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CORRELATION AND REGRESSION ANALYSIS OF THE IMPACT OF ECONOMIC GLOBALIZATION ON THE DEVELOPMENT OF NATIONAL MARKETS

КОРЕЛЯЦІЙНО-РЕГРЕСІЙНИЙ АНАЛІЗ ВПЛИВУ ЕКОНОМІЧНОЇ ГЛОБАЛІЗАЦІЇ НА РОЗВИТОК НАЦІОНАЛЬНИХ РИНКІВ

Summary. The study of consequential relations between economic globalization and the number of subsidiaries of leading TNCs revealed that their development largely depends on the country's involvement in the globalized space. Correlation analysis confirmed the existence of a relationship between TNCs and GDP, which is the main macroeconomic indicator that reflects the participation of countries in export-import operations. Analysis by industry confirmed that economic globalization contributes to the growth of TNCs through increased GDP, regardless of the type of goods and services. On the contrary, TNCs can also have a positive impact on GDP, supporting the scale of economic globalization. Regression analysis and construction of regression models revealed the specifics of the impact of economic globalization on the development of TNCs in countries with different socio-economic conditions. This specificity consists in differences in the influence of one set of factors on the number of foreign branches of TNCs in countries with different levels of development. This confirms the controversy of the phenomenon of economic globalization and indicates that the growth of TNCs is possible only in countries with high indicators of economic globalization. The development of countries is asymmetric, so the spread of globalization processes is also uneven, which indicates the different response of economies to their influence.

Keywords: globalization, economic globalization, TNC, development, correlation analysis, regression analysis, statistics.

Анотація. Економічна глобалізація є одним із ключових чинників, що впливають на розвиток транснаціональних корпорацій (ТНК) у сучасному світі. Вона відіграє критично важливу роль у визначенні стратегій і напрямків розвитку бізнесу, створюючи нові можливості для розширення діяльності ТНК на світових ринках. Зростаюча інтеграція національних економік у глобальний ринок змінює правила гри для бізнесу, сприяючи розширенню мережі дочірніх компаній ТНК по всьому світу. Глобалізація створює динамічне середовище, в якому національні економіки стають більш відкритими і взаємозалежними, що у свою чергу стимулює інвестиції та торговельний обмін. У цьому контексті дослідження взаємозв'язків між економічною глобалізацією та кількістю дочірніх компаній провідних ТНК є актуальним для розуміння динаміки світової економіки. Це дослідження виявляє, як економічна глобалізація впливає на ВВП країн і як ТНК можуть сприяти економічному зростанню, виступаючи каталізатором економічного розвитку та модернізації. Методологічний підхід, що включає кореляційний і регресійний аналізи, дозволяє глибше зрозуміти, яким чином глобалізація і діяльність ТНК взаємно підсилюють одна одну, сприяючи сталому розвитку національних економік у глобальному просторі. Дослідження наслідкових зв'язків між економічною глобалізацією та кількістю дочірніх компаній провідних ТНК виявило, що їхній розвиток значною мірою залежить від залученості країни до глобалізованого простору. Це зумовлює необхідність розробки ефективних стратегій, що забезпечать максимальну вигоду від участі в глобалізації. Кореляційний аналіз підтвердив наявність взаємозв'язку між ТНК та ВВП, що є основним макроекономічним показником, який відображає участь країн в експортно-імпортних операціях, що посилює їхню конкурентоспроможність. Аналіз по галузях підтвер-

