Research on Potential Applications of Artificial Intelligence to Improve Product Recall Procedures in the APEC Region

APEC Digital Economy Steering Group

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Asia-Pacific
Economic Cooperation

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List of acronyms

ACCC - Australian Competition and Consumer Commission
AI - Artificial Intelligence
APEC - Asia-Pacific Economic Cooperation
API - Application Programming Interface
ASEAN - Association of Southeast Asian Nations
BEUC - European Consumer Organisation
CISS - Consumer Injury Surveillance System (Korea)
CPSC - U.S. Consumer Product Safety Commission
CTI - APEC Committee on Trade and Investment
DESG - Digital Economy Steering Group (APEC)
DG GROW - Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (European Commission)
DG JUST - Directorate-General for Justice and Consumers (European Commission)
DPP - Digital Product Passport
EC - European Commission
ECSG - Electronic Commerce Steering Group (APEC)
eSAFE - CPSC's Enhanced Safety and Field Evaluation Program
ESPR - Ecodesign for Sustainable Products Regulation (EU)
EU - European Union
ICAIL - International Conference on Artificial Intelligence and Law
KATS - Korean Agency for Technology and Standards
KCA - Korea Consumer Agency
LLM - Large Language Model
ML - Machine Learning
NLP - Natural-Language Processing
OECD - Organisation for Economic Co-operation and Development
PROFECO - Procuraduría Federal del Consumidor (Mexico)
SME - Small and medium sized enterprise
SOP - Standard operating procedure
TACD - Transatlantic Consumer Dialogue
UNCTAD - United Nations Conference on Trade and Development

Executive summary

Consumer product recalls are a core component of consumer protection frameworks across the Asia-Pacific region. They safeguard public health, reinforce market integrity, and support trust in both traditional and digital marketplaces. However, the rapid expansion of online commerce and cross-border e-commerce has created conditions that traditional recall systems were not designed to manage. Unsafe or recalled products now circulate quickly across multiple jurisdictions, often reappearing online within hours, and frequently in altered or rebranded forms that evade manual detection. These products may continue to resurface for many years.

This report, prepared for the Asia-Pacific Economic Cooperation (APEC) project *Research on potential applications of artificial intelligence to improve product recall procedures in the region*, proposed by the National Institute for the Defense of Competition and the Protection of Intellectual Property (Indecopi), the Peruvian authority for consumer protection, assesses the current state of recall systems across APEC economies and examines how digital and AI-enabled approaches may help address these new challenges. The analysis draws on an APEC-wide questionnaire, 19 interviews with regulatory and technical experts, international best practices, comparative case studies, and demonstrations of commercially deployed AI-enabled tools capable of detecting unsafe products at scale. Where questionnaire responses were not received, the report also drew on publicly available official information from those jurisdictions so that the regional analysis would not be limited only to responding economies.

Across APEC, recall frameworks generally follow similar procedural stages but differ markedly in their legal arrangements, digital maturity, marketplace oversight, and access to structured data. Many authorities continue to rely on manual monitoring and unstructured complaint narratives. As a result, they face significant limitations in detecting the reappearance of recalled products, identifying visually similar or “clone” items, or monitoring evasive listing behaviours such as rebranding, altered images, or mis-categorisation.

A key finding from the project is that several AI-enabled detection tools, especially computer-vision models used by major marketplaces, are already technologically mature and deployed at scale. Demonstrations to APEC economies showed that these tools can identify unsafe products even when images differ or sellers employ evasion tactics. Some platforms now screen 100% of new listings prior to publication, indicating that large-scale pre-listing safety checks are both feasible and operational in commercial environments. This represents a significant evolution in the technological landscape and expands the practical options available to regulators.

AI also offers opportunities to enhance other stages of the recall lifecycle. Natural-language processing can analyse large volumes of consumer complaints and incident reports, enabling earlier detection of hazard patterns. Large-language models can support clear, multilingual, plain-language recall notices, improving reach across diverse populations. Analytical dashboards and anomaly-detection tools can help track recall follow-up, evaluate completion rates, and detect the reappearance of unsafe items online.

The adoption of AI-enabled tools, however, depends on improvements in data quality, interoperability, and governance frameworks, and often requires foundational data-governance reforms. Many economies lack structured recall data or consistent incident-reporting formats, limiting the utility of advanced analytical tools. Smaller agencies may face resource constraints that restrict their ability to deploy or maintain AI systems independently. APEC’s collaborative structure provides opportunities for economies to share training, expertise, and, potentially, digital tools, helping to reduce duplication and support economies at earlier stages of digital readiness.

The report proposes seven non-binding areas for action to help economies strengthen recall systems and explore AI-enabled improvements in ways that reflect their own priorities, capacities, and legal contexts. These recommendations are grouped into three broad pillars. The first pillar, governance and good practice frameworks, encourages economies to review

their recall systems against international good practice, strengthen voluntary cooperation with online marketplaces, and support ethical and transparent use of AI. The second pillar, digital infrastructure and interoperability, focuses on piloting targeted AI-enabled tools, improving structured recall data and interoperability standards, and strengthening digital and AI-related capacity within regulatory authorities. The third pillar, regional and marketplace cooperation, highlights the value of aligning recall digitalisation with broader APEC cooperation, including shared learning, training, and possible collaborative approaches to surveillance, marketplace engagement, and cross-border information exchange. Taken together, these seven recommendations offer a flexible and modular pathway for economies seeking to modernise recall systems while maintaining transparency, accountability, and inclusivity.

Chapter One - General information

1.1 Purpose and scope of the report

This report has been prepared under the APEC project *Research on potential applications of artificial intelligence to improve product recall procedures in the region*. Its purpose is to support economies in strengthening their product-recall systems by providing a clear assessment of current approaches, identifying pressures created by digital and cross-border commerce, and exploring the role that artificial intelligence (AI) and other digital tools may play in enhancing recall performance.

The report draws on questionnaire responses from APEC authorities, interviews with specialists and regulators, analysis of recall data and international guidance, and a review of available literature and statistical indicators. Together, these sources establish an evidence base to help economies review, compare, and update their recall processes considering emerging technologies and marketplace developments.

1.2 The role of recalls in consumer safety, market integrity, and cross-border cooperation

Recalls serve multiple purposes within consumer-protection frameworks. Their primary role is to prevent injury by ensuring that unsafe products are identified and removed, repaired, or refunded. Effective recalls also reinforce market integrity: they discourage unsafe business practices, promote fair competition, and help ensure that hazards do not spread unnoticed across online and offline channels.

In a region characterised by deep economic integration and substantial cross-border e-commerce, recalls are increasingly important to maintaining trust in digital markets. Products sold across several economies highlight the value of coordinated communication, consistent messaging, and timely action, as shown by the trilateral cooperation between North American authorities presented in chapter three. Recalls therefore sit at a point where consumer protection, regulatory cooperation, and digital trade intersect, making them a natural area for collective attention within APEC.

1.3 General description of recall systems in APEC economies

Despite institutional diversity, most APEC recall systems follow a broadly similar sequence: hazard detection, risk assessment, public communication, implementation of corrective action, and follow-up. Differences arise in the legal basis for recalls, the roles assigned to regulators and businesses, the level of preparedness expected from suppliers, and the capacity of authorities to conduct monitoring or evaluate recall effectiveness.

Some economies operate centralised consumer-product agencies with clear mandates and established procedures, while others distribute responsibilities across multiple ministries. Digital capability also varies, influencing how quickly hazards can be identified and how effectively information flows between authorities, businesses, and consumers.

These distinctions matter when considering how AI might assist recall operations, as the benefits of digital tools depend on the availability of structured data, the clarity of institutional responsibilities, and the degree of cooperation from marketplaces and other actors.

1.4 Problem statement and challenges in digital and cross-border contexts

Building upon this general description, recall systems across APEC are increasingly under strain as they confront structural and operational challenges arising from digital and cross-border commerce. Traditional approaches were built around physical supply chains in which manufacturers, importers, and distributors were clearly identifiable, and products moved through predictable channels. Today’s online environment is markedly different. Products circulate across multiple economies within hours; sellers may operate outside the domestic jurisdiction; and items recalled in one economy often remain available elsewhere.

Online marketplaces host very large volumes of listings, making manual oversight difficult. Unsafe goods, including previously recalled products, can be repeatedly relisted by different sellers, sometimes using altered images, modified descriptions, or alternative branding to evade detection[1]. Near identical or "clone" products also appear, marketed under different names but posing similar hazards. These dynamics create significant challenges for regulators and platforms seeking to identify and remove unsafe items consistently.

At the same time, many economies face constraints in processing large numbers of complaints, identifying emerging hazard patterns, and monitoring follow-up actions once recalls are announced. Incident and recall data are often unstructured or fragmented across systems, limiting the potential for automation or the use of AI-enabled tools. Cross-border coordination is hampered when product identifiers, data fields, or reporting formats differ across economies. Marketplace cooperation varies, and authority to require action from sellers located overseas is often limited. Recalled items may reappear on resale or informal channels, further reducing recall effectiveness.

Taken together, these structural and operational challenges illustrate why many economies are exploring digital and AI-enabled tools. Such technologies are not intended to replace regulatory judgment, but to expand the capacity, precision, and timeliness of recall operations in increasingly complex and cross-border digital markets.

1.5 Definitions used in the report

For clarity and consistency, the report uses definitions informed by APEC practice and international sources such as OECD, UNCTAD, and ISO/IEC.

Product recall: refers to any action taken by a business or regulator to remove, repair, modify, replace, or refund a product that poses—or may pose—a safety risk.

Corrective action: is the specific measure taken to address the hazard.

Incident monitoring: encompasses the systems used to collect and analyse complaints, injury data, and hazard indications.

Market surveillance: refers to regulatory activities aimed at identifying unsafe or non-compliant products across physical retail, online marketplaces, and other channels.

Artificial intelligence (AI): An AI system is a machine-based system that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments. Different AI systems vary in their levels of autonomy and adaptiveness after deployment[2].

These definitions are used consistently throughout the report.

1.6 Intended users of the report

The report is intended for consumer-protection and product-safety authorities, market-surveillance agencies, and policy makers across APEC. It may also be useful for online marketplaces, industry associations, technical experts, and consumer organisations that contribute to recall governance.

Its aim is to support informed policy development and voluntary cooperation, rather than prescribe uniform solutions, recognising the diversity of legal frameworks and institutional capacities across the region.

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[1] Which? *In Plain Sight;* Euroconsumers, *Systemic Failures in Product Compliance;* TACD report on online marketplace safety

[2] Explanatory memorandum on the updated OECD definition of an AI system

1.7 Methodological note

The report's conclusions are derived from four sources of evidence:

1. questionnaire responses from APEC consumer-protection and product-safety authorities,
2. interviews with experienced officials and technical specialists,
3. analysis of recall databases, regulatory guidance, and academic literature; and
4. a review of available recall statistics and known data gaps.

This triangulated approach supports the analysis in Chapter Two, the case studies in Chapter Three, the discussion of AI opportunities and considerations in Chapter Four, the workshop synthesis in Chapter Five, and the conclusions and options in Chapter Six.

Chapter Two - Review of existing recall processes and regulatory frameworks

2.1 Introduction

This chapter reviews the recall systems of APEC economies using an international best practice analytical model derived from work undertaken by the OECD Working Party on Consumer Product Safety, the UN Guidelines for Consumer Protection, the ASEAN Product Recall Guidelines, and leading domestic frameworks. The purpose of the model is not to prescribe a single approach but to provide a structured lens through which to assess diverse recall systems, identify gaps, and highlight opportunities, especially those relating to digitalisation and the potential use of artificial intelligence (AI).

