Customs risk management in developing countries: Foresight approach using big data

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ABSTRACT: Risk management is a concept that attracts central attention from managers and organizations around the world to ensure the safety of people and goods. In the customs context, it is increasingly proved to be complex with the development of trade and the circulation of people around the world. This complexity is related to the volume, but also to the techniques used by both individuals and organizations. The challenges of customs administrations are becoming more important, but the potential created by the tools made available by information and communication technologies is proving to have great potential for customs, business and individuals. Sources such as big data are an important source of information, and networked machines, thanks to technological advances, enable fast and efficient processing of data and processes.

The coupling of foresight with the means mentioned above makes it possible to plan in the short, medium and long term, by establishing plausible scenarios. Big data combined with a structured foresight approach can reduce uncertainties and anticipate better risk management while remaining flexible in a constantly dynamic environment. Developing countries are at the forefront, given the challenges they face. The experiences of some developed countries are pioneering in this regard, and can be a source of learning for value creation.

KEYWORDS: Foresight, Big Data, Predictive Analysis, Customs Administrations, Risk Management.

1 INTRODUCTION

In the age of the internet of things, cloud computing, big data and artificial intelligence, information and communication technologies (ICTs) are reshaping the commercial landscape and business processes of customs authorities and other border authorities. To better respond to this technological revolution, these border control agencies rely on ICTs in their operations, according to their national priorities and the availability of resources. This is the reason why customs administrations are currently looking at big data and its usefulness. Unlike conventional data, big data covers a wide range of data. It can be structured (adapted for specific purposes) or unstructured (to be adapted to the use that will be made of it). Some skills are needed to include such diverse data in customs operations. Advanced analysis techniques, which can improve the understanding of the latent risks associated with the object targeted by controls, are one of the keystones of the analysis procedure. Through the analysis of big data, customs administrations take targeting measures in advance based on a broader view of the situation.

In this context, the predictive analysis of risk management data in the customs context is accurate and appropriate. This research paper will try to answer the following question: what is the foresight's contribution to the predictive analysis of risk management based on data for customs administrations?

Giving a more global cause for reflection, this research article is organized in three axes:

- The risk management context in customs administrations: state and issues in developing countries;
- Predictive analytic tools for big data and their contribution to mass data management in the customs context;

- The contribution of foresight as a decision-making tool to the dynamic and complex environment of customs administrations.

2 THE CONTRIBUTION OF FORESIGHT TO PREDICTIVE DATA ANALYSIS IN THE CUSTOMS CONTEXT

2.1 RISK MANAGEMENT IN THE CUSTOMS CONTEXT

Risk management offers undeniable benefits for the international customs community, which must continually improve its efficiency, effectiveness and performance, and be increasingly transparent, accountable and professional.

Beyond this concept, what is the state of this practice internationally? And how is it applied in the context of developing countries?

2.1.1 PREVIEW OF INTERNATIONAL PRACTICE

The World Customs Organization (WCO)[1] defines risk management as "a logical and systematic method of identifying, analyzing and managing risks. Risk management can be associated with any activity, function or process within the organization and will enable the organization to take advantage of opportunities and minimize potential losses"[2].

Risk management is a method that is considered the best approach for customs control purposes in current international trade practice.

Indeed, customs administrations are evolving inside an economic world in continuous growth, and face a set of challenges. They must carry out their main tasks of revenue collection and protection of society, while facilitating the flow of legitimate trade. These jurisdictions are also required to provide better results based on current resources or even lower. Managing customs activities using risk management helps to meet these expectations by moving away from traditional customs control methods, based on random criteria that fail to meet current trade objectives, and adopting a system of intelligent controls in which risks will be assessed and adequate resources released accordingly.