див, що економічна глобалізація сприяє зростанню ТНК через збільшення ВВП, незалежно від типу товарів та послуг. Навпаки, ТНК також можуть позитивно впливати на ВВП, підтримуючи масштаб економічної глобалізації та забезпечуючи довгострокову економічну стабільність. Регресійний аналіз та побудова регресійних моделей виявили специфіку впливу економічної глобалізації на розвиток ТНК у країнах з різним соціально-економічним становищем. Ця специфіка полягає у відмінностях впливу одного набору факторів на кількість закордонних філій ТНК у країнах з різним рівнем розвитку. Це підтверджує контроверсійність явища економічної глобалізації та вказує, що зростання ТНК можливе лише в країнах з високими показниками економічної глобалізації. Розвиток країн є асиметричним, тому поширення глобалізаційних процесів також є нерівномірним, що свідчить про різну реакцію економік на їхній вплив. Незважаючи на переваги глобалізації, існує низка викликів, які слід враховувати. Тому важливо, щоб країни адаптували свої політики до умов глобалізації, забезпечуючи стійке зростання і розвиток. Дослідження наслідкових зв'язків між економічною глобалізацією та кількістю дочірніх компаній провідних ТНК виявило, що їхній розвиток значною мірою залежить від залученості країни до глобалізованого простору. Кореляційний аналіз підтвердив наявність взаємозв'язку між ТНК та ВВП, що є основним макроекономічним показником, який відображає участь країн в експортно-імпортних операціях. Аналіз по галузям підтвердив, що економічна глобалізація сприяє зростанню ТНК через збільшення ВВП, незалежно від типу товарів та послуг. Навпаки, ТНК також можуть позитивно впливати на ВВП, підтримуючи масштаб економічної глобалізації. Регресійний аналіз та побудова регресійних моделей виявили специфіку впливу економічної глобалізації на розвиток ТНК у країнах з різним соціально-економічним становищем. Ця специфіка полягає у відмінностях впливу одного набору факторів на кількість закордонних філій ТНК в країнах з різним рівнем розвитку. Це підтверджує контроверсійність явища економічної глобалізації та вказує, що зростання ТНК можливе лише в країнах з високими показниками економічної глобалізації. Розвиток країн є асиметричним, тому поширення глобалізаційних процесів також є нерівномірним, що свідчить про різну реакцію економік на їхній вплив.

Ключові слова: глобалізація, економічна глобалізація, ТНК, розвиток, кореляційний аналіз, регресійний аналіз, статистика.

Problem statement. The central place in the spatial organization of the system of local, regional and world economic relations in the 21st century belongs to economic globalization [1]. The consequence of the penetration of its all-absorbing processes into the national economy of each country was the diversification of foreign economic ties. A special place in the transformation of economic interaction belongs to internationalization, since its development was reflected in the initiation of international business, a characteristic feature of which today is a permanent increase in the number of TNCs, which are the main suppliers of goods, capital and services in the global economic space. Their combination forms factors of production, the intensification of the international movement of which under the influence of internationalization and transnationalization created the foundations for the development of international trade. International trade, in turn, is considered a necessary condition for the effective functioning of national economies in the system of international economic relations.

Analysis of recent research and publications. The following scientists dealt with the impact of economic globalization on the development of national economies: Vasylieva D.V. [1], Myronenko V.O., Nechitaylo Yu.A. [3], Poplavskyi A.V., Degtyarenko K.E. [5], Turlo N.P., Litvin O.H., Markhonos S.M. [6], Gal E.S. [36], Behun S., Voroniuk A. [37], Dunets I. [38].

The purpose of the article. To analyze with the help of correlation and regression methods the impact of economic globalization on the development of national markets.

Summary of the main research material. In the context of characterizing the consequences of the spread of processes caused by globalization, which occur in the economic dimension, it is appropriate to use international trade as a quantitative indicator, since it makes it possible to establish a clear trajectory of the development of trade relations and to trace the wave-like dynamics of the system-forming process of internationalization, because the degree of involvement of a country in the processes of economic globalization determined by the number of export-import transactions implemented by it.

