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SUPPLY CHAIN MANAGEMENT: METHODS AND TOOLS FOR FOOD PRODUCTION SAFETY AND RISKS MINIMIZATION

The paper demonstrates that the formation of supply chain safety management systems in food production is based on the ISO standards. The system data are considered in the context of the Technical Regulations of the Customs Union TR TS 021/2011 "On food safety" come into force following the HACCP principles.

Keywords: supply chain; monitoring of management systems; food safety; HACCP; Customs Union. JEL classification: M11.

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УПРАВЛІННЯ ЛАНЦЮГОМ ПОСТАЧАЇ: МЕТОДИ ТА ЗАСОБИ БЕЗПЕКИ ВИРОБНИЦТВА ХАРЧОВОЇ ПРОДУКЦІЇ ТА МІНІМІЗАЦІЇ РИЗИКІВ

У статті продемонстровано, що формування систем управління безпекою ланцюгів постачань у виробництві харчової продукції виконується на основі стандартів ISO. Дані системи розглянуто в контексті введення в дію Технічного регламенту Митного Союзу 021/2011 «Щодо безпеки харчової продукції» та реалізації принципів HACCP.

Ключові слова: ланцюг постачань; моніторинг систем менеджменту; безпека харчової продукції; HACCP; Митний союз.

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УПРАВЛЕНИЕ ЦЕПОЧКОЙ ПОСТАВОК: МЕТОДЫ И СРЕДСТВА БЕЗОПАСНОСТИ ПРОИЗВОДСТВА ПИЩЕВОЙ ПРОДУКЦИИ И МИНИМИЗАЦИИ РИСКОВ

В статье показано, что формирование систем менеджмента безопасности цепей поставок в производстве пищевой продукции выполняется на основе стандартов ISO. Данные системы рассмотрены в контексте вступления в силу Технического регламента Таможенного союза 021/2011 «О безопасности пищевой продукции» и реализации принципов HACCP.

Ключевые слова: цепочка поставок; мониторинг систем менеджмента; безопасность пищевой продукции; HACCP; Таможенный союз.

Introduction. Contemporary science offers numerous definitions for supply chain management (SCM). The range of opinions in this regard is very broad, depending on a country, logistics school (theory) and specific researcher. At present, there is no common opinion in relation to the meaning of the term "supply chain management", as it undergoes constant verification and change. In the course of a supply chain certification ISO standards define the following as an object of audit and assessment during the certification of Supply Chain Safety Management Systems (SCSMS) in a general case (Stock et al., 2005):

- policy of supply chain safety management system;
- goals, tasks and programs of safety management system;
- results of safety hazard identification processes and risk assessment, methodologies used to identify safety hazards and risk assessment;

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- planning and implementation of organizational measures to provide supply chain safety;
- organizational structure;
- implementation of key principles of SCSMS;
- documentation, including document entries;
- resources.

Latest research and publications analysis. Various aspects of supply chain management have been reviewed by D.J. Bauercox and D.J. Closs (2001), A.A. Bochkarev (2008), A.P. Dolgov (2002), E.I. Zaitsev and A. Bochkarev (2009), M. Christopher (2004), P.A. Lontsikh et al. (2014), A. Nekrasov (2005), V.I. Sergeev (2006), J.R. Stock and D.M. Lambert (2005), D. Waters (2003). The analysis of the above-mentioned publications will be presented below to identify the key problems of food production safety.

The research objective is to provide insights into the mechanism of formation of the supply chain management systems and their certification for ensuring food production safety and risk minimization.

Key research findings.

Supply chain management. The object of analysis is the domain of certification of management system for supply chain safety in production of various products (services), their life cycles and production processes. The objective of the analysis is to determine the compliance of an organization's SCSMS with the requirements of the respective standard; to evaluate its implementation and effectiveness, its ability to accomplish the set goals and tasks within the framework of safety policy implementation; analysis of the assessment of risks and safety hazards in an organization's supply chain; assessment of the extent of organization's compliance with mandatory legal requirements pertaining to services rendered by the organization (Nekrasov, 2005).

The most widely used definition of supply chain may be formulated as follows: "Supply chain is 3 or more economic entities (organizations or persons), who take immediate part in external or internal flows of products, services, finance and/or information from source to consumer". At present, the emphasis in interpretation of the concept is increasingly shifting towards wider understanding of supply chain management quoted in collective volume of "Standards of Logistics and Supply Chain Management" (Sergeev, 2006).

SCM is defined as organization, planning, control and implementation of the flow of goods, from design and procurement, through production and distribution to final consumer, in accordance with market requirements to cost efficiency. Logistics is defined as planning, implementation and control of flow and placement of manpower and/or goods, as well as support actions related to such movement or placement, within the limits of the economic system created to accomplish its specific goals (Waters, 2003). Numerous examples of different interpretation of "supply chain management" and "logistics" terms could be quoted. It appears difficult to encompass the entire spectrum of these definitions, which is composed of diverse and variable terms from logistics and supply chain management domains.

