

UDC 339.9.012.42

DOI <https://doi.org/10.32782/health-2023.3.12>

## APPROACHES TO ASSESSING THE LOGISTICS OF FOREIGN ECONOMIC ACTIVITIES OF PHARMACEUTICAL PRODUCTION MANUFACTURERS

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*It has been established that the foreign economic activity (FEA) of manufacturing pharmaceutical enterprises is carried out in the form of export of medicines, import of active pharmaceutical ingredients, basic and auxiliary materials, equipment, provision of services and it is one of the important spheres of enterprise activity.*

*It was determined that logistics can improve the efficiency of FEA of enterprises. Logistics operations in the field of FEA of manufacturing pharmaceutical enterprises include the purchase of the necessary active pharmaceutical ingredients, materials and raw materials, their delivery and storage, movement to the workshop, inside the workshop and to the warehouse of finished products, storage of finished products in the warehouse, and their delivery to the consumer. The main problems of the logistics of the FEA of the manufacturing pharmaceutical enterprises are identified: the imperfection of route development, the low efficiency of the pharmaceutical logistics chain, the lack of documentation of all logistics operations, the principles of logistics in international agreements; the lack of unified requirements, standards and rules; compliance with operational procedures related to logistics activities and the impossibility of adjusting the order.*

*It was determined that logistics allows to improve the efficiency of foreign economic activity of enterprises.*

*It is proposed to evaluate logistics activities in the field of foreign economic relations to carry out a rating assessment of the quality characteristics of the logistics of foreign economic activities. It is proposed to carry out the methodology of diagnostics of FEA logistics in five directions: quality of document flow of FEA logistics; system of accounting for logistic operations of FEA; efficiency of FEA logistic activity; reliability of logistics; the efficiency of logistics personnel in the field of FEA. The definition of an integral indicator of FEA logistics activity is proposed. A rating scale of the quality characteristics of the FEA logistics has been developed.*

**Key words:** foreign economic activity, logistics, manufacturing pharmaceutical enterprise, evaluation, medicinal product, effectiveness.

**Сагайдак-Нікітюк Р.В., Захарко Н.В., Нікітюк В.Г., Демченко Н.В. Підходи до оцінювання логістики зовнішньоекономічної діяльності виробників фармацевтичної продукції**

*Встановлено, що зовнішньоекономічна діяльність (ЗЕД) виробничих фармацевтичних підприємств здійснюється у формі експорту лікарських засобів, імпорту активних фармацевтичних інгредієнтів, основних і допоміжних матеріалів, обладнання, надання послуг і є однією з важливих сфер діяльності підприємства. Визначено, що логістика дозволяє покращити ефективність ЗЕД підприємств. До логістичних операцій у сфері ЗЕД*

виробничих фармацевтичних підприємств віднесено закупівлю необхідних активних фармацевтичних інгредієнтів, матеріалів та сировини, їх доставку та зберігання, переміщення до цеху, всередині цеху та до складу готової продукції, зберігання на складі готової продукції, її доставку споживачу. Визначено проблеми логістики ЗЕД виробничих фармацевтичних підприємств, до основних з них віднесено недосконалість розробки маршрутів, низьку ефективність фармацевтичного логістичного ланцюга, відсутність документування всіх логістичних операцій, принципів логістики в міжнародних угодах; відсутність уніфікованих вимог, стандартів і правил стосовно логістичної діяльності у сфері ЗЕД; дотримання операційних процедур стосовно логістичної діяльності та неможливість коригування замовлення. Запропоновано для оцінювання логістичної діяльності у сфері ЗЕД здійснювати на підставі рейтингового оцінювання якісних характеристик логістики ЗЕД. Методику діагностики логістики ЗЕД запропоновано здійснювати за п'ятьма напрямками: якість документообігу логістики ЗЕД; система обліку логістичних операцій ЗЕД; ефективність логістичної діяльності ЗЕД; надійність логістики; ефективність діяльності логістичного персоналу у сфері ЗЕД. Запропоновано визначення інтегрального показника логістичної діяльності у сфері ЗЕД. Розроблено шкалу оцінок якісних характеристик логістики ЗЕД.

**Ключові слова:** зовнішньоекономічна діяльність, логістика, виробниче фармацевтичне підприємство, оцінювання, лікарський засіб, ефективність.

**Introduction.** Today, the domestic pharmaceutical sector of the health care industry is import-dependent, which requires pharmaceutical manufacturers to establish relations with subjects of other countries and carry out export-import operations.