Although APEC economies vary widely in legislative structures, institutional arrangements, and levels of digital maturity, they share common pressures. These include the rapid expansion of online marketplaces, the proliferation of cross-border third-party sellers, and the difficulty of monitoring large product volumes in real time. Viewing APEC systems through a consistent analytical model allows areas of strength and improvement to be identified systematically.

2.2 The international best practice analytical model

International experience shows that strong recall systems tend to include a core set of functional components. These components help structure institutional roles, ensure the clarity of legal obligations, support effective communication, and provide reliable mechanisms for oversight and evaluation. The model used in this review comprises nine dimensions, which collectively illustrate the elements of effective recall governance. An outline of the international model is presented in Box 1, with a more detailed version provided in Annex 1.

Box 1. Overview of the international best practice model for product recalls

The international best practice model identifies nine core components of an effective product-recall system:

i. **Law and governance** - Clear legal duties for economic operators; mandatory recall powers; adoption of safety standards; defined jurisdictional responsibilities.
ii. **Planning and preparedness** - Business recall plans; templates and simulations; regulator training and inter-agency coordination.
iii. **Public communications** - Standardised notices, multilingual and accessible formats, plain language, and multi-channel dissemination.
iv. **Effectiveness and accountability** - KPIs, verification and follow-up procedures, and systematic post-recall reviews.
v. **Infrastructure and data** - Recall portals, machine-readable formats, interoperable data standards, and API connections.
vi. **Roles, resourcing and regional delivery** - Dedicated recall coordinators, laboratories, inspection services, online-monitoring units.
vii. **Remedies, incentives and penalties** - Obligations for repair, replacement, refund; incentives for early reporting; penalties for non-compliance.
viii. **Sectoral specialisation** - Tailored requirements for high-risk sectors such as electrical products, toys, automotive goods, and medical devices.
ix. **AI-Enabled enhancements** - Machine-learning models, NLP tools, image-recognition systems, predictive analytics, and marketplace-scanning technologies.

2.3 Overview of recall frameworks across APEC Economies

The following analysis considers the survey responses received from eleven APEC economies and publicly available information for the remaining APEC economies.

2.3.1 Diversity of Frameworks and Institutional Arrangements

APEC economies maintain a wide variety of recall systems that reflect differences in legal traditions, administrative structures, and regulatory capacity. Australia; Canada; Japan; Republic of Korea; New Zealand; and the United States operate centralised product-safety authorities with clear statutory powers to order recalls and oversee corrective action. Others distribute responsibilities among several ministries, often on a sectoral basis, or rely primarily on voluntary recalls initiated by businesses.

In several APEC economies, recall powers are embedded in broad consumer-protection or general product-safety legislation, notably in Australia; Canada; Japan; Republic of Korea; New Zealand and the United States. Other economies rely more heavily on sector-specific or distributed legal frameworks, which can influence recall coordination and enforcement capacity. This diversity reflects local context rather than regulatory weakness, but it creates differences in surveillance capacity, business obligations, and compliance expectations.

2.3.2 Common stages of the recall cycle

Despite structural differences, most APEC economies follow a similar sequence of actions: hazard detection, risk assessment, public notification, corrective action, and follow-up. The available tools, however, vary dramatically. Some regulators draw on robust injury databases, structured incident-reporting platforms, and established links with online marketplaces. Others rely on manual review of complaints, traditional media notices, or informal follow-up mechanisms with suppliers.

This variation is particularly significant when considering how AI-enabled tools could support recall systems, as technological integration depends heavily on data quality, institutional resources, and cooperation from marketplaces.

2.4 Analysis of APEC recall systems against the best practice model

APEC economies exhibit substantial variation across the nine dimensions of the international best practice model. While all maintain functioning recall frameworks, differences in legal design, institutional resources, data systems, and marketplace engagement significantly influence how effectively recalls operate in an increasingly digital and cross-border environment.

2.4.1 Law and governance

Most APEC economies possess statutory authority to order recalls, require corrective action, and mandate the disclosure of relevant safety information. However, the scope, clarity, and enforceability of these powers vary.

Some economies for example Australia; Canada; Japan; Republic of Korea; New Zealand; Singapore and the United States have comprehensive consumer-product safety laws that define responsible persons, establish clear duties for suppliers, and provide regulators with broad enforcement powers. Others as noted above rely on a patchwork of sectoral legislation or voluntary compliance, creating gaps particularly in online contexts where the traditional definitions of “manufacturer,” “importer,” or “distributor” no longer map neatly onto marketplace structures.

Economies with centralised authorities tend to have clearer decision-making pathways, whereas decentralised systems require strong coordination mechanisms to avoid fragmentation.

2.4.2 Planning and preparedness

Preparedness remains uneven across the region. Only a minority of economies require businesses to maintain written recall plans, conduct simulations, or submit preparedness documentation to regulators.

In many jurisdictions, small and medium sized enterprises (SMEs) lack the capability or experience to design effective recall plans, and regulators note that significant variation persists between well-resourced global brands and domestic suppliers.

Regulatory preparedness, such as internal standard operating procedures (SOPs), emergency response plans, and training, also varies. Some agencies conduct exercises regularly, while others depend on informal processes or staff experience. This inconsistency affects the ability to act quickly when hazards emerge.

2.4.3 Public communications

APEC economies generally perform well in communicating recalls to consumers. Nearly all maintain public recall portals, and many require suppliers to issue notices in standardised formats. However, few economies have adopted machine-readable formats, multilingual notices, accessible design standards, or automated cross-posting to social media and digital channels. This limits reach, especially in economies with large migrant or multilingual populations, and constrains the future integration of AI-enabled communication tools.

Where platforms and regulators collaborate, communications tend to be clearer and more consistent. Where cooperation is limited, messages may be fragmented across multiple channels.

2.4.4 Effectiveness and accountability

Follow-up and measurement remain among the weakest aspects of recall systems in APEC. Most economies do not systematically measure recall completion rates, track returned or repaired products or monitor the reappearance of unsafe items online. Efforts to evaluate recall performance are often ad hoc.

Some regulators request post-recall reports from businesses, but the depth and quality of these vary. Only a few economies have mechanisms for regular post-incident reviews, lessons-learned exercises, or independent audits.

The absence of structured, consistent effectiveness data limits the ability to evaluate performance or to improve practice over time.

2.4.5 Infrastructure and Data

Digital maturity is a primary differentiator across APEC recall systems. Economies with integrated recall databases, structured data standards, and interoperable systems are better positioned to implement scalable monitoring, analytics, and AI-enabled tools. Others still rely on PDF notices, static web pages, or unstructured forms, making automation difficult.

Where application programming interfaces (APIs), data feeds, or machine-readable formats exist, they significantly enhance regulator–industry information flows. However, most economies do not yet have these, and many note difficulties accessing data from marketplaces, customs, or border agencies.

Data quality issues, including inconsistent product identifiers, missing hazard descriptors, and incomplete supplier information, were widely cited as barriers to advanced analytics and AI.

2.4.6 Roles, resourcing, and regional delivery

Institutional arrangements differ markedly. Some economies have strongly resourced, specialist consumer-safety agencies, while others distribute responsibilities across ministries (trade, industry, health, standards, customs). Multi-agency models work well when coordination mechanisms are strong, but many economies reported gaps, duplicated efforts, or unclear mandates.

Resourcing remains uneven, particularly in smaller economies. Staff capacity, technical expertise, access to laboratories, and funding for digital tools vary widely. Regional delivery,

such as cooperation with neighbouring jurisdictions or participation in cross-border enforcement, remains limited outside of specific bilateral and multilateral arrangements (e.g., North America and ASEAN initiatives).

2.4.7 Remedies, incentives, and penalties

Most APEC economies rely heavily on voluntary recalls, even where regulators have mandatory powers. While voluntary systems can be efficient, they depend on strong supplier compliance and do not always extend to cross-border sellers operating on global platforms.

Penalties for non-compliance vary from modest fines to significant criminal sanctions, but enforcement is inconsistent. Some economies lack clear legal pathways to compel online marketplaces to act when unsafe or recalled products are discovered.

Incentives, such as reduced penalties for early reporting or enhanced cooperation, are rare but increasingly recognised as useful in encouraging timely recall action.

2.4.8 Specialisation by sector

Sector-specific frameworks exist in many economies for automotive products, electrical goods, food, cosmetics, and pharmaceuticals. These sectors often benefit from dedicated incident-reporting systems, established traceability mechanisms, and specialised testing infrastructure.

The general consumer-products sector, however, tends to be less formalised, with fewer sector-specific requirements and weaker traceability. This complicates hazard identification and follow-up, especially for small, low-cost goods sold online by third-party sellers.

2.4.9 AI-Enabled enhancements

While interest in AI is widespread across APEC, operational uptake remains limited and uneven. Most AI initiatives are exploratory or pilot based. Economies are experimenting with:

- computer vision to detect visually similar or relisted recalled products.
- Natural language processing (NLP) systems for analysing narrative complaints.
- predictive analytics for trend identification.
- automated translation tools for recall communications.

However, several foundational constraints persist:

- insufficient structured data,
- limited access to marketplace information,
- unclear legal authority to require platform cooperation,
- and a shortage of in-house expertise.

Advanced tools, such as cross-platform surveillance, rule-extraction engines, or fully automated monitoring pipelines, are currently limited to a few economies. Nevertheless, interest is growing, and many economies view AI as a promising opportunity for strengthening surveillance and reducing resource burdens.

2.4.10 Summary of findings

Across all nine dimensions, APEC economies exhibit strong foundational elements but uneven digital readiness, varied institutional coordination, and persistent challenges relating to online marketplaces and cross-border trade. The gaps identified here directly inform Chapter Four, which outlines where AI may add value and how APEC economies might approach digital modernisation in a staged and cooperative manner.

2.5 Addressing the challenges posed by online marketplaces: The role of product safety pledges

The rise of online marketplaces has exposed gaps in traditional regulatory frameworks, which were designed around clearly identifiable manufacturers, importers, and distributors. Marketplace operators often fall outside these definitions, limiting authorities' ability to require proactive monitoring or rapid removal of unsafe products.

To address this gap, product safety pledges have emerged as a flexible cooperation mechanism[3][4]. The first structured initiative, the European Union Product Safety Pledge (2018), established expectations for the timely removal of unsafe goods notified through the EU rapid-alert system, proactive detection of high-risk listings, improved communication with authorities, and greater transparency.

Building on this model, the OECD's 2021 Good Practice Guide on online product safety encouraged economies to explore voluntary cooperation frameworks based on similar principles. Four APEC economies, Australia; Canada; Japan; and Republic of Korea have adopted product-safety pledges inspired by the OECD guidelines, demonstrating that voluntary commitments can play a meaningful role in improving marketplace compliance.

More recently, the European Commission introduced "Pledge Plus", a more advanced model emphasising structure, algorithmic transparency, risk-based controls, and closer integration with Safety Gate. This evolution illustrates how voluntary mechanisms can become progressively more ambitious as digital-marketplace governance matures.

