BORDER SECURITY REPORT

ECONOMIC VELOCITY: THE TECH FRONTIER OF BORDER OPERATIONS

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In today's evolving global landscape, border management has never been more important, nor more of a balancing act between the competing priorities of security and trade facilitation. The Organization for Economic Co-Operation and Development (OECD) expects global trade in goods and services to grow by 2.3% this year and 3.3% in 2025 – more than double the 1% growth seen in 2023. The International Monetary Fund (IMF) puts world trade growth at 3% this year and 3.3% in 2025.

Border Management organizations are not only responsible for ensuring the security of their nations' borders but also for facilitating the efficient movement of people and cargo.

Advancements in technology, data, and innovative workforces have enabled border management and customs organizations to merge these dual missions into one common goal: velocity.

A popular adage in border management and trade facilitation communities is that “cargo at rest is cargo at risk.” Idle goods represent not only a significant cost to businesses but are also more vulnerable and exposed to a variety of risks – be it theft, damage, or illicit activities.

“Cargo at Rest is Cargo at Risk.”

Border management organizations are on the brink of a significant transformation in which they are no longer merely “border guards”, but the catalysts and support systems for economic growth. We are rapidly approaching a world in which border management processes are seamlessly interconnected; data flows between government entities, skilled personnel are augmented by artificial intelligence, and cargo moves frictionlessly. This reality is being made possible through intentional and innovative collaboration between the public and private sectors.

Technology is transforming every facet of the border enforcement mission and expanding the limits of what was previously thought possible. The convergence of operational technologies (OT) with information technologies (IT) and

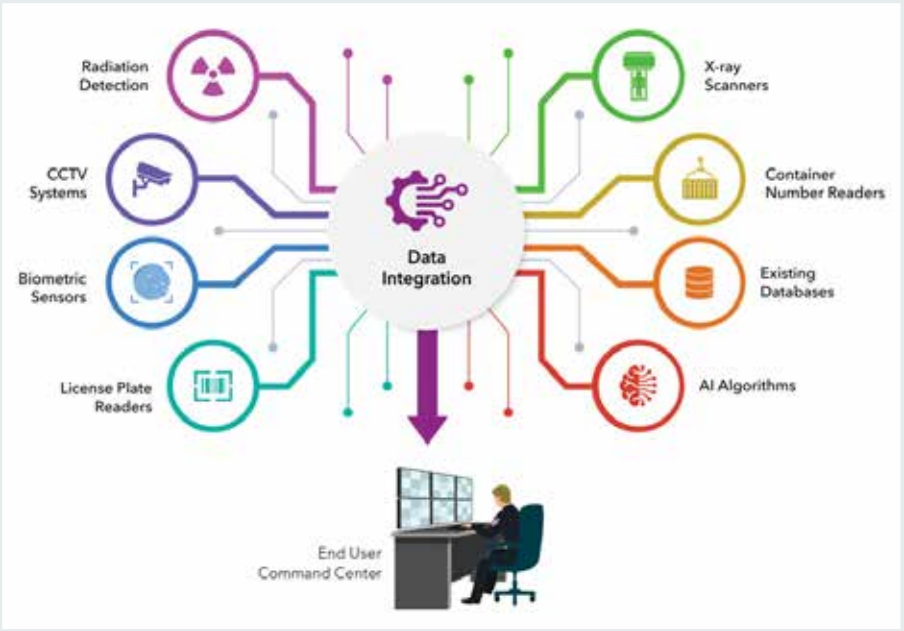

Figure A: Illustration of data sources that could be integrated into a centralized management system

the automating force of artificial intelligence (AI) and machine learning (ML) are automating operational workflows, including the analysis of images. Non-intrusive inspection (NII) systems are becoming increasingly capable of detecting objects in every modality of trade, and correlating technologies – machine vision systems, biometric systems, RFID, QR Code, and other sensors - are enabling x-ray imagery to be linked to commercial data such as shipping manifests and declarations. Standards necessary to ensure data privacy, cyber-physical security, and robust governance are also paving the path forward for integrated decision systems to collect, store, and disposition data. Everything is increasingly connected and shareable, and everything is getting smarter and more secure.

The value proposition offered by these technologies used to be that the whole will at least equal the sum of its parts; likely, the sum will equal a lot more. Innovation empowers border management organizations to build unprecedented internal capacities and, therefore, the possibility to lean farther forward, facilitating trade and travel in unprecedented ways. By identifying risks early in the supply chain, customs administrations make informed decisions with their stakeholder partners swiftly and efficiently, accelerating cargo movement across the globe. Reducing trade frictions and inefficiencies through technological innovation leads to increased

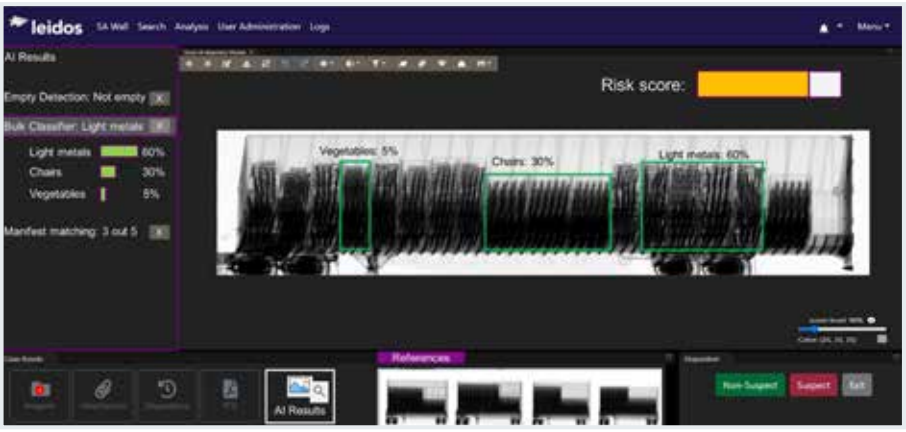

Figure B: Illustration of screening software with bulk classifier capability to distinguish different items in scanned cargo

participation in the global economy by local firms, increased knowledge flows, the creation of new jobs, and an expansion of national innovative capacity.

