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WAYS OF USING DIGITAL TECHNOLOGIES IN THE TRANSFORMATION OF CUSTOMS ACTIVITIES

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Abstract: In this article you can read about ways of using digital technologies in the transformation of customs activities.

Key words: Customs, procedures, economy, e-commerce, century, global developments.

Customs administrations worldwide have modernized in recent years, becoming adept at using digital technologies. We've seen e-commerce grow expo-nentially in scale since the turn of the century, and the global economy has be-come more digitalized. Because of these developments, a wealth of data and digital resources is now available to the customs field.

Moving forward, customs administrations are compelled to go beyond merely automating their procedures: They must capitalize on digitalization to better serve their stakeholders and to contribute to national economic progress. This is particularly pertinent because of the surge in cross-border e-commerce, in-creasing customs- and security-related threats, and the pressing need to sup-port post-COVID-19 economic recovery.

Digital Technologies Reshape Customs Administration

Most digitalization efforts in the industry have concentrated on customs clear-ance management, focusing on declaration processing, particularly functions such as risk management, valuation, data verification, and payment services. While undergoing digitalization, customs administrations can apply digital tech-nologies — such as data mining, big data, and telematics — to enhance their operations and facilitate secure trade.

Focusing on trade facilitation, further digitalization efforts were channelled into the introduction of a Single Windows (facilities, also known as 'SWs,' that allow parties to lodge standardized documents at a single point of entry to meet all regulatory requirements) and institutional cooperation. Customs is often as-signed a leading role in establishing a national SW. In such situations, it now matters little if only customs declarations can be processed electronically; the SW initiative necessitates a coordinated, whole-of-government approach to ensure effective information-sharing, streamlining of procedures, and collabo-ration among border control agencies.

Looking at the customs field, we can now see new forces that will shape our future: the continued rise of e-commerce, the proliferation of national SWs, in-creasingly complex global supply chains, a greater focus on transnational illicit trade, escalating concern for environmental protection, and — because of the ongoing COVID-19 pandemic — an urgent need to replenish depleted treasur-ies. Clearly, then, the role of customs has become more significant, both do-mestically and globally.

In this challenging landscape, it's necessary for customs to recognize new trends and developments. Adapting to this changing outlook calls for fresh mindsets from customs leaders to make the most of these disruptive technolo-gies.

Data Analytics Provides Valuable Insights

Customs has a greater demand for data from the public than any other gov-ernment agency. This is exemplified by Korea Customs Service (KCS) stating, as reported in an article published in June 2018, that it accumulated 45 GB of structured data and 30 GB of unstructured data every day.

These masses of data can provide important insights, if customs can harness them through advanced data analytics. In this context, it's crucial for customs administrations to develop data analysis techniques and become more data-driven. Customs has also turned to data mining and predictive analytics, for example, using cognitive technologies and advanced algorithms to analyze un-structured data, coupled with predictive analytics that help to identify patterns and trends, compliance and/or non-compliance history, gaps, risks, and modus operandi. Data analytics provides a new approach to customs analysis, using sophisticated tools to draw data from various sources, reviewing and analyzing it, and pulling valuable insights from it.

The ever-improving ability to mine information sources by using data analytical techniques is very influential in customs today. In recent years, there has been an upsurge of interest in data analytics and a growing demand for training on the use of data analytic models.

The World Customs Organization (WCO) has initiated several efforts to pro-mote data analytics within customs in recent years. A recent initiative is the Band of Customs Data Analysts (BACUDA) project, a collaborative research platform focused on data analytics that was launched in September 2019. BA-CUDA aims to develop data analytics algorithms in open-source languages (R or Python), so that WCO members can use them for their own data.

Artificial Intelligence Predicts Patterns

While Artificial Intelligence (AI) is not new, it has only more recently received prominence and attention because the accessibility of cloud computing and the large-scale availability of processing power, combined with the exponential in-crease in data, has brought AI into focus more.

Use of AI in customs presents a tremendous opportunity. Given the huge vol-umes of data collected by customs and border agencies generated by goods, people, and vehicles moving across borders, AI provides the ability to make sense of the vast and ever-increasing amount of data. Essentially, these AI technologies can be used to ingest this data and detect and predict patterns more accurately than humans can.

