and battery supply chains while facilitating alignment with the EU Battery Regulation.
- Australia's National Agricultural Traceability Strategy is developing common data standards and an interoperability framework rather than a single central platform, including work on the verification of sustainability claims.
- In the United Kingdom, the Ecosystem of Trust has pilot tested how data held in commercial supply chain systems could be shared with border authorities. The evaluation found that the data could meet around 80% of minimum customs risk assessment requirements and potentially reduce decision times by 17%.

The parallel development of these systems raises the risk of fragmented data models, repeated reporting and inconsistent assurance requirements. Private platforms may be designed primarily to support management of business-to-business social or environmental criteria, while government systems require legally reliable evidence for risk assessment and enforcement. The principal policy challenge is therefore not necessarily to create one universal platform, but to establish the technical,

semantic and legal conditions under which trusted data can be securely reused across systems. This includes alignment of product and business identifiers, data definitions, calculation methodologies, verification requirements, access rights and interfaces with customs and Single Window systems. Particular attention is also needed to ensure that the costs of participating in these emerging data ecosystems do not exclude SMEs or suppliers in developing economies.

Note: The examples provided in this box are meant to be illustrative rather than exhaustive.

Source: Based on (OECD, 2025^[81]); US CBP [Forced Labour Compliance](#); US CBP [Global Business Identifier Test](#); Japan [Ouranos Ecosystem](#); Australia National Agricultural Traceability Strategy; UK [Ecosystem of Trust](#);

The importance of data provenance is therefore particularly pronounced for traceability. Authorities do not only need access to information; they may need to know where it came from, who generated it, when it was produced, which methodology was used, whether it was verified and whether the issuing entity is recognised. This is especially important where traceability information supports regulatory enforcement. A carbon-intensity value, chain-of-custody claim or safety certification is only useful if authorities can assess its reliability.

The growing use of digital traceability systems creates new possibilities for automatically identifying missing, inconsistent or unverifiable information, but also requires governments to decide how such information should be used in border processes. A missing data field or an inconsistency does not necessarily indicate non-compliance, and authorities need clear rules on when such flags should trigger further checks, delay clearance or allow information to be corrected. They must also determine what evidence is sufficient to release goods and who bears responsibility when information provided by a foreign supplier or third-party platform is inaccurate. These questions become particularly important where automated systems inform or directly affect clearance decisions.

There is also a risk that digital traceability requirements could create barriers to participation in trade. Firms that cannot generate machine-readable data, access recognised certification systems or connect to digital platforms may face difficulties accessing certain markets, even where their products meet substantive requirements. This is particularly important for small producers, informal suppliers and firms in developing economies. Digital traceability can support more efficient compliance, but it can also raise the fixed costs of participating in international trade.

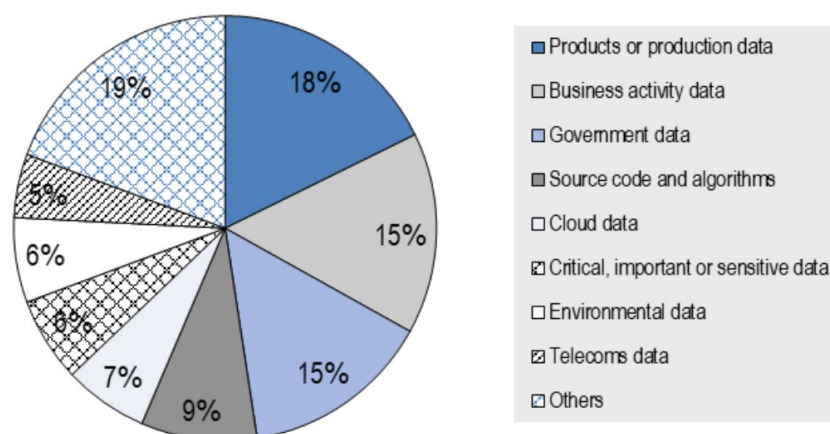
4.5. Data as the cross-cutting enabler

Across all these developments, the cross-cutting issue is data. Digital tools for trade facilitation depend on the ability to generate, transmit, verify and reuse data across public and private systems. For traceability, this includes a growing volume of non-personal data (NPD): product identifiers, batch numbers, facility identifiers, origin information, audit results, emissions values, recycled content, certification status, testing results, transport conditions and chain-of-custody records. These data are often commercially sensitive, technically complex and distributed across multiple actors (Lopez-Gonzalez, Del Giovane and Ferencz, 2025^[59]).

This makes data governance a core aspect in relation to traceability-related requirements. Governments need to define what data are required, who must provide them, in what format, at what point in the trade process and for what purpose. These questions are becoming increasingly important because measures affecting NPD apply to a broad range of information relevant to trade and traceability. Product or production data represent the largest category of data targeted by identified measures, but business activity, government, environmental and other forms of NPD are also frequently affected (Figure 4.2) (Lopez-Gonzalez, Del Giovane and Ferencz, 2025^[59]). Governments also need to determine who can access the data and under which conditions. Some traceability-related information may be relevant for consumers,

some for importers, some for customs, some for environmental or market surveillance authorities and some only for accredited auditors.

Figure 4.2. Identified measures target different types of non-personal data



Note: Products or production data may include technical characteristics of products, as well as information, reports and documents on products and production, including about testing. Environmental-related requirements fall under the 'environmental data' category.

Source: (Lopez-Gonzalez, Del Giovane and Ferencz, 2025^[59]).

Confidentiality is particularly important. Traceability data may reveal supply chain relationships, production methods, sourcing strategies, input prices or other commercially sensitive information. If firms fear that data submitted for regulatory purposes may be exposed to competitors or used beyond their intended purpose, they may resist participation or provide less complete information. Data sharing frameworks therefore need to combine transparency for regulatory purposes with safeguards for confidential business information.

Data quality is another key challenge. Traceability systems are only as reliable as the data they contain. Poor quality data, inconsistent identifiers, outdated registries or unverifiable certificates can undermine both trade facilitation and enforcement (Box 4.2). Governments and international partners therefore need to focus not only on data sharing, but also on validation, auditability, version control, correction mechanisms and the identification of reliable data sources. The objective should be to ensure that data can be acted upon with confidence.

Interoperability is equally relevant. If each market requires different data formats, identifiers, platforms and verification methods, compliance costs will rise. Firms may need to adapt their systems separately for each destination market, while authorities may struggle to compare or verify information across jurisdictions. Common data models, internationally recognised standards, interoperable identifiers and, where appropriate, recognition of digital credentials can help reduce duplication and support more scalable traceability systems (OECD, 2025^[88]); (World Bank, 2025^[89])).

4.6. Trade facilitation considerations arising from digital traceability

The growing use of digital tools for traceability raises policy questions that extend beyond the traditional trade facilitation agenda. A first issue is how traceability-related requirements connect with existing trade facilitation systems. Rather than creating separate digital portals for each new requirement, governments can explore, where appropriate, how relevant information can connect with Single Windows, pre-arrival

processing, risk management and agency co-operation frameworks. This could help avoid fragmentation and unnecessary duplication.

A second issue is a possible shift from document recognition towards greater attention to the underlying data. Traditional trade facilitation often asks whether a document is accepted, whether it can be submitted electronically and whether it is recognised by an authority. Traceability can require a more granular approach. Governments may need to consider specific data elements (see Box 4.2 on improving granularity of HS codes as a necessary complement to digitalisation efforts), methodologies, digital credentials, issuing bodies, accreditation systems or verification processes. The focus therefore extends from the form of a document to the reliability and usability of the information it contains.

Box 4.2. Data granularity considerations for digital traceability of critical minerals

Digital tools such as electronic certificates, product passports, Single Windows and traceability platforms are increasingly promoted to improve transparency and resilience in critical mineral supply chains. However, digitalisation alone cannot ensure traceability if the underlying trade data do not identify the minerals being traded with sufficient precision. Digital systems can only track what is actually recorded.

The OECD's ongoing work on critical minerals trade data shows that conventional HS6 trade classifications frequently aggregate different minerals into broad product categories, obscuring the origin, movement and processing stage of specific materials. As a result, supply dependencies and concentration risks can be significantly underestimated. For some critical minerals, including niobium, scandium, germanium and osmium, concentration measured using more detailed national tariff codes is at least twice as high as that suggested by standard HS6 data.

A key insight from the ongoing OECD mapping of HS codes and national trade nomenclatures is that countries already differ substantially in the extent to which they disaggregate critical minerals. Some jurisdictions have introduced specific statistical breakouts for minerals such as scandium, indium, boron or tellurium, while others continue to record them within broader categories. These differences create opportunities for international co-operation, peer learning and eventual harmonisation of more granular trade classifications.