Foreign economic activity (FEA) is implemented by manufacturing pharmaceutical enterprises (PMEs) in the form of export of medicinal products (PME), import of active pharmaceutical ingredients (API), basic and auxiliary materials, equipment, and provision of services (production, marketing and other). It is worth noting that fierce competition between manufacturers of pharmaceutical products, both in the domestic and foreign pharmaceutical markets, requires them to focus not only on the quality of medicinal products, but also to meet the requirements of partners regarding the volume of the order, the time and place of its execution, taking into account the specific partner's needs with minimal costs.

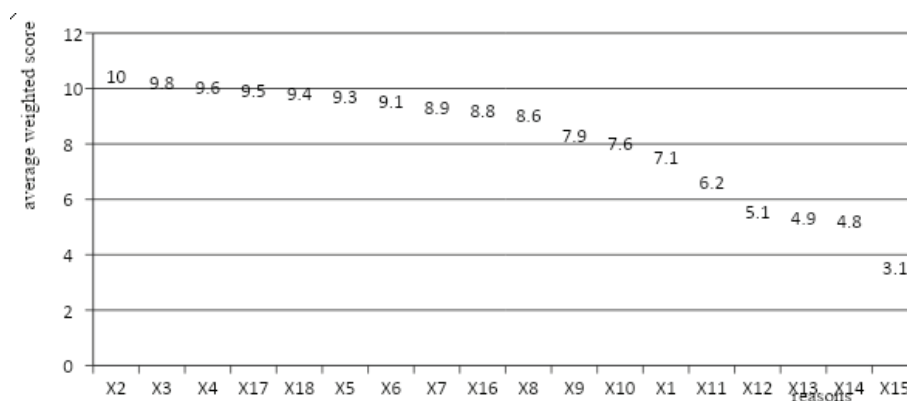
**The purpose of the article** is to develop a methodology for evaluating the logistics of foreign economic activity of a manufacturing pharmaceutical enterprise in order to study the effectiveness and feasibility of its implementation.

**Methods and materials.** The research used the methods of generalization, analysis and synthesis, taxonomic method, questionnaire.

The research was conducted on the basis of a questionnaire of 30 leading specialists of domestic pharmaceutical enterprises, among whom 73% were women and 27% were men. Experts were divided by age as follows: 8% under 25 years, 25–35 years – 14%, 35–45 years – 27%, 45–55 years – 36%, over 55 years – 15%. According to the experience of experts, up to 5 years – 11%, 5–10 years – 15%, 10–20 years – 32%, 20–30 years – 36%, over 30 years – 6%. The experts' opinions are consistent and well-founded (coefficient of concordance – 0.82, Pearson's coefficient – 23.1, which exceeds normative and table data).

**Research results.** The logistics operations of the PMEs carried out by the FEA include the purchase of APIs from a foreign partner, their delivery to the warehouse of the VFP, storage of raw materials in the warehouse of the enterprise and delivery to the workshop, movement storage of finished products within the workshop and warehouse, their delivery to the consumer [1; 2].

The problems of the logistics of foreign exchange, inherent in the PMEs, determined on the basis of the questionnaire conducted by the authors (10 – the biggest problem, 0 – the smallest problem), include: imperfection of route development (X2) (10.0 points); low efficiency of the pharmaceutical logistics chain (X3) (9.8 points); lack of documentation of all logistics operations (X4) (9.6 points); principles of logistics in international agreements (X17) (9.5 points); lack of unified requirements, standards and rules regarding logistics activities in the field of foreign trade (X18) (9.4 points); compliance with operational procedures related to logistics activities (X5) (9.3 points); impossibility of adjusting the order (X6) (9.1 points); imperfect contacts with partners (X7) (8.9 points); irregularity of customs procedures for crossing the border with material flows (X16) (8.8 points); lack of appropriate logistics personnel (X8) (8.6 points); irrational methods of delivery (X9) and low level of informatization and lack of a unified information system in the pharmaceutical logistics chain (X10) (7.6 points); non-observance of appropriate storage and transportation conditions (X1) (7.1 points); imperfect market infrastructure (X11) (6.2 points); unbranched drug distribution network (X12) (5.1 points); unavailability of general information for process participants (X13) (4.9 points); shortcomings in the regulation of delivery processes (X14) (4.8 points); inconsistency of delivery schedules (X15) (3.1 points) (Fig. 1).



