



**World Customs
Organization**

Future of Customs: The Study Report on Disruptive Technologies and Strategic Foresight

WCO Programme on Emerging Technologies
WCO-UNESCAP 5th UNNExT Masterclass
19 September 2022

Future of Customs



- Virtual Working Group on the Future of Customs under the WCO Permanent Technical Committee established in 2015; brings together representatives of over 40 stakeholders (Customs, private sector associations and members of the Private Sector Consultative Group, academia, international organizations)
- Latest trends, technological developments, occurrences influencing the Customs and border management environment
- In 2017 focus placed on: **1. Disruptive technologies**; and **2. Strategic Foresight**



Study Report on Disruptive Technologies – background and objectives



- Acknowledges the importance of exploring new and emerging trends for successful policy making
- Addresses the enhanced interest of the Membership in what we commonly call disruptive technologies
- Brings together outcomes of the discussions in the WCO working bodies and events
- Objective: Raise awareness of the latest technologies and their potentials, provide practical examples and uses cases
- Published in June 2019:
<http://www.wcoomd.org/en/topics/facilitation/instrument-and-tools/tools/disruptive-technologies.aspx>



Study Report on Disruptive Technologies

- contents



- Focuses on 7 technologies: blockchain; IoT; AI and ML; biometrics; drones; virtual, augmented and mixed reality; 3D printing
 - What is it and how is it broadly used?
 - How is it used in Customs and border management today? And in the future?
 - What are the benefits and risks?
- Strategy behind technology
- Recommendations
- 20 use cases



WCO-WTO paper

‘The role of advanced technologies in cross-border trade: A customs perspective’



- Chapter 4 on disruptive technologies of 2021 WCO Annual Consolidated Survey
- 3 groups of technologies (blockchain/DLT; IoT; and DA, AI, ML)
- Level of implementation (global, regional level), benefits and challenges, Members' case studies (full deployment, pilot projects and proofs of concept)
- Fed into the update of the Study Report on Disruptive Technologies 2022



Update of the Study Report on Disruptive Technologies



- Three years since the first version of the Study Report with many new developments having taken place
- To be done jointly with the WTO to include the broader international trade component
- Updates:
 - 2021 Annual Consolidated Survey - current state of play regarding implementation of three groups of technologies (blockchain, Big Data/Artificial Intelligence and IoT)
 - Recommendations and lessons learnt stemming from WCO's regional workshops
 - New chapter on legal and technical standards
 - Use cases on latest projects

Blockchain technology



The blockchain is a type of sophisticated cryptographic distributed ledger architecture, a continuously growing list of records called blocks. It has the capability to move any kind of data swiftly and securely and, at the same time, make a record of that change, movement, or transaction available instantly, in a trusted and immutable manner, to the participants in a blockchain network, called validators or nodes.

- In Customs regulatory processes for improving Customs compliance, trade facilitation and fraud detection
- Reduction of intermediaries and paper/manual tasks
- Improving certainty and predictability based on reliable real-time data
- Allows for traceability and end-to-end visibility thus enhancing supply chain security and facilitation
- Pilot projects and PoC