The majority of customs administrations are aware of the importance of the concept of risk analysis resulting from its implementation, and one of the biggest challenges they face today is to determine how to best apply risk management to identify and mitigate risks at the operational level. This is why the WCO has developed different tools to help its member countries and facilitate their risk management methods. This is mainly the Revised Kyoto Convention (RKC)[3], the WCO Risk Management Guide, the global information and intelligence strategy, standardized risk assessments, the Global High Risk Indicators document, the e-learning materials of the WCO, the Columbus Program[4] and the strategic document entitled "Customs in the 21st century" .The WCO described in chapter 6 of the RKC and in the risk management guide the risk management process to be adopted by member states.

The risk management process involves drawing the context in which risk management will take place, and identifying, analyzing, evaluating and addressing risks. At the operational level, profiling, risk assessment and selection form an important part of customs work related to border controls. These controls are necessary to ensure compliance with applicable laws, regulations and procedures. However, the volume of trade and travel makes it impossible to control everything, so it is necessary to concentrate resources on the control of passengers and high-risk cargoes.

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[1] *The WCO is an independent intergovernmental body whose mission is to improve the efficiency of customs administrations. The WCO now represents 180 customs administrations that are scattered all over the world and handle 98% of world trade. As the world's center of customs expertize, the WCO is the only organization with international competence in customs matters and the spokesperson for the international customs community.*

[2] *"Risk Management Guide", WCO, June 2003.*

[3] *The International Convention on the Simplification and Harmonization of Customs Procedures (RKC) entered into application in 1974. It has been revised and updated to ensure that it meets the current needs of governments and international trade. In June 1999, the WCO Council adopted the RKC as the basis for effective and modern customs regimes of the 21st century. When implemented on a large scale, it will give international trade the predictability and efficiency that modern trade demands.*

[4] *The Columbus program is a program established by the WCO, which provides assistance in the field of risk management in various forms: diagnoses, development advisory services, training, seminars…*

Risk profiles are main tools, based on selection criteria called "risk indicators". In this framework, the WCO has several instruments to identify the most common risk indicators and allow members to develop their own indicators : Standardized Risk Assessments, Risk Profile/Indicator Models; General indicators of high risks; Handbook on risk indicators; …

2.1.2   THE ANALYSIS OF RISK S AND SELECTIVITY OF CUSTOMS CONTROLS IN DEVELOPING COUNTRIES

Under the WCO guidelines, the customs of developing countries make continuous efforts to integrate the risk management process in their strategy control. This process tries to define the risk criteria. These are identified at the level of the different control phases. The indicators that allow the selection and targeting of these risks are established and grouped together at the level of a risk management computer system, where they are studied taking into account the information obtained from the various external sources and also through the data gathered from internal databases. Risk management process Operations and the changes that may affect it are regularly updated.

In fact, the customs of the developing countries adhere to the guidelines of WCO's that aim to standardize the working methods of all the customs of the world. These methods are based on analytical scientific approach with the objective of having an anticipatory and preventive strategy in terms of risk management.

In addition, the risk management methodology adopted strives to be flexible and adaptable, and takes into account changes in the international environment, particularly in terms of processes and legislation. Indeed, the limitation of physical checks is a recommendation of the RCK. It is also part of the Trade Facilitation Agreement[5] (TFA). The promotion of ethics is also an important part of the reforms undertaken in developing countries to modernize their customs.

But currently, we note that the customs authorities of most developing countries are slow to move toward the application of the latest techniques of analysis and risk management[6]. Indeed, risk management techniques are used in many areas at risk of fraud, for example in the areas of insurance, credit banks[7] and risk analysis remains a priority for customs modernization in developing countries.

For developing countries, risk management is a priority on most national and regional political agendas. Nevertheless, progress in this area has been modest. According to requests for assistance in connection with the TFA on improving systems in risk management, developing countries listed by far among the countries seeking technical assistance in this area (Figure 1)[8].

