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FACTORS OF IMPACT ON THE CUSTOMS SERVICE OF ENTERPRISES' BUSINESS PROJECTS

The authors of the article assume that the development of intellectual capital, which is regarded as an irreversible process of qualitative and quantitative changes in intellectual assets with the transformation of financial capital into intellectual (creation of social value) and vice versa (creation of market value), depends on the expanded reproduction (accumulation) of capital. Such a process occurs cyclically by type of capitalization, but mainly by taking into account the mechanism of proportional development of variable and permanent parts of intellectual capital, taking into account the possibilities and efficiency of using the attracted and own intellectual assets. The variable part of it, which consists of human capital and capital of relations, has the properties of self-reproduction and determines the nature of the process of increasing the permanent part – organizational capital.

Keywords: intellectual capital, human capital, capital relations, organizational capital, institution of higher education.

Statement of the problem. One of Ukraine's key commitments in the context of European integration is to provide high-quality, progressive, transparent, non-discriminatory, quick customs services to economic entities, enabling them to quickly and efficiently carry out customs clearance of goods moving across the border of Ukraine. In this case, the efficiency of customs services is determined by a number of factors with different influences from the external and internal environment. This is conditioned by the fact that customs service is a complex process that involves the teamwork of at least two entities – representatives of customs authorities and business structures; however, such cooperation may include the activities of other organizations – customs brokers, specialized non-profit institutions of the customs profile, etc. At the same time, it should be noted that the key role in the customs service of enterprises' business projects belongs to the customs authorities, which provide essential fundamental customs services when goods of foreign economic entities cross the border.

Modern conditions of functioning are highly dynamic and, at the same time, unpredictable, so it is reasonable not only to identify but also to analyze the influence of determining factors on any phenomenon or process. In this context, the customs sphere deserves special attention, as in Ukraine it currently goes through a crucial stage of development and needs radical reform changes in view of the European integration transformations. At present, the customs system of Ukraine is one of the key objects of interest for representatives from various spheres at mega-, macro-, meso-, and microlevel. The reason for this is that the results of the activities of the state customs authorities determine not only the efficiency of international trade of businesses but also affect international cooperation, country's image in the world, international and national security, etc. At the same time, international trade is one of the key drivers of the European integration process, development of the national economy, and improvement of the efficiency of business' functioning. Unfortunately, according to the available research results, today the work of Ukrainian customs authorities has significant problems with different parameters of operation. This, in turn, actualizes the need to analyze foreground factors influencing the effectiveness of customs service of business projects of enterprises.

Analysis of recent research and publications. It should be noted that the customs sector is highly dynamic and is characterized by constant changes in its various parameters; this gives importance to the task of not only actual but also the predictive analysis of the impact on the enterprises' customs service made by priority factors. This will give the possibility to develop measures needed to improve the level of efficiency of customs services, which are more reasonable and adequate for operating conditions. We should also note that the quality of the obtained results of the analysis and evaluation of the factors impacting any phenomenon or process largely depend on the applied instruments.

Researching one or another phenomenon or process, many scholars have analyzed factors of influence in a particular field, using a wide range of quantitative or qualitative instruments. Based on the review

of scientific studies devoted to the issue of impact factor assessment, it has been determined that a significant number of authors use correlation-regression analysis to achieve the goal.

Thus, A.O. Fatenok-Tkachuk[1] analyzed the factors that impact on the development of foreign economic activity of machine-building enterprises. In particular, the author has identified and grouped impact factors of the highest priority, and subsequently, using multifactorial linear regression, constructed economic and mathematical models of the dependence of export volumes on the identified impact factors within each group. According to the author, this has allowed to identify the most important factors and to quantify their influence on the development of foreign economic activity of the enterprise.