Over the past 20 years, we can observe constant fluctuations in the percentage values of international trade from GDP, which indicates the cyclicality of the economy, characterized by the uneven development of economic processes on the global market (Figure 1). This can be due to a number of reasons, among which the most significant influence was the growing integration, due to which countries became more vulnerable to foreign economic influences. On the example of the mortgage crisis in the USA in 2008 and the outbreak of the coronavirus disease pandemic in 2020, we see confirmation of the thesis of the growing interconnectedness of economies in the conditions of the accelerated development of economic globalization, because declines in the volume of international trade caused by crises occurred in every integrated into the world space the country.

The trend line has an upward tendency, indicating a gradual increase in the volume of international trade, which in turn directly depends on the pace and scale of growth of economic globalization,

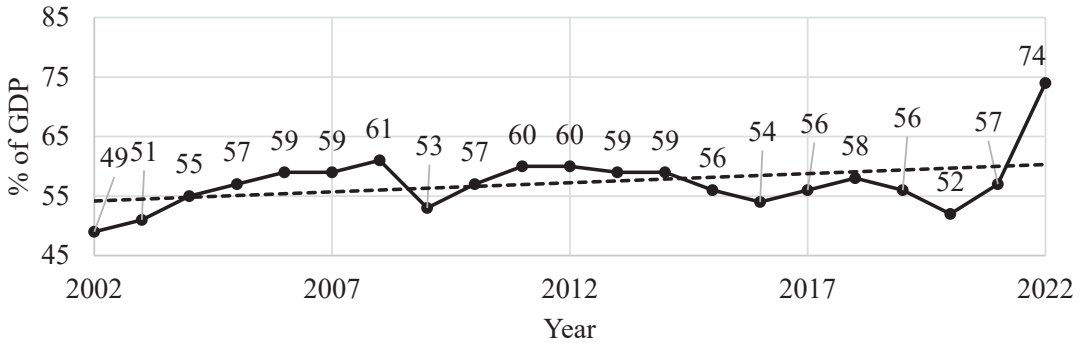

Figure 1 – Dynamics of world volumes of international trade in 2002–2022, %

Source: compiled on the basis of data [2]

because it was this that contributed to the openness of national economies thanks to the elimination of trade barriers and the development of TNCs as key entities international business. In other words, the growth of international trade significantly depends not only on the level of internationalization of business, but also on the level of transnationalization of production and capital, since today the activity of TNCs as international business structures accounts for about 70% of trade operations in the world. This, in turn, makes it necessary to first investigate the possible connection between the processes of economic globalization and TNCs using correlation analysis using the example of different countries of the world and different fields of human activity, as well as to determine the intensity of the influence of these interrelated processes on the development of TNCs through regression analysis.

Among various statistical research methods, we decided to choose correlation analysis, because its application will reveal whether there is a significant linear dependence of one value on another, in our case, these values are the number of TNC branches and the country's GDP [3]. Despite the fact that the changes in the world economy caused by the processes of economic globalization have a planetary character, we consider it necessary to make a correlation analysis at the regional level by means of statistical sampling. Correlation analysis without the use of a sample will demonstrate the obvious global economic effect of globalization processes on the world economy, as it covers the total number of existing countries in the world and the total number of TNCs existing on the market. A selective study compared to a continuous study has many more advantages; its implementation with the help of data modification will allow a deeper and more accurate analysis of the specifics of the impact of economic globalization on the development of TNCs.

For the statistical sample of countries, we used as a basis the typification of countries by the level of socio-economic development proposed by the UN, adapting it to the requirements of our task. The total number selected for the first sample is 28 countries, which are evenly distributed among 4 different categories of 7 countries each (Figure 2).

