

# ASSESSMENT OF THE INFLUENCE OF INFORMAL INSTITUTES ON THE DEVELOPMENT OF FOREIGN ECONOMIC RELATIONS IN THE TRANSBOUNDARY REGION

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## *Abstract*

The purpose of the article is to analyse the impact of informal institutions on the development of foreign economic activity in a cross-border region. An analysis of the expert evaluation of enterprises engaged in export-import operations in order to identify the influence of social and psychological factors on the value of transaction costs in cross-border regions between Ukraine and the European Union was carried out. The study has shown that the degree of influence of each of the elements of the customary field on the value of transaction costs is different. The attention is focused on the fact that in the further intensification of the European integration processes in cross-border regions, foreign economic activity will grow subject to the elimination of gaps in the institutional and customary environment. The results of the study can be used to build a regional model for the development of foreign economic relations, taking into account existing informal institutions in the border regions of Ukraine and the neighbouring countries of the European Union.

Keywords: fuzzy logic, cross-border region, institutional and customary environment, transaction costs, European Union.

JEL Classification: P45, C63, F15

## *Introduction*

Foreign economic relations in the regions located between Ukraine and the countries of the European Union are an important link in the development of cross-border regions, which we regard as a common territory of neighbouring border regions of two or more neighbouring countries, which are integrated into one whole by such structure-forming elements as local government, cross-border infrastructure, institutional environment, human capital, and cross-border market.

The most important structural element of the cross-border region is the institutional environment. Its development is largely determined by the level of similarity of the administrative-territorial structure of the countries whose territories belong to the cross-border region, as well as the nature of the regulatory framework on different sides of the border, including in terms of cross-border cooperation.

In addition, the important components of the institutional environment are the traditions, economic culture and socio-psychological stereotypes of residents, the nature and development of existing social, administrative and market institutions within the trans-frontier region: training and educational centres and scientific institutions, government and public organizations, business structures, banking and non-banking financial institutions, business associations, chambers of commerce, medical and rehabilitation institutions. It is the institutional environment that serves as the main link in the process of harmonizing relations by levelling imbalances in the actions of factors influencing the development of neighbouring territories.

Institutional support for the development of foreign economic relations in cross-border regions between Ukraine and the EU, according to the canons of institutional theory, includes, along with the institutions that exercise its influence on its activation, and the formal legal and regulatory institutions, as well as a wide range of informal institutions.

Such institutions, in particular, include all those norms and rules reflecting the socio-cultural and socio-psychological aspects of the economy and society, and also regulate the behaviour of people in the course of economic activity. In the system of informal institutions, a significant role is played by historical and ethnic traditions, the level of jurisprudence, value factors (Melnikova, 2012).

Thus, it can be argued that in the transboundary space, the activities of informal institutions are based on customary norms and “unwritten rules” that take their origins in social traditions and customs common to residents of adjacent border areas of neighbouring countries.

In order to make a more thoroughly study the influence of the institutional and customary environment on the system of foreign economic relations in cross-border regions formed with the participation of the border territories of Ukraine and neighbouring administrative-territorial units of the EU member states, we will systematize the main informal institutions operating in this cross-border space, as well as the basic factors of direct and indirect impact on them.

The foundation for the formation of a common institutional and customary environment throughout the entire cross-border region (both in the border regions of Ukraine and in the border regions of the neighbouring EU member states) is a series of basic influence factors related to the identity of the natural resource supply of the territory, its location within one geo-economic and geopolitical space, historical experience of using similar formal institutions, mentally and genetic boundaries and common historical memory.

The social standards of the institutional-customary environment of the studied transboundary space are described, which is the source for the formation of the corresponding elements of the customary field, in particular: the dominant economic interests and social problems of the residents of the border areas, their social and economic goals, intentions and common vision of the future, mental stereotypes, traditions and customs, as well as the nature of the cultural and historical environment.

Each of these elements directly affects the activation of foreign economic relations and the effectiveness of foreign economic activity in the cross-border regions between Ukraine and the European Union, determining the number of transaction costs within each such region. Moreover, these elements can have both positive and negative effects on transaction costs, depending on the strength and direction of their manifestation. The authors set the task of investigating, on the basis of the theory of fuzzy logic, the influence of informal institutions on the value of transaction costs in a cross-border region.

# 1 Theoretical background

The influence of institutions on the development of foreign economic cooperation in the cross-border area between Ukraine and the EU was studied in the works of such domestic and foreign scientists as V. Borshchevskiy (Borshchevskiy, 2016, K.Kutsa and Bonk (Kutsa and Bonk, 2016), Matveyev (Matveyev, 2011), Mikula (Mikula, 2010), Mokiy (Mokiy, 1999), Pavlikha (Pavlikha, 2009), Pisarenko (Pisarenko, 2015), Studennikov (Pisarenko, 2015), Timechko (Timechko, 2009), Andreasika, Kavalka and Kavetska-Vizhikovska (Andreasika and kol., 2003), Margulikova (Margulikova, 2005) and others.