M.Y. Nagirna applies a somewhat similar approach[2] when analyzes factors influencing the export-import activity of machine-building enterprises within the limits of etiological diagnostics. The author also identifies key groups of factors influencing the export-import activity of enterprises and lists in detail the main driving forces within each of these groups. Then, based on the expert assessment, the indicators that most represent the impact of the relevant factor are selected. To reflect the impact of certain indicators on the resultant indicator of export-import activity realization, the author constructed an economic-mathematical model using correlation-regression analysis.

Studying the peculiarities of managerial decision-making based on the harmonization of interests of groups having economic influence, I.B. Oleksiv[3] distinguishes two groups of methods for instantaneous modeling of the situation: expert and optimization methods. However, the author notes that the application of regression models should be based on observational data gathered for a considerable period of time, which sometimes complicates the possibility of such modeling due to the lack of the required information array. At the same time, according to the scholar, although expert methods assume taking into account the experience and intuition of experts, they also possess a considerable level of subjectivity of expert opinions. Instead, optimization methods allow choosing the best solution to the problem if resources are limited.

A.V. Todoshchuk[4] analyzed in his work the factors that impact on the probability of customs risks. At the same time, the author classified all impact factors into such groups as macroeconomic, intra-organizational, customs and personal factors. Within each group, specific lists of priority factors that provoke customs risks were identified and characterized. To obtain a quantitative assessment of the determining factors, the author offered to calculate the integral indicator of environmental risk as the square root of the point sum of squares of the measured impact levels made by each group of factors.

O.V. Pyroh and M.I. Tomych[5] apply a concatenation analysis that allows constructing a multifactorial regression model to evaluate the factors that impact on the development of public-private partnerships in foreign economic activity.

V.O. Terletska[6] uses a method of comparative analysis to determine which factors impact on consumer choice when purchasing machine-building products. The author substantiates the feasibility of using this method given the complexity of the studied socio-economic problem, which needs a combination of a qualitative and quantitative assessment of goods.

T.V. Lebid, V.Y. Samuliak and R.V. Feshchur[7] likewise, use the method of a concatenation analysis to study the marketing factors impacting the development of machine-building enterprises. In their research, these scholars generalize that the presence of a single factor is not a sufficient condition to achieve certain results. While improving the performance of the work of a particular entity depends on how effectively

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[1] Фатенок-Ткачук, А.О. (2010). Аналізування факторів впливу на розвиток зовнішньоекономічної діяльності машинобудівних підприємств. *Наукові праці Кіровоградського національного технічного університету. Економічні науки,* 17, 93-100.

[2] Нагірна, М.Я. (2016). *Етіологічна діагностика експортно-імпортної діяльності підприємств.* Львів: Національний університет Львівська політехніка.

[3] Олексів, І. Б. (2011). Особливості прийняття організаційних управлінських рішень на засадах узгодження інтересів груп економічного впливу. *Вісник Дніпропетровського університету. Серія «Економіка»,* 5/4, 252-257.

[4] Тодощук, А.В. (2015). *Управління митними ризиками у діяльності машинобудівних підприємств.* Львів: Національний університет Львівська політехніка.

[5] Пирог, О.В., Томич, М.І. (2017). Оцінювання чинників, що активізують розвиток державно-приватного партнерства в зовнішньоекономічній діяльності. *Бізнес Інформ*, 12, 263-268.

[6] Терлецька, В.О. (2018). *Економічне оцінювання та формування кон'юнктури ринку автомобілебудівної продукції.* Львів: Національний університет Львівська політехніка.

[7] Лебідь, Т.В., Самуляк, В.Ю., Фещур, Р.В. (2010). Дослідження маркетингових факторів впливу на розвиток підприємств. *Збірник наукових праць Київського національного університету імені Т. Шевченка. Серія «Теоретичні та прикладні питання економіки»,* 22, 116-125.

priority factors are combined and used for a synergistic effect. In their work, the authors substantiate the idea that the use of a concatenation analysis allows not only to determine the relative importance of each individual impact factor but as well to analyze the level of development of the studied object under established values of each factor. This method is based on the combination of quantitative calculations with qualitative expert assessment of factors' combinations.