The main macroeconomic indicator, which will be the first value in the correlation analysis, is GDP. The choice of this indicator is due to the fact that it can be used to assess the real situation of the national economy of the countries selected for analysis in the context of the spread of economic globalization processes. In economics, the GDP indicator is considered as the total volume of production of

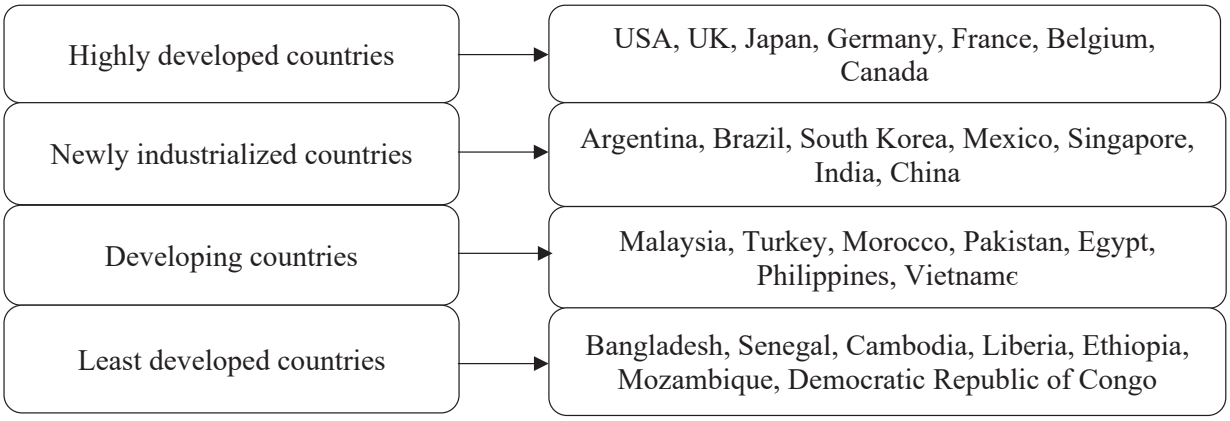

Figure 2 – Classification of countries by different levels of development

Source: compiled on the basis of data [4]

goods and services [5]; it measures the value of final products produced by a country's residents over a certain period of time. Final goods and services are those used for final consumption, accumulation and export [6]. Export is of the greatest importance, since its predominance in the country's economy over import indicates a high degree of involvement of the country in the processes of economic globalization.

The proportions of economic growth of each country under the influence of deepening the phenomenon of economic globalization differ significantly [7]. This, in turn, only confirms the expediency of using a statistical sample for correlation analysis, since in this way we will be able to more accurately characterize the socio-economic situation of countries with different economic development under the influence of controversial processes of economic globalization. In the future, the use of different categories of countries will serve as a basis for determining the strategic priorities of the development of the national economies of these countries, which is quite important in the conditions of accelerated globalization.

Since the analysis of the impact of globalization on economic growth in different countries reveals significant variations, it is important to consider various aspects of the activities of transnational corporations (TNCs) to obtain a more accurate picture. Regarding TNCs, for the correlation analysis we consider it necessary to use as the second value the number of foreign branches of TNCs that are included in the list of the largest companies according to the Fortune Global 500 ranking published in 2022. In addition, taking into account the fact that the diversification of TNC activities is a leading trend in the global market, we decided to form a sample of 27 leading TNCs, which are evenly distributed across 9 different spheres of human activity (Figure 3).

Such a number of companies in the statistical sample shows the scale of TNC production, because their activities are closely intertwined with various aspects and spheres of the world economy. The sample, differentiated by the fields of human activity, will reveal whether the quantitative development of TNCs in the conditions of the rapid spread of economic globalization processes in the sample of countries depends on the specialization of its subsidiaries, as well as what effect this specialization will have on the size of GDP.

