

EVALUATION OF FREIGHT CUSTOMS COMPLEXES' SERVICE USAGE EXPEDIENCE IN INTERNATIONAL ROAD TRANSPORTATION

N.O. Luzhanska¹, I.H. Lebid², I.N. Kravchenya³, M.G. Pitsyk⁴

¹PhD, Senior Lecturer at the Department of International Transportation and Customs Control,
National Transport University, Kyiv, Ukraine,
ORCID ID: 0000-0002-1271-8728

²PhD in Engineering, Associate Professor, Associate Professor
at the Department of International Transportation and Customs Control,
National Transport University, Kyiv, Ukraine,
ORCID ID: 0000-0003-0707-4179

³PhD in Engineering, Associate Professor, Associate Professor
at the Department of Road Transport and Traffic Management,
Belarusian state university of transport, Gomel, Belarus,
ORCID ID: 0000-0002-2670-639X

⁴PhD, Senior Lecturer at the Department of Transport Technologies,
National Transport University, Kyiv, Ukraine,
ORCID ID: 0000-0001-8357-2538

Summary

Introduction. Freight customs complexes' operation expedience in Ukraine as a whole as well as in a separate region depends on the demand for customs and logistic services generated by entities engaged in foreign economic activities. **Purpose.** The purpose of the article is to analyze the use of freight customs complexes' services in international road transportation. **Results.** The paper analyzes behavioral strategies pursued by subjects in the market for transportation services. Based on the research findings, it is found that the domestic market is characterized by a rapid transition from strategies focused on the cost of services, to understanding the need for quality service with a high degree of reliability. The authors conduct an expert assessment of stakeholders' feedback on the experience of cooperation with freight customs complexes from the standpoint of customers' needs. 676 specialists participated in the survey, including 160 consignees, 320 shippers, 74 customs brokers, 67 carriers, and 55 freight forwarders. We carried out the analysis of the stakeholders' feedback on the experience of cooperation with freight customs complexes using mathematical statistics methods, the methods of primary data analysis and the variance analysis in the Statistica program. **Conclusions.** It is established that the enterprises that have experience of cooperation with freight customs complexes express a fairly high degree of satisfaction with the level of customs and logistics services. The data that the authors obtain in the analysis will make for the development of recommendations for Ukrainian customs authorities on interaction with infrastructure facilities and stakeholders of customs and logistics services.

Key words: freight customs complex, expert assessments, data analysis.

ОЦІНКА ДОЦІЛЬНОСТІ ЗАСТОСУВАННЯ ПОСЛУГ ВАНТАЖНИХ
МИТНИХ КОМПЛЕКСІВ ПРИ ВИКОНАННІ МІЖНАРОДНИХ ПЕРЕВЕЗЕНЬ
АВТОМОБІЛЬНИМ ТРАНСПОРТОМ

Н.О. Лужанська¹, І.Г. Лебідь², І.М. Кравченя³, М.Г. Піцик⁴

¹к.т.н., старший викладач кафедри «Міжнародні перевезення та митний контроль»,
Національний транспортний університет, Київ, Україна,
ORCID ID: 0000-0002-1271-8728

²к.т.н., доцент, доцент кафедри «Міжнародні перевезення та митний контроль»,
Національний транспортний університет, Київ, Україна,
ORCID ID: 0000-0003-0707-4179

³к.т.н., доцент, доцент кафедри «Управління автомобільними перевезеннями
і дорожнім рухом»,
Білоруський державний університет транспорту, Гомель, Білорусь,
ORCID ID: 0000-0002-2670-639X

⁴к.т.н., старший викладач кафедри «Транспортні технології»,
Національний транспортний університет, Київ, Україна,
ORCID ID: 0000-0001-8357-2538