More detailed HS classifications would strengthen traceability by enabling customs authorities, regulators and firms to distinguish individual minerals, follow their movement through different stages of the value chain and better assess supply chain risks. For instance, such granularity is particularly important for strategic battery minerals. Lithium trade is highly concentrated, with the top three exporters accounting for almost 90% of global exports, while nickel supply chains are progressively more affected by export restrictions and processing-related policy interventions. Reliable digital traceability of these supply chains therefore depends on the ability to identify these materials accurately in trade data from the outset.

Source: (OECD, 2026 forthcoming^[90]).

A third aspect concerns trusted digital identity. Traceability depends on the ability to identify products, facilities, firms, certifiers, laboratories and regulatory authorities. Digital identity frameworks can help establish whether a product is linked to a given producer, whether a certificate was issued by a recognised body or whether a facility is authorised under a particular scheme. Trusted identifiers can therefore become an important component of trade facilitation infrastructure.

A fourth area is verification without full disclosure. In some cases, firms may wish to demonstrate compliance without revealing all underlying supply chain information. This is particularly relevant where traceability data are commercially sensitive. Digital tools may allow authorities or supply chain partners to

confirm that a product meets a requirement, that a certificate is valid or that a threshold has been respected without requiring disclosure of the full underlying dataset. This could help reconcile regulatory information needs with the protection of confidential business information.

Machine-readable regulatory information is a fifth issue. If traceability checks are to become more automated, regulatory requirements may need to be expressed in clearer and more structured ways. This can include publishing required data fields, accepted formats, recognised certifiers, validation rules and procedural requirements in ways that digital systems can interpret. Machine-readable regulatory information can reduce uncertainty for firms and make it easier for service providers to develop compliance tools.

Finally, digital traceability raises questions of accountability in automated enforcement. Where AI, algorithms or automated rules are used to assess risk or verify compliance, traders need clarity on how decisions are made, how errors can be corrected and how review or appeal mechanisms operate. The use of digital enforcement systems therefore gives greater prominence to questions of transparency, human oversight and accountability (ESCAP and ADB, 2026^[91]).

5

Trust in compliance information is essential to support traceability-intensive sectors

This chapter examines how co-operation could help simplify compliance with information-intensive requirements and support evolving traceability needs. Through an analysis of mutual recognition instruments and related arrangements, it explores how relevant stakeholders facilitate reliance on assessments and evidence generated across jurisdictions in specific sectors. It also highlights the gap that can arise between formal co-operation frameworks and their practical integration into border processes, underscoring the importance of customs connectivity, inter-agency co-operation, risk management and accessible information.

As traceability-related requirements become more information-intensive, firms and authorities face growing risks of duplicative procedures, repeated information requests and fragmented compliance processes. Information accompanying traded goods is progressively generated by multiple actors across supply chains and jurisdictions, creating challenges in determining when, and under what conditions, such information can be relied upon and accepted across borders. Building trust in compliance-related information therefore becomes important for both effective regulation and efficient trade.

This chapter examines examples of practical mechanisms that could help reduce unnecessary duplication and facilitate the acceptance of compliance-related information across jurisdictions. It focuses in particular on conformity assessment, mutual recognition instruments and wider approaches that enable authorities to rely on information, testing, certification or verification conducted elsewhere. By strengthening trust and reducing repetitive procedures, these mechanisms could support compliance with more complex requirements – particularly in key sectors – while limiting administrative burdens for firms and authorities.

5.1. The value of trusted information amid growing compliance complexity

Managing trade costs remains critical for competitiveness, resilience and diversification, particularly in sectors of strategic importance. Yet businesses continue to face significant costs associated with differences in regulatory requirements across markets and with the procedures needed to demonstrate compliance. These costs can arise from identifying applicable requirements, adapting products or production processes, and undergoing testing, inspection, certification or other conformity assessment procedures. They can be particularly significant where assessments undertaken in one market are not accepted in another, requiring firms to repeat tests, obtain additional certificates or engage different conformity assessment bodies before goods can be placed on the market (Correia de Brito, Kauffmann and Pelkmans (2016^[92]); OECD (2026 forthcoming^[93])).

The expansion of traceability-related requirements adds a further dimension to this challenge. As discussed in previous chapters, demonstrating compliance can gradually depend more on information on how goods are produced, processed or sourced, including attributes that cannot be directly observed at the border. Such requirements may therefore increase reliance on evidence generated upstream and on assessments undertaken by specialised public or private actors. In this context, the practical challenge is not only to trace relevant information back to a product or shipment, but also to establish sufficient confidence in the processes and actors through which that information has been generated, assessed or verified (OECD, 2026 forthcoming^[93]). The growing role of traceability can thus reinforce the importance of trusted information along supply chains.

Against this backdrop, international regulatory co-operation (IRC) tools can help address some of the frictions associated with demonstrating compliance across jurisdictions. MRIs are one such relevant tool because they can establish conditions under which conformity assessment results, accreditations or related evidence generated in one jurisdiction can be relied upon in another. In practice, this reliance is generally given effect through domestic regulatory frameworks governing market access, product compliance and conformity assessment, although recognised evidence may also be incorporated into border procedures where documentation is verified at import. MRIs can lower compliance costs by reducing duplicative testing and certification, enabling firms to use recognised conformity assessment bodies closer to the point of production, and supporting confidence in foreign assessment systems.

Existing empirical studies suggest that MRIs can have potentially sizable trade effects, with estimates of goods trade increases ranging from 13% to 41%. Sector-specific evidence further points to practical benefits arising from the avoidance of duplicate testing, lower compliance costs and the cross-border

acceptance of recognised conformity assessment results (Baller (2007^[94]); Chen and Mattoo (2008^[95]); Jang (2018^[96]); Schmidt and Steingress (2019^[97]); (OECD, 2022^[98])).¹⁵

The relevance of these mechanisms extends beyond cost reduction alone. As regulatory requirements evolve, the ability to rely on trusted evidence generated elsewhere gains importance for managing complex compliance ecosystems without systematically reproducing assessments at the border or in the importing market (Box 5.1). This is especially relevant for key sectors characterised by complex regulatory requirements, cross-border supply chains and high levels of import dependency, such as pharmaceuticals and medical devices, chemicals, batteries, and certain advanced manufacturing inputs. Mutual recognition is not the only solution to emerging traceability challenges, nor does recognition of conformity assessment results necessarily imply acceptance for border purposes. It could nevertheless provide an established regulatory infrastructure for building confidence in foreign assessments and the actors that perform them, offering useful insights into how compliance can be simplified as the information and verification demands associated with trade continue to evolve.

Box 5.1. The role of International Regulatory Co-operation (IRC) tools such as MRIs in bridging standards and market access

The factors below explain the gaps in bridging standards and market access, and illustrate the role of IRC tools such as MRIs in addressing constraints:

- International standards alone do not guarantee regulatory acceptance. Although many economies base their requirements on the same international standards, they often reference different versions, introduce national adaptations, or embed those standards differently in domestic regulatory frameworks. Mutual recognition creates a legal bridge that enables regulators to rely on conformity assessment results issued by recognised bodies operating under agreed competence and trust frameworks.
- Conformity assessment is not harmonised by default – the “what” (the standard) might match, but the “how” (testing modules, sampling plans, surveillance intensity, assurance levels) often differs. Mutual recognition specifies which bodies are recognised, how competence is verified, and which results must be accepted, reducing duplicative testing.
- Divergent risk tolerance and regulatory objectives – jurisdictions can assign different risk classes or require extra safeguards under the same standard. MRIs tailor scope, carve-outs, and safeguard clauses to align outcomes while respecting domestic risk preferences.
- Interpretation and implementation gaps – test methods, tolerances, and guidance notes can be read differently. Mutual recognition introduces joint committees, procedures for resolving interpretation issues, and update mechanisms when standards or guidance change.
- Enforcement, liability, and market surveillance – trust hinges on how each side supervises CABs, handles complaints, recalls, and sanctions. Mutual recognition hard-wires information-sharing, audit rights, suspension/withdrawal, and post-market co-operation, which standards alone do not provide.
- Coverage gaps in emerging areas – standards may lag on software, cybersecurity, and AI lifecycle controls (e.g., updates, data governance, human oversight). Mutual recognition can

¹⁵ The literature has focused primarily on estimating trade gains among participating jurisdictions, while comparatively less attention has been paid to transitional costs and exclusion effects affecting non-participants (OECD, 2026 forthcoming^[93]).

require additional process controls, documentation, and incident reporting to ensure ongoing safety beyond initial type approval.

- Quality infrastructure asymmetries – where accreditation systems vary in maturity, mutual recognition can condition acceptance on peer evaluations, witnessed assessments, and capacity-building, creating confidence that competence is genuinely equivalent.

Source: (OECD, 2026 forthcoming^[93]).