The countries chosen for correlation analysis, in addition to differences in the level of socio-economic development, which is evidenced by the size of the

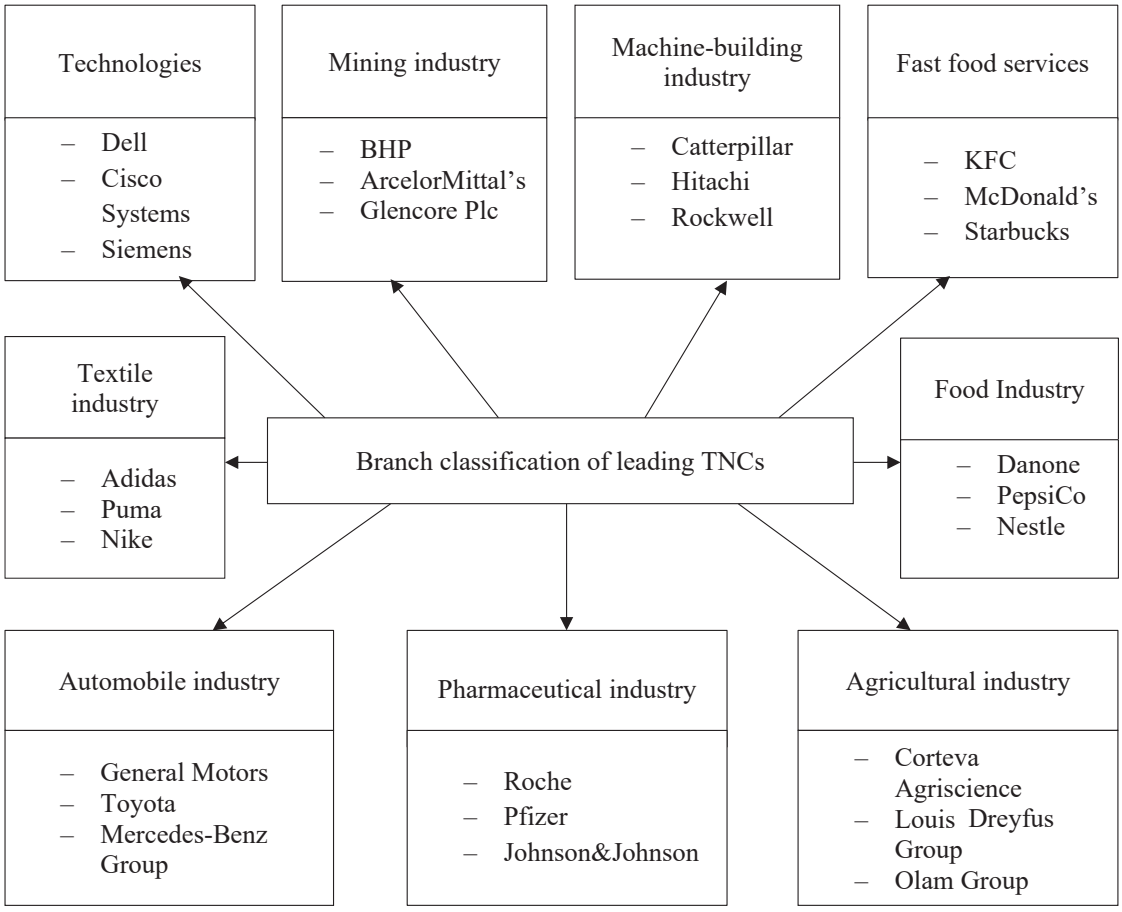

Figure 3 – Classification of TNCs according to different fields of human activity

Source: compiled on the basis of data [8]

GDP, also differ in the degree of transnationalization, which is directly affected by the total number of TNC branches located in the national market of each country, which belong to our statistical sample. The USA has the highest level of transnationalization, as 34,838 TNC subsidiaries are located in the country, which even exceeds the total number of branches located in the other three categories of countries. Among the newly industrialized countries, China is the leader in the number of branches, with about 18,510 branches. In a developing country, the number of TNC subsidiaries does not exceed 2,000 branches; the largest number of them is located in Malaysia, where 1,505 branches operate. As for underdeveloped countries, they are characterized by fairly low numerical values. Bangladesh has the largest number of subsidiaries, with 48 branches.