Blockchain technology: number of projects skyrocketing

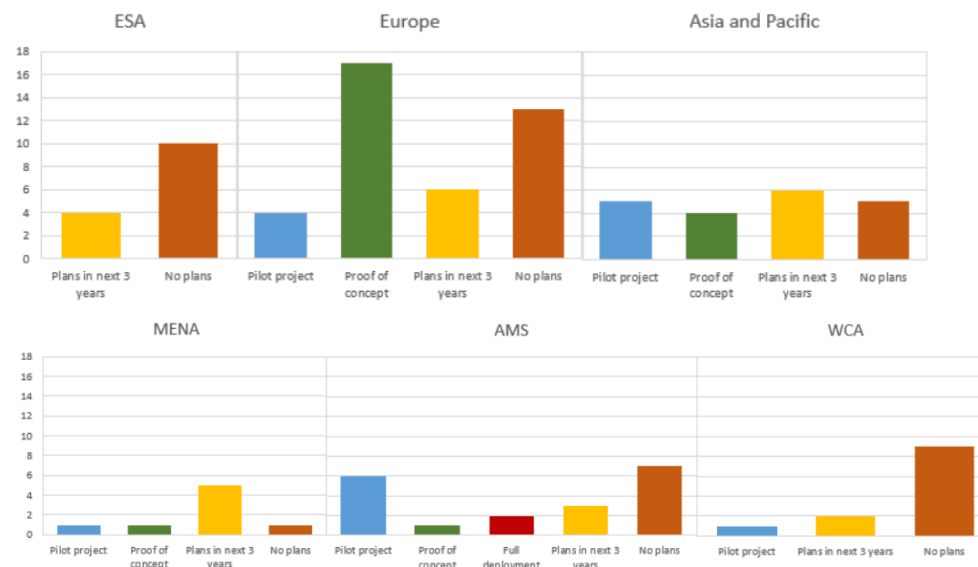
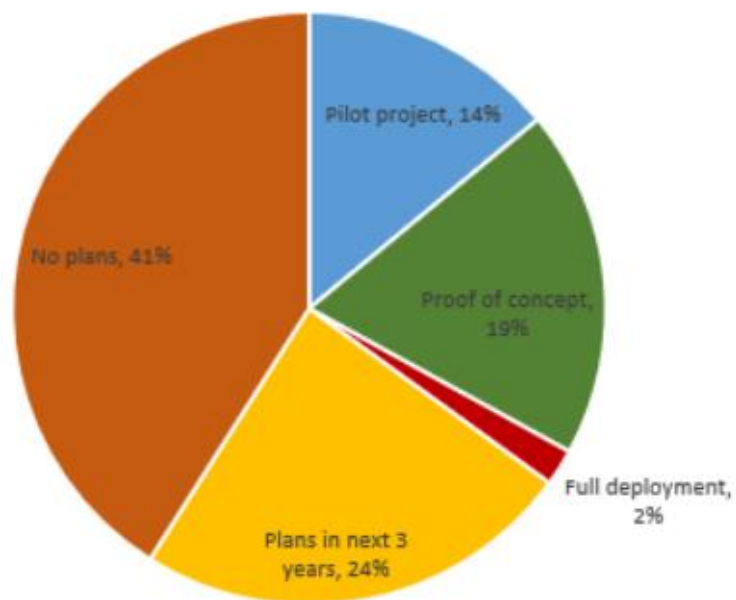


