Harmonization of countries’ information systems to increase Russian agriculture export capacity

Svetlana Kuzmina¹, Vera Silaeva¹, Stanislav Marchenko¹, and Ksenia Machulskaya¹*

¹Saint-Petersburg Electrotechnical University «LETI», 197022 Saint-Petersburg, Russia

Abstract. To determine the directions for the harmonization of information processes and systems in Russia and foreign countries (China, India, Indonesia, the Philippines) the article considers social and economic policies, quality infrastructures and innovation-driven growth of the economies of states as elements of the existing standardization systems of these countries. Taking into account the geopolitical situation that has affected the transformation and growth of Russia's agricultural export, the article identifies barriers that reduce the effectiveness of trade interaction between countries and suggests ways to increase exports of Russian agro-industrial products to Asia-Pacific countries by harmonizing information processes and systems using standardization tools.

1 Introduction

The use of standardization and metrology as tools for stimulation the technological development of technical regulation during the implementation of industrial policy is a good practice. The main criterion of supporting the state socio-economic policy is a balanced quality infrastructure that promotes the development of fair competition and innovation, the reduction of technical barriers on trade, the improvement of the safety of life, health and property of citizens, the protection of the interests of consumers, the environment and the saving of all types of resources.

Standardization is both the basis for ensuring the quality of manufactured products and the innovative growth of the economy, and one of the key elements of the quality infrastructure. The Russian Federation has a law that defines the principles of standardization, according to one of which it is required to ensure that the requirements of standardization documents comply with the current level of development of science, engineering and technology, as well as best domestic and foreign experience.

Modern trade takes place in a multilingual environment, involves the laws of various countries and economic regions, and involves various parties. Trade documents in paper and electronic format are often used to exchange and record information in trade transactions. The simplification and standardization of these documents is a key step in realizing the exchange of information and facilitating the successful exchange of goods between countries.

* Corresponding author: ksenia_vm@bk.ru

© The Authors, published by EDP Sciences. This is an open access article distributed under the terms of the Creative Commons Attribution License 4.0 (https://creativecommons.org/licenses/by/4.0/).
In the current geopolitical situation, the level of relevance of the tasks of reorientation the Russian economy to the countries of the Asia-Pacific region and increasing the export potential of domestic organizations is noticeably increasing.

For the successful solvation of the problems that Russian economy is facing, domestic enterprises need to implement a whole range of measures to develop their export potential, but this article will cover only a part of them - recommendations for harmonization information processes and systems in Russia and several Asia-Pacific region countries.

The Asia-Pacific region (APR) unites 58 countries located along the perimeter of the Pacific Ocean and numerous island states in the ocean itself and is of strategic importance for all participating countries. The international cooperation that has developed in the Asia-Pacific region plays a significant role in coordinating relations between the countries that are part of the Asia-Pacific region. Integration between various countries of the region is expressed in the creation of various economic and political alliances. This article will highlight the key features of the standardization systems of 4 Asia-Pacific region countries: China, India, Indonesia, and the Philippines.

2 Materials

2.1 Standardization in China

In order to improve product quality control, determine who is responsible for product quality, and protect the rights and interests of interested parties, on September 1, 1993, the People's Republic of China adopted the Product Quality Law. The law establishes general provisions for product quality control and supervision of enterprises, in addition, the responsibility and obligations of manufacturers and sellers to consumers for product quality are fixed. The function of checking the quality system of enterprises is entrusted to state bodies.

The main document in the field of standardization in China is the Standardization Law (published in 1988, updated version adopted in 2017 and put in force in 2018). The law regulates the development, implementation, supervision and administration of standards. Mandatory and voluntary (industry and local) standards are applied to achieve the goals set in the law, which belong to the category of technical requirements and must be unitized for use in different sectors of the economy: agriculture, industry, services, social enterprises and others.

Since 2018, the unified management of standardization work has been carried out by the State Administration for Market Regulation (SAMR) [1]. SAMR represents China in the International Certification Organization (ISO) [2], the International Electrotechnical Commission (IEC) and other international and regional standardization organizations.

SAMR approves and organizes activities in the field of international cooperation and exchange of projects in the field of standardization between the respective administrative city departments and regions of the country. Districts are responsible for standardization work in their sectors and industries. At the same time, the State Council coordinates standardization work to plan major reforms in the field of standardization, study the main policies in the field of standardization and coordinate the development and implementation of interdepartmental and intersectoral standards.