Federal Supply Class (FSC) supply chain is the information about the path of the product from the location of production to consumer, including all stages of processing, transformation, production, storage and distribution, where transfer from one

stage of the chain to another also means the change of owner (Dolgov, 2002). Any change of owner in a supply chain requires the implementation of efficient supply chain management systems at the level of organization, as well as their approval by independent certification authorities. Development and implementation of supply chain management systems is an efficient method of control over organization's own production systems, including the origin of materials contained in a product. Certification of such management systems is designed to provide reliable guarantees to consumers, both commercial organizations, governmental institutions and end users, in relation to the fact, that the product being sold (i.e. invoiced), is bearing special code of a certificate, has a controllable source, made of recycled materials or a mix of them. Certification of a FSC supply chain, therefore, promotes transparent flow of products along the chain. Supply certificate represents information about checked sites, processes and product groups, from which such product may originate, as well as references to standard(s) on supply chains used in assessment conducted by an accredited certification authority (Bochkarev, 2008).

In order to be able to state the product is certified (an uninterrupted chain of certified organizations must exist, covering all stages of product more from a certified production site to the final retail point. Therefore, certification of supply chain is needed for all participants of the chain, who have legal property rights for this product (Bauercox and Closs, 2001).

Evolution of the "supply chain management" concept. Development of supply chain management in Russia. The concept of supply chain management is one of the most rapidly developing areas of research and practical activity over the last few decades. The term was proposed by the system integrator – the company "i2 Technologies" in early 1980s (Gatorny et al., 2008). The concept of supply chain management is also often related to the article by K. Oliver and M. Weber (1982).

In the process of evolution, the set of notions of supply chain management concept has evolved considerably, since its terminology remains in constant development. In the 1980s, in many industries of developed economies production costs dropped to the point, which was practically achievable. A new concept of business management was required to continue maintaining competitive advantage. The concept of supply chain management emerging in the 1980s brought about the idea of coordinating flows of materials and finished products not only within one firm, but across a number of related companies. Therefore, it became apparent that efficient management of supply chains is the next step needed to enhance competitive advantage.

At present, supply chain management as a SCM concept is one of efficient methods of maximizing profit and market share, being actively implemented in industrially developed countries. Many large companies, including the Russian ones, implement the principles of supply chain management as a new business ideology. Implementation and development of strategic advantages of logistics both abroad and in Russia is promoted by all-national coordination authorities, e.g. the European Logistics Association (ELA) and Council of Supply Chain Management Professionals (CSCMP).

In Russian Federation, the role of similar coordinating authorities is presently played by the National Logistics Association of Russia and National Council on Supply Chains. Creation and functioning of these organizations is based on the need:

- to develop proposals and amendments to legislation and regulations of Russian Federation on logistics, as there is no specific legislation on logistics in our country at present;
- to eliminate barriers existing in taxation, customs, transport laws of Russia, impeding efficient use of logistics strategic potential;
- to create integrated logistics systems encompassing various domains of entrepreneurship, create cross-regional and international integrated logistic transport, trade and information systems.

National Council on Supply Chains is a non-governmental non-profit organization set up as non-profit partnership, open to all market players (industrial enterprises, suppliers of products and services, transport and logistics companies, financial and credit organizations, insurance organizations, non-profit associations and centers, consulting, training and state enterprises). The main target is to propagate standards of supply chain management in real business in RF and other countries of the CIS.

Mission of the Council on Supply Chains is to develop, expand and popularize the model of supply chain as the basis of all-Russian interdepartmental standard of supply chain management, which consolidates best global and national practices. The model of supply chain defines the general concept of supply chains, standard terminology, system of measurements and evaluation of logistic function, consolidates best practices and functions as a procedural model for implementation of logistic software, performs the integrating functions in building both internal corporate and cross-corporation supply chains (Dolgov, 2002).

National Logistics Association (NLA) of Russia is a non-governmental organization founded by the Higher School of Economics, Russian Association of Business Education and Association of Forwarders of St. Petersburg. The mission of NLA is to build and develop logistics in Russia as a new academic and practical area of activity, promoting socioeconomic development of economic entities and country overall, as well as improving the living standards of the country's citizens. The main tasks of this organization include:

- analysis of foreign theoretical research and practical experience in the area of logistics with the purpose of their adaptation and implementation in Russia;
- development of proposals and supplements to legislation and regulations of Russian Federation related to logistics;
- coordination of activities of enterprises, organizations and institutions involved in research in the field of design, building and functioning support of logistic systems;
- exchange of best practices in logistics developments in RF and abroad;
- organization and participation in the procedure of logistics specialist certification in accordance with Russian and international requirements and standards.