Blockchain technology: Benefits

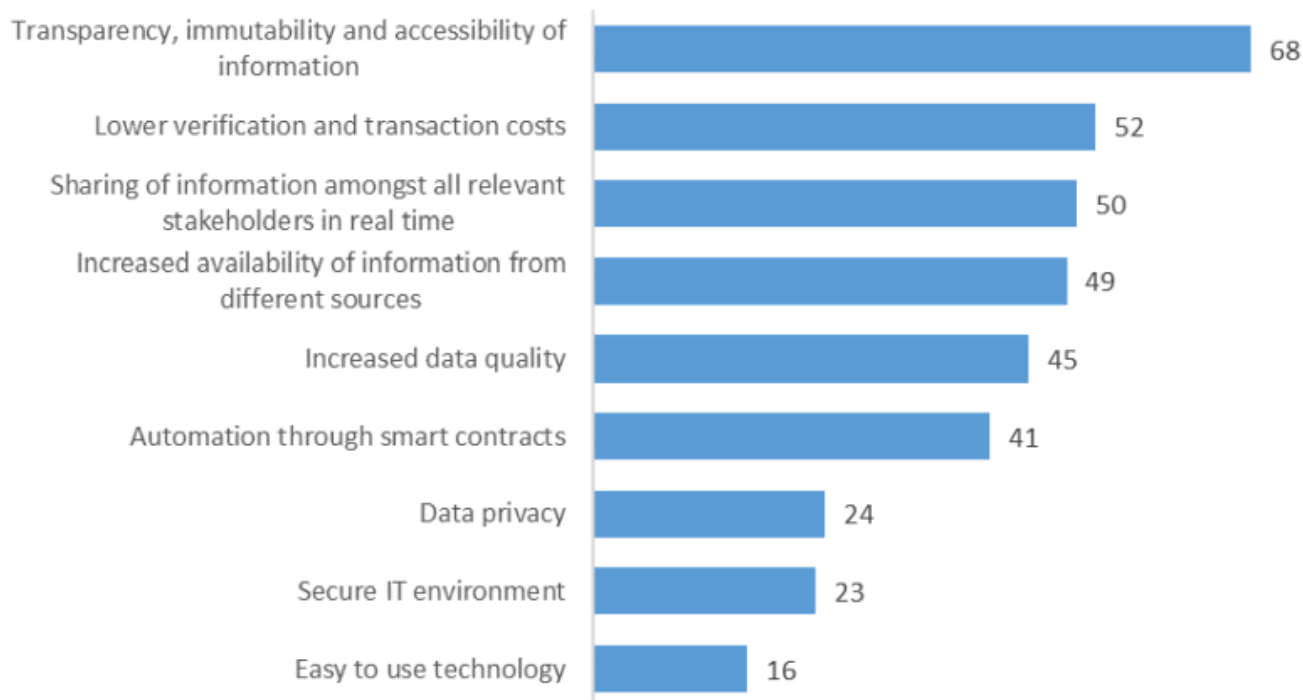


- **Increased security:**
 - no single point of failure
 - immutability and data integrity
 - technically highly secure
- **Greater transparency**
 - full chronology of events
- **Greater efficiency**
 - peer-to-peer interactions
 - automation through smart contracts
- **Greater compliance**
 - Less fraud, no double-spending
 - Audit trail that makes compliance monitoring easier