2.6 Other regulatory and policy trends in the region

APEC economies are increasingly influenced by international developments shaping the future of product-safety regulation. OECD work on online product safety has encouraged structured cooperation with major marketplaces, while the United Nations Guidelines continue to provide a global reference point for transparency, accountability, and consumer rights.

Several APEC economies are revising consumer-protection laws to address online-marketplace responsibilities or to modernise recall processes. Others are investing in general digitalisation strategies, upgrading recall databases, improving incident-reporting systems, and experimenting with AI-based surveillance tools.

Interest in Digital Product Passports (DPPs) is also growing, particularly as the European Union advances implementation. Although few APEC economies are deploying DPPs, many recognise their potential for recall operations, especially for improving traceability, identifying affected batches, and enabling machine-readable updates.

Broader e-commerce policy measures, such as tightening exemptions for low-value imported shipments, eliminating postal exemptions, and improving customs data visibility, may support more effective detection of unsafe cross-border goods.

2.7 Summary of observations

APEC economies maintain diverse recall systems, each shaped by local market conditions and institutional capacity. Foundational elements, legal powers, recall procedures, and public-notification systems are widespread. However, digital maturity, marketplace engagement, and cross-border cooperation vary significantly and increasingly define economies' ability to respond to the challenges of modern e-commerce.

Opportunities exist to strengthen detection, communication, and follow-up processes through improved digital infrastructure, greater interoperability, and the adoption of AI-enabled surveillance tools. Regional collaboration can help economies share expertise, reduce duplication, and explore new technical solutions, collectively laying the foundation for modern, digital-ready recall systems.

[3] European Commission Product Safety Pledge (2018)
[4] OECD guidance on voluntary marketplace commitments

Chapter Three - Case studies and lessons for APEC

3.1 Successful experiences or case studies of recent recalls

This chapter reviews several initiatives that illustrate how economies and regional bodies have strengthened their product-recall systems through cross-border cooperation, digital transformation, and the adoption of emerging technologies. Each case study highlights the context in which the initiative developed, the innovations deployed, and the lessons potentially relevant for APEC economies modernising their own recall frameworks.

3.1.1 Case study 1 – Canada; Mexico; and the United States: Joint recall coordination across borders

Context and objectives

North America represents one of the most interconnected consumer markets in the world. Products sold through major retail chains or online marketplaces frequently reach consumers in Canada; Mexico and the United States, almost simultaneously. For this reason, delays or discrepancies in recall announcements can reduce the effectiveness of corrective actions and create confusion for consumers.

Beginning in 2011, Health Canada and the U.S. Consumer Product Safety Commission (CPSC) began formally coordinating recall announcements, aligning both the content and timing of communications. This cooperation deepened when Mexico's consumer authority, Profeco, joined coordinated announcements from 2020 onwards. Their shared objective has been to provide timely, consistent information to all consumers in the region and support more efficient regulatory responses.

Operational approach and examples

The cooperation relies on aligning procedures and communications rather than introducing new legislation. Regulators share draft notices, harmonise hazard descriptions, and coordinate publication times. Over time, they have adopted standardised templates and streamlined translation workflows, enabling faster trilingual releases.

Several high-profile recalls demonstrate the effectiveness of this approach. The Fisher-Price "Rock 'n Play" sleeper recall was announced in parallel across Canada and the United States and later extended to Mexico. The Peloton treadmill recall followed a similar path, while earlier recalls of IKEA MALM dressers highlighted the benefits of harmonised messaging around tip-over hazards. Since 2011, more than 500 joint Canada-the United States recalls have been issued, with a growing number including Mexico.

Impact and insights

Joint recalls have shortened the time between hazard identification and public notification, with many notices now released within a 24-to-48-hour window across borders. Businesses note that aligned templates reduce administrative burdens, while consistent messaging improves consumer engagement and recall effectiveness. North America demonstrates that coordinated processes can emerge without full legal harmonisation; structured communication and shared workflows can be equally powerful. While joint recalls predate widespread AI adoption, their effectiveness increasingly depends on digital tools such as structured data exchange, automated translation, and, more recently, AI-supported online monitoring.

3.1.2 Case study 2 - Australia: Online Product Safety Pledge and AI-Assisted Marketplace Monitoring

Context and Objectives

Australia's rapid shift toward online shopping has created new product safety challenges, particularly given the large number of overseas sellers operating on global platforms. Recognising these pressures, the Australian Competition and Consumer Commission (ACCC) launched the Australian Product Safety Pledge in 2020. This voluntary agreement encourages

major online marketplaces, including Amazon Australia, eBay Australia, Catch.com.au, AliExpress, and Kogan, to improve the identification, removal, and prevention of unsafe or recalled products.

The ACCC chose a cooperative framework to build trust with platforms and accelerate digital innovations that could improve compliance, while avoiding delays associated with legislative change.

Use of AI and digital tools
Participating platforms increasingly rely on automated tools to identify unsafe listings, including machine learning classifiers trained on past recalls, image-matching systems that detect visually similar products, and keyword algorithms flagging terms linked to known hazards[5]. Internal dashboards track removal actions, seller behaviour, and systemic risks.

According to annual ACCC pledge reviews, signatories removed more than 11,000 unsafe or non-compliant listings in 2022–2023. Many platforms removed flagged items within two business days in 90–95% of ACCC-notified cases. Platforms have also expanded their automated detection capabilities, indicating a maturing internal safety culture.

Commitments under the Australian product safety pledge

- **Rapid response:** Unsafe listings removed within two business days of an ACCC alert
- **Proactive detection:** Use of automated tools such as machine learning and image recognition
- **Improved traceability:** Enhanced seller-verification requirements
- **Clear communication:** Prominent display of recall notices
- **Cooperation:** Information sharing on systemic issues and assistance in enforcement
- **Governance:** Clear escalation processes and trained staff
- **Transparency:** Annual public reporting on performance

These commitments blend proactive prevention with responsive enforcement, making the pledge one of the more operationally detailed voluntary frameworks globally.

[5] ACCC Product Safety Pledge transparency reports (2022–2024)

Addendum - Taking pledges further: The EU's "Pledge Plus"
The European Union (EU) has experimented with a more advanced pledge model, sometimes termed "Pledge Plus." This expands upon the 2018 EU Product Safety Pledge with greater expectations for systemic risk assessment, seller verification, and algorithmic transparency. Platforms are expected to identify hazards proactively, explain how their automated detection systems operate, provide structured data on performance, and integrate closely with the EU's Safety Gate alert system. This model shows how voluntary frameworks can evolve into sophisticated digital-oversight instruments, especially when aligned with broader legislation such as the EU Digital Services Act.

3.1.3 Case study 3 - Korea: AI-Enabled consumer safety infrastructure and online marketplace monitoring

Context and objectives
Korea has emerged as one of the most advanced APEC economies in the digitalisation of consumer-safety systems. Over more than a decade, the Korea Consumer Agency (KCA) and Korean Agency for Technology and Standards (KATS) have built a sophisticated ecosystem of injury-surveillance, data-analysis, and marketplace-monitoring tools. Korea's 2024-2026 AI and "Big Data" programme aim to create a unified platform capable of early hazard detection, online-marketplace monitoring, and streamlined recall information management. These initiatives respond to challenges highlighted in Korea's questionnaire submission, including the re-listing of recalled products, inconsistent marketplace cooperation, and coordination barriers across agencies.

Technological and operational innovations
Korea's intelligent platform for safety information integrates AI-based data analysis, automated recall-information collection, and online-marketplace monitoring into a single operational model. Previously manual tasks, such as the collection of foreign recall data, have been automated through web crawling. This has reduced processing time from seven days to one day and increased the volume of collected records from an average of 1,223 between 2022 and 2024 to 11,493 in 2025, an 839% increase[6].

Korea's AI-based online-marketplace monitoring system analyses listing text, metadata, and product images to identify unsafe or recalled products, including those that have been modified, relisted, or rebranded to evade detection. Image comparison capabilities allow regulators to detect visually similar products even when sellers adjust colours, packaging, or angles, mirroring challenges faced by economies.

Korea has also developed a multi-step AI pipeline that ingests large volumes of unstructured safety information, identifies recurring patterns, extracts regulatory indicators, and flags emerging risks for human review. This system reduces the analytical burden on staff and enables more timely detection of risk clusters. Integration with Korea's long standing Consumer Injury Surveillance System (CISS) ensures that domestic injury data feed directly into recall decision-making.

A business self-regulation portal supports communication and compliance with businesses, strengthening voluntary cooperation, even though marketplace participation remains uneven.

Impacts and lessons for APEC economies
Korea's digital initiatives have strengthened hazard detection, enabled more comprehensive recall information management, and significantly improved marketplace monitoring. Automated data collection has expanded the evidence base for risk assessment and enforcement, while AI-enabled detection tools have increased Korea's ability to identify unsafe products circulating online. Challenges remain, especially where marketplace cooperation is limited or institutional

[6] Korea Consumer Agency questionnaire response

responsibilities overlap, but the overall trajectory demonstrates a clear and scalable model for modernisation.

Korea's experience offers several lessons relevant to APEC economies. Sequenced implementation allows economies to introduce AI capabilities gradually without requiring fully mature systems at the outset. Automating foundational processes delivers immediate value, showing that even relatively simple tools can substantially enhance capacity. Image-based AI is essential for detecting relisted or modified unsafe products, one of the region's most persistent challenges. Integrated surveillance and recall workflows improve both upstream hazard identification and downstream enforcement, while Korea's blend of statutory powers and voluntary frameworks illustrates how governance tools must complement technological solutions.

Taken together, Korea provides a compelling example of how AI-enabled systems can modernise recall processes in practical, incremental steps, even in complex regulatory environments.

3.1.4 Case study 4 - European Commission (DG GROW): eSurveillance and the proactive WebCrawler

Context and objectives
The EU's single market, with high cross-border trade and vast e-commerce activity, presents challenges for member state authorities. Manual monitoring of online listings is not feasible at the necessary scale. In response, the European Commission has developed a suite of digital market-surveillance tools, including web crawling and machine-learning–based classification systems, to detect unsafe products sold through online marketplaces.

Technological approach
At its core is the proactive WebCrawler, which scans hundreds of thousands of listings across major online marketplaces. Machine-learning models detect missing compliance markings, similarity to recalled items, suspicious descriptions, and links to Safety Gate alerts. The results feed into dashboards accessible to all member states, allowing them to spot trends, target inspections, and coordinate enforcement[7][8].

Results
Recent cycles screened more than 400,000 product listings, flagging over 30,000 listings for review. More than 10,000 listings were removed or corrected following enforcement. The Safety Gate portal connected to these systems receives more than two million consumer visits annually, highlighting strong public reliance on digital recall information.

These figures show how shared digital infrastructure can extend regulatory reach and support consistent enforcement across a large regional market.

Addendum - Impact at scale: US-CPSC eSafe Program
The US-CPSC eSAFE program has been in operation since 2021. The program uses Google Lens, the AI-powered evolution of Google's reverse image search technology. In fiscal year (FY) 2024, the eSAFE team screened more than 3 million listings on websites and requested nearly 60,000 Internet site takedowns, resulting in the removal of more than 56,000 listings for recalled or non-compliant products.