According to enactment 4 and 10 of the Law on Standardization, the development of standards is based on scientific, technological research and practical experience of the members of the development team, as well as taking into account public opinion. SAMR is responsible for approving proposals from the administrative departments under the people's governments of provinces, autonomous territory and municipalities, numbering and notifying interested parties of mandatory national standards for further application.
Thus, the level of standardization development in China makes it possible to judge the recognition by state bodies of the importance of interaction in standardization processes, which can be attributed to a sign of the country's readiness to harmonize the requirements of standards.

2.2 Standardization in India

Place In India, the standardization body is the Bureau of Indian Standards (BIS) [3]. The Bureau of Indian Standards is a national body established in 1987 by an Act of the Parliament of India on November 26, 1986. BIS is regulated and controlled by the Ministry of Consumer Affairs, Food and Public Distribution. According to Law No. 11 of 2016, the functions of the BIS include:

- Development of national standards;
- Development and implementation of a product certification scheme;
- Development and implementation of a mandatory registration scheme;
- Development and implementation of a certification scheme for foreign manufacturers;
- Scheme for marking rooms;
- Laboratory services;
- Laboratory recognition schemes and others.

BIS is also a member of international organizations such as the International Standardization Organization (ISO), the International Electrotechnical Commission (IEC), the Pacific Area Standards Congress (PASC) and the South Asia Regional Standards Organization (SARSO).

As can be seen from the listed functions of the BIS, India recognizes the importance of the development of standardization and, as part of its development, seeks to integrate national standards with international ones. The development of standardization will make it easier for foreign companies to enter the Indian market.

2.3 Standardization in Indonesia

Standardization in Indonesia is governed by Law No. 20 of 2014 on Standardization and Conformity Assessment. Other regulations related to standardization are: PBSN No. 3 of 2018 on guidelines for the development of Indonesian National Standards (SNI) and PBSN No. 2 of 2018 on the adoption of international standards and guidelines for publication as the Indonesian National Standard (SNI).

The Law on Standardization and Conformity Assessment establishes the general provisions of standardization and conformity assessment, fixes the duties, responsibilities, subordination scheme and the procedure for interaction of the relevant organizations for standardization, conformity assessment and accreditation in Indonesia. In addition, the Law contains requirements for the procedure for carrying out activities in these areas, and also establishes responsibility for their infraction.

Standardization and conformity assessment is the responsibility of the National Standardization Agency (Badan Standardisasi Nasional – BSN) [4], which is a non-departmental government agency reporting to the President of Indonesia and accountable to him through Coordinating Ministers. BSN approves National Standards (SNI), as well as the SNI Certification Mark, indicating compliance with the requirements of a specific national standard for a product, service, system, process or personnel.

BSN is a member of the International Standardization Organization (ISO), where it represents interests of Indonesia [5]. BSN participates in the activities of technical committees, including policy development committees, in the status of a full member and observer [6].
As of the beginning of May 2020, there were a total of 10,858 national standards in Indonesia, almost 18% of which were harmonized with international standards [7].

2.4 Standardization in the Philippines

The fundamental standardization document in the Philippines is Republic Act No. 4109 (Standardization Act), which transformed the former Standards Division of the Bureau of Commerce into the Bureau of Standards for the purposes of standardization and importation of goods. DTI Administrative Order No. 09-08, issued in 2019, supplements the Standards Act with a Memorandum of Agreement (MOA) between the Standards Developing Organizations (SDOS) and the Bureau of Philippine Standards (BPS), which defines the responsibilities for developing standards.

Bureau of Philippine Standards (BPS) [8] is the national standards body of the Philippines. It is responsible for the development and dissemination of Philippine National Standards, including standards developed by other government agencies such as the Department of Agriculture and the Department of Health.

As a member of the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC), the Bureau of Philippine Standards contributes to the development of international standards and is also the National Reference Center of the WTO (World Trade Organization). The Philippines is a member of Switzerland's SECO-UNIDO Global Quality Standards Program (GQSP).

Most Philippine national standards are harmonized with international standards.

Thus, the internal standards of the standardization systems of each of the considered countries (China, India, Indonesia, Philippines) are striving for harmonization or have already been harmonized with international standards, which provides unitary requirements for product quality assurance.

3 Recommendation on harmonization of informational processes

As a result of the increased attention of the governments of the countries whose standardization systems were considered to security measures and border protection due to the strain foreign policy situation in the world, the number of documentary, procedural, regulatory requirements has increased significantly, which has led to the complication of international trade transactions and an increase in time needed on them. In order to support the business sector, the article proposes recommendations for harmonizing the information processes and systems of Russia and the Asia-Pacific region countries considered in the article, which will reduce the time and cost of international trade transactions, as well as ensure interaction between various parties participating in the international supply chain.