Blockchain technology: Stage of adoption

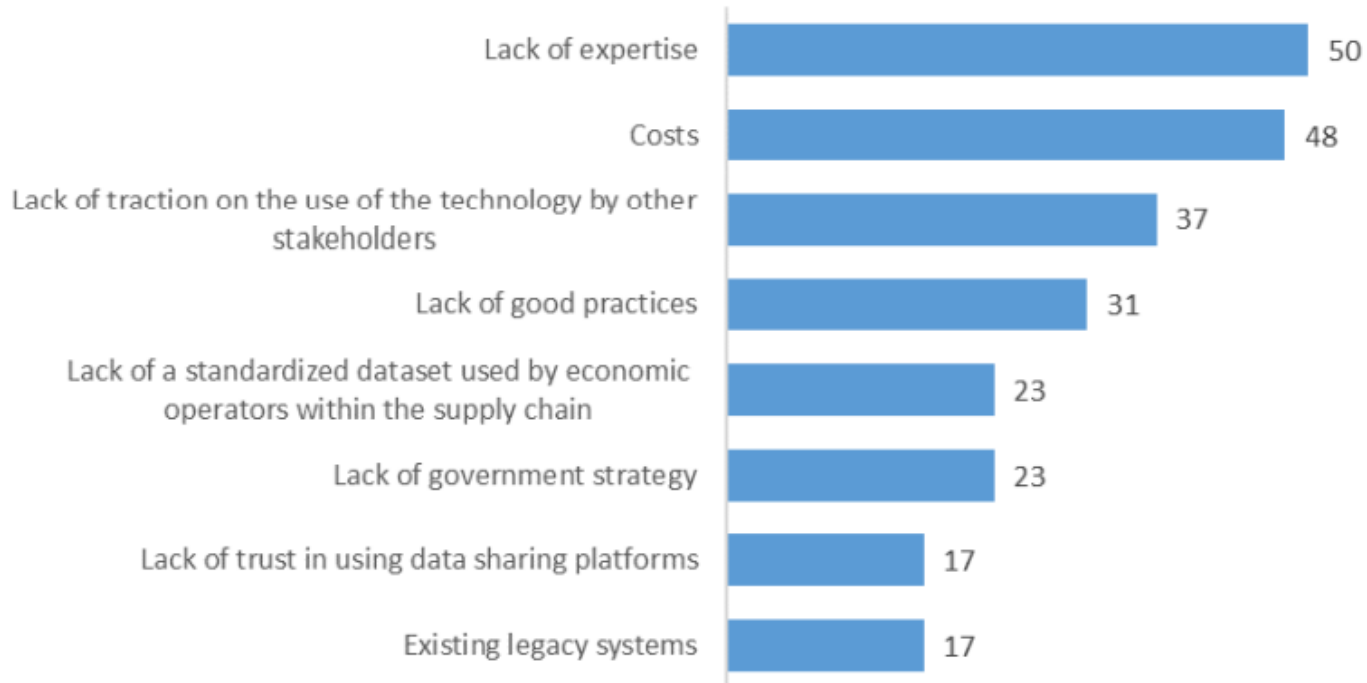


Blockchain technology: Main Benefits



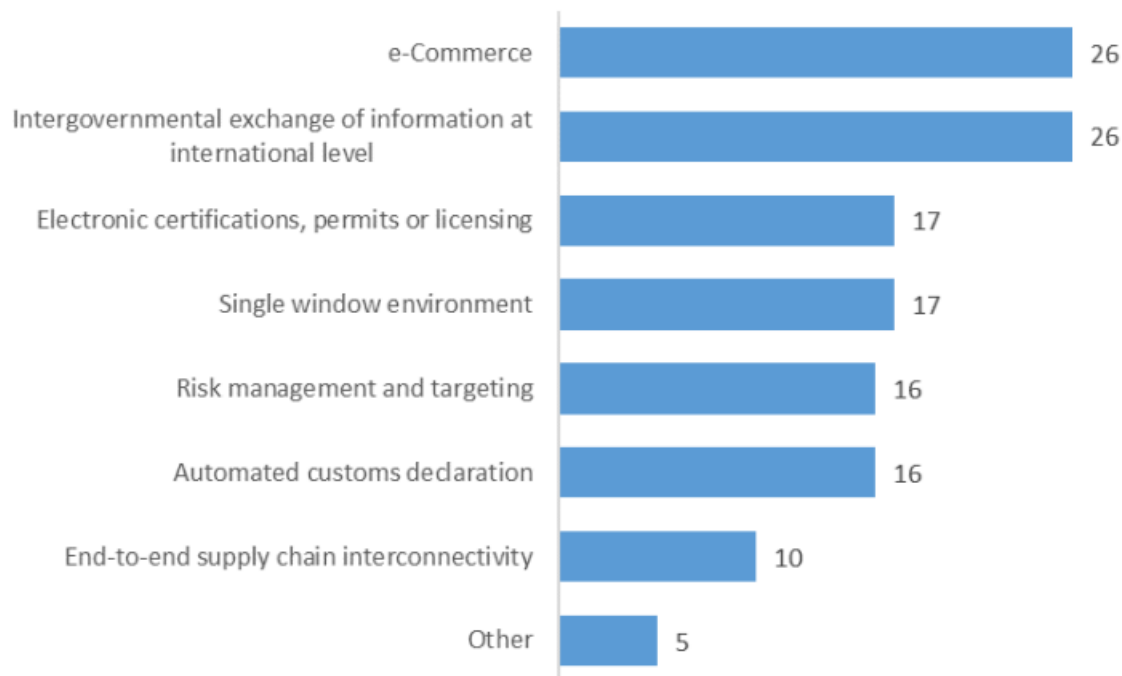
Note: Total respondents numbered 87.

Blockchain technology: Main obstacles



Note: Total respondents numbered 95.

Blockchain technology: Areas of implementation



Note: Total respondents numbered 44.