In light of all the issues mentioned above and taking into account the specific factors influencing the customs service of enterprises' business projects, it can be argued that the use of qualitative tools alone, including the method of expert assessment, is characterized by a sufficiently high level of subjectivity and prevents the achievement of substantiated quantitative results. However, the use of a simple arithmetic apparatus in combination with the expert method ensures that obtained results reflect only the actual level made by impact factors on the studied object. Studying peculiarities of impact factors of the customs service of enterprises, it should be noted that mainly all these factors are quite difficult to accurately assess and interpret through specific quantitative indicators. The vast majority of studies use expert assessment to determine the effectiveness of the customs service of business projects of enterprises. This, in turn, complicates obtaining of the observational data regarding the level of impact factors over a considerable period of time, necessary for the application of the classical correlation-regression analysis. At the same time, the most adequate method to analyze impact factors of the customs service of enterprises' business projects is the concatenation analysis, which helps to organically integrate the expert assessments with sufficiently reliable quantitative calculations of the regression model.

The purpose of the article. The purpose of the article is to identify the impact made by factors on the customs service of business projects of enterprises and the development of appropriate models.

Presentation of the main research material. It is commonly known that the regression model reflects the interconnection between a resulting trait and factor traits. In this case, if the resultant indicator is influenced by only one factor, then a one-factor regression model is constructed. If the resultant indicator is influenced by several factors, then a multifactorial regression model should be developed. In addition to that, regression models may also be classified into linear, parabolic, exponential, logarithmic, and so on. Therefore, the choice of a particular type of model is justified by other additional indicators that determine its reliability and credibility. As stated in the paper, the method of the concatenation analysis is most widely used for the study of complex socio-economic phenomena, and this involves the construction of a multifactorial regression model of a linear type.

It is important to note that the customs service of enterprises' business projects is influenced by many various factors of the internal and external environment. Remembering that customs service is a process with many involved subjects, based on the interaction of at least two participants – customs authorities and entities of foreign economic activity, yet may be realized by customs intermediaries or specialized non-profit organizations, all impact factors based on the subject of the customs services were divided into four groups. In addition, based on the environment of impact, internal and external factors were traditionally distinguished. We should also stress that customs authorities are a key and integral subject of customs services. Besides, a foreign economic entity has the right to carry out a full customs self-service and independently cooperate with customs authorities or partially or comprehensively use the services of customs brokers, specialized non-profit organizations, etc. At the same time, modern scientific and practical publications, more and more frequently, mention the urgency and the numerous problems in the work of customs authorities in providing services to business structures. So, since we've established that the customs authorities are the key link, it is crucial to analyze impact factors that affect the customs servicing of business projects of enterprises implemented by the customs authorities. This permits to thoroughly investigate all factors that cause problems in the work of the customs authorities or, on the contrary, to improve customs service, eliminate negative aspects and strengthen existing advantages in this field.

Customs issues, including the procedure of customs service of enterprises' business projects, have been the research interest of both the scientific community and a large cohort of practitioners. Suchlike studies have become particularly active after the signing and ratification of the Association Agreement between Ukraine and the EU, which implies intensification of foreign economic activity of domestic business structures. Customs should become one of the key drivers of international trade through the facilitation of foreign trade operations of enterprises by simplifying a range of customs procedures, granting preferences and creating preferential conditions for customs service for honest businessmen.

For example, the Institute for Economic Research and Political Consulting with financial support from the EU is implementing a large-scale four-year project "Facilitating trade development by promoting dialogue

between civil society and public authorities (Trade Facilitation Dialogue)", and since 2014 it systematically studies the effectiveness of public authorities' operation intending to facilitate trade procedures, including customs. One of its last studies was the third survey of domestic importers and exporters on the status and prospects of trade facilitation in Ukraine in 2017-2018; its results were reflected in the corresponding report. In total, 1019 enterprises, which carry out export or import operations, or combine both of these trading types, have different size, legal form, type of ownership, branch of activity, region, the geographical orientation of their foreign economic activity, participated in the survey[1].