**Fig. 1. Distribution of the reasons for the inefficiency of the FEA logistics of PME**

X1 – non-compliance with the relevant conditions of storage and transportation; X2 – imperfection of route development; X3 – low efficiency of the pharmaceutical logistics chain; X4 – lack of documentation of all logistics operations; X5 – compliance with operational procedures in relation to logistics activities; X6 – impossibility of adjusting the order; X7 – imperfect contacts with partners; X8 – lack of appropriate logistics personnel; X9 – irrational methods of delivery; X10 – low level of informatization and lack of a unified information system in the pharmaceutical logistics chain; X11 – imperfect market infrastructure; X12 – non-branched drug distribution network; X13 – unavailability of general information for process participants; X14 – shortcomings in the regulation of delivery processes; X15 – inconsistency of delivery schedules; X16 – irregularity of customs procedures for crossing the border by material flows; X17 – principles of logistics in international agreements; X18 – lack of unified requirements, standards and rules regarding FEA logistics

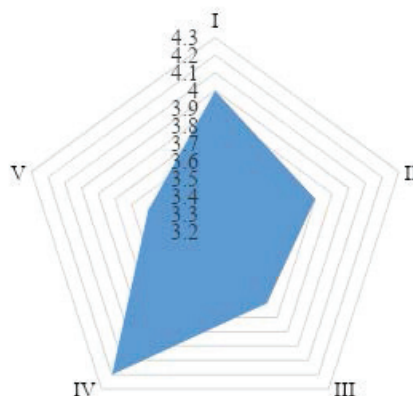
A necessary condition for minimizing the logistics problems of the FEA of the PME is to determine the reasons for the inefficiency of logistics activities and directions for their improvement. The analysis of scientific publications [3–5; 9; 13] and the experience of leading pharmaceutical enterprises shows that today the analysis of export-import operations is carried out in the following directions: export/import volumes and their dynamics index; geography of export/import; the average turnover duration of export-import operations and their riskiness.

The conducted studies [6–8; 10–12] made it possible to conclude that the evaluation of FEA logistics is expedient to be carried out on the basis of a rating

assessment of the qualitative characteristics of logistics of FEA on the basis of a questionnaire (Fig. 2).

The evaluation of the logistics activity of the FEA is proposed to be carried out in five areas:

- the first direction analyzes the level of document flow development;
- the second direction covers the accounting system of logistics operations, transparency of information, level of automation;
- the third direction characterizes the efficiency of the logistics activity of the FEA of the PME;
- the fourth direction determines the reliability of the fulfilment of contractual obligations in terms of time, quantity and quality;



**Fig. 2. The level of the determined evaluations of the quality characteristics of the FEA logistics of the PME “A”**

– the fifth direction – compliance of the competences of logistics personnel who conduct logistics activities.

In the questionnaire, experts need to provide a list of questions that need to be evaluated in points on a scale from 0 to 5 (the lowest is 0, the highest is 5), which allows identifying the weak points of FEA logistics of the PME.

The integral indicator is determined by the set of indicators included in five blocks, taking into account their weighting factor.

The importance of each characteristic ( $\alpha_i$ ) was determined on the basis of expert questionnaires.

The importance of each characteristic was determined on the basis of expert questionnaires. Thus, the importance of the quality of the document flow of FEA logistics of the PME is 0.13; logistic operations accounting system – 0.1; efficiency of logistics activities of the FEA – 0.25; reliability of FEA logistics – 0.3; the efficiency of the activities of the logistics personnel involved in the FEA is 0.22.

It is advisable to represent the rating scale of the quality characteristics of the FEA logistics of the PME as follows:

0–2.0 – critical – the presence of individual elements of compliance with the quality characteristics of the FEA logistics, that do not ensure the absence of risks, systematic facts of violation are observed;

2.1–3.0 – minimal – partial compliance of individual elements, while there is a risk of loss of compliance of the FEA logistics;

3.1–4.0 – satisfactory – compliance of individual elements with the requirements set for them, existing facts of violation and certain risks of logistics activities of the FEA;

4.1–5.0 – normal – complete compliance of the elements with the requirements set for them, in addition, there are no facts of violation.

The assessment of the quality characteristics of the logistics of the conditional PME (which is actually real, but for the sake of confidentiality the name PME “A” is applied to it), which exports to 21 countries of the world and whose product portfolio includes more than 410 names of drugs of all pharmacotherapeutic groups, is given in the table 1.