The connection between MRIs and traceability lies in the recognition and use of compliance-related information across jurisdictions. Traceability systems generate and structure information about products and supply chains, while MRIs help determine whether the certificates, test results, audits, conformity assessments or other evidence derived from that information can be accepted by authorities in another jurisdiction. Without such recognition, firms may need to repeat testing, verification or certification processes, increasing costs and administrative burdens despite having already generated the required information. MRIs can help reduce these frictions by creating mechanisms through which authorities can rely on recognised conformity assessment results and other compliance-related evidence generated elsewhere. Both therefore depend on robust documentation, trusted verification arrangements and effective procedures for accepting externally generated information within regulatory and administrative processes, including at the border where relevant. In practice, they also face similar challenges, particularly in relation to interoperability of data systems and co-ordination among authorities (OECD, 2026 forthcoming^[93]).

5.2. Mapping mutual recognition instruments

Mutual recognition provides one type of established approach for building trust in regulatory evidence generated across jurisdictions. In broad terms, recognition can concern either regulatory requirements themselves, or the institutions and processes used to demonstrate compliance. The latter is the most common form identified in the OECD mapping of MRIs and is the focus of this analysis. It enables authorities and other actors to rely, under defined conditions, on the competence and outputs of foreign regulators, accreditation bodies and conformity assessment bodies (CABs), including testing laboratories, certification bodies and inspection bodies. The trust underpinning such arrangements is often supported by accreditation systems, peer evaluations and oversight mechanisms that provide confidence in the competence and integrity of recognised bodies. By supporting confidence in assessments undertaken elsewhere, these arrangements can reduce the need to reproduce testing, inspection or certification in each destination market while preserving the importing economy's regulatory requirements (OECD, 2026 forthcoming^[93]).

An important distinction concerns the relationship between mutual recognition and market access. In some jurisdictions, recognised foreign conformity assessment results constitute one compliance pathway among several. Firms may demonstrate compliance either through domestic conformity assessment procedures or through recognised foreign results under an MRI. In these situations, mutual recognition primarily acts as a trade facilitation mechanism by reducing the cost and duplication associated with demonstrating compliance. In other cases, however, access to simplified procedures, digital documentation channels or recognised conformity assessment outcomes may only cover partners in the context of an MRI. Where no alternative recognition pathway is in place, the absence of an MRI may in practice require exporters to rely on more burdensome procedures until a government-to-government recognition arrangement is concluded (Correia de Brito, Kauffmann and Pelkmans (2016^[92]); OECD (2026 forthcoming^[93])).

A mapping of MRIs (OECD, 2026 forthcoming^[93]) up to 2024 provides an updated picture of how these tools have developed across regulatory and sectoral settings. The mapping identifies 112 intergovernmental agreements and transnational arrangements in force in 2024 that contain sufficiently

precise and operational provisions for mutual recognition and co-operation on conformity assessment.¹⁶ The repository focuses on instruments that go beyond general commitments to co-operate and instead establish identifiable mechanisms through which recognition can operate in practice. This provides a basis for examining not only the formal scope of mutual recognition, but also the actors, institutional arrangements and operational mechanisms that underpin regulatory trust across borders (OECD, 2026 forthcoming^[93]).

The mapping identifies three main, complementary layers of mutual recognition.

1. Intergovernmental agreements – including stand-alone bilateral or multi-party mutual recognition agreements and specific provisions embedded in trade agreements or common market frameworks – can create obligations for economies and their authorities to accept foreign conformity assessment results within defined scopes.
2. Transnational arrangements among accreditation bodies use common criteria, peer evaluation and related mechanisms to establish confidence that accredited CABs across participating jurisdictions possess comparable levels of competence.
3. Arrangements among CABs themselves can enable testing, inspection or certification activities to be recognised, shared or subcontracted across borders.

These layers differ in their legal effects and proximity to border procedures: transnational arrangements do not in themselves oblige customs or regulators to accept foreign results for market access, but they can provide an important foundation of confidence on which such acceptance may rely. In this sense, accreditation arrangements and the broader quality infrastructure often function as an intermediary layer connecting technical competence with regulatory recognition.

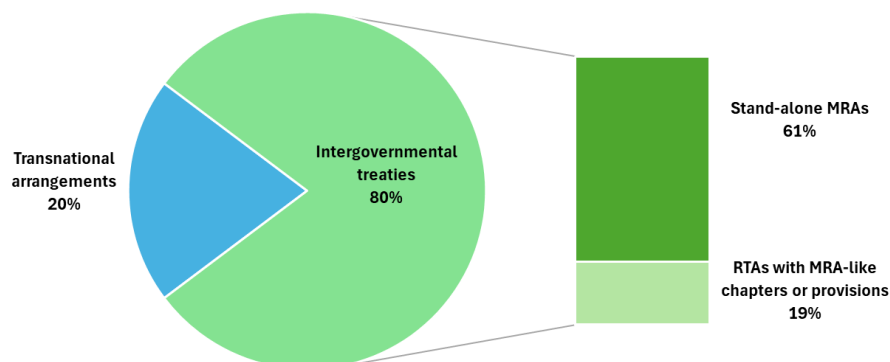
This layered architecture is significant from a traceability perspective. The analysis in earlier chapters has shown that emerging compliance requirements can depend on information generated by multiple actors across supply chains and on evidence that cannot be directly established through physical inspection at the border. Mutual recognition demonstrates that regulatory systems already rely on distributed arrangements for establishing confidence in actors and assessments beyond the importing jurisdiction. Governments, regulators, accreditation bodies, laboratories, and certification and inspection bodies can perform distinct but connected functions within a broader compliance ecosystem. The relevance of this experience lies not in treating mutual recognition as a traceability tool in itself, but in showing how trust in externally generated evidence can be organised across institutional layers – a question likely to become important as traceability-related requirements expand.

The use of these instruments has accumulated over the past three decades, with notable waves of adoption in the early 2000s and again after 2018. Intergovernmental instruments predominate, accounting for around 80% of the instruments identified, while transnational arrangements among accreditation and conformity assessment bodies account for the remainder (Figure 5.1). Bilateral instruments remain the most common, but multi-party arrangements can extend recognition infrastructures across much broader networks. This is particularly evident in transnational accreditation frameworks, whose reach can span large and diverse groups of jurisdictions. Participation in intergovernmental instruments remains concentrated among high-income economies, but the landscape is gradually broadening, including through greater participation by governments in Asia-Pacific, as well as the Americas and several middle-income economies. Transnational arrangements display a more diverse participation pattern, suggesting an additional pathway for extending regulatory trust across economies with differing levels of institutional and regulatory development (OECD, 2026 forthcoming^[93]).

¹⁶ (OECD, 2026 forthcoming^[93]) provides further details on the analytical criteria for the inclusion of MRIs in the mapping. The mapping draws on publicly available sources and inputs from OECD members. The MRIs covered include both OECD members and economies outside the OECD area and instruments that entered in force up to 2024.

Figure 5.1. Intergovernmental treaties were the most common type of MRI in 2024

Share (%) in MRIs identified

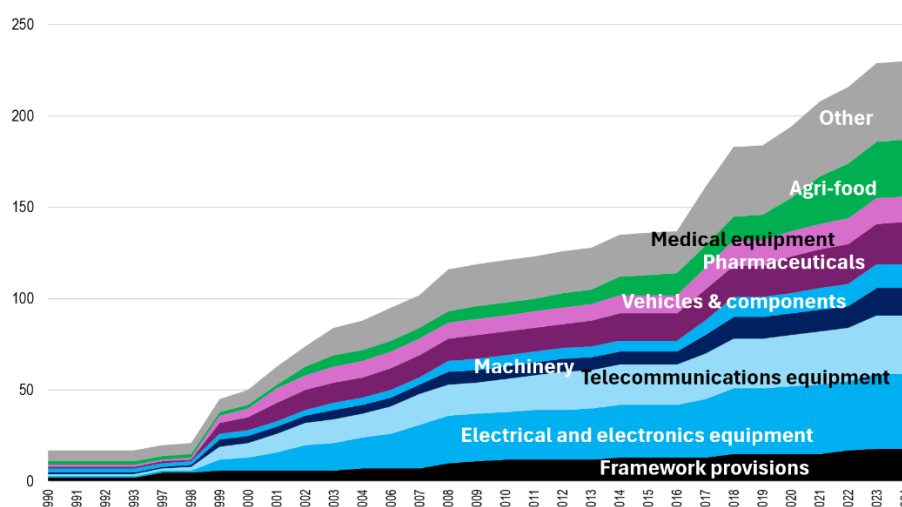


Source: (OECD, 2026 forthcoming^[93]).

Mutual recognition also operates across a wide range of regulatory and sectoral contexts. Some instruments provide broad frameworks for recognising testing, inspection or accreditation capabilities across multiple areas, while others target specific regulatory functions such as Good Manufacturing Practice, Good Laboratory Practice, electromagnetic compatibility or organic certification. Around half of the mapped instruments focus on a single sector, while approximately one third cover multiple sectors, with multi-sectoral approaches expanding particularly since the latter half of the 2010s. Electrical and electronic goods, telecommunications equipment, agri-food and pharmaceuticals are among the most frequently covered sectors, followed by machinery, medical equipment, vehicles and vehicle components, and laboratory equipment (Figure 5.2). Many of these sectors combine intensive conformity assessment needs with complex international supply chains and strategic relevance for resilience and economic security (OECD, 2026 forthcoming^[93]).