Анотація

Вступ. Питання доцільності функціонування вантажних митних комплексів в Україні в цілому, а також в окремо взятому регіоні залежить від попиту на митні та логістичні послуги у суб'єктів зовнішньоекономічної діяльності. **Мета.** Метою статті є аналіз використання послуг вантажних митних комплексів під час виконання міжнародних перевезень автомобільним транспортом. **Результати.** Проаналізовано поведінкові стратегії суб'єктів ринку транспортних послуг. За результатами досліджень встановлено, що для вітчизняного ринку характерним є стрімкий перехід від стратегій, орієнтованих на вартість послуг, до розуміння потреб в якісному обслуговуванні з високим ступенем надійності. Залежно від потреб замовників проведена експертна оцінка відгуків стейкхолдерів про досвід співпраці з вантажними митними комплексами. В опитуванні приймали участь 676 фахівців, з них: вантажоодержувачі – 160 осіб, вантажовідправники – 320 осіб, митні брокери – 74 особи, перевізники – 67 осіб, експедитори – 55 осіб. Аналіз відгуків стейкхолдерів про досвід співпраці з вантажними митними комплексами проводився за допомогою методів математичної статистики. Для дослідження використовувалися методи первинного аналізу даних і дисперсійний аналіз в програмі Statistica. **Висновки.** Встановлено, що підприємства, які мали досвід співпраці з вантажними митними комплексами, підтверджують досить високий ступінь задоволеності рівнем митно-логістичного обслуговування. Отримані в результаті аналізу дані дозволяють розробляти рекомендації для митних органів України з об'єктами інфраструктури та стейкхолдерами митно-логістичних послуг.

Ключові слова: вантажний митний комплекс, експертні оцінки, аналіз даних.

Introduction. A significant drawback of the modern market for transportation services is most private enterprises' inability to provide the appropriate quality and reliability of services at the level of European standards for organizing foreign trade organizations due to limited resources. Basically, the reason for such results is a significant number of participants in the transportation process with complex organizational ties among them.

Along with this, the situation in the market indicates the need for the provision of integrated customs and logistics services at freight customs complexes in the context of Ukraine's trade potential development and in order to meet stakeholders' needs.

Important components of the formation of the management strategy for freight customs complexes' operation in different regions of Ukraine are the development of an assessment system of their foreign economic potential level; forecasting the export and import transportation volume; the degree of infrastructure support and the availability of production facilities. The expedience of building new freight customs complexes and improving technical, technological and organizational support in a particular region depends on the availability of demand for their services and the prospects for further development of production and the economy.

Problem statement. The main purpose of the country's customs and logistics infrastructure operation is to provide high-quality services to entities engaged in foreign economic activities when delivering goods internationally. This aspect is quite important both for enterprises that are registered as residents of the country and for non-residents developing foreign trade relations with foreign business partners. Providing a wide range of logistics services supplied as soon as possible at a mutually beneficial cost, and with a high level of reliability will contribute to the development of trade between states [1]. In turn, the optimization of customs formalities should be aimed at reducing the time of crossing borders at checkpoints as well as the most efficient completion of customs clearance and customs control processes. Thus, the task of assessing the expedience of integrated customs and logistics service provision at the freight customs complex in the context of Ukraine's trade potential development in order to meet stakeholders' needs is urgent.

The analysis of recent research and publications. Formulating scientific principles and methodology for determining the effectiveness of transport and customs infrastructure is discussed in the works by many scientists [1-14].

The paper [5] proposes a model that allows Customs to optimize its inspection process to target high-risk containers without hindering the flow of safe containers with extra delays at ports. The model characterizes optimal informational and physical inspection rates as a function of the risk factors attributed to containers. This model is used to analyze how an effective public-private partnership for risk and security management can be established between Customs and private firms.

The usage of e-Customs platforms ensures a more cost-efficient application of resources while preserving a smooth flow of goods across international borders [7]. However, the lack of stability forces the users of the European e-Customs to continuously modify and investment in IT participate in the infrastructure [8].

The paper of Raus, M., Flugge, B., Boutellier, R. [9] investigates the diffusion of an e-Government innovation, a common e-Customs standardized solution. To achieve trade facilitation as well as to secure import and export the European Government aims to have a common e-Customs standardized solution.

To simplify customs clearance of vessels and cargoes the Mednet project was launched [10]. As part of the project a common evaluation framework for the performance of ports in the form of a set of Key Performance Indicators (KPIs) together with a list of the best practices in terms of operations and customs procedures was developed.

Articulation of the research objectives. To assess the expedience of using freight customs complexes' services in international road transportation based on the expert assessment of feedback from stakeholders on the experience of cooperation with the given customs infrastructure facility.

