IV. Strategy behind technology

A. Developing and implementing new technology

There is a need to harness the latest technologies as traveller and trade growth, including e-commerce, has significantly outpaced the typical Public Service volution, challenging conventional operations, programme policies and legislation. Drivers for technological change in Customs organizations include the following:

- **Global environment:** Becoming a leader in trade facilitation and Customs services in the marketplace
- **Accountability:** Enhancing accounting capabilities and internal controls
- **Efficiency and service delivery:** Making it easier for client and business interaction
- **Business simplification:** Reducing barriers to trade and lowering costs for importers
- **Technology:** Increasing productivity and improving decision-making capabilities while supporting trade fraud and evasion detection.

Technologies such as blockchain, biometrics and artificial intelligence are more than business enablers, they set expectations for our stakeholders and change how we work. It is essential, however, to focus technological changes on those key to an organization's mandate, as otherwise there is a risk of over-committing.

Innovation is key to developing and implementing new technology and can include:

- Reviews of the latest technologies
- Establishing partnerships with the private sector, between countries and with academia
- Considering the global ecosystem
- Keeping people, processes and change management at the forefront

Innovation initiatives require a clear process to properly review and assess the ideas. Some initial ideas will be of low value, unfeasible or already in the works. The process must allow for the appropriate gating and filtering of ideas to allow the "right ones" through to pilot and potentially full production/implementation.

Options for the implementation of emerging technologies must be evaluated based on the services required and the needs of the organization. Commercial-off-the-shelf services on hosted platforms may be the right solution for one line of business within an organization while a purchased platform with services built internally may be the right solution for another.

Organizations must also evaluate the potential time to market, security requirements, the need for product customization as well as the size and knowledge of their development team when determining the right technological fit. There is also a need to continuously re-evaluate technology strategies and plans over the course of projects as new technologies may be more relevant and cost effective.

The high rate of failure in large, multi-year IT-enabled projects has resulted in organizations moving away from large IT system development and instead selecting technologies that can easily migrate to new hardware in the future. Organizations are looking to aggressively standardize on key platforms by buying the software once and using it multiple times. Furthermore, system dependencies are being decoupled and large monoliths broken down in small sub-systems to allow for scaling, enhancement and re-use of individual components.

Where possible, organizations have moved or are moving away from waterfall approaches to project management and towards more rapid prototyping and design thinking. These iterative approaches are focused on understanding the problem from the point of view of all stakeholders, going through many iterations of ideate, build and test.

To allow iterative project management approaches to lead to success, key performance indicators need to be defined at the outset and assessed as prototyping unfolds. This includes having quantifiable measures of system performance, effectiveness and suitability to document whether what is being delivered offers the expected quantifiable outcomes. If so, documenting the extent to which it does so allows scope for small adjustments so as to deliver more capabilities in the long run. Positive qualifiable outcomes are obtained through iteration, where incremental changes hone the product more and more closely towards user expectations.

Key to these methodologies is the principle of failing fast and recovering quickly. The fidelity of the solution increases with each iteration as what worked is kept and what failed is reworked in the next iteration. Ideas are tested through a phased approach to gain insight while managing immediate pressures, as outlined by a sample timeline below:

- **Phase 1 - Proof of Concept (1-3 months):** Carrying out mini experiments with the individual pieces to see what might work;
- **Phase 2 - Prototype (3-6 months):** Putting the pieces that worked in the Proof of Concept together; framing the end-to-end solution/response; understanding the glue that frames the response (i.e., policy, new class of employees, training, infrastructure, technology, etc.); multiple iterations that increase in fidelity each time;
- **Phase 3 – Minimum Viable Pilot to Production (1-2 years):** Real life in the field and addressing immediate pressure; opportunity to see what works and what does not work in a real-life context; fixing what does not work while the pilot is running (iterate the pilot fidelity); informs the implementation of a national product.

Regardless of the size of the project, test-driven system development is crucial to gain agility, boost product quality, and reduce delays between releases as well as errors during handoffs. This is achieved by developing tests before their associated features, thus inherently increasing test coverage. Doing so ensures that each feature meets the intended use before it is fielded, new features being developed by disparate teams are tested against the existing features and that all features function as expected before being fielded. The concept of continuous integration enabled through automation, including automated testing, ensures that the tooling is in place to orchestrate testing and deployment, thus reducing manual intervention, delays and human errors. These pieces are essential to boost design thinking and improve velocity between iterations.