3.2 Lessons for APEC from the case studies
The four case studies, Australia; Republic of Korea, North America and the European Union together with the U.S. CPSC's eSAFE program, demonstrate that effective modern recall systems increasingly rely on cross-border cooperation, digital transformation, and structured

[7] DG GROW eSurveillance/WebCrawler documentation
[8] Safety Gate annual reports

engagement with online marketplaces. The addition of eSAFE also shows that regulators themselves can operate AI-enabled monitoring systems at a significant scale. Several insights emerge for APEC economies:

- **Large-scale AI deployment is already feasible within regulatory agencies.**

The CPSC's eSAFE program screened more than 3 million listings and facilitated the takedown of over 56,000 non-compliant or recalled products in FY2024, demonstrating that AI-enabled image analysis can be applied operationally, not only as a pilot or platform-led initiative[9].

- **Regional coordination remains feasible and impactful even without legal harmonisation.**

Shared workflows, aligned notices, and consistent communication can improve recall effectiveness across borders, as shown in the North American case.

- **Hybrid voluntary–regulatory approaches accelerate digital adoption.**

Australia's pledge model and coordinated EU surveillance both show how voluntary frameworks can build trust, test digital tools, and support more rapid responsiveness from platforms.

- **AI-enabled tools require structured, machine-readable data to operate effectively.**

All case studies indicated that data quality, clear product identifiers, consistent hazard fields, and interoperable formats are foundational for AI-enabled monitoring, analysis, and communication.

- **Shared regional digital infrastructure can help smaller agencies participate.**

Tools such as WebCrawler models, shared dashboards, and regional data feeds allow economies with limited resources to benefit from advances pioneered elsewhere.

- **Voluntary mechanisms can evolve into more structured governance tools.**

As seen with the EU's Pledge Plus, cooperation frameworks can develop into detailed operational commitments when transparency and accountability requirements are added.

These lessons provide a strong foundation for the next chapters of the report, which examine where AI may add value and how APEC economies may pursue flexible, non-prescriptive strategies for developing digital-ready recall systems.

[9] CPSC FY2024 Performance Report

Chapter Four - APEC recall procedure to develop AI and enhanced improvement strategies

This chapter examines how artificial intelligence (AI) and related digital technologies may support improved recall procedures across APEC economies. It builds on insights from questionnaires, interviews, case studies, and international experience. While the readiness of economies varies considerably, many expressed their interest in exploring digital solutions that can strengthen hazard detection, risk assessment, communication, and follow-up activities. The chapter identifies areas where AI may add value, describes the types of tools available, considers readiness factors across the region, and outlines a set of improvement strategies economies may wish to explore.

4.1 Integration opportunities for AI Across the recall lifecycle

AI applications hold potential to support several stages of the recall process. Economies responding to the questionnaire consistently indicated that manual monitoring and analysis processes are increasingly strained by the volume, speed, and cross-border nature of online commerce. Interview participants added that regulatory teams often work with limited resources or fragmented data systems. Against this backdrop, AI-enabled tools may offer value by supporting earlier detection of safety issues, improving the efficiency of risk assessment, enhancing communication reach, and strengthening recall effectiveness monitoring.

Authorities highlighted the difficulty of monitoring large online marketplaces, where unsafe or recalled products may appear under different sellers, titles, or images. AI-enabled tools, such as machine-learning classifiers, image recognition systems, and natural-language processing (NLP), can help identify potentially hazardous goods by scanning listings at scale. These tools can flag listings resembling recalled items or containing terminology associated with known hazards. Such detection tools may be particularly valuable for small regulatory teams. Korea's experience demonstrates that foundational automation, such as web-crawling of foreign recall data, and the use of OCR and morpheme-based NLP for listing analysis, can significantly enhance detection capacity even before full AI deployment. The experience of the U.S. Consumer Product Safety Commission (CPSC), whose eSAFE program screened more than 3 million listings and facilitated over 56,000 takedowns in 2024, illustrates that large-scale image-based detection can also be operated directly by regulators, not only by online marketplaces. This underscores the practical feasibility of applying AI-enabled tools to high-volume monitoring environments.

These opportunities are not uniform across the recall lifecycle; rather, they arise at specific stages where automation, pattern recognition, or scale can meaningfully augment existing regulatory processes.

Several interviewees observed that incident data often arrives in unstructured narrative form, making it hard to analyse without intensive manual review. NLP techniques may assist by clustering consumer complaints, identifying patterns, or extracting key risk terms. Predictive analytics may help authorities prioritise which categories of products require closer oversight. These approaches can reduce the time needed to draw insights from large volumes of information. Korea's development of AI-supported classification of hospital, fire service, hotline and review data illustrates how NLP can be used for early hazard identification.

Recall effectiveness depends heavily on consumer awareness. AI-assisted translation and summarisation tools may help create multilingual notices or improve the clarity of communication. Some jurisdictions are exploring chatbots or virtual assistants to answer consumer questions and support engagement, particularly on mobile devices. Such tools may also help guide consumers through return or repair processes.

Monitoring recall effectiveness remains a challenge in many economies. AI-enabled tools may help detect the re-appearance of recalled goods on online marketplaces or social media resale. Analytics dashboards can support authorities in tracking return rates or mapping geographic

patterns of consumer engagement. These tools may provide insights that support targeted follow-up or corrective measures. Korea's extension of monitoring to second-hand marketplaces shows the importance of including resale platforms within follow-up and enforcement workflows.

4.2 Mapping relevant AI-enabled tools and technologies

Although the use of AI in recall operations is still emerging globally, a substantial ecosystem of tools already exists, ranging from simple classification models to sophisticated large-scale surveillance systems used by online marketplaces and commercial safety-monitoring providers. These tools vary widely in purpose, technical complexity, and data requirements, but together they illustrate how AI can support earlier detection of hazards, faster analysis, clearer communication, and more effective follow-up. Korea's model also highlights the importance of automated recall-intelligence collection and image-analysis tools capable of detecting modified or rebranded products.

To help economies navigate this landscape, the table below consolidates the main categories of AI-enabled tools relevant to recall management and maps them to the stages of the recall lifecycle in which they may offer the greatest value. This integrated presentation highlights both the *function* of each tool and its *operational relevance*, providing a conceptual overview of where AI can assist regulatory processes in practical and targeted ways.

Category of Tool	**Function**	**Recall Lifecycle Stage**
Marketplace scanning tools (computer vision; NLP-based metadata extraction)	Detect visually similar, near identical or evasively listed unsafe products. Match listings to recalled products despite image variation, rebranding, mis-categorisation, or altered titles.	Detection and signal identification: - Early hazard detection - Monitoring online marketplaces - Identifying relisted recalled items
Incident monitoring and complaint analysis tools (NLP clustering; keyword extraction; pattern detection)	Analyse complaints, reviews, and social-media comments to detect early hazard patterns and cluster recurring fault modes.	Assessment & decision support: - Triage and risk assessment - Identifying recurring fault modes - Forecasting emerging issues
Predictive analytics platforms (machine learning models; risk forecasting)	Identify high-risk product categories based on injury history; forecast injury likelihood and emerging trends.	Assessment & decision support: - Prioritisation of regulatory action - Strategic planning and resourcing
Analytics dashboards and follow-up systems (data visualisation; anomaly detection)	Monitor recall progress, return/repair rates, and anomalies; detect reappearance of recalled items; support enforcement workflows.	Follow-up, monitoring & enforcement: - Tracking recall effectiveness - Identifying reappearance of recalled items - Enforcement support

This lifecycle-based perspective underscores that AI is not a single technology but a collection of complementary tools. Marketplace scanning systems support early detection; natural-language processing enables more systematic assessment of narrative complaints; predictive analytics assist in prioritising risks; communication tools broaden the reach of recall messages; and dashboards strengthen follow-up and enforcement. When combined, these approaches can help modernise recall operations, particularly in digital marketplace environments where product volumes are high and regulatory resources are often stretched.

Technology maturity and use cases
Many of the studies undertaken by product safety authorities, consumer organisations, trade associations, and academic researchers that have identified unsafe products online have used off-the-shelf products, including reverse image search functions built into search engines that can be easily deployed. Korea has already operationalised optical character recognition and image analysis in marketplace monitoring, confirming their practical maturity.

Commercial demonstrations confirm that several categories of AI-enabled tools relevant to product safety have reached a high level of maturity. Marketplace scanning systems are already deployed at scale, using multi-image analysis and metadata extraction to match online listings to recalled or unsafe products with considerable accuracy. Large language model (LLM) systems are now capable of ingesting regulatory texts and automatically extracting enforceable parameters, a development that may help support more consistent application of rules across jurisdictions.

The maturity of these tools is further demonstrated by large-scale regulatory deployments. The U.S. CPSC's eSAFE program, which uses Google Lens-based computer vision to scan millions of online listings annually, achieved more than 56,000 removals of recalled or non-compliant products in 2024. This example confirms that image-recognition systems are sufficiently robust for operational use by public authorities, even in high-volume digital marketplaces.

Tools for analysing consumer complaints and product reviews have also improved, especially when models are tuned to the specific terminology and failure modes of particular product categories. Predictive-analytics approaches are proving valuable for identifying high-risk product types and emerging trends, although their utility depends on access to structured, high-quality injury and incident data. In parallel, AI-enabled communication tools have advanced rapidly, with LLMs now able to produce clear, multilingual recall notices suitable for public dissemination and accessible to diverse consumer groups.

Across all these domains, AI is best understood as a complement to, rather than a substitute for, regulatory judgment. Effective use requires appropriate oversight, validation, and transparent operating procedures to ensure reliability and public trust.

4.3 Readiness and capacity assessment across APEC economies
The readiness of APEC economies to adopt AI varies considerably. Questionnaire responses and interview insights suggest three broad clusters:

Economies with advanced digital infrastructure
These economies typically have modern recall portals, incident databases, and established digital-governance frameworks. Some already use automated monitoring systems or engage directly with online marketplaces for data exchange. Their main challenges relate to integrating existing systems, scaling pilot activities, or ensuring ethical AI governance.

Economies with emerging digital capacity
A larger group of economies has begun digitalising recall systems, often through online portals, structured forms, and basic analytics. They may have limited data harmonisation or unstructured legacy datasets. For these economies, piloting selected AI-enabled tools, particularly those focused on marketplace scanning or communication, could offer incremental benefits.

Economies with developing infrastructure
These economies may depend on manual recall processes, unstructured data, or limited IT capacity. They expressed strong interest in AI-enabled improvements but noted challenges related to staffing, budget constraints, and foundational data availability. Many indicated that regional tools or shared platforms would be beneficial, especially those requiring minimal local infrastructure.

Cross-cutting readiness themes
Across all groups, several themes emerged:

- the importance of foundational data governance.
- the need for staff training on digital tools and AI concepts.
- interest in shared platforms or regional pilots to reduce costs.
- the value of incremental steps, beginning with improving data structure and digital workflows.

Interviewees consistently noted that "AI cannot be effective without strong underlying data", underscoring the importance of strengthening recall information systems before deploying advanced tools.

4.4 Proposed AI-enhanced improvement strategies

This section outlines potential strategies economies may wish to explore voluntarily and at their own pace. The strategies are aligned with the diversity of existing systems and do not prescribe specific approaches. Rather, they identify flexible pathways based on the evidence collected.

Strengthen data foundations. As demonstrated by Korea, automation of foreign recall collection is a practical first step.
Improving data structure, standardising recall fields, and adopting machine-readable formats can provide the basis for future AI-enabled tools. Developing shared data dictionaries or model templates for recall notices may support both domestic improvements and cross-border cooperation.

