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MODEL OF DIGITAL TRANSFORMATION OF CUSTOMS SERVICES AIMED AT MAKING CUSTOMS CONTROL OF GOODS SENT BY INTERNATIONAL MAIL MORE EFFECTIVE (WITH REFERENCE TO MEDICAL DRUGS)

I.V. Grekov, I.A. Aksenov, P.N. Afonin, D.V. Gorshkov

Background. *Information technologies of the Russian Federation Customs Authorities have been made part of the state digital economy, providing interaction between foreign trade participants and the services provided by the Customs Authorities officers.*

Purpose. *Detection innovations of customs services and customs control of goods sent by international mail (on the example of medical preparations)*

Materials and methods. *In the study, the authors used materials of special customs statistics reflected on the website of the Federal Customs Service of Russia, statistics of foreign economic activity reflected on the website of Rosstat, data reflected on the Federal State Unitary Enterprise Russian Post.*

In this work, dialectical, systemic, historical, logical, formal-legal, comparative research methods were used.

Results. *Processing the flow of information and revealing potential threats while moving IMPI (including medications) shall become completely automated with the help of a monitoring system, applying the machine learning technology.*

Conclusion. *The scope of customs control exercised over the goods forwarded in IMPI shall be , on the one hand, extensive , and on the other -efficient, without placing excessive burden in the form of money and time costs on the persons involved in forwarding IMPI*

Keywords: *innovations, customs control, customs services, electronic commerce, postal items, artificial intelligence, risk, monitoring, automatic differentiation system, analysis of X-ray images, medicines, narcotic drugs, prohibited goods.*

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Научная статья | Мировое хозяйство

МОДЕЛЬ ЦИФРОВОЙ ТРАНСФОРМАЦИИ ТАМОЖЕННЫХ УСЛУГ В ЦЕЛЯХ ПОВЫШЕНИЯ ЭФФЕКТИВНОСТИ ТАМОЖЕННОГО КОНТРОЛЯ ТОВАРОВ, ПЕРЕСЫЛАЕМЫХ В МЕЖДУНАРОДНЫХ ПОЧТОВЫХ ОТПРАВЛЕНИЯХ (НА ПРИМЕРЕ МЕДИЦИНСКИХ ПРЕПАРАТОВ)

И.В. Греков, И.А. Аксенов, П.Н. Афонин, Д.В. Горшков

Обоснование. *Информационные таможенные технологии таможенных органов Российской Федерации входят в систему цифровой экономики государства, обеспечивая взаимодействие участников внешнеэкономической деятельности с услугами, которые оказывают должностные лица таможенных органов.*

Цель. *Выявление инноваций таможенных органов при организации таможенного контроля товаров, пересылаемых международными почтовыми отправлениями (на примере медицинских препаратов)*

Материалы и методы. *В исследовании использованы материалы специальной таможенной статистики, отраженные на сайте Федеральной таможенной службы России, статистики внешнеэкономической деятельности, отраженные на сайте Росстата, данные, отраженные на ресурсах ФГУП «Почта России».*

В работе использовались диалектический, системный, исторический, логический, формально-правовой, сравнительный методы исследования.

Результаты. *Обоснование внедрения системы мониторинга, основанного на технологии машинного обучения в процесс обработки потока информации и выявление потенциальных угроз при перемещении международных почтовых отправлений (в том числе медицинских препаратов).*

Заключение. *Объем таможенного контроля, осуществляемого в отношении товаров, пересылаемых в международных почтовых отправлениях, должен быть, с одной стороны, обширным, а с другой – оперативным, который не должен формировать чрезмерного бремени в виде финансовых и*

временных затрат на лиц, участвующих в экспедировании международных почтовых отправлений.

Ключевые слова: *инновации; таможенный контроль; таможенные услуги; электронная коммерция; почтовые отправления; искусственный интеллект; риск; мониторинг; автоматическая система дифференциации; анализ рентгеновских снимков; лекарственные средства; наркотические средства; запрещенные товары*

Для цитирования. *Греков И.В., Аксенов И.А., Афонин П.Н., Горшков Д.В. Модель цифровой трансформации таможенных услуг в целях повышения эффективности таможенного контроля товаров, пересылаемых в международных почтовых отправлениях (на примере медицинских препаратов) // Siberian Journal of Life Sciences and Agriculture. 2023. Т. 15, №3. С. 458-474. DOI: 10.12731/2658-6649-2023-15-3-458-474*

Introduction

Digital transformation of the economy and technological development of any country are the fundamental elements of building up the country's economic growth at the International level.