X-Ray Image Analytics Enhance Inspection Efficiency

The introduction of container shipping has created the need for Non-Intrusive Inspection (NII), by customs. Meanwhile, the rise of 'parcelization' of trade (the increasing prominence of cross-border e-commerce) exacerbate the need for NII inspection. Using NII equipment, such as X-ray scanners, is a key element to enhance customs' inspection efficiency and effectiveness.

Typically, a cargo X-ray scanner can scan up to about 35 to 50 containers per hour. With the images uploaded onto their ICT network, customs image ana-lysts scrutinize the images for anomalies, aided by software imaging tools. Still, analysis of X-ray images is a demanding visual-cognitive task — requiring specific abilities to locate a target efficiently and effectively, despite a variety of potential distractions. Naturally, human errors caused by eye-fatigue are com-mon, leading to a great risk of illicit cargo going undetected.

Unsurprisingly, there is increasing demand for automated image identification to ease the burden on human image analysts, because of the ever-growing volumes of trade. Research efforts to develop automated image identification and risk assessments with AI are ongoing. In this context, the intelligent image analysis system, which applies AI technology is a great boon for more efficient customs controls with the large volume of e-commerce items.

With advanced image compression technology and much cheaper storage, customs can now collect, store, and archive X-ray scans more economically, and to build up a sufficiently large image library as a learning reference data-base for training purposes, as well as for developing Automated Threat Detec-tion (ATD) algorithms. For example, since 2017, China Customs has explored the use of AI alongside its inspection equipment systems and carried out pilot projects to test, and the machines proved effective at detecting restricted and prohibited items. Because of these pilots, confidence in ATD grew, so ATD was incorporated more into China Customs inspection scanners, and integrat-ed into their customs information systems as well to the library of scanned im-ages.

Internet of Things: Improving Security.

The Internet of Things (IoT) enables customs to monitor cargo and track jour-neys more effectively. Customs can collect and analyze data from sensors embedded in vehicles and containers as well as at critical checkpoints. With IoT, X-ray scanners can communicate with container electronic seals (e-seals), enabling the images from the X-ray scanners as well as manifest data to be remotely transferred onto the e-seals. This facilitates better verification and acquittal at the destination point. The IoT information can also aid more efficient vehicle traffic flow in the customs control area. Meanwhile, customs agencies can also make greater use of IoT to detect fraud and other crimes. For instance, IoT can raise an alert when cargo isn't moving along the ap-proved routes, and it can also detect potential tampering in containers.

There are, however, several challenges to the widespread use of IoT technol-ogy. One of these challenges is concerns about privacy, as IoT information could be considered private data, with it including individuals' habits, prefer-ences, and locations. IoT also presents issues around digital evidence, data provenance, and traceability. Meanwhile, exchanges of IoT data among cus-toms administrations could be tricky in terms of ownership of data, intellectual property rights, and data usage. Because of these issues, it's necessary to have appropriate policies and legislation in place to address data privacy and IoT data exchanges between customs administration.

In recent years, IoT devices — such as e-seals, integrated with Global Track-ing System (GPS) and Electronic Cargo Tracking Systems (ECTS) — have been used more and more in customs operations. For example, the East Afri-can Community (EAC) has implemented the Regional Electronic Cargo Track-ing System (RECTS), through the use of GPS enabled e-seals for an end-to-end electronic monitoring of transit cargo along its Northern Corridor (which serves Kenya, Uganda, Rwanda, Burundi, and eastern Democratic Republic of Congo). The use of e-seals has reduced the risk of fraud and security threats while enabling greater levels of facilitation for goods in transit.

Robotic Process Automation Increases Efficiency

Robotic Process Automation (RPA) is a machine or software to perform high-volume, repeatable tasks with much greater efficiency than humans. RPA software robots can log into applications, enter data, handle queries, calculate and maintain records and transactions, complete tasks, and then log out. What distinguishes RPA from traditional IT automation is the ability of the RPA

soft-ware bots to mimic a human worker — to be aware of and adapt to changing circumstances, exceptions, and new situations. Once RPA software is pro-grammed to capture and interpret the actions of specific processes, it can then manipulate data, trigger responses, initiate new actions, and communicate with other systems autonomously.