Figure 5.2. Certain sectors account for a large share of OECD MRIs

Number of MRIs covering a specific sector by year, 1990-2024



Note: The figure shows the stock by year in the number of agreements for each type of MRI. An MRI can cover one or multiple sectors.

Source: (OECD, 2026 forthcoming^[93]).

The scale of trade potentially associated with these arrangements is substantial. While allowing for the limitations inherent in mapping regulatory instruments to goods classifications, MRIs appear to be potentially relevant for one-third of global exports¹⁷ in mapped sectors and approximately one-fifth of global merchandise trade, equivalent to about USD 4.8 trillion (Table 5.1). These estimates suggest that arrangements for recognising and relying on foreign regulatory evidence have the potential to influence trade across a substantial share of international merchandise trade. They already operate across significant trade flows and in sectors where regulatory compliance is particularly consequential. As traceability-related requirements increase the volume and complexity of evidence that may need to accompany goods across supply chains, this existing architecture offers a pertinent foundation for considering how trust can be extended without requiring each actor or jurisdiction to reproduce every underlying assessment (OECD, 2026 forthcoming^[93]).

Table 5.1. A large volume of trade potentially falls within the scope of MRIs

Selected sectors across identified MRIs, USD billion in 2024

Sector	Value of exports that potentially fall within the scope of MRIs	Total global exports in the selected sectors	Share of exports that potentially fall within the scope of MRIs in total global exports (%)	Total trade between OECD economies in the selected sectors	Total trade between OECD and non-OECD economies in the selected sectors
Chemical products	1 031	2 305.7	44.7	1 313.1	662.9
Construction materials and equipment	11.4	442.8	2.6	215.6	127.2
Cosmetics	56.9	153.4	37.1	84.0	51.9
Distilled spirits	1.9	40.9	4.6	25.9	10.7
Electrical and electronics equipment	1 523	4 177.3	36.5	1 019.1	1 828.2
Entertainment equipment	3.3	213.2	1.5	66.0	109.0
Feed additives	24	73.0	32.9	38.1	24.1
Food additives	75	193.4	38.8	96.9	64.4
Laboratory equipment	125	262.8	47.6	136.8	97.1
Machinery	1 123.7	2 739.4	41	1 173.2	1 057.6
Marine equipment	47.2	174.1	27.1	47.1	76.2

¹⁷ This does not represent the value of trade actually utilising MRIs in place now, it represents the potential share that could be covered. Approximately 32.1% of global exports in the selected sectors potentially fall within the scope of MRIs. This aggregate share is calculated by dividing the total value of exports potentially covered by MRIs by total global exports across all selected sectors. Table 5.1 also reports sector-level shares, highlighting substantial variation in the potential coverage of MRIs across sectors.

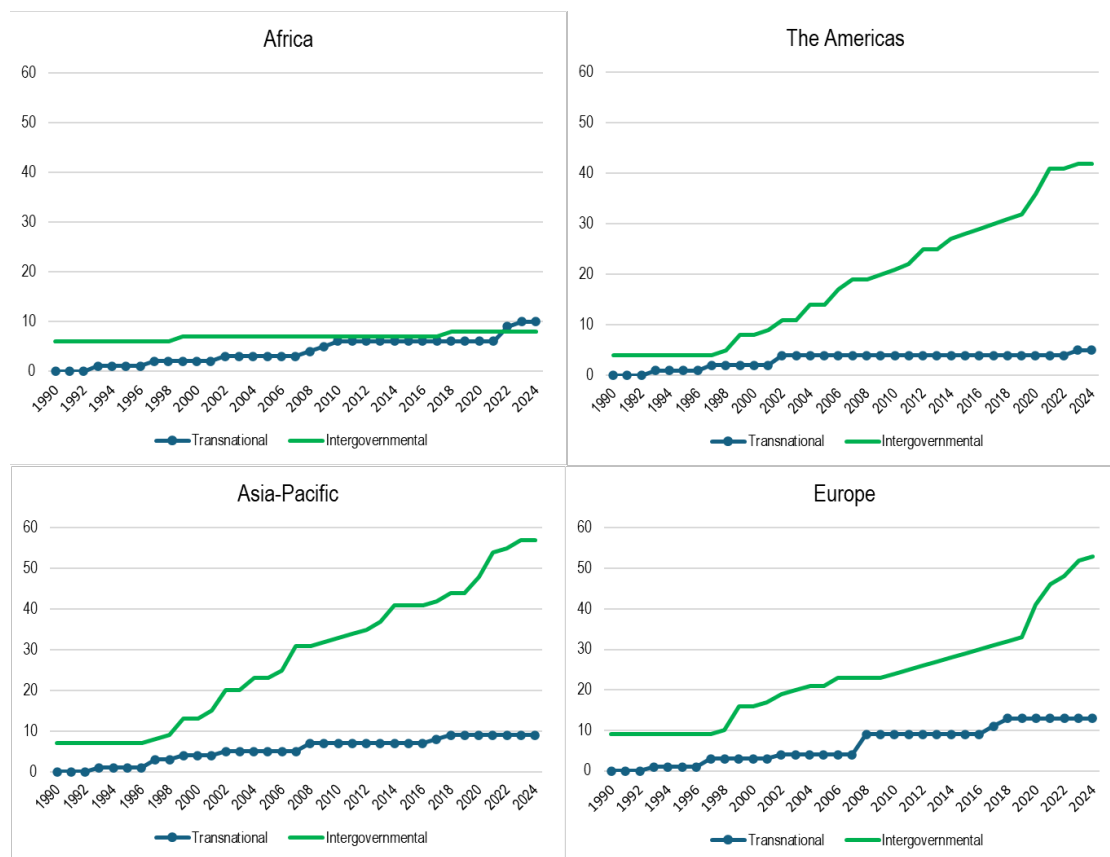
Medical devices	11.4	383.3	3	241.7	118.9
Pharmaceuticals	280.4	925.4	30.3	684.5	204.1
Telecommunications equipment	130	914.0	14.2	217.9	435.9
Toys	0.3	62.4	0.5	13.2	38.1
Vehicles and vehicle components	340.3	1 862.8	18.3	1 221.9	448.1

Note: Sectoral trade values are based on an illustrative, best-effort HS6 mapping to the descriptions of sectors included in MRIs. The number of distinct HS6 codes covered by each aggregate sector is: chemical products, 923 across HS 28 - 38; construction materials and equipment, 199 across HS 25, 32, 39, 44, 68, 69, 70, 73, 76, 84 and 94; cosmetics, 23 across HS 33 - 34; distilled spirits, 7 in HS 22; electric and electronic equipment, 322 across HS 84 - 85; entertainment equipment, 40 across HS 85 and 95; feed additives, 17 across HS 23, 29 and 35; food additives, 38 across HS 13, 21, 29, 32, 33, 35 and 38; laboratory equipment, 47 across HS 38, 70, 84 and 90; machinery, 538 in HS 84; marine equipment, 37 across HS 63, 84, 85, 89 and 90; medical devices, 47 across HS 30, 38, 90 and 94; pharmaceuticals, 89 across HS 29 - 30; telecommunications equipment, 37 across HS 85 and 90; toys, 1 in HS 95; tractors, 12 in HS 87; vehicles and vehicle components, 98 in HS 87. Global exports include those potentially covered by MRIs.

Source: (OECD, 2026 forthcoming^[93]).

MRIs are increasingly being used across regions. More than half (57%) of all instruments in the repository connect partners from different regions, while recent growth has been driven primarily by intergovernmental arrangements. These have expanded steadily in Europe, Asia-Pacific and the Americas since the late 1990s and accelerated further in recent years. Although Europe has been a key hub for intergovernmental MRAs throughout the period covered, the repository indicates that North America and the Asia-Pacific region now account for a growing share of these agreements, alongside recent engagement by several lower- and middle-income economies, including India, and countries that are part of the Association of Southeast Asian Nations (ASEAN). By contrast, transnational MRIs remain more limited and flatter over time, although recent increases in Europe and Africa suggest some broadening of this model (Figure 5.3).

Figure 5.3. Intergovernmental MRIs are growing fastest, especially in Europe, Asia-Pacific and the Americas



Note: Cumulative stock of instruments in force by year. Instruments are counted once in each region represented among their parties; cross-regional instruments therefore appear in more than one regional category, and regional totals are not additive. The EU is counted as one European jurisdiction. The Americas include economies in North, Central and South America.

Source: (OECD, 2026 forthcoming^[93]).