A separate paragraph of the analytical report on trade facilitation of the Institute for Economic Research and Political Consulting assesses customs performance on several parameters. Thus, according to the results of the survey, the key problems in the work of Ukrainian customs authorities are imperfect customs legislation (47% of respondents), obsolete technical support (26%), deliberate overpricing of the customs value of goods (26%), lack of transparency and openness (26%), corruption and bribery (24%), frequent changes in structure and leadership (18%), fiscal function of customs (14%), low level of inspectors' skills (13%). What is interesting, same as in the previous year, the leading problem is low-quality customs legislation, although fewer respondents have mentioned it (47% in 2017 versus 56% in 2016). At the same time, the problem of outdated customs clearance and control equipment increased (26% in 2017 versus 22% in 2016). As for the rest of the problems, in 2017, compared to 2016, a smaller proportion of respondents have noted given difficulties in the work of customs authorities.

If we consider the above problems separately reported by exporters, importers and enterprises engaged in export-import operations, the most important problems for them are imperfect customs legislation (38%; 53%; 48% respectively), obsolete technical support (26%; 21%; 29% respectively), deliberate overpricing of customs value (13%; 33%; 26% respectively), lack of transparency and openness (17%; 31%; 26% respectively), corruption and bribery (26%; 24%; 24% respectively), constant changes in structure and leadership (18%; 18%; 18% respectively), fiscal function of customs (5%; 20%; 13% respectively), non-professional inspectors (10%; 16%; 13% respectively). As you can see, the overwhelming majority of problems are more important for importers and businesses involved in export-import operations, rather than for exporters.

It should be noted that according to the source, the studied phenomenon should not have more than six factors, as otherwise there is a risk to lose control over the results of the analysis. At the same time, to build an adequate model, impact factors cannot correlate with each other, or such correlation should not be significant.

It is worth noting that in the above list of factors evaluated by experts, some of the factors are interrelated, which requires to eliminate factors of lower priority. Thus, the deliberate overpricing of the customs value of goods can be attributed to the factor of corruption and bribery as one of their means. The lack of transparency and openness in the work of customs authorities also correlates with corruption as one of its manifestations. Therefore, we believe it is more reasonable to focus on the factor of corruption and bribery of customs authorities, as, in relation to other mentioned factors, it is a more complex parameter which affects the efficiency of customs service of business projects of enterprises. Such factors as frequent changes in structure and management and low level of inspectors' qualifications can be combined into a more complex factor – the level of organization of customs authorities' work. Regarding the fiscal function of the customs, this factor is linked to the organization of the customs activities, as there is an unjustified prioritization of the tax burden.

Therefore, after consideration and logical arrangement of the identified impact factors affecting the efficiency of customs service of enterprises' business projects and key problems mentioned by the respondents in the framework of a specialized research[2], it was established that the most significant factors in the studied area are:

– quality of customs legislation;

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[1] Інститут економічних досліджень та політичних консультацій (2018). *Аналітичний звіт за результатами третьої хвилі опитування українських імпортерів та експортерів «Спрощення процедур торгівлі в Україні: оцінки та очікування бізнесу 2017/2018».* <http://www.ier.com.ua/files/Public_events/2018/TFD_III_Presentation/ TFD_III_2017-2018_report.pdf> (2020, January, 15).

[2] Інститут економічних досліджень та політичних консультацій (2018). Аналітичний звіт за результатами третьої хвилі опитування українських імпортерів та експортерів «Спрощення процедур торгівлі в Україні: оцінки та очікування бізнесу 2017/2018». <http://www.ier.com.ua/files/Public_events/2018/TFD_III_Presentation /TFD_III_2017-2018_report.pdf> (2019, November, 15).

  – level of software and technical support of customs authorities;
  – quality of work organization of customs authorities;
  – level of corruption of the customs authorities.

Now, let's more carefully consider each of the identified factors that impact the customs service of business projects of enterprises implemented by the customs authorities.