Pilot targeted AI-enabled tools. Early pilots may include automated recall-intelligence tools and basic image-matching systems.
Economies may consider piloting AI-enabled tools that offer high-impact, low-barrier benefits, such as marketplace scanning or automated translation of recall notices. Several interviewees emphasised the value of "small-scale, well-governed pilots" to test feasibility and build institutional confidence.

Leverage regional cooperation
Given the resource constraints many economies face, shared pilots or regional tools under APEC coordination may be effective. Tools such as shared WebCrawler models, regional dashboards, or data harmonisation templates could support economies that lack internal technical capacity. Some interviewees also expressed interest in linking APEC efforts with global resources such as OECD's Global Recalls database.

Develop skills and institutional capacity
Training initiatives, covering AI fundamentals, data governance, ethical oversight, and digital-marketplace monitoring, may strengthen institutional readiness. Economies responding to the questionnaire consistently requested capacity-building support.

Ensure ethical and transparent use of AI
Ensuring transparency, accountability, and inclusivity in AI use is essential. This includes documenting how models' function, explaining classification outcomes to businesses and consumers, and evaluating potential impacts on vulnerable communities, including linguistic minorities and individuals with low digital literacy.

Promote platform cooperation
The case studies highlight the potential benefits of voluntary cooperation frameworks. Economies may explore options for establishing or strengthening commitments with online marketplaces, including information-sharing arrangements that support recall operations.

These strategies are intended to guide discussion and support informed decision-making, rather than prescribe a specific approach.

4.5 Gender and inclusivity considerations

Digital tools and AI-enabled solutions must be designed to support all consumers. Interviewees emphasised the importance of reaching communities that may face barriers in accessing recall information, such as linguistic minorities, older adults, or individuals with disabilities. AI-assisted translation may support multilingual communication, while clear, accessible design can enhance understanding. Ensuring diverse datasets in training models may help mitigate bias in detection and analysis systems.

Inclusive approaches also extend to regulatory staffing. Supporting women's participation in digital consumer protection roles contributes to more representative and sustainable governance structures. Questionnaire responses indicated interest in training programmes that encourage broader participation in AI-related functions.

4.6 Summary

AI offers opportunities to enhance recall performance across detection, analysis, communication, and follow-up activities. However, feasibility depends on data quality, digital infrastructure, technical capacity, and governance arrangements. APEC economies display diverse levels of readiness, suggesting that flexible, staged approaches may be most appropriate. Strengthening data foundations, piloting targeted tools, enhancing regional cooperation, and investing in capacity building may together support economies in exploring AI-enabled improvements while maintaining ethical and inclusive practices.

The potential contribution of AI to recall management can be visualised across four broad stages of the recall lifecycle. Each stage presents distinct opportunities where AI-enabled tools could support earlier detection, improve communication, or strengthen follow-up activities. Together, these opportunities illustrate how AI-enabled tools can complement existing regulatory processes by increasing efficiency, improving accuracy, and supporting more timely interventions throughout the recall lifecycle.

Conceptual overview of AI opportunities across the recall lifecycle

1. Detection and signal identification

- Automated scanning of online marketplaces using computer vision to identify listings visually like recalled or unsafe products.
- NLP-driven flagging of hazardous keywords or patterns in product titles, descriptions, and seller metadata.
- Trend detection from incident reports, social media complaints, and reviews (where permitted), supporting early identification of emerging risks.

2. Assessment and decision support

- NLP classification of narrative incident reports to cluster complaints and highlight recurring fault modes.
- Predictive analytics to identify high-risk product categories or forecast injury likelihood based on historical data.
- Tools that support triage by prioritising cases requiring rapid regulatory intervention.

3. Communication and consumer engagement

- Automated generation of multilingual recall notices using AI translation engines and plain-language models.
- Chatbots or virtual assistants providing recall information and guiding consumers through remedy steps.
- AI-assisted tailoring of messages to different demographic or linguistic groups, improving recall reach.

4. Follow-up, monitoring, and enforcement

- Algorithms that detect the reappearance of recalled items across platforms, including near identical listings or modified versions.
- Dashboards that visualise recall progress and identify anomalies in return or repair rates.
- Tools that support enforcement workflows through pattern recognition of repeat non-compliant sellers.

Chapter Five - Workshop findings and their implications for APEC

5.1 Introduction

The APEC workshop on the application of artificial intelligence to product recall systems brought together a diverse group of regulators, international organisations, academics, and practitioners to examine how consumer product safety systems are evolving in response to digitalisation and global trade.

While artificial intelligence was the central theme, the discussions quickly revealed that the core issue is not technological. Rather, the workshop exposed a deeper structural challenge: whether existing recall systems can operate effectively in a marketplace that has become faster, more complex, and increasingly mediated by digital platforms.

Across both days, participants returned repeatedly to the same underlying concern. Product recall systems were designed for a different era - one characterised by identifiable supply chains, domestic markets, and relatively stable product lifecycles. These conditions no longer apply. As a result, recall systems are being required to perform functions for which they were not originally designed.

5.2 A System under strain

A strong consensus emerged that recall systems remain essential but are under increasing pressure. The growth of cross-border e-commerce, combined with the scale and speed of online marketplaces, has fundamentally altered the operating environment.

Participants described situations in which unsafe products are identified and removed, only to reappear online within hours. In some cases, the same product is relisted under a different description or identifier; in others, it re-enters the market through a different seller operating from another jurisdiction. These dynamics make it difficult for regulators to maintain control over recalled products.

This persistence of unsafe goods in the marketplace represents a fundamental shift in recall systems. A recall can no longer be understood as a discrete intervention. Instead, it has become an ongoing process requiring continuous monitoring and enforcement.

This observation was reinforced by international evidence, which shows that a significant proportion of recalled or banned products remain available online. The implication is clear: issuing a recall notice is no longer sufficient to ensure product removal.

5.3 The problem of visibility and data

At the centre of these challenges lies a persistent lack of visibility.

Participants highlighted that regulators often lack reliable information on whether recalled products have been removed from circulation, returned by consumers, or continue to be sold. In many cases, the data required to answer these questions either does not exist in a usable form or is fragmented across multiple systems.

Several practical examples illustrate this problem. One participant noted that injury data collected by hospitals may contain valuable signals about product risks but is rarely connected to consumer safety systems. In other cases, relevant information is published in academic literature but not integrated into regulatory workflows. This fragmentation delays the identification of hazards and weakens the ability to respond effectively.

Another issue raised was the time lag between the emergence of a safety problem and regulatory action. Participants described situations in which it can take years for patterns of harm to be recognised and translated into recalls. By that point, the product may already be widely distributed, increasing both the scale of the risk and the difficulty of corrective action.

These examples underscore a central conclusion: the effectiveness of recall systems is fundamentally constrained by the quality, accessibility, and integration of data.

5.4 Online marketplaces and the limits of traditional regulation

The role of online marketplaces emerged as a defining feature of the discussion. Platforms are no longer peripheral actors; they are central to how products are distributed, discovered, and sold.

This creates both opportunities and challenges. On the one hand, platforms possess significant technological capabilities and access to data. On the other hand, their position within the supply chain complicates traditional regulatory approaches.

Participants emphasised that regulators are increasingly dependent on cooperation with platforms. Without access to platform data and without mechanisms to influence platform behaviour, it becomes extremely difficult to prevent the reappearance of unsafe products.

At the same time, reliance on voluntary cooperation raises concerns about consistency, accountability, and coverage. Not all platforms participate, and even where they do, commitments may vary in scope and enforcement.

This tension between the necessity of cooperation and the limitations of voluntary approaches was a recurring theme throughout the workshop.

Case Study - Australia: Online product safety pledge

Australia's online product safety pledge provides a practical example of how regulators can engage directly with platforms. Under this voluntary initiative, major online marketplaces commit to removing unsafe or recalled products, monitoring listings, and cooperating with regulatory authorities.

The pledge has led to measurable improvements in the speed of product removal and the quality of communication between regulators and platforms. It has also provided regulators with greater visibility over marketplace activity.

However, the initiative remains voluntary, and its effectiveness depends on continued engagement by participating platforms. It does not cover all actors in the marketplace, and its long-term sustainability depends on how it is integrated into broader regulatory frameworks.

This model demonstrates how cooperation with platforms can be operationalised in a practical way. It offers a scalable approach, particularly for economies with limited enforcement capacity, while also illustrating the limits of voluntary arrangements.

5.5 Artificial Intelligence: Promise and pragmatism

Artificial intelligence was discussed as a potential tool to address many of the challenges identified during the workshop. Participants explored a range of applications, including the use of AI to monitor online marketplaces, analyse consumer complaints, and detect patterns of risk.

The examples presented demonstrated that AI can significantly improve the speed and scale at which regulators operate. In particular, AI enables authorities to process large volumes of data and identify signals that would be difficult to detect manually.

Case Study - European Union: AI-enabled market surveillance

The EU has developed advanced tools that use AI to scan online marketplaces, identify non-compliant products, and support enforcement actions. These systems combine web scraping, natural language processing, and image recognition to detect products that resemble recalled or unsafe goods.

These tools have improved detection capabilities and allowed authorities to operate at a scale that was previously not possible. They are integrated into broader regulatory frameworks, including cross-border coordination mechanisms.

However, their implementation requires significant technical capacity and access to high-quality data.

Relevance for APEC: This case illustrates the potential of AI to support proactive enforcement. It also highlights the importance of integrating technology within robust governance and data systems.

Despite these advances, participants were cautious not to overstate the role of AI. A consistent message emerged that AI is not a solution.

AI is an enabler, but its effectiveness depends on the systems in which it is embedded. Without structured data, adequate infrastructure, and clear governance frameworks, AI tools are unlikely to deliver meaningful improvements.

5.6 Data integration and early detection
Several examples presented during the workshop highlighted the importance of integrating multiple data sources to improve early detection of risks.

Case Study - Korea: Data-driven consumer safety
The Republic of Korea has developed systems that integrate consumer complaints, product data, and other information sources to identify emerging risks. AI tools are used to analyse patterns and detect signals that may indicate unsafe products.

This approach supports earlier intervention and enables regulators to move from reactive to more preventive models of product safety.

However, it also requires robust data governance and attention to issues such as data quality and privacy.

This case study demonstrates the importance of connecting data sources and building analytical capability. It provides a model for incremental development, particularly for economies seeking to strengthen detection without large-scale infrastructure investments.

5.7 International cooperation and shared infrastructure
The workshop also highlighted the importance of international cooperation in addressing cross-border challenges.

Case Study - OECD: GlobalRecalls and international coordination
The OECD's GlobalRecalls portal aggregates recall data from multiple jurisdictions, providing a shared resource for regulators. Combined with analytical work on online product safety, it supports cross-border awareness and coordination.

The OECD has also promoted the development of product safety pledges and other cooperative mechanisms involving online marketplaces.

This case study highlights the value of shared data infrastructure and international coordination. It provides a model for how regional organisations can support alignment, knowledge sharing, and collective action.

In addition to OECD initiatives, participants highlighted the growing role of UNCTAD in shaping global approaches to consumer product safety, particularly in the context of e-commerce and digitalisation.

UNCTAD's work is particularly significant for APEC economies because it focuses not only on advanced regulatory models, but also on the needs of economy-wide at different stages of development. Its recently adopted UN Guidelines for Consumer Product Safety, together with ongoing technical work on e-commerce and digital markets, provide a common reference point for strengthening local frameworks.