It should be noted that most scientists explore the environment of bilateral cooperation in the framework of cross-border regions of Ukraine and the EU through the prism of institutional and organizational support and regulatory framework for cross-border cooperation. And, as a result, a number of problems remained outside the field of view of scientists related to the impact of conventional norms on the system of foreign economic relations, namely: crossing the border, conducting cross-border trade, carrying out investment activities and so on.

## 2 Data and research methods

In order to identify the degree of influence of various components (elements) of a conventional field on the value of transaction costs of foreign economic activity within the border regions between Ukraine and the EU, a corresponding expert study was conducted (Hoblyk, 2015) in the border regions of Ukraine, Poland, Slovakia, Hungary and Romania (Table 1).

According to the estimates of the experts on a five-point scale, the share of different types of transaction costs in different transboundary regions between Ukraine and the EU is not the same. Thus, in the Ukrainian-Polish cross-border region, the highest transaction costs for border crossing and security are (40% and 30% respectively), while in the Ukrainian-Hungarian cross-border region, transaction costs for searching the information is (25%) for the Ukrainian-Polish cross-border region are insignificant (only 5%).

In the Ukrainian-Slovakian cross-border region, transaction costs for setting agreements and making calculations (25% each), while the Ukrainian-Romanian and Ukrainian-Hungarian regions proportion of the last indicator is the smallest of all the analyzed and composes (10% and 15% respectively)

*Table 1: Expert assessment of the impact of socio-psychological factors of development of cross-border cooperation on the number of transaction costs in cross-border regions between Ukraine and the EU*

Components of custom field	Mental stereotypes, social traditions and customs	Dominant interests	Main problems	Socio-economic goals, intentions, vision of the future	Cultural and historical environment
Transaction costs					
<b>Ukrainian-Polish transboundary region</b>					
For security (30%)	5	3	4	2	2
For searching for information (5%)	4	4	3	2	1

Transaction costs \ Components of custom field	Mental stereotypes, social traditions and customs	Dominant interests	Main problems	Socio-economic goals, intentions, vision of the future	Cultural and historical environment
At the border crossing (40%)	3	4	4	3	1
On agreements (15%)	3	5	3	4	3
To make calculations (10%)	2	5	4	3	2
<b>Ukrainian-Slovak transboundary region</b>					
For security (20%)	3	4	4	4	3
For searching for information (15%)	3	2	2	5	1
At the border crossing (15%)	3	3	2	3	2
On agreements (25%)	4	5	3	3	1
To make calculations (25%)	2	4	2	2	1
<b>Ukrainian-Hungarian transboundary region</b>					
For security (20%)	5	3	3	2	3
For searching for information (25%)	5	4	2	3	4
At the border crossing (20%)	3	4	3	2	2
On agreements (20%)	4	4	2	4	3
To make calculations (15%)	2	3	1	1	2
<b>Ukrainian-Romanian transboundary region</b>					
For security (30%)	5	3	3	3	4
For searching for information (25%)	4	2	3	4	3
At the border crossing (20%)	4	2	3	2	3
On agreements (15%)	4	5	3	5	4
To make calculations (10%)	3	2	2	3	3

Source: Made by the authors.

The value of qualitative assessments: 5 - high influence, 4 - above average, 3 - medium, 2 - below average, 1 - low.

To identify the integral magnitude of the influence of each component of the customary field on various types of transaction costs in the cross-border space between Ukraine and the EU, a corresponding model was developed for using the theory of fuzzy logic (Zadeh, 1975; Zadeh, 1978).

In modern studies of complex socio-economic systems, fuzzy equations acquire considerable weight (Billot, 1992; Aluja, Kaufmann, 2002; Buckley, Jowers, 2006; Grigorenko, 2006). They arise, in particular,

when making decisions in economic and other tasks, where the parameters are not clearly defined or blurred, and sometimes are determined subjectively (Georgescu, 2001; Bojadziev, 1997).

To solve fuzzy equations, it is necessary, first of all, to analyse arithmetic operations on fuzzy numbers that “do not have opposite and inverse numbers, and when added and multiplied, they are commutative, associative, but in general, distributive” (Aliev, Fazlollahi, 2004).

Therefore, the solution of such equations is possible with the introduction of additional operations of subtracting and dividing fuzzy numbers, either through the approximation of fuzzy numbers with a system of level sets or due to the use of *L-R* fuzzy numbers (Aliev, Fazlollahi, 2004).