Thus, the existing legislative framework in the customs field is a key regulator of customs service of business projects of enterprises, which establishes the basic principles for the interaction between customs authorities and foreign economic entities or their representatives for the provision of customs services on the clearance of goods that move across the state border of Ukraine. The quality of customs legislation is determined by its logic nature, validity, harmonization with international customs standards, interrelation and consistency of all regulations governing customs service of enterprises.

Software and technical support of customs authorities reflects the need for both simple and high-tech instruments for customs clearance and control, including computer hardware, software, and so on. An adequate level of technical and property support of customs authorities means that checkpoints must be equipped with sufficient hardware and software, which is in good working condition, progressive and corresponding to the current international trends in customs development. Unfortunately, as Ukrainian customs practice shows, today there are significant problems in the technical and property support of the customs authorities, which are associated with the deficiency of high-tech devices as well as with the existence of primitive means of customs control and clearance at certain customs checkpoints. Much of the equipment used by customs inspectors is out of date, out of order, and is not regularly updated. This significantly complicates the implementation of customs service of enterprises, increases the amount of time spent for the provision of customs services, increases the risk of errors in the customs clearance of goods that foreign economic agents move across the state border, etc.

Quality of work organization of customs authorities is, first of all, aimed at forming an organizational structure of management, which in turn will distinguish the management levels of customs authorities, reflect the centralization of management, a functional and quantitative load of structural units, their internal relations, subordination, etc. Within this factor, it is also reasonable to mention the level of qualification of customs personnel, including staff that provides customs service to businesses and directly determines its effectiveness. The high-grade organizational structure has clear managerial vertical and horizontal, the optimal functional division of customs bodies into structural units and their staff, close interaction between the units, and a defined responsibility.

The corruption of the customs authorities reflects the presence of hidden illegal aims of customs officials, which give rise to the illegal movement of goods across the state border through smuggling and fraudulent transactions, submission of false and unreliable information about the goods, nonpayment of the customs duties in full, etc. The presence of corruption in the customs authorities hinders the implementation of legal trading operations by law-abiding business representatives, related to the biased and unfair treatment from customs officers, delays in customs clearance, additional unjustified examinations in case of refusal to participate in corruption schemes, and so on.

In general, the multifactorial regression model is expressed by the following equation:

$$y = b_0 + b_1 x_1 + b_2 x_2 + \cdots + b_n x_n, \tag{1}$$

where y – the dependent variable, or the resulting indicator;
  $x_1, x_2, \ldots, x_n$ – independent variables, or factor indicators;
  b_0 – the free term of the model;
  $b_1, b_2, \ldots, b_n$ – parameters of the model.

We should stress, it was reasonable to choose the quality of customs service of business projects of enterprises as the resulting indicator, because it is a generalized complex parameter that characterizes the totality of features of this process, which determine the ability to quickly and effectively meet the needs of foreign economic operators in customs services.

Henceforward, it is necessary to determine the levels that characterize the factors influencing the customs service of business projects of enterprises. As stated in the work by Feshchur , when using the method of the concatenation analysis, such differentiation of trait levels should be ensured which will be appreciable to experts while having a minimal number of such levels. Based on this, the levels of factors influencing the customs service of enterprises have been determined and remained appreciable to experts. (Table 1).

