INSIGHTS FROM THE PROFILE EU PROJECT

WHERE TO POSITION DATA ANALYTICS IN THE CUSTOMS PROCESS AND PERFORMANCE IMPROVEMENT CONSIDERATIONS:

Prof. dr. Yao-Hua Tan (Delft University of Technology)
Dr. Boriana Rukanova (Delft University of Technology)
MSc. Marcel Molenhuis (Customs Administration of the Netherlands)
Dr. Micha Slegt (Customs Administration of the Netherlands)
Jonathan Migeotte (Belgian Customs)
Dr. Mathieu L.M. Labare (Belgian Customs)
Dr. Toni Mannisto (Cross-border Research Association)
Dr. Juha Hintsa (Cross-border Research Association)
Customs PROBLEM

- **160 M customs declarations/year** submitted by importers/exporters to Dutch Customs
  - Most of them have **inaccurate data**
    - **Price too low** (Undervaluation)
    - **Incorrect** Description of Goods (e.g. ‘Toys’)
  - Due to **e-Commerce, Brexit** declaration could increase to 450M/year by in a few years!!

- This steep increase **can not be solved** by hiring **more inspectors**, only by more automated processing of declarations with IT innovation

- **IT innovation**
  - **Collect extra business data** (e.g. purchase order, invoice, container packing list) to cross-validate declaration data
  - **IT infrastructure for sharing data** in international supply chains
  - **Data Pipeline, Blockchain** and **Big Data analytics**
Data Pipeline (Frank Heijmann, David Hesketh)

"Internet for Logistics" developed in EU research projects e.g. CORE, CASSANDRA, ITAIDE
Global data pipelines already scaling-up e.g. TRADELENS Blockchain IT platform

Not exhaustive list of Events tracked by platform

Not exhaustive list of Events tracked by platform

Note: representative only; not all documents require Paperless Trade nor is this an exhaustive set of documents that could be processed by Paperless Trade

Paperless Trade (Blockchain Network)

Hyperledger Fabric

IBM

MAERSK
Data sharing and data analytics as next steps

- "Get Data from the Source"; Customs should use more trade data to cross-validate accuracy of import/export declarations
  - Examples: invoice, purchase order, packing list

- Companies are willing and able to share their trade data via IT platforms with customs
  - Able; Most companies use enterprise information systems (e.g. ERP)
  - Willing; if it provides less inspections (= "trade facilitation")

- Data sharing among customs administrations, as well as between Customs and other agencies nationally and internationally
  - Combining data from different sources can improve risk management

- Data analytics as a next generation IT innovations for customs
**Goal**
Develop modern data analytics and leverage Big Data and open data sources for customs risk management

**Partners**
15 partners (5 Customs)

- Belgium
- Estonia
- Netherlands
- Norway
- Sweden

**Budget**
5 million EUR

**Customs Administrations**
- Cross-border Research Association (Coordinator)
- Netherlands Organisation for Applied Scientific Research
- The Swedish Defence Research Agency
- The Norwegian Defence Research Establishment

**Other Partners**
- IBM
- INLECOM
- BMT
- Joint Research Centre
- TU DELFT
- University of Lausanne

**Duration**
36 months

**Start**
1 August 2018
Current research in the PROFILE EU-project

- **4 Living Labs** for using data analytics in customs in different countries

- **Living labs** pilot with data analytics based on:
  - **Internal customs data**
  - **External government data** from other customs or other government agencies
  - **External data** from eCommerce websites
  - **External data** from data pipeline providers
Risk Analysis in the Customs Clearance Process

1. Risk rules
   - Selected
   - Not selected

2. Selected
   - Not selected

3. Capturing inspection results
   - True negative
   - False negative
   - False positive
   - True positive

Country A
- Other eCommerce websites
- eCommerce platform
- Product X
- Product Y
- Importer
- End customer
- $
Different Options of Where to position Data Analytics in the Customs Process

Country A

1. Risk rules: Selected
2. Data Analytics (DA?): Selected
3. Capture inspection results:
   - True negative
   - False negative
   - False positive
   - True positive

Country B

1. Risk rules: Selected
2. Data Analytics (DA?): Selected
3. Capture inspection results:
   - True negative
   - False negative
   - False positive
   - True positive

Compare/Validate

Declaration
Where to focus the performance improvements with Data Analytics

Large increase in declaration volumes

Risk rules

Declarations

Selected

Not selected

Selected

Not selected

3

True negative

False negative

False positive

True positive
Observations

- Decision points where **DA benefits** are **most useful**
  - Use DA to decrease **False Positive** inspections?
    - Now typically 94% False Positives
    - What if DA would improve that to 70% False Positives?
    - Less ineffective inspections, hence increase customs efficiency
      - Needed to be able to process the huge growth in declarations due to e-commerce and Brexit
  - Use DA to decrease **False Negative** inspections
    - “catch more illicit trade”
    - Different types of DA innovation (e.g. different training data sets)

- Customs **Resource limitations** constrain DA benefits
  - More true positives also requires more customs staff
    - to inspect
    - for administrative after processing (fines, reporting etc.)
  - **Trade-offs** have to be considered between DA innovation and customs resource limitations
EXECUTIVE MASTER IN CUSTOMS AND SUPPLY CHAIN COMPLIANCE

THANK YOU!

Prof. dr. Yao-Hua Tan, Delft University of Technology
y.tan@tudelft.nl

Program Director Master Customs and Supply Chain Compliance
Rotterdam School of Management

Scientific Coordinator EU projects PROFILE, PEN-CP, CORE, CASSANDRA, ITAIDE

www.profile-project.eu
www.pen-cp.net