Blockchain technology: Use cases



Proving integrity and ensuring trust in IOSS VAT identifiers through a decentralized registry

1. Taxation authorities will allocate an IOSS VAT identifier
2. A new block with a Fingerprint of the IOSS Identifier will be created after verification
3. The Node will call other Nodes to obtain their endorsement of the proposed information
4. Customs authorities of the Member State of Importation can then verify the integrity and validity of the shared IOSS VAT identifier on the blockchain

Blockchain technology: Use cases



Blockchain based e-commerce platform

Connecting major e-commerce players like e-commerce companies, logistics companies, courier, government authorities and free zone

1. E-commerce / logistics Company will submit an E-Commerce Order with transport details to the platform;
2. The platform sends Declaration Creation Request to the Declaration system;
3. The Declaration system will send back a clearance message after risk assessment;
4. Last mile delivery company will provide delivery confirmation.

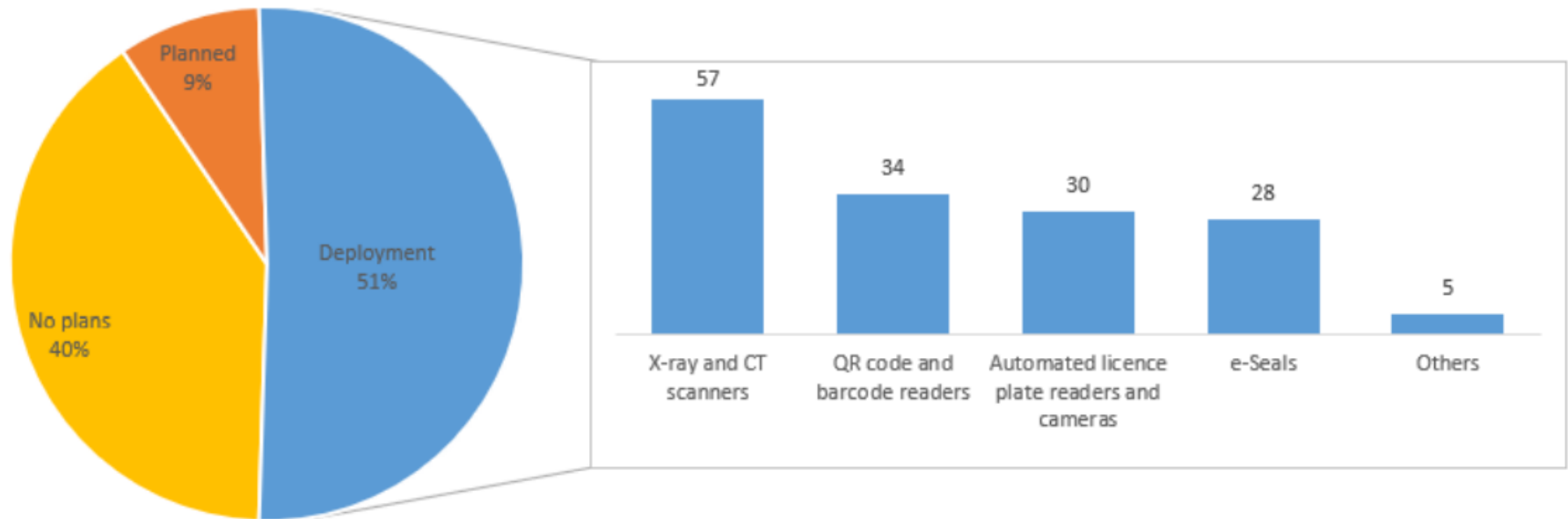
Internet of Things

The Internet of Things (IoT) is the internetworking of physical devices (also referred to as “connected devices” and “smart devices”), vehicles, buildings and other items embedded with electronics, software, sensors, actuators, and network connectivity which enable these objects to collect and exchange data. Simply put, the IoT transforms physical objects into smart devices to communicate, as well as interpret, information from the surroundings. It is used to make our lives more comfortable, and our businesses more efficient and less costly.