Participants noted that these guidelines help to establish baseline expectations in areas such as responsibilities of economic operators, risk-based approaches to product safety, recall procedures and corrective actions, and cross-border cooperation.

Importantly, the guidelines are complemented by UNCTAD's technical notes and capacity-building initiatives, which address emerging issues such as the role of digital platforms and the implications of new technologies, including artificial intelligence.

A key contribution of this work is that it provides a practical entry point for economies seeking to modernise their product safety systems, including those with more limited resources. Rather than prescribing highly technical solutions, UNCTAD's approach emphasises progressive implementation, adaptation to local contexts, and strengthening of institutional foundations.

Participants also emphasised that UNCTAD's framework can support the gradual integration of AI into product safety systems by helping economies to establish clearer governance structures, improve data collection and management, and develop cooperation mechanisms with platforms and other stakeholders.

In this sense, UNCTAD's work complements more technically advanced models by providing a pathway for capacity building and alignment, enabling a broader range of economies to participate in the transition toward more data-driven and digitally enabled recall systems.

Perhaps most importantly, UNCTAD was seen as providing a platform for enhanced international collaboration, particularly for economies seeking to align with global best practices, share experiences and tools, and participate in coordinated approaches to cross-border challenges. This role is particularly relevant in the context of APEC, where diversity of capacity requires frameworks that are both robust and adaptable.

Case Study - UNCTAD: Global guidelines and capacity building for consumer product safety

UNCTAD has developed a set of UN Guidelines for Consumer Product Safety, alongside technical work on consumer protection in e-commerce and digital markets. These initiatives aim to support economies in strengthening their product safety frameworks in a rapidly evolving global environment.

UNCTAD's work focuses on establishing baseline international principles for product safety, supporting risk-based approaches to regulation and enforcement, promoting cross-border cooperation, and providing technical assistance and capacity building. In parallel, UNCTAD has developed technical notes and analytical work addressing digital marketplaces, emerging technologies, including AI, and challenges in developing and transition economies.

There is a need for increased alignment around core product safety principles, greater awareness of the need to address e-commerce-related risks, and development of practical guidance for economy-wide at different capacity levels. Importantly, UNCTAD's work bridges the gap between high-level policy frameworks and operational realities in lower-capacity environments.

This case study is particularly relevant because it provides a common baseline framework adaptable to diverse legal systems, a pathway for incremental system strengthening, and support for economies seeking to integrate AI gradually, starting with data improvements, governance structures, and cooperation mechanisms. It also reinforces the importance of

international collaboration platforms, enabling economies to share experience and coordinate responses to cross-border challenges.

Global guidelines can support progressive and context-sensitive reform. Capacity building is essential for enabling adoption of digital tools. AI integration should be approached as part of broader system development. International organisations play a critical role in facilitating cooperation and alignment.

5.8 From reactive to proactive systems

Taken together, these examples point to a broader transformation in product safety systems. Participants described a shift from reactive responses to proactive detection, from local approaches to cross-border coordination, and from manual processes to data-driven systems.

This transformation is already underway in some jurisdictions but remains uneven across the APEC region.

5.9 Capacity and adaptation

A recurring theme was the diversity of capacity across APEC economies. Participants emphasised that there is no single model that can be applied universally.

For some economies, the priority may be to develop advanced AI tools. For others, the focus may be on more foundational steps, such as improving data formats or establishing basic monitoring capabilities.

This diversity reinforces the need for approaches that are both flexible and scalable, allowing economies to progress at different speeds while moving in a common direction.

5.10 Conclusion

The workshop highlighted that product recall systems are at a critical point of transition.

The challenges posed by digital markets require not only new tools, but new ways of thinking about product safety. Artificial intelligence can play an important role, but only if supported by strong foundations in data, governance, and cooperation.

Ultimately, the discussions pointed to a shared conclusion: the future of product safety lies in systems that are more proactive, more connected, and more collaborative.

For APEC economies, the key challenge is to translate these insights into practical actions that reflect the diversity of the region while moving toward a more effective and resilient system.

Chapter Six - Conclusions, policy recommendations and actions

This chapter synthesises the key findings from the research and workshop discussions and presents a set of non-prescriptive policy recommendations and actions that economies may wish to consider when strengthening their recall systems or exploring AI-enabled improvements. The analysis draws on questionnaire responses, interview insights, international best practices, case studies, and the outcomes of the March 2026 workshop.

6.1 Key findings

The review of recall systems across APEC economies highlights a landscape that is both diverse and dynamic. Economies maintain different legal frameworks, institutional structures, and levels of digital readiness, yet many share common challenges as they navigate an increasingly complex global marketplace.

Diversity and commonalities across APEC recall frameworks

Recall systems across the region share foundational elements of hazard detection, assessment, communication, and follow-up. However, economies differ significantly in:

- the authority of regulators to order recalls.
- the extent of business obligations for preparedness.
- the structure and sophistication of recall portals.
- the consistency of data formats used in recall notices.
- the integration of marketplace cooperation; and
- available resources and technical capacity.

These differences reflect domestic contexts and market conditions, but they also highlight opportunities for greater convergence, especially in areas where digital tools may support common needs. Evidence from the U.S. CPSC's eSAFE program also shows that regulator-operated AI-enabled tools can function at scale, with millions of online listings screened and tens of thousands of unsafe or recalled items removed annually. This demonstrates that AI-enabled recall processes are already feasible in public-sector contexts and not limited to marketplace-led initiatives.

Shared challenges

Across economies, several shared challenges emerged:

- **Resource constraints:** Many authorities work with small teams, limiting their ability to monitor high-volume online markets.
- **Unstructured and inconsistent data:** Incident reports and recall notices are often unstructured, making analysis difficult.
- **Online marketplace oversight:** Unsafe products may be quickly relisted by sellers across platforms. Cooperation varies.
- **Cross-border e-commerce:** Products move rapidly between economies, complicating enforcement.
- **Recall effectiveness monitoring:** Many economies do not systematically measure recall outcomes.

These challenges underscore the increasing complexity of the recall environment and point to areas where digital improvements could be beneficial.

Specific gaps addressed by AI

The research identified several areas where AI-enabled tools may support improved recall performance across APEC economies:

1. Detection of recalled or previously identified unsafe products

AI-enabled tools, especially computer-vision systems and metadata-matching models, can detect products that have already been recalled but reappear online through relisting, rebranding, mis-categorisation, or altered images. Interviewees identified this capability as one of the most urgent needs in modern recall enforcement, given the frequency with which recalled

products circulate repeatedly across online marketplaces. Korea's experience also shows that automating foreign recall collection can substantially enhance detection capacity before advanced AI is added.

2. Early hazard detection
AI-enabled marketplace scanning, social-media monitoring, and NLP-based text analysis can identify emerging hazards earlier than traditional complaint-driven systems. Interviewees consistently highlighted this as the area with the "fastest and highest value potential" for adoption. Korea's approach highlights that high quality structured data from hospitals, fire services and hotlines may be more effective than noisy social media scraping.

3. Data-driven oversight and follow-up
AI systems can analyse recall completion rates, resale patterns, and demographic response trends, enabling regulators to prioritise interventions where they are most needed. Data analytics can also detect the persistent re-listing of recalled or unsafe products online. Korea's extension of AI monitoring to second hand marketplaces also illustrates that oversight must include resale platforms where older recalled goods circulate.

4. Support for resource-constrained economies
Shared AI-enabled tools, particularly marketplace scanning systems, could significantly expand the operational capacity of smaller regulators. This was a recurring theme across multiple interviews.

While AI is not a comprehensive solution, these applications can provide complementary value when supported by adequate data quality, governance arrangements, and institutional capacity. Together, these insights reinforce the importance of APEC-wide collaboration in advancing digital and AI-ready recall systems.

6.2 Policy Recommendations and actions

The following recommendations reflect the findings of this report and are presented for economies' consideration according to their own priorities, circumstances, and levels of readiness. They are intended as non-binding recommendations and possible avenues for future work.

Recommendation 1 - Explore alignment with international best practices
Economies may consider examining their existing recall processes against elements of international good practice models. Such alignment may help strengthen legal clarity, internal preparedness, communication standards, and follow-up processes. Documented procedures or templates may support consistency across sectors.

Recommendation 2 - Explore voluntary cooperation with online marketplaces
Voluntary pledges or cooperation frameworks, such as those used in Australia; Canada; Japan; Republic of Korea; or the European Union, may support improved responsiveness and better detection of unsafe products online. Economies may wish to explore whether similar approaches could enhance relationships between regulators and platforms within their jurisdictions. Korea's Product Safety Pledge demonstrates that voluntary cooperation can enable AI-based monitoring even without statutory authority.

Recommendation 3 - Pilot test AI-enabled tools in targeted recall functions
Pilot activities may be a useful way to explore the feasibility of AI-enabled tools. Pilots could focus on targeted use cases such as detecting visually similar listings of recalled products, analysing narrative complaints, or structured-data extraction. Economies may also consider early pilots in automated collection of foreign recall data, which experience from Korea shows can provide substantial benefits even before advanced AI is deployed. Large-scale regulatory deployments, such as the U.S. CPSC's eSAFE program, also demonstrate that regulator-operated AI-enabled tools can screen millions of online listings and identify tens of thousands

of unsafe or recalled products. Economies may therefore explore regulator-led pilots to assess governance, data requirements, and scalability in their own contexts.

Recommendation 4 - Develop minimum data-exchange or interoperability standards
Structured data formats and interoperable recall fields may support improved analysis, cross-border cooperation, and potential AI adoption. Economies may consider developing, refining, or adopting minimum data standards for recall notices or incident reporting. Such standards may also support linkages with international resources such as the OECD Global Recalls database.

Recommendation 5 - Strengthen capacity building on digital and AI-enabled tools
Increasing digital literacy, AI awareness, and data-governance capacity among regulatory teams may help economies better understand how digital tools could support their recall processes. Training programmes may include modules on AI fundamentals, ethical considerations, marketplace oversight, and data structuring.

Recommendation 6 - Support ethical and transparent use of AI in consumer product safety
As AI-enabled tools become more widely used, economies may wish to consider principles for transparency, accountability, inclusive design, and oversight. This may help ensure that tools complement regulatory judgment and maintain public trust.

Recommendation 7 - Integrate recall digitalisation within broader APEC cooperation frameworks
Economies may wish to explore how recall-related digital improvements can align with APEC's wider work on digital trade, cross-border data flows, consumer protection, and marketplace cooperation. Enhanced regional collaboration may help economies share tools, training resources, and model templates, reduce duplication of effort, and support more consistent enforcement across platforms that operate region wide. Experience from regulator-operated AI systems, such as the U.S. CPSC's eSAFE program, also suggests that shared or regionally supported tools may help economies with limited resources access advanced detection capabilities. Joint work could examine opportunities for hosted models, coordinated engagement with online marketplaces, or shared surveillance infrastructure to support economies at different stages of readiness.

6.3 Overall assessment

The digital marketplace environment is evolving rapidly, placing strain on traditional recall frameworks. While foundational recall processes remain sound, economies face increasing challenges related to high-volume online listings, cross-border e-commerce, inconsistent data structures, and variable levels of marketplace cooperation. Korea's phased model confirms that incremental adoption, starting with basic automation, can deliver rapid improvements even in resource-constrained settings.

AI offers practical near-term opportunities to strengthen recall outcomes, a conclusion reinforced by evidence from regulator-operated systems such as the U.S. CPSC's eSAFE programme, which operates at multi-million–listing scale. Many of these tools are already commercially available and do not require extensive technical resources to adopt[10].