Statement of basic materials. In order to confirm or refute the expedience of using freight customs complexes' services depending on customs and logistics service consumers' needs, we conducted an expert assessment of stakeholders' feedback on the experience of cooperation with this customs infrastructure facility. The survey involved enterprises with the corresponding experience. They were asked to rate their satisfaction with the service on a 10-point scale. In total, 676 professionals took part in the survey (Figure 1) representing the interests of enterprises engaged in the following areas: 160 consignees, 320 shippers, 74 customs brokers, 67 carriers, 55 freight forwarders.

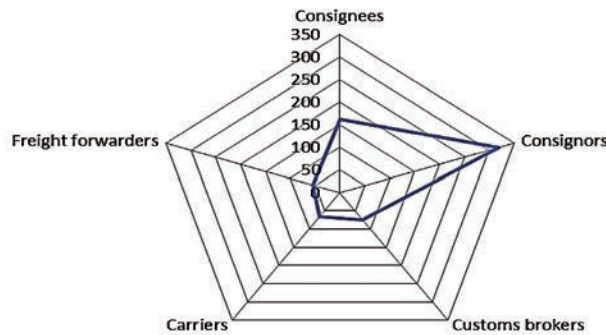


Fig. 1. Survey findings on the assessment of the experts' satisfaction with cooperation with freight customs complexes

The consignees that used freight customs complexes' services in foreign trade operations gave a quite high rating to the customs infrastructure facility they cooperated with. It should be noted that the survey among the experts did not specify what customs and logistics services provided by a freight customs complex were used by the business entities. According to the obtained results, 51 experts assessed the degree of satisfaction with eight points, 27 experts estimated it at nine points, and 41 professionals gave the highest score on the proposed scale (Figure 2).

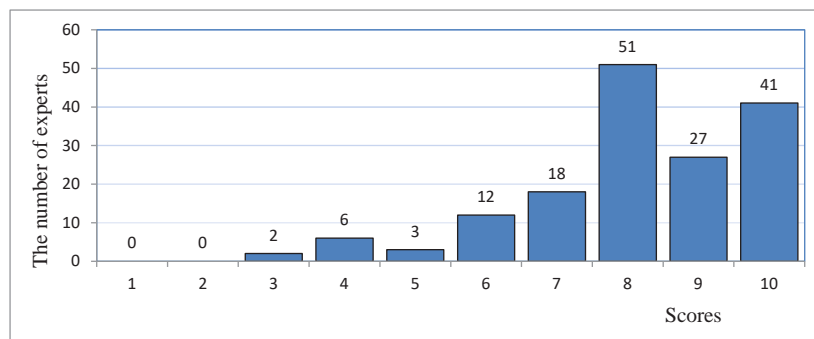


Fig. 2. Consignees' assessment of cooperation with freight customs complexes

The quality of customs and logistics services is a no less important aspect of shippers' activity organization. After all, for the most part, under sales contracts, they are obliged to organize all work to ensure international transportation and related operations (Figure 3).

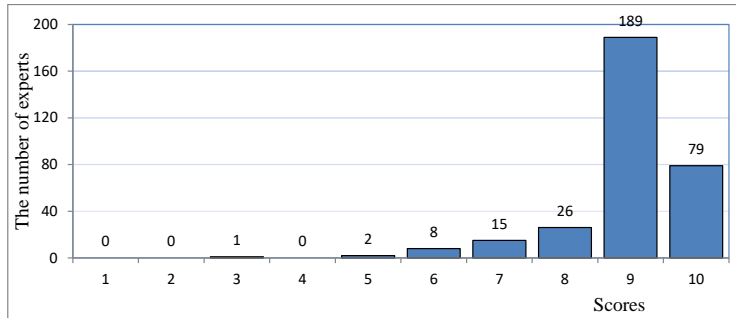


Fig. 3. Shippers' assessment of cooperation with freight customs complexes

A high degree of trust to freight customs complexes was reflected in the corresponding assessments given by the customs brokers that directly interact with the units of customs authorities in the completion of customs formalities (Figure 4).