On the basis of the conducted questionnaire studies, it can be concluded that on average the PME is at a satisfactory level, but there are facts of violations

Table 1

**Assessment of the quality characteristics of the FEA logistics of the PME “A”**

№	Characteristic	Average weighted score
I	QUALITY OF DOCUMENT FLOW OF FEA LOGISTICS ACTIVITIES	4.0
1	Correctness of contracts	4.2
2	Implementation of documented procedures	3.6
3	Compliance with the conditions of storage of documentation	4.1
4	Adherence to the deadlines for archiving documentation	4.2
II	ACCOUNTING SYSTEM OF FEA LOGISTICS OPERATIONS	3.8
1	Automation of logistics reporting	4.3
2	Transparency of information	3.5
3	Determination of procedures and order of interaction between partners	3.8
4	Procedures of internal control of logistics activities	3.6
III	EFFICIENCY OF FEA LOGISTICS ACTIVITIES	3.7
1	The coefficient of loss of goods in the process of carrying out in FEA	3.5
2	The modernity of ordering methods	3.8
3	The level of readiness for the supply of pharmaceutical products	4.1
4	The level of failure-free supplies of pharmaceutical products	4.4
5	Correctness coefficient of supplier selection	3.5
6	Compliance with transportation conditions	3.6
7	Compliance of the vehicle with the requirements of the country to which the pharmaceutical products are sent	3.5
8	The level of logistics service quality assurance	3.4
IV	RELIABILITY OF FEA LOGISTICS	4.2
1	Reliability of fulfilment of contractual obligations by pharmaceutical enterprises in terms of delivery time	3.9

№	Characteristic	Average weighted score
2	Reliability of fulfilment of contractual obligations by pharmaceutical enterprises according to the number of products	4.8
3	Reliability of fulfilment of contractual obligations by pharmaceutical enterprises in terms of product quality	4.8
4	Reliability of logistics partners	3.3
V	EFFICIENCY OF THE LOGISTICS STAFF	3.6
1	Coefficient of professional and qualification compliance of logistics staff	3.9
2	Ability of logistics staff to control and monitor compliance with the requirements of logistics operations	4.3
3	Ability of logistics staff to use modern mathematical tools, computer software and programs	3.8
4	The level of training and retraining of logistics personnel	2.5
INTEGRAL INDEX OF LOGISTICS RESPONSIBILITY		3.86

and certain risks of the logistics activity of the FEA (Fig. 2 and Fig. 3)..

As the analysis showed, PME's have deviations both by parameters and by years, which is explained by the constant improvement of logistics activities, the emergence of new approaches and technologies of logistics activities, etc. The main problems identified on the basis of the diagnostics of the quality characteristics of the logistics of the FEA include the problems of block II (3.8 points), block III (3.7 points) and block V (3.6 points), which entered the satisfactory zone.

The most problematic issues are the constant training of the personnel involved in the FEA, the implementation of documented procedures, the definition of procedures and the order of interaction

between partners, the procedures for internal control of logistics activities, the reliability of logistics partners, the correctness of the selection of suppliers, the compliance of transportation conditions and the compliance of the vehicle with the requirements of the country to which send pharmaceutical products. In this regard, there is a need to develop directions for improving the logistics activities of the FEA, which should be implemented in the activities of the PME.

**Conclusions.** Diagnostics of the current state of the FEA logistics of domestic pharmaceutical enterprises was carried out to identify its main problems, which is caused by the instability of the political and economic situation in the country.

A rating assessment of the quality characteristics of the FEA logistics is offered.

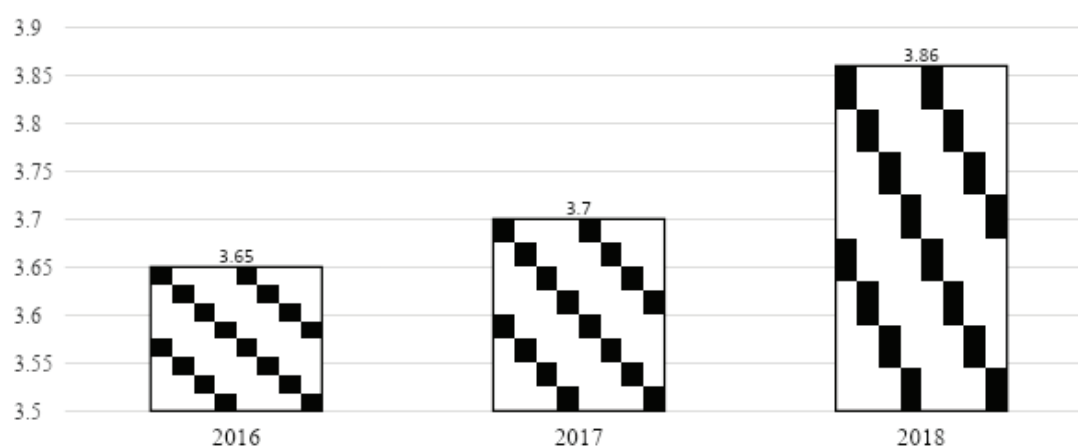


Fig. 3. Dynamics of the integral indicator of conformity of quality characteristics of the FEA logistics of the PME "A"

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