Stronger cooperation, both with marketplaces and across economies, may help reduce duplication, support smaller agencies, and facilitate more consistent enforcement across borders.

[10] OECD AI classification framework; ICAIL 2023 proceedings; Academic studies (Abrahams; Spanakis)

6.4 Conclusion

Digital transformation and AI-enabled tools are reshaping many aspects of consumer protection and product safety[11]. For APEC economies, AI-enabled tools offer potential benefits to strengthen recall systems and improve monitoring of online markets. Adoption should be guided by principles of transparency, accountability, and inclusivity, and implemented in ways that reflect economies' differing capacities and policy priorities. Because the circulation of unsafe products is inherently cross-border, strengthening regional and international collaboration will be essential to ensure that improvements in recall systems have an impact across the broader APEC marketplace.

Pillar 1: Governance and good practice frameworks

This pillar represents foundational system elements that support clarity, transparency, and accountability. It includes:

- exploring alignment with international recall-good-practice frameworks, such as those developed by OECD, ASEAN, and UN guidelines.
- reviewing legal and procedural settings to ensure clarity of roles, duties, and follow-up processes.
- considering voluntary cooperation arrangements with online marketplaces, like existing safety pledges in use across several economies; and
- supporting ethical, transparent, and inclusive AI practices.

These actions strengthen the enabling environment within which any digital or AI-enabled tools must operate.

Pillar 2: Digital infrastructure and interoperability

This pillar highlights the data and technical foundations needed to support more modern recall operations and, where desired, AI-enabled enhancements. It includes:

- improving recall-data structures, including consistent fields, machine-readable formats, and shared taxonomies.
- developing minimum interoperability approaches to support cross-agency and cross-border data exchange.
- piloting digital tools such as structured recall portals, secure APIs, or automated translation systems; and
- exploring how emerging concepts such as Digital Product Passports may, in time, support traceability and targeted recall notifications.

These steps address the underlying systems required for scalable digital transformation.

Pillar 3: Regional and marketplace cooperation

The final pillar emphasises opportunities for shared capacity-building and cross-border alignment. It includes:

- piloting AI-enabled tools in targeted recall functions (e.g., marketplace scanning) through APEC-led or multi-economy initiatives.
- strengthening cooperation with global online marketplaces through voluntary information-sharing arrangements.
- supporting regional training programmes on AI fundamentals, digital-marketplace oversight, and data governance.
- encouraging economies to share lessons learned, model templates, and emerging use cases.

Actions in this pillar help reduce duplication, support economies with limited resources, and improve overall regional recall effectiveness.

Together, the three pillars illustrate a modular and flexible pathway. Economies may begin with governance or data improvements, test small-scale pilots, engage in regional cooperation, or combine all three approaches. No sequence is assumed; each option can be pursued

[11] OECD (2020, 2023) on digital enforcement; CPSC eSAFE

independently or in combination, reflecting APEC's diversity of regulatory frameworks and digital readiness.

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Annex 1. International best practice analytical model for product recall systems

This annex summarises the international analytical model used throughout the report to assess the strengths, weaknesses, and maturity of product-recall systems. The model reflects a synthesis of global frameworks and leading regulatory practice, including approaches adopted by the OECD Working Party on Consumer Product Safety, the European Union's Safety Gate system, North American recall coordination processes, ASEAN Guidelines on Consumer Product Safety Recalls, economy-wide legislation across APEC, and academic research on digital and AI-enabled surveillance.

The analytical model is structured around nine pillars, representing the interdependent functions required for an effective, modern, and consumer-centred recall system. Each pillar captures both traditional regulatory elements and emerging digital transformations that increasingly define effective recall practice.

1. Law and governance

A strong legal foundation underpins all recall activity. Best practice includes:

- Clear legislative duties for manufacturers, importers, and online marketplaces
- Defined powers for regulators to mandate recalls, impose penalties, and require corrective actions
- Alignment with international standards to facilitate cross-border cooperation
- Transparent governance structures and public accountability mechanisms

Mature systems provide regulators with enforceable authority while encouraging industry self-responsibility and proactive hazard reporting.

2. Planning and preparedness

Effective recall systems depend on **advance planning** by both regulators and businesses. International practice includes:

- Mandatory or strongly encouraged business recall plans
- Templates for recall notices, action plans, and communication workflows
- Simulation exercises and recall drills
- Internal escalation procedures and designated recall coordinators

Preparedness is especially critical for SMEs, which are often unaware of recall requirements and may lack access to guidance or technical support.

3. Public communications

Transparent, accessible, and timely public communication is a hallmark of high-performing recall systems. Key features include:

- Standardised recall-notice formats to ensure clarity
- Multilingual and accessible notices that comply with recognised accessibility principles
- Use of multiple channels—web portals, social media, email alerts, mobile push notifications, and marketplace integrations
- Rapid dissemination of updates, corrections, or expanding recall parameters

Modern systems increasingly integrate automated translation and mobile-first design.

4. Effectiveness and accountability

Best practice requires regulators to evaluate whether recalls actually work. This involves:
Defined KPIs such as timeliness, return/repair/disablement rates, incident reductions, and consumer reach

- Verification mechanisms (e.g., retailer reporting, serial-number validation, or field inspections)
- Post-recall reviews to assess root causes, communication success, and systemic weaknesses
- Publication of performance metrics that encourage continuous improvement

Many economies have begun moving from static "announce and close" models toward dynamic effectiveness tracking.

5. Infrastructure and data systems

Digital infrastructure is increasingly central to product safety. Internationally mature systems include:

- Modern recall portals with real-time updates
- Machine-readable data formats (e.g., JSON, XML) enabling automated use by platforms and third parties
- Interoperable data standards linking recall notices, product identifiers, hazard codes, incident statistics, and enforcement actions
- API connections to online marketplaces, customs authorities, and other regulators

This pillar is foundational for AI-enabled recall systems.

6. Roles, resourcing, and regional delivery

International best practice emphasises the importance of clear institutional roles and adequate resources:

- Dedicated recall coordinators within regulatory agencies
- Sufficient staffing for monitoring, outreach, and enforcement
- Laboratory capacity and inspection resources for priority categories
- Mechanisms for decentralised or regional delivery (important in larger economies)
- Structured relationships between regulators, consumer organisations, and business associations

Well-resourced roles are crucial for ensuring the effective use of digital tools and AI systems.

7. Remedies, incentives, and penalties

Effective recall regimes combine corrective options with enforcement mechanisms. Best practice includes:

- Clear remedies for consumers (repair, replacement, refund, disablement)
- Incentives for early reporting and voluntary corrective action
- Penalties for non-compliance, misleading communication, or systematic safety failures
- Rules for disposal, repair verification, and follow-up reporting

Balanced incentive structures drive higher recall completion rates and better business compliance.

8. Sectoral specialisation

Different sectors pose unique risks and therefore require differentiated recall policies. International models incorporate:

- Specific requirements for high-risk categories such as toys, electrical goods, medical devices, food, and vehicles
- Sector-specific test requirements, documentation rules, or certification obligations
- Specialised surveillance or laboratory capacity
- Distinct reporting timelines or recall notice formats

Sectoral rules reduce ambiguity and improve both compliance and enforcement outcomes.

9. AI-Enabled enhancements and digital transformation

- The most forward-looking pillar of the model reflects emerging global practice in integrating AI and digital tools. This includes:
- Marketplace scanning using image recognition and natural-language processing
- Social media and complaint-text mining for early hazard detection
- Predictive analytics to prioritise surveillance resources
- Automated multilingual communication, summarisation, and personalised alerts
- Dashboards to track recall effectiveness, trace resale patterns, and identify high-risk sellers
- Interoperable product identifiers to support cross-platform detection

International pilots (EU eSurveillance, Australia's pledge, CPSC/NIST research) demonstrate that AI can dramatically expand regulatory reach—especially in markets dominated by cross-border e-commerce.

Synthesis: How the nine pillars work together

The analytical model views recall systems as **ecosystems**, not linear processes. High-performing systems combine strong laws, capable institutions, and modern digital technologies. The pillars reinforce one another:

- Digital data standards (Pillar 5) enable AI-enabled tools (Pillar 9).
- Strong governance (Pillar 1) supports proactive business planning (Pillar 2).
- Clear roles and resources (Pillar 6) drive follow-up and accountability (Pillar 4).
- Sectoral rules (Pillar 8) shape communications and remedies (Pillars 3 and 7).

Fragmentation in any one pillar—such as weak data standards or unclear institutional roles—undermines the entire system.

Conclusion

The International Best Practice Analytical Model provides a comprehensive framework for evaluating recall systems across APEC. It captures both traditional regulatory functions and emerging digital capabilities, offering a clear roadmap for modernisation. The model enables economies to benchmark their systems, identify reform priorities, and plan coordinated, stepwise improvements anchored in global experience and adapted to regional needs.

Annex 2. Methodology, data sources, questionnaire process, and interview framework

This annex outlines the methodology used to generate the findings in this report. It describes the research design, data sources, questionnaire administration, interview processes, analytical methods, and limitations. It is intended to provide transparency about how conclusions were developed and to support future replication or extension within APEC.

1. Research design and approach

The project employed a mixed-methods research design, combining documentary analysis, comparative regulatory assessment, a structured questionnaire distributed to APEC authorities, expert interviews, and detailed case studies. This approach enabled triangulation across multiple sources and ensured that the analysis reflected both international best practice and practical experience from a range of APEC economies. The final design also went beyond the minimum originally envisaged, with 19 interviews conducted rather than five.

Key research components included:

Desk research and literature review

Analysis of local recall systems, legal frameworks, digital tools, AI initiatives, and international guidance from OECD, UN, ASEAN, and other bodies.

Comparative regulatory mapping

Systematic analysis of recall processes across APEC economies using the nine-pillar International Best Practice Analytical Model (Annex 1).

Questionnaire to APEC authorities

A structured questionnaire collected information on recall procedures, digital readiness, marketplace oversight, and interest in AI-enabled improvements.

Expert interviews

Semi-structured interviews captured insights from practitioners, technical experts, industry representatives, standards professionals, and consumer advocates.

Case study development

Illustrative case studies highlighted real-world examples of successful recall coordination, digital transformation, and AI applications.

2. Data sources

2.1 Primary data

Primary data consisted of:

(a) Questionnaire responses

Consumer protection and product-safety authorities across the APEC region were invited to complete a questionnaire covering:

- Legal basis for recalls
- Digital recall infrastructure
- Use of AI or automated tools
- Marketplace engagement practices
- Challenges in cross-border e-commerce
- Data formats and availability
- Capacity-building needs

Responses were thematically analysed and used to map AI and digital readiness in Chapter 4 and to validate key assumptions regarding regulatory capacity and challenges. Where questionnaire responses were not received, the research was supplemented by publicly available official information from those jurisdictions, including legislation, regulator websites, recall portals, and guidance materials, to support broader regional coverage.

(b) Expert interviews
Confidential, non-attributable interviews were conducted with:

- Public officials working in recall enforcement, digital services, incident management, and marketplace oversight
- Data-science and AI specialists
- Industry and marketplace representatives
- Standards and conformity-assessment experts
- Consumer protection and civil society organisations

Their insights addressed operational realities, data needs, AI feasibility, communication barriers, and opportunities for regional cooperation.