- Asset tracking has become very important for supply chain management and monitoring the movement of goods in real time
- Big companies are using IoT to track their goods and improve service
- Customs using smart security devices such as e-seals and car plate readers, X-ray scanners, QR code and barcode readers



Internet of Things: Stage of adoption

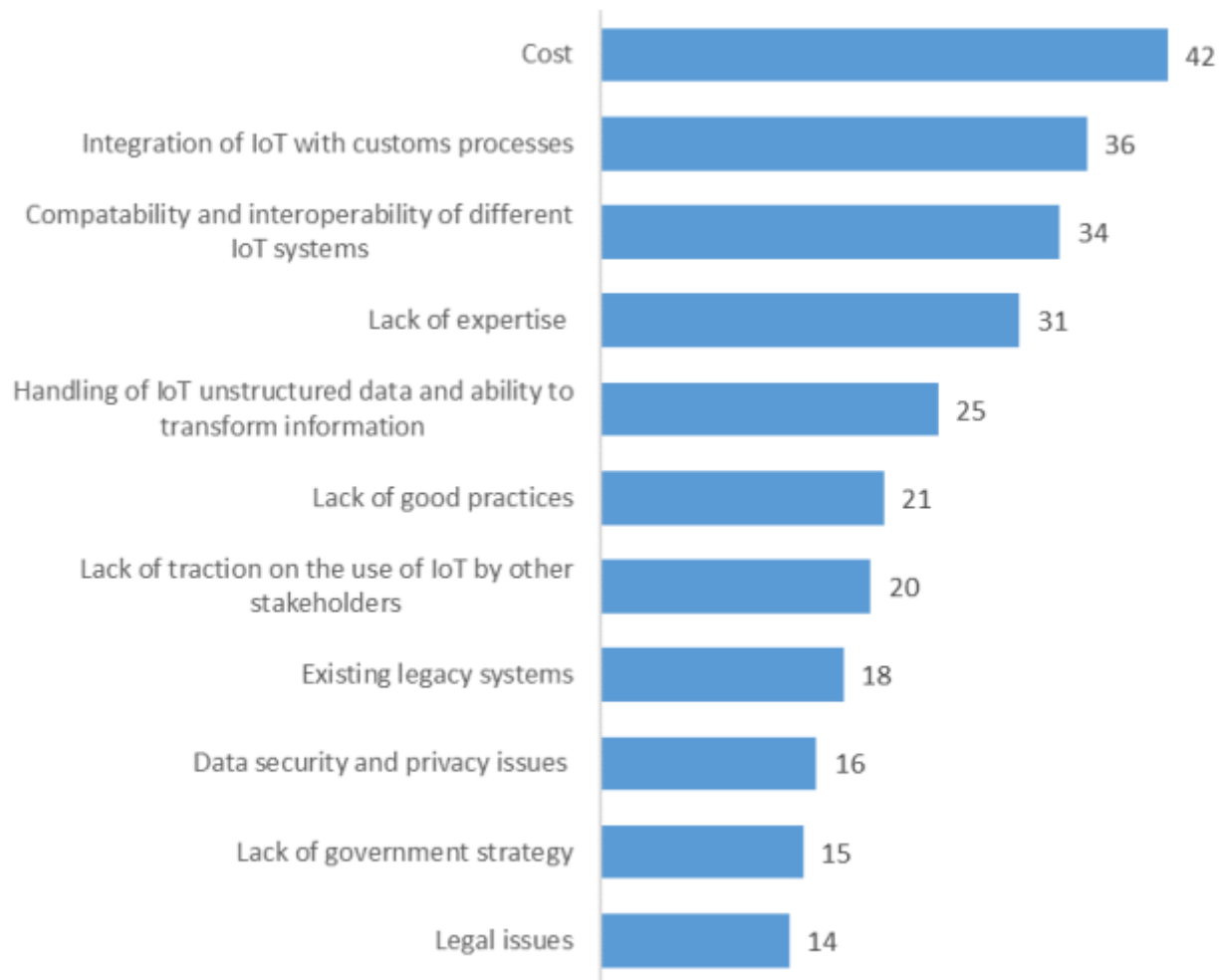


Internet of Things: Main Benefits



Note: Total respondents numbered 83.