Growing globalization, interaction with Western companies, as well as Russian research and publications in the field of logistics and supply chain management allow applying the global experience in practice. In the course of expanding the geography of supply chains, many foreign companies include RF as a sales market for finished products, or with the purpose to allocate production capacities in the country to produce goods as a part of their own supply chain, thus involving Russian partners into global integration.

Consequently, at present Russian companies together with their Western counterparts may use or already being using the potential of the concepts of logistics and supply chain management, which is expected to enhance their competitive advantage.

Classification of supply chains. To support its activity, any industrial, trade or service company creates a complex structure, which includes, in addition to suppliers and consumers of different levels, also a large number of contractors and agents. Logistic agents include firms offering logistic services on the outsourced basis, for a central company of the supply chain: forwarders, carriers, warehouses, terminals, customs brokers, insurance companies, agents, stevedoring companies etc.

Institutional contractors include customs authorities, supervisory authorities, licensing authorities (sanitary inspection, veterinary and plant control, tax inspectorates etc.). Other intermediaries include banks, companies of information services, advertising companies etc. It is apparent that "Organization must demonstrate its adherence to compliance with values defined in "Policy for Association of Organizations " (FSC-POL-01-004, originally adopted in July 2009) (Waters, 2003).

Depending on the number of units as proposed in Manual AC PP management system certification of supply chain security ND #004.00-139 (2006) and in the article (Sergeev, 2006), 3 levels of supply chain complexity are distinguished:

- 1) direct chain of supply;
- 2) expanded chain of supply;
- 3) maximum chain of supply.

Direct chain of supply is composed of focus (central) company (usually – an industrial or a trade firm), supplier and buyer/consumer, participating in external and/or internal flow of products, services, finance and/or information. Meanwhile, as a rule, the focus company defines the structure of supply chain and management of relations with business contractors.

In its essence, supply chain is the sequences of suppliers and consumers: each consumer then becomes a supplier for the following (downstream) activity types of functions, and this sequence continues until the finished product reaches its final user. Therefore, the existence of a "network structure of supply chain" may be stated, where each company (an organization or standalone structural division) provide each other with materials and goods or services, thus adding value to the product.

Motivation for implementation of food products supply safety systems. Russia's joining the WTO was preceded by practically 20 years of discussions, as shown in (Zaitsev and Bochkarev, 2009). Now, being a member of WTO, Russia must meet the requirements of this international organization. Present-day WTO promotes the development of global economy. It creates favorable conditions for investments, elevates trust etc.

The rules regimenting food products safety at the world market have been established by the Agreement on Application of Sanitary and Phytosanitary Measures. Discussion and decision-making on problems and perspectives of further development of international trade occur in the framework of multilateral trade negotiations. It is worth noting that the most important agreement of WTO in relation to food products safety is the Agreement on the Application of Sanitary and Phytosanitary Measures (often referred to as Agreement WTO-SPM) (Tyapukhin, 2009). The

Agreements define the sanitary and phytosanitary measures as those required to protect life and health of humans, animals and plants against the risks arising due to illnesses and their carrier organisms, contaminants, animal-borne diseases, plant-borne diseases or any products containing them.

The Agreement recognizes the right of countries to introduce such measures, but requires they be equivalent to each other, proportionate to the scientifically justifiable risk and be based on international standards. The Agreement requires member states public information on such measures being visible on regular basis. It allows countries disregard international standards in this domain in cases, when international standards are not applicable due to (Manual AS PP ND #004.00-139, 2011).

International and national standards, national regulations, guidelines and recommendations recognized within the WTO framework as the basis for equivalence of sanitary and phytosanitary rules include the following (Manual AS PP ND #004.00-139, 2011) :

a) in relation to food products safety – standards, guidelines and recommendations established by the Committee "Codex Alimentarius" (Lontsikh et al., 2014), which deal with food supplements, veterinary preparations, residual pesticides, contaminants, methods of analysis and sampling, as well as rules and guidelines in relation to hygienic norms;

b) in relation to health of animals and fauna – standards, guidelines and recommendations developed under the auspices of the International Epizooty Bureau;

c) in relation to plant health – international standards, guidelines and recommendations developed under the auspices of the Secretariat of International Convention on Plants Protection in cooperation with regional organizations functioning within the framework of the International Convention on Plants Protection.

Conclusion. Originally, certificate scheme FSSC 22000 covered the enterprises producing food products and food ingredients of plant and animal origin (food categories C, D, E and L according to ISO/TS 22003). However, after publication of PAS 223:2011, and later – PAS 222:2011, certification scheme FSSC 22000 began to include also the producers of food packaging and animal food producers. GFSIFSSC is prepared to expand the coverage as new PPU technical specifications become available for new sectors of food production. At present, when the certification scheme of FSSC is referred to, not the two original standards are implied, which formed the basis of the system, but rather the standard ISO 22000 in combination with "technical specifications for the relevant sector of PPU".

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