5.3. Bridging mutual recognition and border processes

Formal recognition of foreign conformity assessment results does not in itself ensure that goods will face simpler or faster procedures at the border. The extent to which recognised conformity assessment results are used at the border varies across regulatory systems. In some jurisdictions, compliance is demonstrated primarily through economic operator responsibility and market-surveillance mechanisms, while in others conformity assessment documentation forms part of import verification procedures. The clearance of regulated products can depend on certificates of conformity, test reports, technical approvals or other evidence demonstrating compliance with importing-market requirements. For mutual recognition to generate practical trade facilitation gains, customs and other relevant border agencies therefore need to be able to identify recognised evidence, understand its scope and use it within applicable clearance and control processes. Yet the OECD mapping suggests that this operational connection remains limited: few mutual recognition instruments explicitly address customs or border procedures, even where they contain detailed provisions on conformity assessment and regulatory co-operation (OECD, 2026 forthcoming^[93]).

The strength of this connection varies across instruments and sectors. Some arrangements establish direct links between recognition and the documentation used in trade procedures. Agreements covering organic products, for example, can require recognised certificates to accompany imported consignments, while

selected transport-related frameworks specify documentation, approvals or markings relevant to inspections during transport or at entry. In many other sectors, however, the border implications of mutual recognition remain largely implicit. Instruments covering areas such as electronics, vehicle type approval, Good Manufacturing Practice inspections or metrology may establish recognition of conformity assessment results without specifying how customs or market surveillance authorities should use those results in import procedures. Their practical effect can therefore depend on domestic administrative arrangements and co-ordination between regulatory and border authorities.

This points to a broader institutional gap. Mutual recognition and trade facilitation reforms have often developed through different policy communities and operational channels: the former through regulators, accreditation systems and conformity assessment infrastructures, and the latter through customs and other border agencies. As a result, formal recognition may exist without being fully visible or readily usable within border management systems. Where conformity assessment documentation is verified at import, limited awareness of applicable instruments, products covered, recognised bodies or acceptable documentation can lead to requests for additional evidence or duplicative verification, potentially reducing the efficiency gains that recognition is intended to provide. The issue is therefore not only whether foreign evidence is formally recognised, but whether that recognition is translated into clear and usable instructions, information and procedures for the actors responsible for implementation.

The relationship between mutual recognition and trade facilitation is also not always straightforward. While recognition arrangements are generally intended to reduce compliance costs and administrative burdens, their practical effects depend on whether recognised foreign evidence supplements existing compliance options or becomes a prerequisite for accessing simplified procedures. In some regulatory settings, foreign firms may either comply through domestic procedures or rely on recognised foreign assessments, certificates or digital credentials. In such cases, mutual recognition expands the range of available compliance options and can reduce costs without constraining market access for firms from jurisdictions outside the arrangement (Correia de Brito, Kauffmann and Pelkmans, 2016^[92]). In some digital trade and paperless trade frameworks, the acceptance of electronic signatures, digital credentials or electronic documents may depend on the existence of recognition or interoperability arrangements between jurisdictions. Traders from jurisdictions without such arrangements may be required to continue using paper-based documentation, manual verification processes or additional certification requirements (UNCITRAL, 2019^[99]).¹⁸

Several established trade facilitation tools could potentially help strengthen this connection. Single Window environments and other interoperable platforms can provide channels for submitting recognised certificates, test reports or approvals and, where – technically feasible – validating them against relevant registries or information systems. Such integration can reduce reliance on manual verification and make recognition more visible within clearance processes. Existing practice nevertheless remains uneven. While some systems enable electronic validation of selected certificates or regulatory documents, in many cases conformity-related evidence continues to be processed separately or manually, limiting the operational integration of recognition arrangements with customs procedures.

Inter-agency co-operation is equally important because mutual recognition frequently involves responsibilities distributed across customs, sectoral regulators, market surveillance authorities, accreditation bodies and other parts of the quality infrastructure. Clear communication channels, shared protocols and defined responsibilities can help border agencies determine when recognised evidence is sufficient and when additional controls may be warranted. This can also support more coherent

¹⁸ The trade facilitation benefits associated with mutual recognition can therefore be linked to the scope and participation of recognition arrangements. While participating jurisdictions may reduce compliance costs and duplicative assessments, firms operating outside recognition frameworks may continue to face the costs associated with alternative conformity assessment and administrative procedures.

implementation where regulatory authorities hold the technical expertise needed to interpret conformity assessment results, while customs authorities manage the transaction-level information and controls associated with the movement of goods. In this sense, effective border facilitation depends on connecting regulatory trust established through mutual recognition with the institutional arrangements through which that trust can be acted upon.

Risk management provides a further avenue for operationalising recognition. Information that a product has been assessed by a recognised CAB, or that a certificate originates from an accredited body within an established recognition framework, could inform the differentiation of controls where consistent with the applicable regulatory framework and risk profile. This may allow authorities to focus attention on higher-risk consignments, products or operators while avoiding unnecessary repetition of checks on evidence already subject to trusted assessment processes. The value of recognition for risk management, however, depends on border agencies having timely access to reliable information on the scope and status of recognised bodies, certificates and arrangements.

Finally, documentary simplification is central to ensuring that reductions in duplicative conformity assessment translate into reductions in administrative burdens. The benefits of recognition can be weakened if traders are still required to submit multiple or overlapping documents despite the acceptance of foreign test results or certificates. Clarifying which recognised evidence is sufficient for border or market-entry purposes, aligning documentary requirements with the scope of recognition instruments and, where appropriate, standardising formats can help translate regulatory co-operation into more tangible facilitation gains (OECD, 2026 forthcoming^[93]).

These findings resonate with the broader implementation challenges identified for traceability-related requirements in earlier chapters. In both contexts, compliance depends more on information or evidence generated beyond the border and by a wider set of actors, while customs and other border agencies need mechanisms to determine when and how that evidence can be relied upon. The experience of mutual recognition shows that establishing trust upstream is only one part of the implementation challenge: facilitation gains also depend on making trusted evidence visible, accessible and operationally usable within border processes.¹⁹ Stronger links with Single Windows, risk management, inter-agency co-operation and streamlined documentary requirements can therefore help bridge the gap between formal recognition and practical implementation.

5.4. How institutional architecture and awareness shape operational implementation

The practical functioning of mutual recognition depends on the institutional architecture that sustains confidence over time. Recognition is rarely a one-off decision to accept foreign conformity assessment results. Regulatory requirements evolve, standards and assessment methods change, and the competence or status of recognised bodies may need to be monitored. Effective implementation therefore requires mechanisms to maintain confidence between participating authorities and institutions, manage changes in scope or requirements, address implementation issues and ensure that recognition continues to operate as intended.

The MRIs mapping (OECD, 2026 forthcoming^[93]) shows that many instruments establish dedicated governance and oversight mechanisms for these purposes. Around two-thirds provide for joint committees or similar bodies responsible for overseeing implementation, facilitating dialogue and addressing emerging

¹⁹ At the same time, the ultimate effectiveness of recognition depends on how recognised evidence is incorporated into domestic regulatory and compliance systems more broadly, including through market surveillance and placing-on-the-market arrangements.

issues. Depending on the instrument, these mechanisms can support functions such as reviewing the operation of recognition arrangements, exchanging information on regulatory developments, resolving technical questions and adapting implementation as requirements evolve. Their role is particularly important where recognition connects multiple authorities or jurisdictions and where differences in regulatory systems need to be managed without requiring full harmonisation.

Information sharing provides a complementary layer of this architecture. Some instruments establish specific mechanisms for sharing information between authorities or with relevant stakeholders, although explicit provisions of this kind remain relatively limited, appearing in around 13% of mapped instruments. Such mechanisms can support notification of regulatory changes, communication on the designation, suspension or withdrawal of recognised bodies, and the transmission of information relevant to implementation or enforcement. More broadly, timely information sharing can help ensure that recognition decisions remain aligned with changes in regulatory requirements and that authorities have access to the information needed to determine whether particular conformity assessment results can continue to be relied upon.

International standards also play an important role in sustaining confidence across different regulatory and institutional settings. Around one-third of mapped instruments promote, require or otherwise refer to the use or joint development of international standards. Common standards can provide shared reference points for testing, inspection, certification and accreditation, reducing uncertainty over the methods and competencies underpinning conformity assessment results. This role is particularly visible in transnational accreditation arrangements, where common criteria and peer-evaluation processes help establish confidence in the competence of accreditation bodies and, through them, the CABs operating within participating systems. International standards therefore contribute to an infrastructure in which trust can extend across institutional layers without requiring participating economies to operate identical regulatory systems.

These governance mechanisms also illustrate that regulatory trust depends on more than the formal recognition of a certificate or test result. Confidence rests on a broader chain of institutions and processes: the body that generated the assessment, the accreditation or oversight mechanisms supporting its competence, the standards and methodologies applied, and the authorities or arrangements through which its results are recognised. Weakness or uncertainty at any point in this chain can affect the usability of the resulting evidence. From this perspective, the institutional architecture surrounding mutual recognition performs an important function by making the provenance, competence and oversight underpinning regulatory evidence more credible and predictable.