Table 1

**The description of impact factors that affect the customs service
of business projects of enterprises**

№	Factors	Levels (traits) of factors	Content description of the levels of factors	Acronyms for the levels of factors
1	Customs legislation	Favorable enough	Provisions of legal acts regulating the customs service of enterprises are aimed at facilitating legal international trade through the simplification of customs procedures, harmonized with European and international acts, consistent and interrelated	FE
		Not favorable enough	Separate provisions of customs legislation have been developed in line with European and international law, but the existing regulatory framework is not fully aimed at facilitating legal international trade and is characterized by the existence of certain contradictions with the provisions of interrelated legal acts	NFE
2	Software and technical support	Progressive	Customs authorities have sufficient technical means and software for customs service of enterprises, which are systematically updated, are in good working condition and characterized by a high level of progressiveness	P
		Sufficient	Customs authorities are provided with only primitive technical instruments and software and do not have high-tech tools and advanced software at their disposal	S
3	Work organization of the customs authorities	Optimal enough	Reflects a strong customs administration focused on the development of customs service with clear managerial vertical and horizontal, proper centralization of management, optimal functional workload, qualified staff, and clear accountability mechanism	OE
		Not optimal enough	Activities of the customs administration are aimed equally at the achievement of customs and fiscal goals, there is a weak managerial vertical, functional load of structural units is not optimal enough, an average level of staffing	NOE
4	Corruption of the customs authorities	Absent	Any manifestations of corruption by the customs officials during the customs service of enterprises are absent	A
		Low	Minor cases of corruption may be observed during the implementation of customs procedures by customs officials on clearance of goods of foreign economic operators	L
		Medium	There are systematic manifestations of corruption in the customs service of enterprises	M

Source: Developed by the authors

In order to reduce the number of independent variables in the regression model, one of the traits of each factor can be excluded from consideration. Thus, when constructing a multifactorial regression model, we consider such factors as:

x_1 – favorable enough customs legislation;

x_2 – progressive level of software and technical support of customs authorities;

x_3 – optimal enough work organization of customs authorities;

x_4 – absent corruption of the customs authorities;

x_5 – low level of the corruption of the customs authorities.

Thus, the sought-for linear multifactorial regression model for the analysis of the impact factors of the customs service will look as follows:

$$y = b_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5. \tag{2}$$

According to the source[1] a factor trait can obtain the next values: «+1», «0», «-1». Thus, «+1» is assigned when a factor trait appears in a specific set of factor traits assessed by experts. The value «0» is assigned if a factor trait is not included in the specific set of factor traits but it does appear in the developed regression model. If, however, the factor trait is not included in the corresponding set of factor traits and is not represented in the regression model, then its value is «-1».

It is worth noting that experts receive the opportunity to assess not a separate trait of the impact factor of customs service of enterprises' business projects but its complex characteristics with established combinations of factor traits. However, what is important, such combinations or sets of factor traits can be numerous, so it is advisable to use orthogonal arrays to optimize their number. When selecting combinations of factor traits for the expert evaluation, it is necessary to take into account that the contributions of each factor trait to the total assessment should be balanced, and the set of such combinations should be minimal. Besides, the formed array of combinations of factor traits is ranked by experts in descending order of priority.

To assess the combinations of impact factors affecting the customs service of business projects of enterprises we needed to form a group of experts. The circle of respondents includes specialists in customs or foreign economic issues from export and import enterprises, which are characterized by the largest volumes of customs clearance in the area of Lviv Customs (Ukraine) in the first quarter of 2018. This will ensure the territorial differentiation of experts and a proper level of awareness given the high frequency of cooperation with customs authorities. As for the sample size, to ensure the reliability and credibility of the survey results, we calculate the minimum number of experts according to the formula:

$$\sigma_{min} = \frac{3}{2} \times \left(\frac{1}{\varepsilon} + 1 \right) + 1, \tag{3}$$

where ε – a margin of error.

If we accept a margin of error of 5% (ε = 0,05), which means the reliability of the calculation by 95%, then the minimum permissible sample size of experts is:

$$\sigma_{min} = \frac{3}{2} \times \left(\frac{1}{0,05} + 1 \right) + 1 \approx 33 \text{ (oc.).}$$