How will border management organizations realize the value offered by transformative technology? To help illustrate the ways this can be done, we consider a few notable examples on the horizon including the port of the future, single window systems, and expanded risk management systems.

Port of the Future

The Port of the Future model has gained popularity in governmental and academic circles recently. This concept focuses on creating ports of entry that blend the use AI, advanced analytics, human capital, and innovative technologies to result in a highly efficient port.

To achieve this, the many different technologies operationalized at ports and borders need to communicate seamlessly. Integration technology has enabled data from biometric sensors, license plate readers, closed-circuit television (CCTV) systems, manifests, container number readers, NII systems, and radiation detection systems to be connected and available immediately to customs officers.

To enable the centralized data management of cross-border movements, providers of these technologies should have a proven, configurable commercial off the shelf (COTS) application capable of ingesting, transporting, managing, storing, and sharing NII data, in a standardized format, to end-user command centers. Highly trained image adjudication analysts can have images and data from multiple sites transmitted to them for review, which allows scanning and processing to occur at the speed of travel without unnecessary stops or delays. Image adjudicators, with the assistance of AI/ML technology, can provide almost instantaneous feedback on high-risk shipments, miscategorized cargo, and guidance on what requires further review by an in-person officer.

In the Port of the Future model, collaboration is essential. Stakeholder dynamics are increasingly complex as data sharing between cross-border government entities, international organizations, and private sector stakeholders becomes the norm. Harmonized policies and procedures, innovative standards, and agreements for information sharing are the foundation for such system. Border management agencies must experiment through pilot programs or other means to incubate new solutions and adjust as necessary.

Figure B shows how AI/ML can augment manifest and scanning data with commodity identification capabilities. A trained AI/ML system can identify that the cargo being scanned is composed of light metals, chairs, and vegetables. This evaluation is then automatically cross referenced with the manifest. If any discrepancies are identified, the officer can quickly direct the cargo for secondary inspection.

Single Trade Window Systems

Since the 1990s, single trade window (STW) systems have aimed to expedite the customs clearance processes, reduce bureaucratic hurdles, and enhance efficiency in cross-border trade. Historically,

the interests of governments and commercial companies at borders have been characterized as in opposition. Importers, exporters and trade facilitators want to move goods efficiently across borders at minimum cost, while government agencies need to enforce regulations and legislations. This can require companies to provide data multiple times in different formats, slowing trade.

STWs dissolve this opposition by building a system that benefits all users – companies and governments. Traders enter data into a single system, saving them time and providing greater visibility of shipping status to inform planning and increase operational efficiency. That transparency further benefits government agencies by automating enforcement processes and holding all border-related data in a single, easily searchable IT system, rather than in siloes, to reduce risk and support revenue collection.

Beyond just supporting seamless travel and international trade, STW's have the potential to identify and mitigate potential security and terrorism risks by facilitating data sharing between government agencies, thereby improving risk identification and management, interoperability, and traceability of goods. The most ambitious STWs define their mandate even more broadly than uniting all government services. With the Networked Trade Platform (NTP), for example, one

country's STW allowed companies to fulfill a range of state requirements such as customs declarations, while also accessing private services such as freight booking and cargo insurance. In building the NTP, this customs service also worked with the monetary authority to share data from customs permits with private banks, helping financial institutions monitor fraud and mitigate the risks associated with trade-based money laundering. Meanwhile, traders can give consent through the NTP for their data to be shared directly with financial institutions, reducing the amount of information they subsequently need to provide to their banks about goods entering or leaving that country.

The internet of things (IoT), edge/cloud devices and AI technologies have enabled STWs to now converge with risk management and NII functions, allowing agencies to target suspected cargo and traders, assess relevant inspection data from multiple control points, and deploy mitigating resources methodically and efficiently. AI/ML approaches can augment risk management capabilities and enable customs to transform from a reactive posture to a predictive posture, predicting potential compliance risks by analyzing current and historical trade and inspection data.

The integration of innovative technologies into border processes is deeply intertwined with a fundamental shift of border management organizations from their traditionally regulatory role to one that is a force driving economic growth and productivity. In this new role, border management organizations drive international trade and economic development for their respective countries by reducing the time that cargo is idle, helping minimize the costs and risks to businesses with cross-border trade, all while building capacity within their border management organizations to achieve a "forward-leaning" approach.

Summary

While the above provides examples of how technology transforms the border management mission, the corollary is that without these capabilities, border control agencies and businesses will be burdened.

Technology will continue to improve the speed and quality of trade and border controls.

However, border management agencies must ensure that they acquire capabilities in a way that yields effective results, maintaining performance over time, and most importantly, that AI/ML algorithm results are trusted.

Deployment of AI/ML into an operational environment at scale will require more than the algorithms themselves and should not be viewed as a "Commercial Off the Shelf" acquisitions. Agencies will need to apply a holistic view to deploy performing, sustainable AI/ML capabilities, requiring consideration of infrastructure requirements such as the physical and cyber security of the technology ecosystem, strategies for data storage and processing, and planning for how AI/ML results will be delivered.

In addition to infrastructure considerations, agencies will need to adopt best practices around the use of AI/ML. Notably, these will include an approach to AI governance, data standards application, data curation strategy, and development operations and machine learning operations pipelines.