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[5] *The TFA contains provisions for expediting the movement, release and clearance of goods, including goods in transit. It also sets out measures for effective cooperation between customs and other appropriate authorities on trade facilitation and customs compliance issues. It further contains provisions for technical assistance and capacity building in this area. The Agreement will help improve transparency, increase possibilities to participate in global value chains, and reduce the scope for corruption. The TFA was the first Agreement concluded at the World Trade Organization (WTO) by all of its Members. The Agreement entered into aplication on 22 February 2017 when the WTO obtained the two-thirds acceptance of the Agreement from its 164 Members.*

[6] *Geourjon & Laporte 2005; Geourjon, Laporte & Rota Graziozi 2010.*

[7] *Bolton & Hand 2002; Phua et al. 2005*

[8] *The TFA contains special and differential treatment provisions that allow developing and less developed countries (LDCs) to determine when they will implement the various provisions of the Agreement and to identify which ones they will be able to implement once they have received technical assistance and capacity-building support.*

To qualify for special and differential treatment, a Member must classify each provision of the Agreement according to the categories below and notify that classification to the other WTO Members in accordance with the specific deadlines provided for in the Agreement.:

- *Category A: provisions that the Member will implement at the time of entry into force of the Agreement (or in the case of a LDC Member within one year of entry into force).*
- *Category B: Provisions that the Member will implement after a transition period following the entry into force of the Agreement.*
- *Category C: provisions that the Member will implement at a date after a transition period following the entry into force of the Agreement and requiring the provision of assistance and support for capacity building.*

Requests for assistance for risk management that Members submitted in their category C notifications			

List of notifications that developing and LDC Members notified under category C

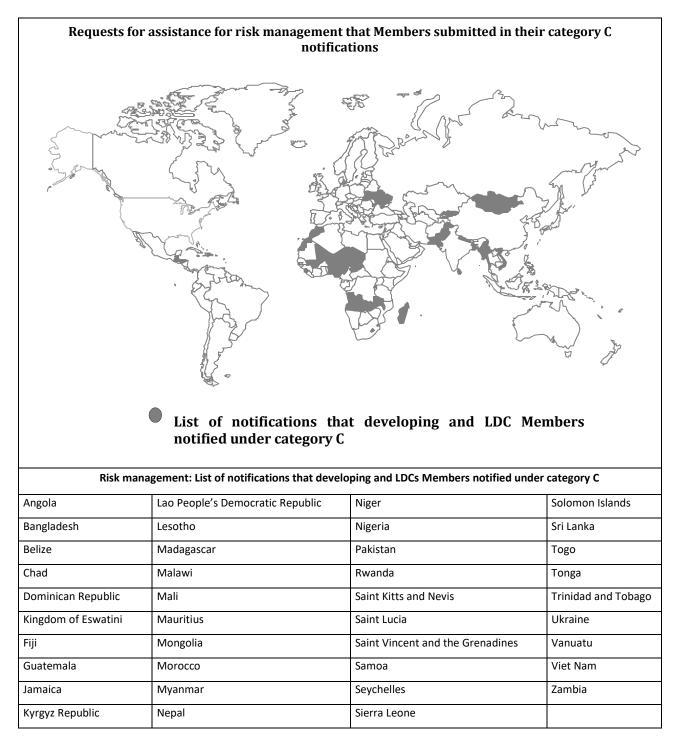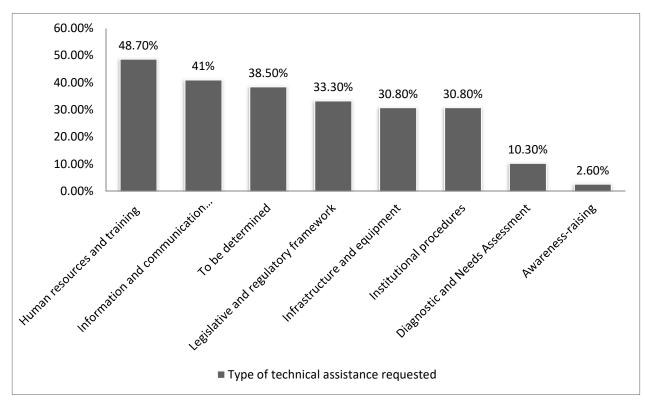| Risk management: List of notifications that developing and LDCs Members notified under category C			
Angola	Lao People's Democratic Republic	Niger	Solomon Islands
Bangladesh	Lesotho	Nigeria	Sri Lanka
Belize	Madagascar	Pakistan	Togo
Chad	Malawi	Rwanda	Tonga
Dominican Republic	Mali	Saint Kitts and Nevis	Trinidad and Tobago
Kingdom of Eswatini	Mauritius	Saint Lucia	Ukraine
Fiji	Mongolia	Saint Vincent and the Grenadines	Vanuatu
Guatemala	Morocco	Samoa	Viet Nam
Jamaica	Myanmar	Seychelles	Zambia
Kyrgyz Republic	Nepal	Sierra Leone	