Customs organizations are using these kinds of new methodologies to implement the disruptive technologies outlined in this Study Report. The Canada Border Services Agency (CBSA) is, for example, developing prototypes using design thinking, one of which was deployed at the Ambassador Bridge, between Canada and the US, in September 2018 to remotely process commercial vehicles as part of the Secure Corridor Concept - Trusted Trader pilot. The pilot tested the technology's ability to reduce the processing times of trusted, low-risk commercial trucks at the Primary Inspection Line by up to 50%, increase truck volume throughput at the port of entry, and reduce the administrative burden on border service officers (BSOs) by removing manual processes. This would contribute to an overall reduction in average border wait times for commercial carriers leading to reduced costs to industry partners.

Highlights of this initiative included:

- A design thinking approach that was taken from concept to prototype to pilot, introducing technology quickly;
- Key performance indicators identified to measure new technology against existing processes;
- A combination of technologies used to automate the capture and input of commercial passage information into CBSA systems, removing the administrative burden from the BSO and allowing for greater decision-making focus; and
- Mounted on installations around the primary inspection line (PIL) lane, technologies to be evaluated include:
  - RFID (radio frequency identification) – collecting and authenticating passage information
  - Licence Plate Readers – collecting plate information
  - CCTV – monitoring drivers
  - VoIP – two-way audio interaction.

Since the inception of the Secure Corridor in September 2018, the pilot has successfully demonstrated that commercial processing can be modernized by leveraging existing technology to effectively offer a touchless border experience and minimize the requirement for trucks to idle in line-ups at the PIL lane. The CBSA is now transitioning the Secure Corridor pilot to a project with a goal to automate more trusted commercial lanes, thereby allowing for more efficient processing coupled with an increase in truck throughput capacity in designated Secure Corridor lanes. The Secure Corridor project aligns with the Government of Canada's Economic Recovery efforts and the Agency's modernization agenda and supports the CBSA's priorities of public and officer safety, security and trade facilitation.

Consequently, beginning in 2023-24, the CBSA will expand the suite of Secure Corridor technologies to 12 additional commercial lanes at six of Canada's busiest ports of entry.

Given the success of the Secure Corridor pilot, the CBSA will also be outfitting all land commercial lanes with modern technology such as licence plate readers and a single interface for BSOs that will greatly improve the efficiency of primary processing. This will impact 44 commercial lanes at 13 of Canada's largest ports of entry, representing 90% of the land commercial volume.

B. Cooperation with other stakeholders

Cross-border supply chains today are very complex and involve multiple public and private sector stakeholders. Even though significantly important, Customs is only one of the stakeholders in the supply chain. Digitalization of processes has greatly advanced in the logistics and transportation sector, as well as in the e-commerce domain. Customs administrations can to a large extent not only benefit directly, but also learn about the application of different technologies to ensure that their procedures are more effective and efficient. Furthermore, connecting to already digitalized supply chains with readily available data from reliable sources contributes to greater trade facilitation and compliance, which are both ultimately important objectives of Customs.

National Trade Facilitation Committees (NTFCs), an obligation under the WTO Trade Facilitation Agreement, bring together Customs and other border agencies, the private sector and other stakeholders. Their aim is to monitor TFA implementation and identify the need for modernization projects and initiatives. They may serve as a relevant vehicle in driving innovation in the border management domain.

Apart from Customs and industry, academia and research institutions are often involved in innovative projects and programmes which contribute to addressing some of the challenges and requirements in the area of border management. These research projects allow for active and conscious thinking about topics for which there is a real need for knowledge and insights from the Customs and other border agencies' side. On the other hand, they aim to provide an overview of the supply chains from the science and companies side. Collaboration between the government, companies and education promotes the collection, sharing and application of knowledge and research, to the advantage of Customs.

An example of the types of fruitful collaboration between Customs and other stakeholders can be found in the case study by the Dutch Customs in the Annex to this Study Report, under 'Collaboration: Industry – Science – Research'.

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