Internet of Things: Main Obstacles



Note: Total respondents numbered 82.

Internet of Things: Use cases



Kenya, Uganda, and Rwanda: Regional Electronic Cargo Tracking System (RECTS)

End-to-end tracking across the borders of partner states as well as offering tailored solutions for cargo tracking and monitoring

- GPS tracking and GSM communication (integrated SIM Card) devices
- Real time monitoring of cargo in transit
- Facilitate the transit procedure while reduced cargo diversion cases

Big Data & Artificial Intelligence

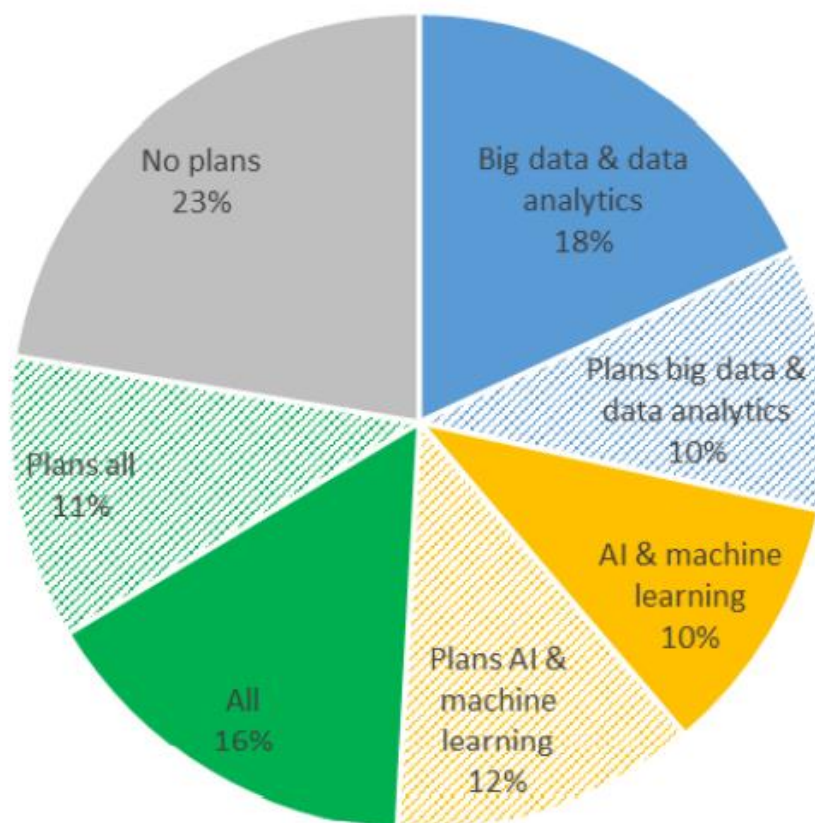


Artificial intelligence (AI) is an area of computer science that focuses on the creation of intelligent machines that work and react more like humans. AI refers to systems that change behaviors without being explicitly programmed, based upon data that is observed, collected and analyzed. It is a broad term that includes different technologies such as machine learning, deep learning, computer vision and natural language processing that, taken individually or in combination, add intelligence to applications.

- Detect and predict patterns more accurately than humans can
- Revenue collection models, classification of products, Customs audits, risk-based targeting, analyzing container images from x-ray scanners, logistics monitoring, identifying high-risk passengers and vehicles
- Visual search and facial recognition, behavioral and predictive analytics can be tailored for use in Customs and Border Management



Big Data & Artificial Intelligence: Stage of Adoption



Note: Total respondents numbered 94.

Big Data & Artificial Intelligence: Main Benefits



Note: Total respondents numbered 94.