Fig. 1.   Elaboration of the authors on the basis of requests for assistance for risk management that Members submitted in their category C notifications[9]
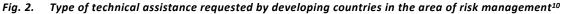
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[9] *WTO Trade Facilitation Agreement Database : https://www.tfadatabase.org/measures/article-7-4 (accessed on 28/12/2018).*

For developing countries, requests for assistance have been made by these countries as part of the improvement of their risk-management systems (Figure 2). These types of assistance are distributed as follows:

- 48.7 percent for human resources and training (19 requests),
- 41 percent for ICTs (16 requests made),
- 33.3 per cent for the legislative and regulatory framework (13 requests made),
- 30.8 per cent for infrastructure and equipment (12 requests made),
- 30.8 per cent for institutional procedures (12 requests made),
- 10.3 percent for diagnosis and needs assessment (4 requests made), and
- 2.6 per cent for awareness-raising measures (1 request made).

This analysis is based on the information regarding the assistance and support for capacity building that Members submitted in their category C notifications. The numbers refer to how many times a type of assistance has been cited as a requirement for technical assistance.

Fig. 2. ***Type of technical assistance requested by developing countries in the area of risk management[10]***

2.2 CUSTOMS RISK MANAGEMENT: TOWARDS SMARTER SOLUTIONS

This section provides an overview of the projected or actual implementation of big data by security and crime enforcement agencies in the United States, Europe, and other countries.

Notably, predictive analytic solutions seem to be attracting more interest from customs services, and will enable better control of customs risks.

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[10] *WTO Trade Facilitation Agreement Database : https://www.tfadatabase.org/measures/article-7-4 (accessed on 28/12/2018)*

2.2.1 BIG DATA PREDICTING TOOLS

Prediction tools[11] for big data complement traditional approaches of risk management and propose new approach. This approach differs radically from deductive data mining techniques by cross-checking databases. The originality of the big data approach lies in the fact that it does not rely on the pre-existing structure of data collection, but intends to discover it within these data models. The approach relies on a number of algorithms that allow the identification of hidden structures in the data, without prior assumptions about these structures. For example, in the customs field, these could be non-trivial risk profiles that could not be described by a cross-check sequence.

Thanks to the advance of predictive models, "machine learning", which deal with complex data (such as facial, vocal, etc.) and network structures, it becomes possible to identify and solve complex problems evading traditional approaches. These models offer many advantages over traditional risk identification, risk profiling and data mining operations. They enable the management of databases that are so large and diverse that they can no longer be managed by traditional methods. The big data technique therefore gives meaning to raw data and allows the systematic and consistent exploitation of data by integrating all dimensions without ignoring their complexity. It makes it possible to reduce the risks of misinterpretation by working on an objective basis, updated in real time, with the possibility of extrapolation by analyzing previous similar cases. The advantage is not only the processing of massive data but also their processing in real time, and no longer offline, thanks to the available algorithms and computing power. The structuring of the information received at last can be adapted: results analysis, images …

The use of the inductive rather than the deductive method allows an analysis without predefined hypothesis, allowing a wider spectrum of information work, which may include weak information that would have been eliminated a priori. Its use avoids waste of time and resources by eliminating false tracks, alerts or truncated or inappropriate data. In addition, the evolving nature of the risk analysis system allows the integration of new, more efficient software, both in the analysis and in the presentation of the results. This method is developing in the medical field (remote diagnostics) automobile (auto pilot vehicles), and in the administrations (police, tax, customs…).