2.2 Secondary data

Secondary data sources included:

- OECD Working Party materials, including pledge frameworks and global survey results
- UNCTAD digitalisation and consumer-protection documents
- ASEAN recall guidelines
- EU Safety Gate annual reports and eSurveillance materials
- Public recall notices from multiple APEC jurisdictions
- Academic literature on AI, NLP, computer vision, and risk analytics
- Online marketplace transparency reports
- Technical standards related to data exchange and product identification

3. Questionnaire framework and use in the analysis

3.1 Purpose

The questionnaire was designed to provide a consistent evidence base across APEC economies on:

- Current recall processes
- Existing digital tools and datasets
- Operational challenges with online marketplaces
- Views on potential AI applications
- Capacity, staffing, and training needs

3.2 Content structure

Sections included:

- Legislative authority and institutional roles
- Incident detection and monitoring
- Recall communication and consumer outreach
- Digital portals and machine-readable data
- Cross-border coordination
- AI readiness and interest in pilots
- Barriers to digital transformation

3.3 Integration into the report

Findings from the questionnaire informed:

- The recall-system diversity mapping in Chapter 2
- The readiness cluster analysis in Chapter 4
- Prioritisation of AI-enabled tools most needed in the region
- Identification of capacity-building opportunities and shared infrastructure needs

4. Interview framework

4.1 Objectives

Interviews were designed to capture:

- Operational challenges within recall systems
- Insights on digital and AI-enabled tools already in use

- Data-governance gaps and resource constraints
- Marketplace behaviour and enforcement realities
- Inclusivity and communication barriers
- Opportunities for APEC-wide cooperation

4.2 Structure
Interviews followed a semi-structured guide, enabling consistency while allowing interviewees to elaborate on context-specific issues.

4.3 Analysis and treatment
Interview notes were anonymised, thematically coded, and synthesised into key issues, such as:

- Hazard detection
- Marketplace monitoring
- Data interoperability
- Institutional capacity
- AI-readiness barriers
- Cross-border enforcement
- Consumer communication challenges

These insights directly supported Chapters 3, 4, and 5.

4.4 Interviewee backgrounds (abstracted summary)
Interviewees represented a broad cross-section of expertise relevant to product safety, digital transformation, and AI. While no individuals or organisations are named, the group collectively reflected the following professional backgrounds:

- Regulatory practitioners involved in recall oversight, digital services, incident response, and e-commerce enforcement
- Technical and analytical specialists with experience in data science, machine learning, and digital risk assessment
- Industry and marketplace participants familiar with online platforms' internal safety processes and automated moderation systems
- Standards and conformity-assessment professionals with knowledge of product identifiers, digital documentation, and supply-chain traceability
- Consumer advocates and civil society representatives focused on accessibility, inclusivity, trust, and fairness in digital communication

This diversity ensured that the analysis drew from operational, technical, commercial, and consumer perspectives, strengthening the overall evidence base.

5. Analytical methods
Analytical techniques included:

- Thematic analysis of interviews and questionnaire responses
- Model-based assessment using the International Best Practice Analytical Model
- Comparative mapping of APEC recall frameworks against international benchmarks
- Technology maturity analysis for AI-enabled tools
- Triangulation of case study data across multiple sources

6. Limitations
Limitations included:

- Variation in the completeness and detail of questionnaire responses
- Inconsistent availability of machine-readable recall data across economies
- Limited transparency regarding marketplace AI systems
- Rapid evolution of AI capabilities
- Wide differences in regulatory authority, staffing, and infrastructure

Despite these limitations, the methodology produced a robust, triangulated evidence base for identifying opportunities to strengthen recall systems within APEC.

7. Conclusion

Annex 2 provides transparency about the methodology supporting this report. By combining questionnaire data, expert interviews, desk research, and international benchmarking, the project generated a credible and comprehensive foundation for analysing recall systems and identifying AI-enabled improvement strategies for APEC economies.

Annex 3. Summary of questionnaire results

This annex summarises the responses received from APEC consumer-protection and product-safety authorities through the structured questionnaire distributed as part of this project. Responses varied in level of detail, but together they provide a clear snapshot of the current recall landscape, digital maturity, and AI-readiness across the region.

1. Overall response pattern

Most responding economies provided detailed descriptions of their current recall procedures, identification of ongoing challenges, information on digital tools and data infrastructure, views on AI and digital transformation needs, and interest in regional cooperation. Responses came from economies at widely differing levels of regulatory maturity and digital infrastructure, reflecting the diversity within APEC. For non-responding jurisdictions, the project used publicly available official materials to support broader comparative coverage.

2. Key themes identified

2.1 Legal Frameworks and Recall Procedures

Most responding authorities reported:

- a clear legal basis for mandatory recalls.
- growing reliance on voluntary recalls initiated by businesses.
- centralised or semi-centralised recall portals.
- limited alignment with international data standards.

Only a minority reported codified requirements for business recall plans, product identifiers, or post-recall verification.

2.2 Digital recall systems

Digital maturity varied significantly:

- A few economies have **modern, publicly accessible online recall portals** with structured submission forms.
- Many rely on static webpages with PDF announcements.
- Very few provide **machine-readable recall data**, APIs, or automated feeds.
- Only a small number track recall effectiveness beyond basic follow-up.

2.3 Data and incident monitoring

Most authorities reported:

- insufficient structured incident data.
- limited capacity to analyse narrative complaints.
- dependence on manual review.
- a need for better tools to integrate complaints from multiple channels.

Several respondents noted that they do not have access to timely data from online marketplaces.

2.4 Interaction with online marketplaces

Most respondents expressed challenges in:

- detecting and removing unsafe products sold online.
- monitoring cross-border sellers.
- ensuring that online marketplaces take responsibility for unsafe listings.

Only a few economies had formal cooperation agreements or voluntary pledges with platforms.

2.5 AI readiness and interest in pilots

A strong majority indicated **high interest** in AI-enabled tools but **low current capacity**.
Common needs identified:

- tools for automatic marketplace scanning.
- NLP-based incident analysis.
- AI-enabled translation of recall notices.
- automated dashboards and analytics.

Respondents emphasised that **shared regional tools** would be especially valuable for economies with limited technical resources.

3. Capacity-building needs identified

Authorities consistently cited:

- training in AI concepts and digital enforcement.
- templates for digital recall notices.
- guidance on data governance.
- model cooperation frameworks with online marketplaces.
- examples of best practice from advanced economies.

4. Conclusions from questionnaire findings

Overall, the questionnaire revealed:

- strong commitment to improving recall systems.
- notable gaps in digital infrastructure and data standards.
- widespread interest in AI-enabled tools.
- demand for APEC-led coordination and shared platforms.

These insights directly informed the digital-readiness mapping in Chapter 4 and the recommendations in Chapter 6.

Annex 4. Summary of interview findings

This annex synthesises insights from confidential, semi-structured interviews conducted with regulators, academic experts, industry representatives, standards professionals, and consumer organisations. No individuals or economies are named, consistent with Annex 2's confidentiality provisions.

1. General observations across interviews

Across all interviews, participants shared the view that:

- current recall systems are under increasing strain.
- cross-border e-commerce has intensified enforcement challenges.
- AI and digital tools offer significant potential benefits.
- but adoption is limited by capacity, data quality, and resourcing.

Several interviewees emphasised that traditional "announce and close" recall models are no longer sufficient in digital-marketplace environments.

2. Operational challenges identified

2.1 Hazard detection

Interviewees repeatedly described:

- growing difficulty manually detecting unsafe products online.
- large volumes of listings across multiple marketplaces.
- lack of early-warning indicators from consumer complaints.
- absence of structured or machine-readable recall data.

Technical experts reinforced the need for NLP-based early-signal detection systems.

2.2 Marketplace oversight

Regulators noted:

- inconsistent cooperation from online marketplaces.
- re-listing of unsafe goods by repeats sellers.
- lack of seller verification.
- delays in platform response times.

Industry representatives described efforts to automate detection but acknowledged gaps across platforms.

2.3 Recall communication

Consumer advocates stressed:

- reach gaps for vulnerable consumers.
- the importance of multilingual communication.
- that recall notices must be readable on mobile devices.
- challenges tracking consumer response and recall completion.

Several interviewees supported generative-AI summarisation tools for clearer recall messaging.

3. Opportunities for AI and digital tools

Interviewees identified four recall stages with the highest potential:

3.1 Detection

- AI scanning of marketplaces using computer vision and NLP
- automated identification of prohibited or look-alike recalled items
- cross-platform intelligence sharing

3.2 Analysis

- text mining of complaints
- clustering of injury narratives
- predictive identification of high-risk product categories

3.3 Communication

- machine translation for multilingual recall notices
- chatbots for consumer queries
- personalised alerts via mobile or platform-integrated systems

3.4 Follow-Up and enforcement

- detecting re-sale of recalled goods
- automated tracking of return/repair patterns
- dashboards for regulators to monitor effectiveness

4. Structural barriers and constraints

Interviewees highlighted:

- lack of data standards across APEC economies.
- limited availability of machine-readable recall information.
- insufficient technical staffing.
- budget constraints.
- legacy IT systems.
- limited AI governance frameworks.

Some interviewees noted that AI-enabled tools cannot be piloted without foundational improvements in data governance.

5. Perspectives on regional cooperation

Participants consistently supported:

- APEC coordination of shared AI-enabled tools.
- technical assistance and training.
- voluntary marketplace pledges.
- alignment with OECD Global Recalls.
- greater cross-border information sharing.

Several interviewees emphasised that smaller economies would benefit most from APEC-level shared services.

6. Ethical and inclusivity insights

Consumer advocates and AI-ethics specialists stressed:

- the importance of transparent AI decision-making.
- the risks of excluding linguistic minorities or low-digital-literacy users.
- the need to design AI-enabled tools with inclusive datasets.
- human oversight for all automated systems.

These insights directly informed Chapter 4.5.

7. Conclusions from interview findings

The interviews provided detailed, operationally grounded evidence that:

- AI-enabled recall modernisation is both necessary and urgently needed.
- foundational improvements in data governance are essential.
- regional cooperation can accelerate development and reduce costs.
- marketplaces must play a stronger, more transparent role.
- inclusive design should be integral to digital transformation.

These findings fed directly into the case studies (Chapter 3), AI opportunities (Chapter 4), and recommendations (Chapter 6).

Annex 5. Workshop programme and outcome synthesis

5.1 Workshop timing and format

The workshop was held online on 24 and 25 March 2026, with two three-hour sessions each day. It was organised to allow participation from APEC economies across multiple time zones and combined live presentations, moderated discussion, and pre-recorded expert inputs.

5.2 Programme logic

The programme was structured to move from diagnosis to application. Day one established the baseline on recall systems in APEC economies and examined international experience with AI in product safety. Day two focused on feasibility, governance, cooperation with online marketplaces, and practical next steps for APEC. This sequencing helped ensure that policy discussion remained grounded in the evidence presented in the research report while still allowing participants to test the realism of proposed improvement strategies.

5.3 Outcome synthesis

Across the workshop, participants endorsed a staged and cooperative approach to recall modernisation. The most consistent messages concerned the need to improve data quality and interoperability, the importance of pragmatic pilots, the value of product safety pledges and platform cooperation, the continuing role of human oversight, the need to cover second-hand markets, and the benefits of regional sharing of tools and expertise. These outcomes directly informed Chapter Five and Chapter Six of this final report.