However, the existence of this architecture does not ensure that relevant information is readily accessible to those who need to use it. Information on mutual recognition instruments remains fragmented across international, regional and national sources, and can be difficult to navigate. Traders may struggle to determine whether an instrument applies to a particular product, market or conformity assessment procedure; which bodies are recognised; and which certificates, reports or approvals can be used. Border agencies may face similar challenges where information on recognition arrangements is not integrated into operational guidance or border management systems. Limited awareness can therefore weaken the practical value of recognition even where robust institutional arrangements exist.

Improving awareness requires more than publishing the legal text of an instrument. Operational use depends on accessible and up-to-date information on product and sectoral scope, participating jurisdictions, applicable conformity assessment procedures, recognised or designated bodies, accepted certificates and relevant changes in status. Greater coherence across existing repositories and clearer links between recognition information, regulatory guidance and border procedures could help firms identify applicable requirements and enable authorities to use recognised evidence more consistently. Digital registries and other information tools may also support implementation where they allow users to verify the

status and scope of recognised bodies or evidence, although their value ultimately depends on the quality, accessibility and maintenance of the underlying information.

These findings have broader relevance for traceability-related requirements. As earlier chapters have indicated, demonstrating compliance ever more depends on information generated, transmitted and verified by multiple public and private actors across supply chains. The mutual recognition experience suggests that trust in such information cannot rest on the data alone: it also depends on confidence in who generated, assessed or verified it, according to which methods or standards, under what oversight arrangements, and whether those actors and processes remain recognised and reliable over time. Joint governance mechanisms, information sharing, common standards and transparent information on the status and competence of relevant actors therefore offer useful lessons for the wider compliance ecosystems emerging around traceability-related requirements.

The broader implication is that awareness and institutional architecture are complementary. Governance mechanisms can establish and maintain trust between participating systems, but awareness is needed to make that trust visible and usable by firms, regulators and border agencies. As compliance requirements become more information-intensive and involve a wider range of specialised actors, strengthening both dimensions will be important for translating trusted evidence into practical simplification at the border.

5.5. Where traceability demands meet existing recognition infrastructures

Several of the sectors discussed earlier in the report as facing growing traceability demands are also sectors in which mutual recognition arrangements already play an important role. Examining this overlap can provide insights into how existing recognition infrastructures may support the implementation of information-intensive compliance requirements.

The relevance of mutual recognition may become particularly pronounced in sectors where several trends intersect: i.e., conformity assessment requirements are extensive, supply chains are complex and internationally fragmented, traceability demands are increasing, and disruptions can have wider economic or strategic consequences. In such settings, firms and authorities may need to manage growing volumes of product, production and supply chain information while maintaining confidence in evidence generated by specialised actors across jurisdictions. The challenge is therefore not only to obtain relevant information, but also to determine when assessments, certifications or verification processes undertaken elsewhere can be relied upon without unnecessary duplication.

The OECD mapping suggests that mutual recognition already has a significant presence in several sectors with these characteristics. Electrical and electronics equipment, telecommunications, pharmaceuticals, medical equipment, machinery and selected agri-food products feature prominently across mapped instruments, while broader arrangements covering testing, certification and accreditation can extend across multiple sectors (OECD, 2026 forthcoming^[93]). Many of these sectors are also characterised by internationally fragmented production networks and significant regulatory requirements, in addition to be frequently identified in national and international discussions relating to economic security, resilience and supply chain diversification (OECD, 2025^[5]). The examples discussed below are therefore illustrative rather than exhaustive.

This overlap does not imply that existing MRIs were designed to address emerging traceability requirements. It does, however, suggest that some of the institutional relationships, conformity assessment infrastructures and trust mechanisms that may become more important for implementing traceability-related requirements are already present in these sectors.

Critical minerals illustrate one potential area of operational integration. Critical minerals and their processed forms are indispensable inputs into the energy transition, digitalisation, advanced manufacturing and defence industries (OECD, 2026 forthcoming^[90]). Their supply chains can span extraction, processing,

refining, component production, assembly, use and end-of-life stages across multiple jurisdictions, while upstream production may involve heterogeneous operators and, in some contexts, artisanal or informal activity. Emerging requirements can increase demand for information on origin, production conditions, environmental performance, recycled content or other attributes across these stages (a trend reflected in recent G7 traceability initiatives for critical minerals described in Box 5.2). At the same time, demonstrating compliance may require testing, certification, auditing or verification by specialised actors. The experience of mutual recognition is relevant here not because existing instruments necessarily provide recognition of all such traceability information, but because they offer established approaches for building confidence in the competence of bodies generating or assessing evidence across jurisdictions. This may gain prominence where critical supply chains depend on avoiding unnecessary repetition of assessments while maintaining credible assurance.

Box 5.2. International co-operation and standards-based approaches to critical minerals traceability

This box builds on the discussion in Box 1.3, which examined how traceability is being implemented across critical mineral supply chains and the practical challenges faced by firms. Here, the focus shifts to recent international efforts to strengthen interoperability, transparency and trust through co-ordinated initiatives.

Recent G7 work on critical minerals places traceability at the centre of efforts to build more resilient, responsible and diversified supply chains. The 2025 *G7 Roadmap to Promote Standards-based Markets for Critical Minerals* identifies transparency, traceability, sustainable mining practices, trustworthiness and reliability as core principles for critical minerals markets. It calls for stronger traceability and transparency requirements in strategic supply chains, interoperable digital infrastructure, digital credentials and product passport compatibility, as well as pilot studies to test data collection needs and interoperability between G7 members and partners.

The 2026 *G7 Leaders' Declaration on Securing Supply Chains for Critical Minerals* further strengthens this agenda by linking traceability to supply chain security, high standards, market transparency and action against illegal trafficking. It commits G7 members to work towards harmonised and interoperable mechanisms for tracing the origin of critical minerals, starting with lithium and nickel, with the intention to extend pilots to five additional minerals each year, with particular attention to rare earths.

These initiatives illustrate how traceability in critical minerals is moving beyond firm-level due diligence towards a broader policy infrastructure for market structuring, resilience and compliance. They also highlight key implementation challenges: avoiding fragmented systems, limiting excessive cost burdens, ensuring interoperability, protecting confidential data, and aligning traceability tools with standards, certification and conformity assessment frameworks.

A forthcoming OECD report highlights that around one-fifth of a total of 54 bilateral and plurilateral critical minerals agreements signed or in force between 2019 and February 2026 include transparency and governance issues relating to due diligence and traceability. Labour, by contrast, while also a uniquely important topic in relation to critical minerals, is not included as frequently (OECD, 2026 forthcoming^[100]).

Source: Government of Canada (2025), [Roadmap to Promote Standards-based Markets for Critical Minerals](#); G7 France (2026), [G7 leaders' declaration on securing supply chains for critical minerals](#); (OECD, 2026 forthcoming^[100]).

Pharmaceuticals and medical products can provide a second illustration. These sectors combine extensive regulatory oversight with highly internationalised supply chains and significant consequences from

disruption.²⁰ Existing recognition arrangements already cover areas such as Good Manufacturing Practice inspections and selected conformity assessment procedures, demonstrating how authorities can establish confidence in assessments performed elsewhere while retaining their own regulatory responsibilities. Traceability needs in these sectors can extend across manufacturing sites, batches, distribution networks and supply chain actors. The relevant lesson is therefore not that existing recognition arrangements resolve all traceability challenges, but that institutional mechanisms for relying on foreign inspections, competent authorities and conformity assessment processes can reduce duplication and offer practical experience in organising trust across borders.

Electrical and electronics equipment and related technologies are another area where traceability and trade facilitation aspects may intersect. These sectors are among the most frequently covered by existing mutual recognition instruments, reflecting long-standing needs to manage testing and certification for areas such as electrical safety, electromagnetic compatibility and telecommunications equipment. At the same time, complex multi-tier supply chains and growing attention to environmental performance, circularity, product life cycles and the sourcing of key inputs can increase demands for traceability-related information. Existing recognition infrastructures may therefore provide useful foundations for considering how confidence in specialised assessments can be maintained as the range of information associated with products expands. This may be particularly relevant where multiple assessments apply to the same product and where duplicative testing or verification could increase costs or delay market access.

Selected agri-food value chains help illustrate a somewhat different form of potential integration. Traceability has long played an important role in food safety, animal and plant health, origin and organic production, while certificates and other official assurances frequently accompany cross-border movements. Mutual recognition and equivalence arrangements in areas such as organic products demonstrate that recognition can, in some cases, be linked more directly to documentation used in trade and border procedures. As requirements relating to deforestation, land use, environmental performance or production practices evolve, these sectors may offer particularly useful experience in connecting upstream information, recognised assurance mechanisms and transaction-level documentation (as illustrated by the case of traceability initiatives in Colombia's cocoa sector in Box 5.3). They also illustrate the importance of ensuring that new information demands remain workable for smaller producers and firms operating in fragmented supply chains.