Thus, 15 Ukrainian importing enterprises, the largest in the volumes of customs clearance, were selected for the survey, namely: LLC "Procter & Gamble Trading Ukraine"; Foreign Enterprise "LOGIN"; LLC "Nestle Ukraine"; Subsidiary Company "LPP Ukraine" of PJSC "LPP"; LLC with foreign investments "Procter & Gamble Ukraine"; LLC "Marvel International Tobacco Group"; Public Company "Lviv confectionery Svitoch"; LLC "SCA Hygiene Ukraine"; LLC "Mondi Packaging Bags Ukraine" (also a major exporter); LLC "ATB Market"; Electrolux LLC Subsidiary Company; LLC "KPP Center"; LLC "AT 2015"; Company "Oliyar"; LLC "Tovar-Expo". Besides, the sample will include representatives of 14 exporting enterprises, the largest in the volumes of customs clearance, namely: Private Enterprise "Trading House Mayola"; LLC "Swiss Krono"; Private Enterprise "Typhoon-Plus"; LLC "Sokme"; LLC "Mebel-Service"; Subsidiary Company "NG Metal Ukraine" of "N. Graversens metalvarefabrik A/S"; LLC "Busol"; LLC "Lviv Isolation Company"; PJSC "Enzym"; LLC "PRIMED"; LLC "Radekhivskyi Sugar"; PJSC "Paper & Board Company"; ALC "Chervonograd Metalworks Factory"; Subsidiary Company "Holger Christiansen Production Ukraine" of "Holger Christiansen A/S".

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[1] Фещур, Р. В., Барвінський, А. Ф., Кічор, В. П. (2003). *Статистика: теоретичні засади і прикладні аспекти*. Львів: Інтелект-Захід.

It is worth noting that at each of the listed enterprises it was necessary to interview 1-2 specialists involved in customs clearance of goods moving across the state border. Thus, the minimum permissible sample size of respondents was ensured. As a result of the survey, 38 questionnaires were received from representatives of the studied enterprises.

The study limited the number of possible combinations of traits of factors, that impact the customs service of enterprises, to 20. Table 2 shows a complete set of combinations of factor traits that determine the customs service of enterprises.

Table 2

**The matrix of combinations of factor traits that determine the customs service
of business projects of enterprises**

№ of the combination	Impact factors on the customs services			
	Customs legislation	Software and technical support of the customs authorities	Work organization of the customs authorities	Corruption of the customs authorities
1	NFE	S	NOE	L
2	NFE	S	NOE	M
3	NFE	S	OE	L
4	NFE	S	OE	M
5	NFE	S	OE	A
6	NFE	P	NOE	A
7	NFE	P	OE	A
8	NFE	P	NOE	L
9	NFE	P	NOE	A
10	NFE	P	OE	L
11	FE	S	NOE	M
12	FE	S	NOE	L
13	FE	S	OE	L
14	FE	S	OE	M
15	FE	S	OE	A
16	FE	P	OE	M
17	FE	P	NOE	A
18	FE	P	NOE	L
19	FE	P	OE	L
20	FE	P	OE	A

Source: developed by the authors based on the results of an expert survey

Taking into account the given methodology for the assessment of factor traits with Boolean variables ("+1", "0", "-1") and the results of the expert survey, in Table 3 we will form the input data for the construction of the regression model according to the formula (2).

It should be noted, that to determine the value of the resulting trait for each combination of factor traits it is necessary to calculate the average values of the transformed combinations of factor traits. In doing so, the transformed rank (R_em) is calculated by the formula[1]:

$$R_{em} = (n + 1) - r_{em}, \tag{4}$$

where e – the index of an expert (respondent);

m – the index of a combination;

n – the number of combinations;

r_{em} – the rank of m- combination of factor traits as assessed by e- expert.

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[1] Фещур, Р. В., Барвінський, А. Ф., Кічор, В. П. (2003). *Статистика: теоретичні засади і прикладні аспекти*. Львів: Інтелект-Захід.