Using the latter approach in the case of *L-R* fuzzy numbers, equations with fuzzy numbers can be solved by obtaining the appropriate form. It should also be emphasized here that the  $\alpha$ -level writing of convex fuzzy subsets allows for further analysis of tasks with fuzzy numbers using interval analysis methods.

Applying the outlined tools for analysing the impact of various institutional and customary norms on the development of foreign economic relations in the cross-border regions between Ukraine and the EU, we use the identified relationship between the impact of the constituent (elements) of the institutional field on enhancing cross-border cooperation and the value of transaction costs in the cross-border regions under study (Table 1).

Let us pay attention to the choice of the grading scale. Let's start with the range. Using the grading scale from 0 to  $\infty$  may be useless. The fact is that our ability to distinguish what is in a very limited range, and when there is a significant discrepancy between comparable objects, actions or circumstances, our assumptions to be arbitrary and, of course, turn out to be far from reality.

Since the unit is a standard of measurement, the upper limit should not be very far from it, although it is sufficiently remote to more or less clearly represent our range of ability to distinguish.

Therefore, the number of compared objects should be quite small. Conventional borders are usually denoted by a range from 5 to 9. The choice of such borders is based on the research of E. Weber, G. Fechner and S. Stevens (Syavuko, Pasichnyk, 2001).

Thus, E. Weber formulated the law, which states that the change in perception differs when the stimulus increases by a constant share of the stimulus itself, and G. Fechner showed that perception is a linear function of the logarithm of the stimulus. S. Stevens proved that, in practice, there are few qualitative differences in responses to incentives, and for a person, the ability to make qualitative distinctions is well represented by five definitions: high, above average, average, below average and low. You can make trade-offs between neighbouring definitions when greater accuracy is required. Then the values will be 9.

### 3 Results

Taking into account the above, to assess the impact of socio-psychological factors of cross-border cooperation on the number of transaction costs in the cross-border regions under study, 5 gradations were chosen: 5 - high, 4 - above average, 3 - medium, 2 - below average, 1 - low.

Thus, the influence of socio-psychological factors of development of cross-border cooperation on the magnitude of the above transaction costs is described by systems of linear algebraic equations of the form  $Bx=C$  (1), where

$X$  is the vector of magnitudes of the influence of socio-psychological factors where:

$x_1$ -security;  
 $x_2$ - searching for information;  
 $x_3$ - border crossing;  
 $x_4$ - agreements;  
 $x_5$ -making calculations.

$B$  is a matrix of expert assessments;

$$B = \begin{pmatrix} B_{11} & \dots & B_{15} \\ B_{41} & \dots & B_{45} \end{pmatrix}$$

$C$  is a vector of transaction costs estimation values.

$$C = \begin{pmatrix} C_1 \\ C_2 \\ C_3 \\ C_4 \\ C_5 \end{pmatrix}$$

That is, to assess the transaction costs of security within each of the cross-border regions under study, we obtain the system:

$$\begin{pmatrix} 5 & 3 & 4 & 2 & 2 \\ 3 & 4 & 4 & 4 & 3 \\ 5 & 3 & 3 & 2 & 3 \\ 5 & 3 & 3 & 3 & 4 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \end{pmatrix} = \begin{pmatrix} 30 \\ 20 \\ 20 \\ 30 \end{pmatrix}$$

To estimate the transaction costs in these cross-border regions for searching the information, the system will look like this:

$$\begin{pmatrix} 4 & 4 & 3 & 2 & 1 \\ 3 & 2 & 2 & 5 & 1 \\ 5 & 4 & 2 & 3 & 4 \\ 4 & 2 & 3 & 4 & 3 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \end{pmatrix} = \begin{pmatrix} 5 \\ 15 \\ 25 \\ 25 \end{pmatrix}$$

Evaluation of transaction costs at border crossings is described as follows:

$$\begin{pmatrix} 3 & 4 & 4 & 3 & 1 \\ 3 & 3 & 2 & 3 & 2 \\ 3 & 4 & 3 & 2 & 2 \\ 4 & 2 & 3 & 2 & 3 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \end{pmatrix} = \begin{pmatrix} 40 \\ 15 \\ 20 \\ 20 \end{pmatrix}$$

To estimate the transaction costs of the concluding the agreements, the system will be as follows:

$$\begin{pmatrix} 3 & 5 & 3 & 4 & 3 \\ 4 & 5 & 3 & 3 & 1 \\ 4 & 4 & 2 & 4 & 3 \\ 3 & 5 & 3 & 5 & 4 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \end{pmatrix} = \begin{pmatrix} 15 \\ 25 \\ 20 \\ 15 \end{pmatrix}$$