Box 5.3. Traceability in agri-food value chains: The case of Colombian cocoa

OECD analysis of 14 environmental sustainability initiatives in Colombia's cocoa sector shows that traceability has become a systemic priority, driven by both domestic sustainability objectives and evolving international market requirements. Eleven of the 14 initiatives reviewed explicitly refer to traceability, although only 3 have developed or are actively implementing dedicated traceability tools. These tools include GPS and polygon farm mapping, traceability platforms, and systems integrating farm-level biodiversity and soil information. Across initiatives, traceability is primarily used to monitor land-use change, verify deforestation-free sourcing, and support alignment with due diligence frameworks such as the EU Deforestation Regulation.

The Colombian case also illustrates that traceability is not only a technical issue. Digital platforms can link farm-level data, geo-coordinates, deforestation alerts, transaction records, certification and

²⁰ Pharmaceuticals and medical products encompass a highly diverse range of goods with differing regulatory, technological and supply chain characteristics. Medical products can range, for instance, from relatively simple, low-risk items to highly sophisticated equipment and technologies. The discussion here is intended to illustrate broad sectoral trends relating to traceability, conformity assessment and regulatory trust rather than to imply uniform conditions across all products within these sectors.

compliance documentation, but implementation remains uneven. Smallholders, especially in remote or post-conflict areas, may face barriers linked to connectivity, digital literacy, finance and technical assistance. The analysis therefore highlights the importance of combining digital tools with field-based support, co-operative engagement, co-financing and institutional co-ordination. It also points to risks of fragmentation, as multiple buyer- or importer-driven systems can increase costs for producers and co-operatives.

Source: (Deuss, Du Bois and Angulo, 2026^[101]).

Across these sectors, the potential point of integration lies in a common implementation challenge. Traceability can establish links between a good and information concerning its origin, production, processing or movement through the supply chain; conformity assessment and related assurance mechanisms can help establish confidence in particular claims, attributes or processes; and recognition can, under defined conditions, enable actors in one jurisdiction to rely on assessments or competencies established elsewhere. Recent OECD work on Free Trade Zones (FTZs) similarly points to the importance of combining traceability, due diligence, verification and governance mechanisms to strengthen trust in supply chain information (OECD, 2025^[102]). These functions remain distinct and should not be conflated. Yet as compliance advances to depend more on complex information generated across jurisdictions, their interaction may grow in importance.

This interaction also highlights the potential value of network effects. Recognition arrangements that connect multiple jurisdictions, accreditation bodies or conformity assessment bodies can extend the reach of trusted assessment infrastructures beyond individual bilateral relationships. In critical sectors characterised by concentrated production, complex supplier networks or dependencies on a limited number of markets, broader recognition networks may help diversify the locations from which trusted evidence can be generated and reduce the need to recreate assessment capacity in every market. The diverse participation observed in transnational accreditation arrangements may be particularly relevant in this respect, although further evidence is needed on how such networks interact in practice with emerging traceability-related requirements and border procedures.

At the same time, important limits remain. Recognition of conformity assessment results does not necessarily imply recognition of underlying regulatory requirements, acceptance of traceability data for border purposes or equivalence between different methodologies. Emerging requirements may involve information – such as embedded carbon emissions, land-use history or conditions deep within supply chains – that differs substantially from the product testing and certification functions covered by many existing MRIs. Differences in methodologies, data quality, legal mandates, confidentiality rules and acceptable levels of assurance may therefore constrain the transferability of existing models. Any extension of recognition approaches to new compliance areas would need to reflect the specific risks, regulatory objectives and institutional capacities involved.

The experience of mutual recognition nevertheless offers relevant lessons for critical sectors facing growing traceability demands. It shows that confidence in evidence generated elsewhere can be supported through layered institutional arrangements involving governments, regulators, accreditation bodies and CABs; that common standards and peer-evaluation mechanisms can help sustain trust across jurisdictions; and that formal recognition generates the greatest facilitation benefits when it is transparent and operationally connected to border processes. Such benefits, however, are often realised first through domestic regulatory frameworks that recognise and give effect to foreign conformity assessment results, with border procedures representing only one possible implementation channel. These lessons suggest that, as traceability-related requirements evolve, policy attention could usefully focus not only on what information needs to be traced, but also on the infrastructure through which related evidence is generated, assessed, recognised and made usable for compliance.

From this perspective, mutual recognition emerges as a relevant – but not the only – component of a broader strategy for simplifying compliance in critical sectors. Its contribution is likely to be greatest where existing recognition infrastructures can complement, rather than substitute for, traceability systems; where the competence and oversight of relevant actors can be established with confidence; and where trusted evidence can be integrated into customs and other border management frameworks.

At the same time, the facilitation effects of mutual recognition depend on its design. Where recognition complements alternative compliance pathways, it can broaden access to trusted information and reduce costs without restricting participation. Where recognition becomes a prerequisite for access to specific procedures, digital channels or compliance mechanisms, benefits for participating jurisdictions may be accompanied by adjustment costs for firms in non-participating jurisdictions. Evaluating the net trade facilitation impact of MRIs therefore requires consideration of both the efficiencies created within recognition networks and the potential costs associated with negotiating, maintaining and expanding those networks over time.

6

Conclusions and forward-looking observations

This chapter synthesises the main findings of the report and outlines key considerations for the future. It highlights the importance of ensuring coherence between trade facilitation and traceability systems, strengthening digital readiness, and supporting effective and efficient compliance mechanisms. The chapter identifies areas for further analysis and co-operation, with a view to supporting resilient, transparent, and environmentally performing supply chains in an ever more complex global trade environment.

6.1. Preparing trade facilitation systems for new requirements

This report has examined how traceability is becoming more central to trade, not as a standalone policy objective, but as part of a broader shift in the way governments, firms and border authorities manage more complex requirements. Trade policy is becoming in practice more data intensive. Regulatory requirements linked to social and environmental performance, forced labour, responsible sourcing, circularity, product safety, supply chain resilience and economic security depend gradually more on information about how goods are produced, sourced, moved and verified and are also increasingly enforced at the border. The intersection between policy design and implementation in practice is therefore becoming key to trade facilitation systems.

A key lesson is that the design of new requirements cannot be separated from the systems that will implement them. Requirements that pursue legitimate policy objectives can create implementation challenges in practice if they are not translated into clear procedures, usable data requirements and operational processes at the border. Conversely, trade facilitation tools can help ensure that more complex requirements are implemented in ways that remain predictable, proportionate and efficient. The challenge is therefore not whether traceability should be strengthened, but how it can be embedded into trade processes without creating parallel systems, duplicative reporting obligations or avoidable delays.

A further lesson is that the next frontier lies in making technical interoperability work in practice. Much of the policy discussion on traceability has focused on regulatory interoperability: how authorities can understand, trust and, where appropriate, accept information, documents, certifications or verification results generated by other actors or jurisdictions. This remains essential. Trusted compliance mechanisms, including mutual recognition instruments (MRIs), can support this objective by providing frameworks through which authorities can rely on assessments and conformity assessment results generated elsewhere. However, the growing volume and granularity of traceability-related information also raise a more operational challenge: whether data systems, Single Windows, electronic documents, digital product identifiers and platforms are able to allow for the transmission, verification and reuse of information securely and efficiently. Without this technical layer, even well-designed regulatory co-operation arrangements may be difficult to implement at scale. Technical interoperability is therefore becoming a key condition for turning traceability requirements into workable border processes.

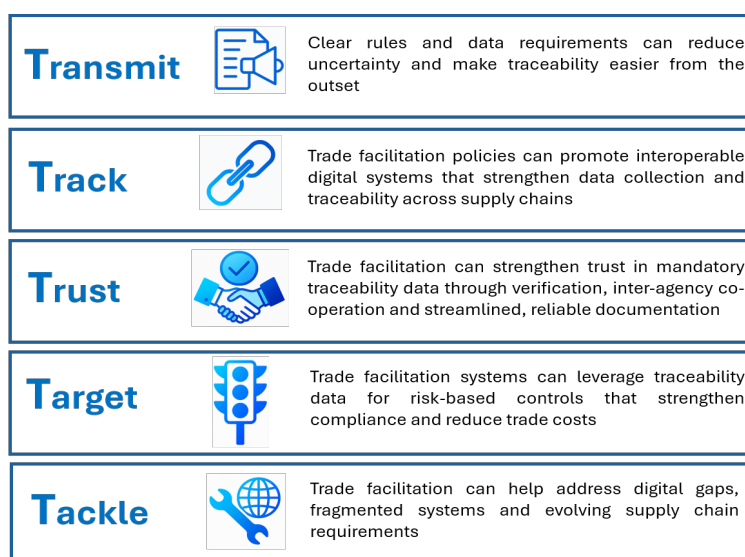
Customs authorities are at the forefront of this transformation, but they cannot manage it alone. Traceability-related requirements advance to involve environmental agencies, market surveillance authorities, standards bodies, conformity assessment institutions, sector regulators, certifiers and private assurance schemes. The quality infrastructure underpinning testing, inspection, certification, accreditation and standards is therefore becoming more closely connected to border processes. This makes inter-agency co-operation and trust in information central to implementation. The issue is no longer only how customs processes declarations, but how different authorities and actors can work together to assess risks, verify information and facilitate compliant trade.