Unlike regular automation, digital transformation consists in radical enhancing of the process efficiency which results in the creation of novel and perfect business-models due to its successful implementing in the ordinary course of business. Thus, it is not every project on implementing or upgrading business information systems that is worth being called digital transformation [10, 18, 25].

Digitalising a state economy is a synergy of the digital technologies, which employ automatic algorithms for analysing big structured data, and the elements of economic performance which include service sector, customs inter alia [12, 19, 23, 26].

Digital transformation in the government management must lead to a cardinal change of approaches in organizing the work of authorities using technologies and algorithms. It is in a way the process of adaptation to new conditions of activity considering the needs of the market and customers' expectations of services. Without systematic transformation of the managerial processes and cardinal reconstruction of the work of the whole state apparatus there can't be large-scale feedback of the digitalising provided.

It is worth noting , that quality and logistical and information (software) support for customs authorities and customs services providers play an important role in digitalising the economy.

Relevance of this work is the necessity of elaborating the effective tooling of digital transformation which may be used in the customs authorities, which hasn't been formed to this day. The work is devoted to implementing the monitoring system based on the machine learning technology into processing the flow of information and revealing the potential threats while moving IMPI.

Relevance of the issue tackled upon in this article is primarily due to the fact that customs information technologies of the Russian Federation Customs Authorities have been made part of the state digital economy, providing interaction between foreign trade participants and the services provided by the Customs Authorities officers. The concept of «digital economy» has been expressed in the programme «Digital Economy of the Russian Federation», expanding the principal provisions of Information Society Development Strategy in the Russian Federation for 2017-2030.

Materials and methods

Examining the aspects of digitalising customs service in the Russian Federation one can not fail to focus on vigorous scientific interest in exploring this area. Both national and foreign researchers are studying the peculiarity of digital transformation.

I.A. Gokinaeva, A.V. Agapova, I.N. Popova, T.G. Maximova, G. Fedotova, V.B. Mantusov, V.G. Makarenko, X. Huang, Y. Wang, Z. Zhu, X. Song, M.J. Ahn, Y.-C. Chen researched in their work the digitalising of rendering customs services and assessed the results in the area [1, 4, 9, 19, 17, 15]. The authors' materials provide an exhaustive classification of digital technologies used in customs and customs-related activities, specifically: artificial intelligence, big data, robotics, high-speed Internet, blockchain technology, etc. In our article, we used this classification of digital technologies and adapted them to the specifics of the implementation of customs control of goods moving IMPI (on the example of medical preparations).

A group of authors from S-Petersburg does the active research of digital transformation of the activity of customs service [1]. A special focus is made on automating some functional customs part, particularly on the development of electronic customs unit.

Another group of authors that is Maksimova T and Popova I pay attention to the statistic evaluation of digital transformation in their works. In our view the given approach is rather effort-consuming, yet not resulting enough due to a low level of the used statistics credibility.

The article by V.B. Mantusov is an extensive research on analysing and evaluating the outcome and prospects of digitalising currency control function

of the customs service [6]. The article builds an algorithm for interdepartmental information interaction between the customs service, tax authorities and the banking system under customs control. It reflects how the elements of artificial intelligence can be applied when accepting currency control of the customs service on the basis of interdepartmental information interaction.

The work of V.G. Makarenko, having a narrower scope but being significant in the above mentioned area nevertheless, is devoted to digitalising the process of customs fees collection [23]. The author in his article adapts 2 types of digital technologies (specifically, artificial intelligence technology and big data technology) to the process of collecting customs payments. The author of the article reflects that with the use of these technologies, the process of collecting customs payments will be more transparent both for foreign trade participants and for customs authorities. Also, the use of these technologies will simplify this process as much as possible.

The work of A.V. Egorova quite accurately reflects the specifics of the movement of medicinal preparations in international postal items [7]. The article reflects that the process of moving drugs in IMPI is prohibited. It turns out that there are no such offenses in the statistics of customs activities, although there are precedents for the movement of medicines in IMPI.

A work published in the Journal of business researches in which the authors conduct systematizing of modern interdisciplinary knowledge about digitalizing and digital transformation [21]. The article reflects that the business processes of any organization and any departments, including "non-information", require the "embedding" of employees with developed digital competence.

Results of the research

That exerting customs control and rendering services by the customs authorities officers must not impose the burden of excessive time and money consuming acts on the persons involved in forwarding postal items (IMPI) via international mail.