In the case of customs, big data could help not only in the area of risk management, but also to address other concerns such as: improvement of performance indicators, workload of services and perspectives, etc.

At this stage, the use of machine learning methods in the customs context remains relatively confidential because of concerns about the protection of privacy and the manipulation of, sometimes, sensitive data.

2.2.2 THE BEST PRACTICES OF BIG DATA TECHNIQUES IN THE INTERNATIONAL CONTEXT

In a highly evolutionary and innovative context, big data techniques are widely distributed in customs administrations: For example, in the customs field, these could be non-trivial risk profiles that could not be described by a cross-check sequence. Around the experiences, we can cite :

- The American administration: is the most advanced, because a pioneer in the field, with massive investments. For example, the United States (US) Customs and Border Protection has decided to apply big data techniques to its own data at a central location. US Customs are aware that big data technologies are still maturing and therefore expect to be able to tap into their full potential as soon as the right investments are made. In addition, the greatest benefit of the practical application of big data to US customs is the ability to leverage the various existing big data banks and allow them to be used for analytical purposes in more affordable conditions than if traditional storage techniques and computer methods had been used.

- The Canadian Border Services Agency (CBSA): collects data from internal and external sources. It takes advantage of open source data and information about specific situations. CBSA's work in the big data area is focused on the analysis

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[11] According to Cointot and Eychenne (2014): A prediction tool creates a series of models by analyzing historical data. Then he deploys these models, tracks the successes of these models and their failures, and replaces them with more powerful ones. A model creation tool offers the possibility of developing predictive models using historical data. These models can be run in batch offset or real time by processing continuous data streams.

of large volumes of structured data, while efforts are also being made to resolve complex issues. The main objective is to align CBSA's analytical capabilities with the broader definition of large data, as well as their velocity and variety.

- The New Zealand Administration: has established a centralized team[12] which launched an ambitious IT project, in which the analytical tools were used for risk assessment and border management purposes. This team aligns datasets from different departments and designs targeting models. Simultaneously, it reviews the existing data in order to identify patterns and connection that can provide more information to customs and help them make the necessary decisions.

- Great-Britain: relies on university research to develop big data. Its tax administration uses data analysis through the "Connect system", compiling 28 data sources, and allows searches on sites abroad. This system would have allowed the additional recovery of billions of euros.

In addition to these pioneering experiences, other countries are undertaking important initiatives in the same direction[13].

In the end, the customs use of big data is progressively made according to priority applications defined by the governments. The expected benefits are considerable and likely to change the organization of existing structures.

2.3   THE CONTRIBUTION OF FORESIGHT TO THE TOOLS OF PREDICTIVE DATA ANALYSIS

Facing the future, it is hard to think about a strategy that does not take into account the long-term uncertainty. The long delays in the decisions mean that it is difficult to make decisions in full awareness today without carefully thinking about their effects over the years and decades to come.

Foresight is neither a prediction nor an estimate of the probability of particular routes. It is a question rather to broaden the understanding of drivers of societal change and to better prepare for future inevitable surprises. Foresight then uses the various perspectives of change to construct a range of plausible narratives or scenarios, and roadmaps to indicate basic directions[14].

Foresight enhances organizational agility by building resilience, vigilance about trends, awareness of drivers of change, and preparedness for shocks, problems and potential challenges. Essentially, foresight uses a repetition readiness approach by addressing the "what if" scenarios.