Having examined each of the samples, we decided to first conduct a general correlation analysis, which involves covering the GDP of all countries selected for analysis and all fields of human activity in which the TNCs selected for analysis work. With the help of a general correlation analysis, we will be able to generally find a relationship between the volume of GDP for 2022 (quantity x) and the number of subsidiaries of TNCs located in countries at different levels of economic development, belonging to different spheres of human activity (quantity y). If we detect this dependence between the described values, we will be able to calculate the correlation coefficient [39]. In our study, we will use Pearson's coefficient, a descriptive statistics tool that summarizes one of the characteristics of a data set by describing the strength and direction of association between quantitative variables [40]. We will characterize the correlation coefficient according to the Chaddock scale, which, compared to others, allows us to more accurately determine the degree of closeness of the connection.

During the general correlation analysis, we obtained a correlation coefficient equal to r=+0,98. According to the Chaddock scale, the value of this indicator is very high, which directly indicates a high degree of closeness of the relationship between the number of foreign branches of TNCs (y) in the countries selected for analysis and the volume of GDP (x). Since the value of the coefficient is positive, it indicates a direct correlation between the variables. Therefore, when the number of TNC subsidiaries in a country with a certain level of development increases, its GDP increases and vice versa. Correlation analysis confirms the existence of a relationship between TNCs as independent business entities and the values of macroeconomic indicators, in particular GDP.

The next step in our research was to conduct a correlation analysis on categories of countries with different levels of economic development in order to find out exactly how the GDP indicator will change as the main indicator of the country's involvement in the processes of economic globalization under the influence of the increase in the number of TNCs.

Comparing the obtained results of the correlation analysis, it should first be emphasized that all the coefficients have positive numerical values, which indicates a directly proportional dependence of the selected values (Figure 4). With an increase in the number of subsidiary companies of TNCs in countries with any socio-economic development, the volume of GDP increases.

The category of highly developed countries has the highest correlation coefficient, its value is r=+0,99. According to the Chaddock scale, the selected values have a very high degree of correlation. With an increase in the number of branches in highly developed countries, the size of GDP will increase significantly. This can be explained by the fact that the national market of highly developed countries is sufficiently saturated with TNC branches, while the market of developing countries is saturated with goods and services produced by these branches. Highly developed countries have a higher degree of internationalization of production compared to other countries, which is accompanied by the permanent exit of enterprises to foreign markets, the creation of new TNCs and the expansion of existing ones. In addition, the parent companies of the most profitable TNCs are concentrated precisely in highly developed countries, where the tertiary sector occupies the largest share in the economy, which makes them post-industrial countries.

Characterizing newly industrialized countries, we see that the correlation coefficient is equal to r= + 0,98. According to the Chaddock scale, the obtained value is very high, which indicates, first of all, a strong significant correlation between the selected variables. Therefore, with a gradual increase in the number of foreign branches of TNCs, the GDP of the countries where they are located will increase significantly. The high ratio in newly industrialized countries is associated with the peculiarities of their economic growth rates, which are higher than in highly developed countries. Over the last decade, such countries have undergone significant transformations related to the agrarian-industrial nature of their economy. The rich natural resource potential and active participation in international trade processes enable these countries to involve the world's leading TNCs in their economic activities, which is only positively reflected in the volume of their GDP [36].

Developing countries have the lowest correlation coefficient. The numerical value of the coefficient is r=+0,41. According to Chaddock's scale, the degree of close connection between the variables is moderate, and therefore, with an increase in the number of TNC subsidiaries, the GDP of these countries will not grow significantly. Such a degree of linear dependence can be explained by the fact that developing countries