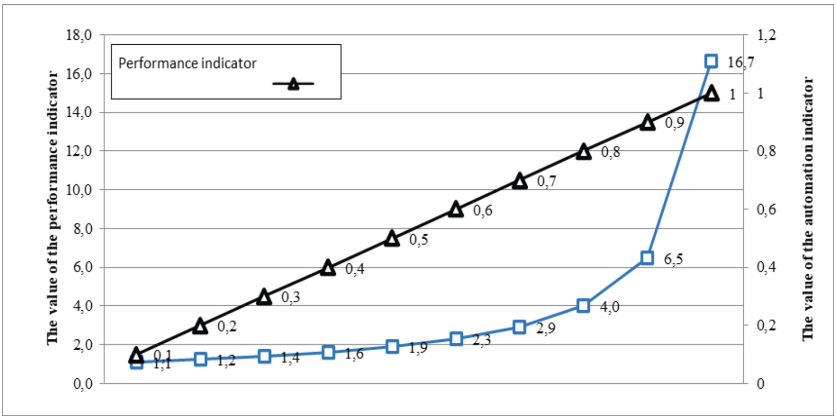
Time and money costs incurred by the ultimate recipient of the goods in the form of customs control and proper procedures as well as requesting additional information, when providing customs services, must comply with the principle of selective customs control, set forth in the international law, and control procedures by customs authorities under national law being necessary.

Customs services in the IMPI area are the acts, performed by the customs authorities with the goods forwarded via IMPI, to perform public functions and to satisfy the needs of individuals and entities (the recipients of customs services in IMPI). [3]

One of the methods for improving customs services is automation and digitalising the procedure of customs control of IMPI by implementing the Model of digitalising customs services and customs control of international postal items (hereinafter Model) [2]. Due to the fact that the scope of IMPI is constantly increasing, the models that are using at the moment are becoming ineffective. In the research, we are considering a new model for the implementation of customs control IMPI based on 2 digital technologies: artificial intelligence and big data control.

The Model consists of three functional blocks (national system of data management, the block of developing customs services and the block of developing customs control).

Taking the opportunity to automate processing the information about the persons involved in forwarding IMPI, as well as the goods, will enable customs authorities to enhance efficiency, namely to provide customs services and provide customs control within significantly shorter time, and the efficiency being preserved . Picture 1 shows the correlation between the Model's efficiency indicator and various values of automation indicator. The effectiveness of customs control evaluated by 2 signs: the speed of the provision of customs services and the number of identified violations of foreign trade participants



Picture 1. Dynamics of the efficiency indicator subject to various values of automation indicator [Compiled by the authors]

Customs control of international postal items depends on both the method of IMPI movement (import, export, transit) and on the format of filing information with the customs authority (e-format or paper format).

In case a customs declaration in a paper format is filed with the customs authority («CN 22» or «CN 23»), customs officers shall verify the consignment based on their experience as well on the information contained in the customs declaration (without an opportunity to have data processing automated) comparing it with the results of inspecting IMPI (or customs inspection with the help of an X-ray).

In case a customs declaration in a digital format is filed with the customs authority on-line in the form of the organized data on IMPI [16], customs control is automated to spot the violation of EAEU rules and Customs Regulation Law of the Russian Federation.

IMPI data received from the authorised postal service provider in the e-format and used by the customs authorities predetermines the increase in data flow which should be processed by the information system used by customs authorities, hence optimisation, speed enhancing and implementing novel automated methods of processing IMPI data is necessary.

Analysis of the volume of goods forwarded in IMPI across the border of the Russian Federation within 2005 -2020 shows a growing trend (an average growth rate was 22%) , which is a precursor of a workload imposed on both the postal service providers and customs authorities officers. Based on the value forecast by 2025 the amount of imported (exported) IMPI must reach the value of 1,4 billion articles [20].

However, the facts of consolidation of small shipments into one IMPI, the value norms increase of importing goods, geopolitical situation in 2022 state the fact of forecast decrease in the volume of goods forwarded in IMPI.

However, this situation is levelled by the increase in the limits of duty-free import of goods in IMPI for personal use, which were imposed under the Resolution of EEC Council for the period of April ,1 , 2022 till October 1, 2022 [14].

Despite the fact that the volume of IMPI might decline , the trend of importing prohibited or restricted to import goods into Russian Federation continues, as well as providing false information by the persons involved in IMPI in order to cut cost implications which cause offences and crimes.[13].

It should be emphasized that the shipment of narcotic drugs (psychotropic substances) in international mail is prohibited in accordance with paragraph 2 of article 19 of the Universal Postal Convention.

When moving prohibited goods (narcotic drugs) in international mail, cover goods (for example, medicines) can be used.

In order to classify the medical preparations found in international mail as narcotic drugs, the customs authorities of the Russian Federation use an examination that identifies the composition of the goods [8].

It should be noted that there is no statistical information on the identified facts of the shipment of narcotic drugs in international mail under the guise of medicines in open sources, however, there is spot information on the detection of these facts on some official websites of customs authorities [28].