The implementation of the recommendations on the harmonization of information processes will make possible the creation of an information system in the future, which will be an important step towards the automation of international trade.

To develop recommendations for the harmonization of information processes, it is necessary to determine the tasks that will allow obtaining the results necessary for further automation of international trade:

• Description of the documentary requirements of the business processes involved in the data harmonization project;
• Definition of covered data in the data dictionary;
• Analysis of selected data;
• Development of guidelines for main documents.

After the solution of the set tasks, it will be possible to obtain a list of collected documents within the harmonization project; develop a set of data dictionaries used in paper / electronic
documents; determine the total array of data to be analyzed; create guidance on the use of main documents.

Many countries are now implementing the Single Window system, which allows the exchange of a complete set of information necessary for the export or import of goods. Through the use of this system, trade and logistics stakeholders can provide standardized information and documents in one system to meet all import, export and transit-related regulatory requirements. Thus, in order to harmonize information processes and systems, it is necessary to ensure the participation of Russia, China, India, Indonesia and the Philippines in the Single Window system. The inclusion of these countries in the Single Window system will provide the basis for paperless trade between them.

The article proposes recommendations consisting of 5 stages, the implementation of each of which will bring closer to the goal - the harmonization of information processes and systems of Russia and considered the Asia-Pacific region countries. When developing recommendations, the document "UNNExT Guidelines on Data Harmonization and Modeling for a Single Window Environment" [9] was used.

Recommendations for data harmonization and development of electronic documents:

1) Determination of the requirements for the data of the seller, determined as part of the analysis of business processes.

The Single Window environment uses documents and information to manage and implement business processes. To simplify, standardize, and automate data and documents, you need to understand the business processes that generate or use both data and documents.

The first step in a data harmonization project is to capture all data requirements in the relevant business documents through analysis of the considered trade processes. This step provides a list of the sales documents used in the data harmonization project and a description of the business processes in which these documents are used.

At this stage, it is recommended to conduct a business process analysis, which will allow you to define, analyze and simplify business processes. For a more visual perception of the information received, it is proposed to use the use case diagram and the activity diagram.

2) Develop a clear definition for data elements.

The purpose of this step is to get a clear description of the data requirements. The description and specification of the data is written using the definitions and terminology of business users and experts, such as a customs officer, buyer/seller or freight forwarder. This formation of a base for a clear understanding of the semantics of data, data type, presentation form, format and restrictions, allows you to identify important information for automating information flows at subsequent stages. Any ambiguity in the meaning and use of data elements may delay the process of harmonizing the attributes of such data elements with the chosen semantic rules, as well as create inconsistencies in the process of their harmonization.

After completion of this step, for each defined in step 2 documents, a data dictionary is compiled that describes the data elements contained in the document in detail from the user's point of view.

3) Analysis of data elements in various documents.

The purpose of this step is to translate data specifications from various documents into comparative form. This step assists in the sequential matching (correlation) of data elements with the data model, which is carried out as part of the next step.

The formulation of data requirements is based on the definition of data, i.e. data elements from different documents with the same name are placed in the same row.

In order to ensure consistent mapping, data dictionaries should be structured to refer to the same type of sales document.

4) Harmonization of data elements and development of a data model.

Matching is the process of linking an element in one dictionary with a semantically equivalent element in another dictionary. The data dictionary contains descriptions of data
elements in national trade documents, as defined from the point of view of a business expert. Within this step, these data elements are mapped to semantically equivalent data elements in the reference data model.

The result of the harmonization is a list of data elements in the reference data model that are necessary for national data exchange between countries. The national data model will be used in the final step to generate specifications for national electronic trade documents.

The main task of the step is to match the data elements in the resulting data dictionary with their respective components in the World Customs Organization (WCO) data model (DM). The corresponding component in the WCO DM is identified by a WCO Identifier (ID), an alphanumeric unique identifier for a data element in the Data Model. Data modelers are encouraged to keep a record of the reconciliation results, while expanding the compiled data dictionary with an additional column containing the WCO Identifier.


Structuring an electronic document requires technical skills in the area of available syntaxes and relevant technical standards. Depending on the initial business requirements, specific syntax such as XML (Extensible Markup Language) and EDI (Electronic Data Interchange) can be used when drawing up the structure of an electronic document.

As part of the described stages, the development of an array of simplified, standardized and harmonized data for trade between countries is being carried out. Within the 4th and 5th stages, the correlation of the data array with the reference data model is explained.

4 Conclusion

The implementation of the proposed recommendations will reduce the time and cost of international trade transactions, as well as ensure the interaction between the various parties involved in the international supply chain.

References