2.3.1   SYSTEMIC DYNAMICS AND COMPLEXITY OF THE CUSTOMS ADMINISTRATION'S ENVIRONMENT

The idea of using the concept of the system to understand the phenomena is attributed to the work of Bertalanffy at the end of the years 1920. According to Bertalanffy (1968)[15], a singular causal analysis was no longer possible, considering the complexity of the whole organism. This led to the introduction of the idea of systems as an approach of dealing with the complexity inherent to physical, living and social systems[16]. Thus, the central concept of a system includes "a set of interrelated elements that form a whole, showing the properties that are the properties of all rather than the properties of its components" (Checkland 1981)[17]. It was not until the early eighties, characterized by the considerable development of computing power,

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[12] This team consists of the Government of New Zealand, Customs, Border Partners and the Ministry of Primary Industries.

[13] These experiences include:
- Ireland, for its part, has created a consortium supported by private companies to fund research in this area.
- The European Commission, for its part, has launched programs to define the strategic orientations. Currently, the French customs seeks to develop the use of big data. She is in the forefront of digitization. His big data project is being finalized.
- The Australian administration, for its part, is engaged in an interministerial approach.
- Hong Kong Customs has made remarkable efforts in this area and has decided to "centralize" and "consolidate" all useful data that would otherwise be disparate and therefore less relevant. Since 2012, a centralized repository of information has been established. It is like a centralized data warehouse where operational data is stored from nine different information channels, all of which have their own regulatory purposes.

[14] G. S. Richards (2015) in "Foresight and STI Governance", University of Ottawa.

[15] L.V. Bertalanffy (1968), "General System Theory".

[16] Churchman 1968, Beer 1979, Ackoff 1981.

[17] O. saritas (2013) "Systemic Foresight Methodology".

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the reduction in the cost of processing information and the introduction of new mathematical techniques, so that complexity research goes beyond the stage of speech and that of metaphor.

Complexity can also be defined, like Casti (1994)[18] did, by its opposite, by highlighting what illustrates simple systems. In contrast to what is complex, simplicity is characterized by a predictable behavior, a limited number of interactions and feedback and feed forward loops, a centralized decision-making and possible decomposition.

Fully understanding the potential short-term, and even less long-term, impacts of decisions in a dynamic environment is a difficult task. Foresight provides tools and decision-making processes that enhance the ability to "… sense the meaning and nature of events before they have occurred", according to Daniel Kim[19].

To manage the complexity of the customs administrations' environment, Foresight offers an asset to better understand this complexity.

2.3.2   FORESIGHT AS A TOOL FOR DECISION SUPPORT

Systemic thinking recognizes that systems are continually changing and therefore dynamic. This action sequence continues looping in time, brings the second type of continuity. The foresight system learns, evolves and intervenes in situations through the modification of norms, policies and objectives. After establishing its underlying assumptions, systemic foresight methodology says that a robust forecasting exercise involves continuous interaction between context, content and the process of change, as well as skills to regulate relations between the three.

Two levels of context can be distinguished: the External Context, and the Internal Context. Thus, the systemic foresight methodology proposes a system of learning, which structures a system-based debate to formulate the basic processes of (1) Intelligence (delineation phase, monitoring and analysis), (2) Imagination (creative phase and divergent), (3) Integration, (4) Interpretation of the action phase, (5) Impact (evaluation phase), and (6) Interaction (interactive phase and participatory phase) which continues throughout the activity.

Social, technological, economic, environmental, political and values (STEEPV) form the external context in which the foresight activity is integrated and therefore influenced by the factors in it. Foresight aims to improve or modify one or more parts of these systems. The content, depending on the agenda, of the foresight exercise is extracted from STEEPV systems, which are interdependent and shape the real-world situations. Loveridge and Saritas (2009)[20] formulated three questions as a starting point for investigating these situations[21].