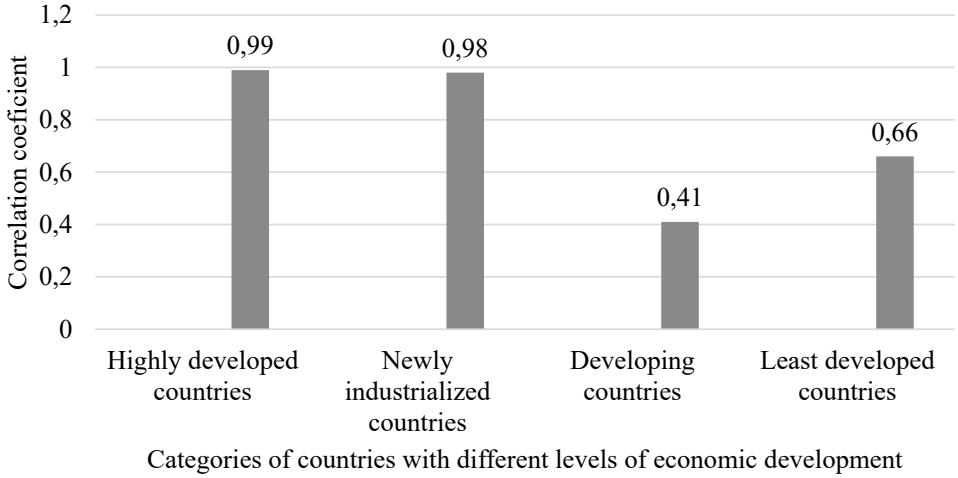

Figure 4 – Results of correlation analysis by category of countries with different levels of economic development, 2022

Source: compiled on the basis of data [7; 9–35]

are at the stage of adaptation to the processes of economic globalization; their economy grows at a slower pace compared to highly developed countries, because they have a relatively small number of branches of TNCs, and in the structure of their economy a significant share belongs to national enterprises that do not enter foreign markets. Despite the fact that developing countries are to a certain extent integrated into the world economic space, their level of transnationalization of capital and production constantly fluctuates in accordance with the changing trends of economic globalization.

As for underdeveloped countries, during the analysis we obtained a correlation coefficient, the value of which is equal to r=+0,66. According to the Chaddock scale, such a numerical value indicates the presence of a significant correlation between the variables, and therefore, an increase in the number of foreign branches of TNCs located in underdeveloped countries is accompanied by a significant increase in GDP per year. Despite the fact that developing countries have a larger number of TNC branches, their correlation coefficient is lower than the coefficient in underdeveloped countries. This is explained by the fact that for underdeveloped countries, the penetration of new companies into the market contributes to the emergence of an "economic miracle" due to the expansion of the range of products, the creation of new jobs and the growth of revenues to the state budget. The combination of these components has a positive effect on the numerical values of GDP in underdeveloped countries, where TNCs will act as leading coordinators of international trade in an unstable economy, while developing countries are at the stage of transition from one phase of the economic cycle to another phase.

In addition to the general correlation analysis, with the help of which we discovered the existing relationship between the volume of GDP and the number of foreign branches of TNCs, as well as the analysis by category of countries, the use of which made it possible to estimate the change in the correlation coefficient depending on the change in the socio-economic development of the country, we consider it necessary in the work to analyze separately each branch of human activity that is in the sample. Conducting a correlation analysis on the spheres of activity of TNCs is justified by the need to determine the degree of dependence of the GDP of the countries selected for analysis on the number of subsidiaries involved in the production of certain goods or the provision of certain services.

In the course of conducting a correlation analysis of 9 spheres of human activity, we found that the obtained correlation coefficients, regardless of the specialization of TNCs, have a positive value, which indicates a directly proportional dependence of the values, and therefore, the increase in the number of subsidiaries of TNCs in various sectors of the economy is directly proportional to the growth of GDP in selected countries.

The greatest linear dependence between the volumes of GDP of countries with different levels of economic development and the number of TNC subsidiaries is observed in the field of fast food services. In statistics, this result can be explained primarily by the significant preponderance of the number of subsidiary companies in this industry over others. In the economy, the number of TNCs involved in the provision of fast food services is rapidly developing and expanding, which can be explained by relatively easy conditions for entering the foreign market. If, for example, pharmaceutical companies in another country need a highly qualified workforce, the presence of research institutes, high-tech material support, then these conditions are not

mandatory for the expansion of a network of fast food establishments, which greatly facilitates the process of their quantitative growth.