RPA has the potential for greater use in customs operations, such as data ver-ification of many manifests and declaration submissions. It can be pro-grammed to check, for example, if the value of the goods in the declaration doesn't match the invoice, the declaration has a missing certificate, or there are erroneous data inputs. Typically, RPA can help to detect and resolve mis-takes that are common but incur considerable time and human resources on customs. The use of RPA, combined with optical character recognition bot, da-ta entries on manifests and declarations can be quickly verified with supporting documents attached — such as commercial invoices, packing lists, certificate of origin, and permits — and immediately corrected in the declaration pro-cessing system.

Cloud Computing: A Platform for Custom Applications

The on-demand availability of computer system resources — especially data storage and computing power that cloud computing provides — has solved the financial and infrastructural problems to develop and maintain custom applica-tions, as it eases the investment burden. But the advantages of cloud compu-ting services go beyond just cost-saving.

The traditional methods of developing custom applications, which previously took months, can now be completed much faster. Applications that use virtual-ized IT services are generally more efficient and better equipped to meet user demands. Various cloud computing services subscription models, such as pay-per-use and computing as a utility, provide clients with flexibility in how much they want to spend and reduce unnecessary expenses. Cloud computing tech-nology is now more mature, so it's able to offer customs the opportunity to run collaborative systems in a potentially massively scalable environment, with substantial gains in efficiency and cost savings.

Previously, concerns on privacy and misuse of information weighed heavily on customs, deterring them from operating on a public cloud platform. However, alternatives such as private or hybrid cloud solutions have eased some of the initial concerns and pave the way for increased acceptance of cloud computing in customs. For example, we have seen in the tender requirements for the Barbados Electronic Single Window (BSEW) — a strategic initiative that aims to position the Caribbean nation as a regional pioneer and logistics hub — re-questing proposals for interconnectivity between the customs, port authority, and border control agencies through cloud-based services.

Blockchain: Transformational Technology?

Blockchain has been the lauded as transformational technology for many fields, including the government sector. Blockchain-based technology has many uses for government agencies; one of its key advantages is its trustwor-thiness, with cryptography ensuring that records can't be altered.

Features of blockchain technology, such as Distributed Ledger Technologies (DLT) and smart contracts, have enormous potential to improve the efficiency and speed of cross-border supply chains by simplifying processes and reduc-ing the need for human intervention in several

transactions. These attributes also reduce cross-border friction and lower the cost and complexity of cross-border transactions. Using DLT and cryptography, the governments of the trading community can securely share and exchange data with customs and other government agencies. This eliminates a single point of failure and pro-tects sensitive trade and government data. Smart contracts can automate the customs clearance process by automatically releasing shipments that match customs' criteria.

As customs undergoes a process of digitalization, blockchain will become a more attractive proposition. Several customs authorities have started pilot pro-jects, such as exchange of electronic certificates and bills of lading. With many of these efforts in the proof-of-concept stage, it will be a matter of time before blockchain is more widely used by customs. However, there are still various issues that impede it from widespread use, such as the lack of governance standards and limited interoperability.

Customs authorities should continue working with the trade community to ex-plore potential applications and to identify processes that can benefit from blockchain technology to ensure digital trade growth remains strong. A promis-ing use of blockchain technology is in improving the interoperability of SW sys-tems regionally and globally.

The KCS has been piloting the use of blockchain solutions in selected customs operations, such as the import/export clearance process, e-commerce imports, and cross-border information exchange. These pilot programs helped to un-cover technical and institutional issues, and resolutions can be found to enable mainstream usage of blockchain in customs systems. The KCS pilot programs mostly used hyperledger fabric, a private, permissioned blockchain framework.

The Future of Customs

The pandemic has highlighted the critical roles customs played in facilitating trade and has created a greater impetus for the digital transformation of cus-toms administration. The potential of these emerging technologies is promising and realizable — if adopted correctly. Customs leaders need to adopt a holistic approach in implementing digital technology, to instill greater automation and improve efficiencies and effectiveness.

Another change in mindset is also necessary: While technologies are critical enablers, digital transformation can't be undertaken as solely an ICT endeavor. Far too often, digitalization efforts fail to gain traction when projects are ap-proached in a siloed fashion, led by only ICT departments.

Instead of a piece-meal approach, digitalization efforts ought to have a trans-formative effect on whole organizations. It's necessary, therefore, for those responsible for both operations and business to be principally involved, equipped with re-engineered use cases and processes for these newer tech-nologies. With this coordinated approach to this promising technology, the journey ahead for customs will be rewarding.

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