According to the work of Saritas, the combination of the identified elements of this approach will take the form of the matrix presented in the table 1.

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[18] J. Casti (1994). "Complexification: Explaining a Paradoxical World Through the Science of Surprise", New York: Harper Collins.

[19] D. Kim (2002), "Leading Ethically Through Foresight".

[20] D. Loveridge and O. Saritas (2009), "Reducing the democratic deficit in institutional foresight programs: a case for critical systems thinking in nano technology".

[21] The content of the first two questions is recognized in the context of (possible) science and (feasible) technology. However, both have added contexts and content that extend to the third question of (desirability) where social, political and value contexts intersect with the two issues of governance, regulation, precaution, social acceptance and policy.

Table 1.   Systemic Approach of Strategic Foresight: adapted from O. Saritas systemic foresight methodology matrix

	Framework/Phase of studies	Creative phase	Organization phase	Strategy phase	Action phase
	information	Imagination	Integration	Interpretation	Intervention
Diverging methods (open and creative)	Studies and scans	Conceptualization/ Modelization	Priority Definitions, Analysis	Strategies and programs	Plans, policies, actions
	Horizon scanning Weak signals	Scenario Analysis	Risk assessment	Cross Impact Analysis	Key technologies
	Knowledge and Research Map			Logical context	Operational research
	Literature review				
Convergent methods (targeted and specific, quantitative)	Science and Information Technology Policy Analysis	Scenarios Modeling	Social costs/Learnings	Linear programming	Impact studies
	Bibliometrics	Dynamics of systems	Economic multiplier		

In our case, the main tasks of the customs administration are to meet revenue, trade facilitation and security risk management objectives related to the flow of people and goods. Figure 3 describes in detail the priorities of Customs administrations. The matrix takes up these priorities, especially in the case of developing countries. For the use of big data and predictive risk analysis, the prioritization matrix can be used to ensure that efforts are focused first and foremost on the most appropriate levers. This matrix is as follows:

Risk Management in Customs Administrations of developing countries

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- Cooperation between border agencies - Bilateral cooperation (with other countries) - Establishment of administrative structures to manage customs risks	- Global and National Information and Intelligence Strategy - Global and National Risk Management Strategy - Protection of the national economy - Consumer protection, society, cultural heritage, intellectual property and environmental protection - The integration of risk management as a culture of administration
- Collection of revenue (customs duties)	- Customs Control Deployment Strategy - Measures of compliance with national laws - Facilitation measures for trade and travel

Value of the organization (vertical axis label)

-   **Feasibility of implementation**   +

The main tasks of the Customs Administration are to meet revenue, trade facilitation and security risk management objectives related to the flow of people and goods. New methods of monitoring and risk analysis are increasingly recommended by the WCO, including mirror data analysis.

The results of the mirror analysis make it possible to correct the customs statistics. The asymmetries in statistics are an important issue as they affect the reliability of the balance of payments and national accounts. The data reconciliation exercise is needed to improve the quality of external trade statistics for which customs is responsible in many countries. With quantum computing, it is for example possible to develop new cryptography enhancing security based on the foundations of quantum formalism, or new methods of calculation which can be exponentially more efficient than conventional methods. The quantum information concerns not only physicists but also the theoreticians of information, mathematicians and algorithmicians working on complexity theory.

Fig. 3.   Priorities setting of customs administrations in risk management (case of developing countries)

According to the OECD[22], tax and transfer systems reduce overall income inequality in all countries; cross-sectional studies can be conducted with the aim of introducing tax policies, particularly customs policies, which can contribute to the achievement of the economic objectives set out in the country's strategic plans.

In the area of risk control and risk analysis, new methods are increasingly recommended by the WCO, including data analysis « mirrors »[23].

The various stakeholders in the supply chain around the world (importers, exporters, shippers, etc.) have comprehensive databases of information relating to trade. The customs administration, in order to better optimize the planning and organization of movements and flows, will be able to get closer to these actors by ensuring compliance with the laws in force. It will also be able, within the framework of a global network with the confreres, to synchronize the data through a « mirrors technique »[24].