Evaluation of transaction costs for making calculations is presented in the form of:

$$\begin{pmatrix} 2 & 5 & 4 & 3 & 2 \\ 2 & 4 & 2 & 2 & 1 \\ 2 & 3 & 1 & 1 & 2 \\ 3 & 2 & 2 & 3 & 3 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \end{pmatrix} = \begin{pmatrix} 10 \\ 25 \\ 15 \\ 10 \end{pmatrix}$$

Since all these systems are degenerate, the B- matrices are rectangular and their normalized matrices have rank 4, then the solution of the normal equation (1) determines the significance of socio-psychological factors ( $x_1$  .....  $x_5$ ) for each of the four transboundary regions. We obtain the following solutions:

To estimate transaction costs for security:

$$x_1 = 3,71; x_2 = 2,54; x_3 = 2,83; x_4 = 2,19; x_5 = 2,41.$$

To estimate transaction costs for information retrieval:

$$x_1 = 2,65; x_2 = 1,77; x_3 = 1,54; x_4 = 2,39; x_5 = 1,86.$$

To estimate transaction costs at border crossings:

$$x_1 = 3,52; x_2 = 3,71; x_3 = 3,69; x_4 = 2,85; x_5 = 1,88$$

To evaluate the transaction costs of drafting contracts:

$$x_1 = 2,04; x_2 = 2,54; x_3 = 1,46; x_4 = 2,07; x_5 = 1,36$$

To assess the transaction costs for the implementation of the calculations:

$$x_1 = 1,9; x_2 = 3,05; x_3 = 1,65; x_4 = 1,78; x_5 = 1,37$$

By presenting all these solutions in tabular form, we obtain the matrix of the influence of the components of the customary field on the value of various types of transaction costs in the cross-border space between Ukraine and the EU (Table 2).



Table 2: The influence of the components of the „customary field“ on the value of transaction costs in the transboundary space between Ukraine and the EU

Transaction costs \ Components of custom field	Mental stereotypes, social traditions and customs (%)	Dominant interests (%)	Main problems (%)	Socio-economic goals, intentions, vision of the future (%)	Cultural and historical environment (%)
For security	3.71	2.54	2.83	2.19	2.41
For searching for information	2.65	1.77	1.54	2.39	1.86
At the border crossing	3.52	3.71	3.69	2.85	1.88
On agreements	2.04	2.54	1.46	2.07	1.36
To make calculations	1.90	3.05	1.65	1.78	1.37

Source: Made by the authors

That is, the reducing the influence of mental stereotypes, public traditions and attitudes on the one position of the assessment scale will lead to decrease in transaction costs for safety in the entire cross-border area between Ukraine and EU by 3.71%. This also reduces the transaction costs for searching for information by 2.65% for crossing the borders by 3.52% for transactions by 2.0% and for settlements by 1.9%.

However, if the experts would evaluate the influence of mental stereotypes of social traditions by a ball that corresponds to the second position of the assessment scale, this would lead to a decrease in transaction costs for safety by 7.42% (twice as much). Accordingly, there will be a decrease in transaction costs on the search for information by 5%, for crossing the border - 7.04%, on agreements- 4.0%, for the making calculations of 3.8%.

As can be seen from the presented table, the growth of the influence of dominant interests for border crossing costs (by 3.71%), as well as mental stereotypes, public traditions and customs for security costs (on same value). Close to this is the indicator of the impact of the main problems of the residents of the border area for transaction costs at border crossings (a decrease of 3.69% with a decrease in the influence of this indicator by one position).

## Conclusion

The result of the study is the possibility of applying the theory of fuzzy logic and fuzzy sets in the study of cross-border cooperation, in particular, the influence of informal institutions that operate in a normal environment. Modelling of the processes taking place in transboundary regions makes it possible to describe qualitative characteristics that cannot be quantified. This is especially characteristic of cross-border markets, where the conditions for conducting foreign economic activity are constantly changing, which makes it possible to make forecasts in the face of uncertainty and improve the decision-making process.



At the same time, attention should be paid to the fact that the established interrelation of the above-described components of the customary field of the cross-border space between Ukraine and the EU in terms of the value of certain types of transaction costs for carrying out foreign economic activity within their limits may change under the influence of various institutional and conventional barriers, which requires further research.

It should be noted that the established connection of the components of the customary field of cross-border regions of Ukraine and the EU with the magnitude of certain types of transaction costs for the implementation of foreign economic activity, may change due to the impact of various institutional and customary barriers.

The analysis of the mechanism of the destructive influence of the institutional and customary barriers to the development of foreign economic relations requires further research.

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