6.2. Five pillars for enabling the operational integration between trade facilitation and traceability

The analysis presented in this report suggests that the operational integration between trade facilitation and traceability can be promoted through five complementary pillars: transmit, track, trust, target and tackle. Together, these “5Ts” provide an operational framework for integrating traceability information into trade facilitation systems and border processes (Figure 6.1).

- Governments and agencies need to **transmit** the right information by making trade-related rules, procedures and data requirements clear and accessible. Traceability can only support compliance if firms know what information is required, when it must be provided, in what format, to which authority and for what purpose.
- Systems then need to **track** products, materials and attributes across supply chains through better data collection, digitalisation and interoperability. This does not imply continuous monitoring of all goods by border authorities. It means that relevant information on origin, composition, production processes, movement, certifications or social and environmental characteristics should be capable of being linked to the goods presented at the border.
- Authorities and firms need to **trust** the information being shared. This can imply verification mechanisms, audit trails, accredited certifiers, conformity assessment bodies, reliable certified trader programmes and, where appropriate, mutual recognition and other arrangements that enable authorities to rely on assessments carried out elsewhere. Traceability information is only useful if relevant authorities can rely on its integrity, authenticity and relevance.
- Traceability information should help authorities **target** controls where risks are highest. More information should not automatically lead to more inspections. Its value lies in supporting smarter risk management, allowing authorities to focus on high-risk consignments, routes, products, firms or suppliers while reducing unnecessary checks for compliant trade.
- Overall, governments need to **tackle** the frictions that can prevent traceability from becoming trade facilitating. These may include uneven digital capacity, fragmented systems, data sharing challenges and constraints, confidentiality concerns, weak interoperability, limited co-ordination among agencies and capacity gaps among smaller firms and suppliers. Addressing these challenges requires proportionate approaches, phased implementation, practical guidance, international co-operation and a supportive policy environment for non-personal trade data.

Figure 6.1. The “5T” pillars of an integrated framework for trade facilitation and traceability



Source: Authors.

6.3. Key considerations

The “5T” pillars provide a useful basis for framing the report’s key considerations. Improving technical interoperability supports the ability to transmit and track information across supply chains and border systems. More strategic use of traceability-related information enhances authorities’ ability to trust information and target controls where risks are greatest. Stronger domestic and international co-operation underpins all five functions by enabling information, responsibilities and verification arrangements to operate effectively across institutions and jurisdictions while helping to tackle the frictions that can impede implementation.

A first consideration is therefore to improve technical interoperability and make greater use of existing trade facilitation tools to enable information to be reused across systems wherever appropriate. A key objective could be to make traceability data reusable. **This principle is equally relevant to excise-control systems. Where tax stamps, fiscal identifiers and traceability mechanisms coexist, governments should seek to avoid duplicate reporting and maximise data reuse across customs, tax and enforcement authorities.** The same information on a product, producer, facility, shipment or supply chain may be relevant to several regulations, border agencies and export markets. Where data can be submitted once and subsequently reused – subject to appropriate governance, confidentiality and access arrangements – it has the potential to support compliance with multiple requirements without imposing repeated data collection, verification and reporting costs.

At the same time, the value of traceability depends not only on data availability but also on the broader compliance and enforcement framework in which it operates. Measures such as licensing, due diligence, recordkeeping, audits and proportionate sanctions help ensure that supply-chain data can be used effectively to identify non-compliance, support investigations and strengthen deterrence.

Greater technical interoperability between public systems, private platforms and jurisdictions could therefore reduce burdens for firms and authorities while improving data quality, consistency and operational efficiency. Conversely, requiring similar information repeatedly in different formats risks multiplying compliance costs without necessarily strengthening enforcement. Rather than creating parallel reporting systems, future reforms could seek to build on existing digital infrastructure for trade facilitation so that information can flow efficiently across processes while remaining fit for different regulatory purposes.

A second consideration concerns a more strategic use of traceability-related information to strengthen risk management while preserving efficient border processes. As traceability-related requirements expand, more information should could support smarter, more targeted border management by helping authorities identify higher-risk consignments, products, operators and supply chains while facilitating compliant trade.

This consideration is particularly timely given the broad wave of customs and border reforms under way worldwide. Governments are modernising Single Windows, customs data environments, risk management systems and trusted trader programmes, while also reconsidering how border authorities contribute to supply chain resilience and economic security. These reforms provide an opportunity to integrate traceability-related information into existing trade facilitation systems rather than creating separate compliance structures. Digitalisation, automation and risk management can therefore help preserve the speed, predictability and proportionality of border procedures as regulatory requirements become more information intensive.

A third consideration is to deepen co-operation within governments, across border agencies and regulators, between public authorities and private actors, and across jurisdictions. Traceability-related requirements progressively involve customs authorities alongside environmental agencies, market surveillance bodies, standards organisations, conformity assessment institutions and sector regulators.

Effective implementation therefore depends on co-ordinated institutional arrangements and trusted information flows.

Domestically, greater co-operation can help align data requirements, clarify responsibilities and embed traceability-related information into Single Windows, risk management systems and other existing trade facilitation tools. Internationally, closer collaboration can reduce unnecessary duplication, improve compatibility between regulatory approaches and strengthen trust in information accompanying traded goods. Sectoral co-operation will also become important where requirements are technically complex and firms rely on standards, certification or conformity assessment bodies to generate and verify information.

6.4. Forward-looking observations

The importance of these issues is likely to increase. Requirements related to social and environmental performance, including those linked to NPR-PPMs, are becoming more prominent. Policies supporting a more circular economy will require additional information on product composition, reparability, reuse, recycling and waste status. Strategic sectors – including critical minerals, medical goods, advanced technology products and agri-food – are also likely to face growing traceability demands linked to supply continuity, product safety, responsible sourcing and economic security. For businesses, the ability to generate, manage and transmit reliable product and supply chain information will therefore become important for market access, supplier diversification, compliance planning and competitiveness, while border systems will need to process ever more granular and diverse information without compromising speed, predictability or proportionality.

Understanding the role of verification arrangements in practice will also become prominent. These arrangements may include verification by competent public authorities, accredited conformity assessment bodies, certification schemes, recognised assurance providers, audit-based systems, trusted trader arrangements, digital attestations or combinations of these approaches. At the same time, verification arrangements represent only one component of a broader compliance architecture. Their use will depend on the policy objective, sector, risk profile and institutional preferences of governments, while continuing to raise important questions regarding credibility, transparency, accountability, accessibility and alignment with public policy objectives.

Emerging initiatives also point to the closer links between traceability, verification and supply chain governance. For example, OECD work on Free Trade Zones (FTZs) has highlighted the role that certification frameworks, due diligence processes and traceability systems can play in strengthening transparency and trust across trade and logistics networks (OECD, 2025^[102]). These experiences suggest that future approaches may combine progressively more traceability data with verification, certification and governance mechanisms designed to support both compliance and trade facilitation.

The central message of this report is that traceability will support trade only if it is designed and implemented with trade facilitation in mind. Better information can strengthen regulatory compliance, improve risk management and support more resilient supply chains. It can also be important for the functioning of standards-based approaches in strategic sectors, including critical minerals, where reliable information on origin, production and movement can help ensure that market claims are credible and that goods are assessed consistently against relevant requirements. Yet fragmented requirements, poorly co-ordinated processes and systems disconnected from border operations risk becoming new sources of trade friction. The policy challenge is therefore not simply to collect more information, but to make that information usable: clear enough for firms to comply with, reliable enough for authorities to trust, interoperable and reusable across regulations and jurisdictions, and proportionate enough to preserve the efficiency and predictability of international trade.

Trade facilitation and traceability are becoming intertwined. Trade facilitation provides the procedural, institutional and digital foundations through which traceability becomes operational at the border, while traceability provides the information needed to implement public policy objectives that grow in complexity. Greater operational integration between the two enables traceability systems to build on existing trade facilitation infrastructure for the transmission, verification and reuse of information, reducing duplication, lowering compliance costs and strengthening confidence in regulatory compliance. In doing so, it allows ever more information-intensive trade requirements to support resilience, economic security and broader public policy objectives without undermining the efficiency and predictability on which international trade depends.

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