Based on the results of the analysis of information on the official websites of customs authorities on the spot facts of the detection of narcotic drugs in international mail, it can be concluded that cases of their detection are quite frequent, as well as attackers hide these prohibited goods in separate objects (phones, alarm clocks, packages and medicines).

In order to prevent the cases of forwarding prohibited or restricted to import (export) goods via IMPI, customs authorities in Russian Federation study the issue of implementing innovative approaches into current algorithms of customs control [25].

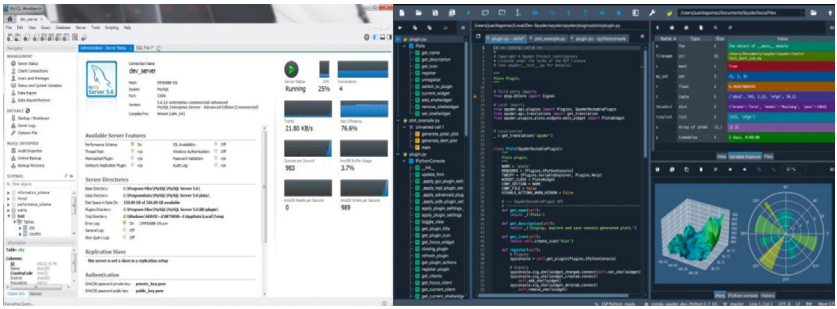
Using an automated system of differentiating IMPI , which implies using the information about the whole supply chain of a shipment (shipper, recipient , goods) to be classified subject to 5 risk level groups, is the principal innovation in IMPI customs control [11].

Subject to the practical implementation of the Model, an option for installing a monitoring system (digital twin of the procedure) is created, which is a completely automated process of controlling a shipment with regard to the risk level group.

At the same time, an additional innovation in IMPI customs control is an automated analysis of X-ray shots of IMPI in which artificial intelligence is applied. At present, implementation of the artificial intelligence in the procedures of customs authorities of the Russian Federation has been provided by the Strategy for developing Customs Service 2030 as the first target landmark aimed at digital transformation of customs processing and control technologies.

Thus, processing the flow of information and revealing potential threats while moving IMPI shall become completely automated with the help of a monitoring system , applying the machine learning technology [5].

When applying the machine learning technology the principal method of automated monitoring and analysis of an IMPI shipment is interaction between two software programmes «Puthon» and «MySQL Workbench» (Picture 2). The software programme «Puthon» enables to launch automated algorithms of data analysis by means of the express SQL inquiries. It should be noted , that this system shall take into account all necessary cybersecurity protocols excluding unauthorised access of third parties.



Picture 2. Programme interface Puthon (Spyder, left) and SQL (MySQL Workbench, right) [Compiled by the authors]

Discussion

On the whole, the advantages and disadvantages of the model recommended by the authors may be displayed in the form of the table.

Advantages	Disadvantages
1. Automatized analysis about the persons moving the IMPI 2. The "subjectivity" of the official person while carrying the customs control is reduced 3. The opportunity of automatized customs control of IMPI 4. Automatized analysis of photos of IMPI	1. The dependency of the indicator of the effective customs control of IMPI from the form of customs declaration provided 2. Enhancing of the postal and customs IT infrastructure is required

Automated algorithms, which have been generated, will take into account all specific features required from the dataset declared, methods of moving goods , the workload of customs authorities etc. Having made the analysis with the help of the those algorithms, customs officers will identify specific risk areas to be focused on (excessive workload on the customs authority, violations within a specific class of goods, an error made by a monitoring system etc).

With regard to implementing all the above-mentioned innovations, the scope of customs control exercised over the goods forwarded in IMPI shall be , on the one hand, extensive , and on the other -efficient, without placing excessive burden in the form of money and time costs on the persons involved in forwarding IMPI.

The analysis made by a monitoring system of all the decisions taken on a specific IMPI shipment being forwarded (including the results of customs control) shall exclude the fact of excessive inspection by the customs authority, and it reducing the time allocated for rendering a customs service.

Conclusion

This research reflects the necessity of elaborating the effective tooling of digital transformation in the area of customs control, which hasn't been formed yet to this day. The work develops the mechanism of processing the flow of information while moving IMPI.

Improving the quality of the customs services subject to customs control of IMPI shall encourage , inter alia, the increase in the share of gods exported via IMPI, which will affect Russian economy due to the fact that mostly high-tech goods are exported in IMPI which require specific manufacturing and technological treatment.

Within the prospective research framework it is necessary to affect the issues of information safety and the peculiarity of the interaction of the digital systems of the customs authorities and FSUE "Post of Russia" more closely.

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