Big Data & Artificial Intelligence: Main Obstacles



Note: Total respondents numbered 94.

Big Data & Artificial Intelligence: Use cases



Hong Kong: Cargo Big Data System (CBDS)

Big data analytics and artificial intelligence (AI) on cargo clearance to analyze the ever-changing trade pattern and trend in order to effectively combat cross-border smuggling crimes.

- AI Text analytics to process the unstructured free-text cargo data (e.g. goods descriptions and company names).
- Analytical tools such as pattern analysis, network analysis, as well as data visualization.
- Web crawling to analyze the latest smuggling trends.

Big Data & Artificial Intelligence: Use cases



Zambia: Using AI Chatbot (ZAX)

Chatbot to engage with taxpayers alongside other customer service channels

- Uses natural language processing to answer basic questions via a business.
- The information on the chatbot is managed by the Customers Support Unit working in collaborations with various divisions to ensure that relevant and updated information is fed into Zax.

Biometrics

Biometrics is the measurement and statistical analysis of an individual's physical and behavioral characteristics. The basic premise of this field is that every individual person is demonstrably unique and therefore identifiable via his or her physical or behavioral traits.

- Helps to identify wrong-doers and widely used already in immigration
- Potential uses by Customs in the future: verifying identities and controlling access of Customs operators, identifying the different actors in the supply chain such as Customs brokers, freight-forwarders, logistics operators and others



Biometrics: Use cases



European Union: iBorderCtrl –facilitate and secure border check points with biometrics

- Travellers will use an online application to upload pictures of their passport, visa and proof of funds, then use a webcam to answer questions from a computer-animated border guard
- Analyses the micro- gestures of travellers to figure out if the interviewee is lying
- Travellers who have been flagged as low risk during the pre-screening stage will go through a short re-evaluation of their information for entry, while higher-risk passengers will undergo a more detailed check

Drones

A drone is an unmanned aircraft or ship guided by remote control or onboard computers. Unmanned Aircraft Vehicles (UAVs) were originally used for missions too “dull, dirty or dangerous” for humans. While they originated mostly in military applications, their use is rapidly expanding to commercial, scientific, recreational, agricultural and other applications, such as policing, peacekeeping, and surveillance, product deliveries, aerial photography, agriculture, smuggling, and drone racing.

- Misuse of drones for smuggling
- Used by Customs for surveillance and monitoring purposes
- Customs needs to monitor, analyze and comprehend emerging developments concerning the use of drones and related regulatory developments and up with an appropriate policy response, together with potential adjustments of Customs procedures and requirements, where needed



Virtual, Augmented and Mixed Reality



Virtual reality, augmented reality and mixed reality are technologies that either create a fully simulated world or add digital artefacts to the physical world. Virtual reality is on one end of the spectrum, being a fully immersive technology. On the other end of that spectrum is augmented reality, where digital artefacts are added to the physical world. With mixed reality, digital artefacts are projected in the physical world. Those artefacts can interact with and exist alongside physical objects. This allows the merger of the physical and digital worlds.

- Can be used at physical inspection to project visual assistance in the physical world: 1. General assistance provided in advance to all employees; and 2. Assistance to provided by someone that can see what the Customs officer sees, in real time
- Visualization of big data sets
- Training of Customs officers – BACUDA project



Foresight in WCO



- Introduction through the PTC Virtual Working Group on the Future of Customs
- Awareness raising in PTC from November 2018 onwards
- Plan of future work on strategic foresight endorsed by the PTC in April 2020

1.	Promote strategic foresight at WCO's regional Directors' General meetings
2.	Develop a relevant methodology, based on strategic foresight, for drafting the WCO Environmental Scan
3.	Promote strategic foresight at WCO's regional workshops on disruptive technologies
4.	Through a number of workshops carry out a back-scanning or scenario planning exercise in order to develop a global WCO response to the open questions on the Future of Customs in the 20, 30 or 40 years ahead
5.	Consider including foresight methodology into the PICARD standards



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Thank You

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