In his article on big data and cloud computing, Changqin Ji[25] raises the limits of current technologies by comparing their speed of growth with that of the data produced. However, and thanks to the expected perspectives of quantum computing, we can for example design new cryptography methods whose security is based on the foundations of quantum formalism, or new computational methods that can be exponentially more efficient than classical methods.

In terms of values, and from a social perspective, in the standard model of tax evasion originally proposed by Allingham & Sandmo (1972)[26], and Yitzhaki (1974)[27], the taxpayer is treated as an isolated utility maximizer that takes a portfolio decision within uncertainty[28]. The individual's perception of the fairness of his or her tax burden can influence his or her tax evasion decisions. Indeed, Spicer and Becker (1980)[29] have provided evidence that those who believe they are unfairly treated by the tax system are more likely to evade taxes to restore fairness.

Theorized by scientists before being adopted in several countries like the US, the Great-Britain or France, the "nudges" are proving to be an effective tool to encourage taxpayers to change certain behaviors which undermine the efficiency of the customs administration and the achievement of the objectives assigned to it.

In the case of developing countries where the tax issue is a priority in the development of government policies, foresight is an effective tool to encourage an impact assessment exercise, which can serve as a benchmark to update in multidisciplinary expert panels and feed into the customs administration's forecast databases.

3   CONCLUSION

In this research work, we examined the contribution of foresight to support big data techniques in order to improve risk management in customs administrations. Indeed, it is important for decision-makers to understand which technologies are of interest to them and to prepare for them accordingly.

The potential benefits of these technologies can be significant, but the challenges are no less important. If policymakers expect these technologies to fully impact the economy, it will be too late to see the benefits or react to the consequences of this change. Thus, from this research paper, we can deduce three important conclusions:

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[22] *Organization for Economic Co-operation and Development.*

[23] *Mirror analysis compares a country's imports (or exports) with the exports (or imports) reported to it by its partner countries, in order to detect discrepancies between quantity, weight and value data, can reveal currents and fraud practices.*

[24] *The data reconciliation exercise will enable customs statistics to be corrected, thereby improving the quality of foreign trade statistics for which customs is responsible in many countries, the reliability of the trade balance, the balance of payments and national accounts.*

[25] *Changqing Ji 1 al (2012), "Big Data Processing in Cloud Computing Environments".*

[26] *M.G. Allingham and A. Sandmo (1972), "Income Tax Evasion : a theoretical analysis".*

[27] *S. Yitzhaki (1974), "Income Tax Evasion : a theoretical analysis".*

[28] *Cheating on taxes comes down to a simple game with the tax authority whose gain is either a lower tax burden or, with a given probability, a larger penalty. Similarly, Gordon (1989) and Myles and Naylor (1996) argue that an individual can derive a psychic benefit from adherence to the standard pattern of report behavior in his or her reference group (social compliance effect). By learning from peers, a taxpayer can find less expensive ways to under-report income, reduce the risk of getting caught, or reduce the penalties associated with tax audits (social learning effect).*

[29] *M.W. Spicer and L.A. Becker (1980), "Fiscal inequity and tax evasion: an experimental approach".*

1. Customs risk analysis techniques are powerful tools of control, but the evolution of technologies and the volume of data, and the category of risks in a complex environment, require additional efforts for strong targeting systems and improved performance in terms of costs and deadlines.

2. The implementation of big data in an organization like customs is potentially a strategic choice with organizational consequences. The expected benefits of implementing such a practice in the customs context would improve the efficiency and effectiveness of customs risk analysis systems.

3. Taking into account social, economic and value factors, and the perspectives of technological change are essential to reduce the uncertainties and increase the agility of customs administrations coping with change. This will be possible thanks to the combination of the techniques of the foresight approach.

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