Table 3

**Input data for the construction of a multifactorial regression model
that reflects the impact of priority factors on the customs service
of enterprises' business projects**

№ of the combination	Factor traits that determine the customs service of enterprises					
	Favorable enough customs legislation, x_1	Progressive level of software and technical support of customs authorities, x_2	Optimal enough work organization of customs authorities, x_3	Absent corruption of the customs authorities, x_4	Low level of the corruption of the customs authorities, x_5	Average values of transformed ranks of factor traits combinations, y
1	-1	-1	-1	0	1	1,4
2	-1	-1	-1	-1	-1	1,6
3	-1	-1	1	0	1	3,6
4	-1	-1	1	-1	-1	3,6
5	-1	-1	1	1	0	4,8
6	-1	1	-1	1	0	10
7	-1	1	1	1	0	10,2
8	-1	1	-1	0	1	7,2
9	-1	1	-1	1	0	9
10	-1	1	1	0	1	8,4
11	1	-1	-1	-1	-1	6,2
12	1	-1	-1	0	1	13,8
13	1	-1	1	0	1	16,2
14	1	-1	1	-1	-1	15
15	1	-1	1	1	0	15,2
16	1	1	1	-1	-1	19,2
17	1	1	-1	1	0	13
18	1	1	-1	0	1	13,8
19	1	1	1	0	1	19,6
20	1	1	1	1	0	18,2

Source: calculated by the authors

As we can see from Table 3, the most significant combinations of factor traits were the nineteenth, sixteenth, and twentieth, which have an impact on the customs service of an enterprise. Henceforth, we'll determine the individual contributions of each factor trait into the total rank assessment. For this, we are developing a multifactorial regression model that reflects the impact of priority factors on the customs service of enterprises:

$$y = 10,27 + 4,39x_1 + 2,22x_2 + 1,62x_3 + 0,66x_4 + 0,36x_5. \tag{5}$$

The reliability of the obtained results confirms the sufficiently high value of the multiple regression coefficient (R=0,94), indicating that there is a quite tight connection between the resultant and the factorial traits. Also, the significance of the model is evidenced by the results of its testing according to the Fisher criteria, because the calculated value (20,07) exceeds its table value (2,96) at the selected level of significance (α=0,05).

We must point out that the sought-for multifactorial regression model reflects the impact of only five of the nine factors that determine the customs service of enterprises' business-projects. Partial weightiness of the factor traits not taken into account in the regression model will be calculated according to the formula[1]:

$$\sum_{j=1}^{n} r_{ij} = 0, \quad i \in \overline{1,m}, \tag{6}$$

where r_{ij} – partial weightiness of the i- factor of j- trait;

      n – number of factors' traits;

      m – number of factors.

In Table 4 we will demonstrate the calculated partial weightiness of those factors that were not included in the regression model.

Table 4

**Partial weightiness of the factors' traits that determine
the customs service of enterprises**

Factors	Factors' traits	Partial weightiness
1. Customs legislation	Favorable enough	4,39
	Not favorable enough	-4,39
2. Software and technical support	Progressive	2,22
	Sufficient	-2,22
3. Work organization of the customs authorities	Optimal enough	1,62
	Not optimal enough	-1,62
4. Corruption of the customs authorities	Absent	0,66
	Low	0,36
	Medium	-1,02

Source: calculated by the authors

As we can see from the obtained regression model, all factor traits are directly related to the resulting trait. However, it should be noted that favorable customs legislation (x_1) and progressive software and technical support (x_2) have the greatest impact on the quality of customs services. It is interesting that some experts still believe that the presence of a small level of corruption has a positive effect on the quality of customs service of their enterprises.

Conclusions. The applied aspect of holding expert interviews with a target group of respondents and making correlation-regression modeling for the analysis of factors impacting the customs service of enterprises' business projects was reflected in the paper. Due to the obtained results, it has been established that the most significant impact in this area is made by such factors as quality of customs legislation, level of software and technical support of customs authorities, quality of work organization of the customs authorities, and their level of corruption. Then an expert survey was conducted to determine the most relevant characteristics of the identified factors and to build a correlation-regression dependence between the quality of customs services and the identified impact factors. The statistical reliability and adequacy of the obtained correlation-regression model was confirmed by the results of the calculation of the multiple regression coefficient and its testing according to the Fisher criteria.

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