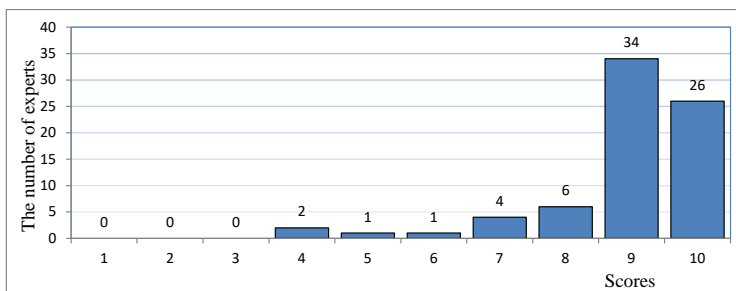


Fig. 4. Customs brokers' assessment of cooperation with freight customs complexes

Today's realities of international delivery of goods indicate a significant role of carriers in this process (Figure 5). Because, in addition to driving a vehicle, they are responsible for the control of shipping documents and interaction with all the necessary services and institutions that may be involved in the transportation process.

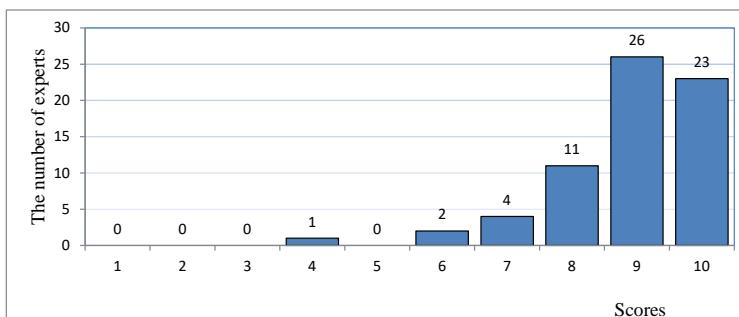


Fig. 5. Carriers' assessment of cooperation with freight customs complexes

Freight forwarders' professional responsibilities include the effective organization and planning of shipping concentrating on the efficiency criteria established by the customer. Modern practice shows that freight forwarders often cooperate with freight customs complexes when the customer demands integrated customs and logistics services.

Thus, a freight forwarder is also interested in this servicing format, as it minimizes the number of intermediary organizations that would need to be involved in the organization of shipping eliminating the need to monitor their activities and make financial payments with each individual transport market participant. Cooperating with the freight customs complex, it is possible to mitigate commercial and transportation risks associated with the activities of third parties (Figure 6).

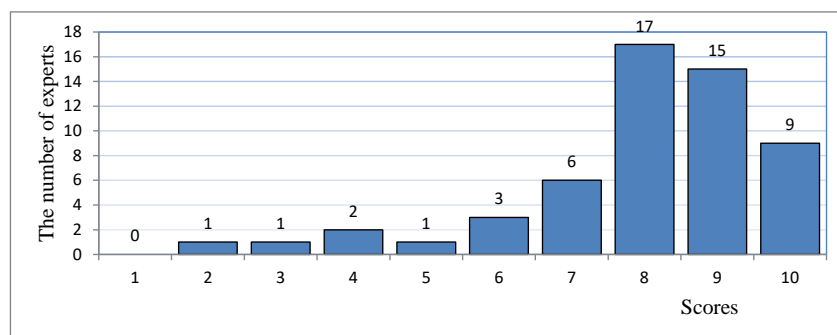


Fig. 6. Freight forwarders' assessment of cooperation with freight customs complexes

Numerical characteristics of the expert opinions calculated in Statistica [15], a software package of statistical analysis, are given in table 1.

Table 1

Numerical characteristics of the expert opinions

Summary Statistics	Consignees	Shippers	Customs brokers	Carriers	Freight forwarders
Count	$n = 160$	$n = 320$	$n = 74$	$n = 67$	$n = 55$
Average	$y_{e.av.} = 8,15$	$y_{e.av.} = 8,95$	$y_{e.av.} = 8,93$	$y_{e.av.} = 8,9$	$y_{e.av.} = 7,98$
Median	$M_e = 8$	$M_e = 9$	$M_e = 9$	$M_e = 9$	$M_e = 8$
Mode	$M_o = 8$	$M_o = 9$	$M_o = 9$	$M_o = 9$	$M_o = 8$
Variance	$D_{av.} = 2,68$	$D_{av.} = 0,95$	$D_{av.} = 1,68$	$D_{av.} = 1,4$	$D_{av.} = 3,17$
Standard deviation	$\sigma_{av.} = 1,64$	$\sigma_{av.} = 0,98$	$\sigma_{av.} = 1,3$	$\sigma_{av.} = 1,8$	$\sigma_{av.} = 1,78$
Coeff. of variation %	$V = 20,09\%$	$V = 10,91\%$	$V = 14,51\%$	$V = 13,29\%$	$V = 22,29\%$
Minimum	3	3	4	4	2
Maximum	10	10	10	10	10

The indicators for each group of experts are homogeneous. The average scores in different groups, in general, are 8 (the consignees and freight forwarders) and 9 (the shippers, customs brokers, and carriers). When analyzing the consistency of expert estimates, the coefficient of variation V is also used, which characterizes the measure

of the spread. The value of the coefficient of variation by the groups of experts ranges from 10.9% to 20.1%, which does not exceed 33%. Thus, the assessments of expert opinions are consistent.

To identify differences in the assessments of the effectiveness of stakeholders' cooperation with freight customs complexes by different groups of experts (freight forwarders, carriers, customs brokers, shippers, and consignees), we used the analysis-of-variance method in Statistica, a statistical analysis software package. Figure 7 presents a box-and-whisker plot illustrating the assessment of the effectiveness of the different groups of experts' cooperation with the freight customs complex.

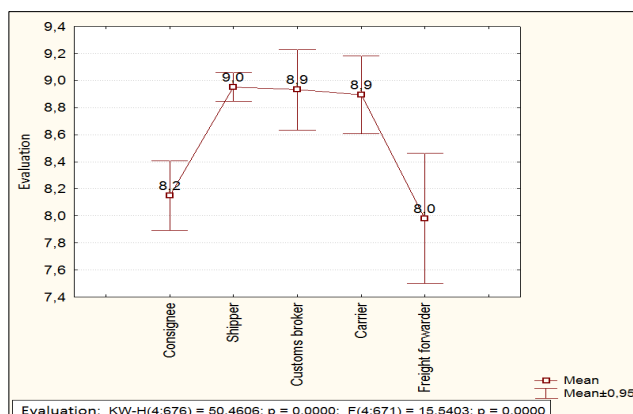


Fig. 7. Categorical box-and-whisker plot illustrating the effectiveness of the stakeholders' cooperation with freight customs complexes

From the categorical box-and-whisker diagram shown in Figure 7, it can be seen that according to the criteria “Kruskal-Wallis test” and “F test, p (ANOVA)” the assessment of the effectiveness of cooperation with freight customs complexes significantly depends on the group of experts, since $p \leq 0.05$. The pairwise comparison does not reveal significant differences in the assessments given by the shippers, customs brokers and carriers (Figure 8), as well as the shippers and freight forwarders, as $p > 0.05$.

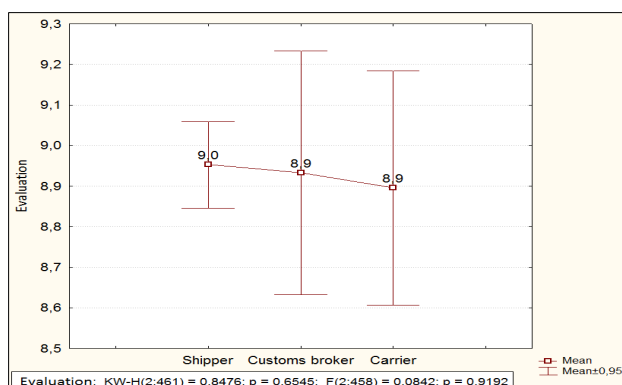


Fig. 8. Categorical box-and-whisker plot illustrating the effectiveness of the shippers, customs brokers and carriers' cooperation with freight customs complexes

Conclusions. The paper evaluates the expedience of freight customs complexes' service usage in international road transportation on the basis of an expert estimation of the stakeholders' feedback on their experience of cooperation with the given customs infrastructure facility.

In general, based on the research findings, we can conclude that companies that have experience of cooperation with freight customs complexes express a fairly high degree of satisfaction with the level of customs and logistics services.

Formation of a clear list of parameters for assessing the efficiency of customs and logistics infrastructure facilities will make for the development of practical recommendations for entities engaged in foreign economic activity, and will contribute to rational planning in international road transportation, taking into account the values of indicators and the methods of their determination

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