Despite the fact that the mining industry is one of the largest in terms of the number of companies in the sample, it has the smallest linear relationship between the GDP of countries with different levels of economic development and the number of its subsidiaries. This can be explained by the fact that the development of the mining industry is slowing down due to the problem of depletion of natural resources. In addition, subsidiary companies have a limited number of recipient countries, because according to the characteristics of the international division of labor, not all countries have rich mineral deposits. The largest of them are located in newly industrialized countries and underdeveloped countries.

Having determined with the help of correlation analysis the existence of a relationship between GDP volumes as the main indicator demonstrating the degree of involvement of the countries selected for analysis in global economic processes and the number of subsidiaries of TNCs operating in various sectors of the economy, we consider it necessary to use regression analysis to investigate in more detail, which factors of economic globalization affect the growth of the transnationalization of production and capital. The use of regression analysis will allow to investigate the consequential relations between the factors and to reveal patterns and trends in the development of the studied performance parameter [37].

Taking into account the fact that the development of TNCs is quantitative, for the implementation of multivariate regression analysis, we took the number of foreign branches of TNCs in 9 different fields of human activity (y) for the year 2022 as an effective indicator. As for the factor indicators, we chose those factors that, in our opinion, reflect the main essence of economic globalization, the large-scale impact of which is noticeable not only in changes in the number of realized trade transactions. Economic globalization is closely intertwined with various aspects of the world economy, namely with innovations, infrastructure, business and state regulation of foreign economic activity.

These indicators include population (x1), purchasing power parity (x2), inflation (x3), innovation index (x4), corruption perception index (x5), trade freedom index (x6), share of the tertiary sector of the economy (x7), index business freedom (x8), investment freedom index (x9). Each of the listed factors describes the socio-economic situation of 28 countries in accordance with the trends of economic globalization, the totality of which forms a statistical sample.

First, we decided to conduct a general regression analysis covering the total number of countries. In this way, we will be able to identify a set of key factors of the impact of economic globalization on the quantitative growth of TNCs at the global level.

The general regression model obtained during the calculations has the following form:

$$Y = 0,142_{x1} + 0,490_{x2} - 0,180_{x3} + \\ +0,666_{x4} - 0,404_{x5} - 0,276_{x6} \\ +0,294_{x7} + 0,322_{x8} - 0,122_{x9} - 0,022 \quad (1)$$

Analyzing the general regression model, we see that with an increase in such factor indicators as population (x1), purchasing power parity (x2), innovation index (x4), the share of the tertiary sector of the economy (x7), the effective indicator of the number of TNC subsidiaries in the country increases. When such indicators as inflation (x3), corruption perception index (x5), trade freedom index (x6), business freedom index (x8), investment freedom index (x9) increase, the value of the performance indicator of the number of TNC subsidiaries will be inversely proportional, and therefore it will decrease.

The factor index of the investment freedom index (x9) has the least effect on the change in the effective indicator of the number of TNC subsidiaries in the country. The innovation index factor indicator (x4) has the greatest effect on the change in the effective indicator of the number of TNC subsidiaries in the country. Such a result can be explained by the fact that in the 21st century, various countries of the world are rapidly implementing the latest technologies in production, and this is quite attractive to foreign investors and entrepreneurs.

Next, we calculated four regression models, each of which represents countries with different economic development, which will allow us to investigate the features of the socio-economic situation of groups of countries and how these features affect the growth of the number of subsidiaries of TNCs.

The regression model of the category of highly developed countries looks like this:

$$Y = 0,269_{x4} + 0,44_{x5} - 0,469_{x6} + 0,89_{x7} + 0,37_{x8} \\ +0,281_{x9} - 0,662 \quad (2)$$

Describing this model, it is important to emphasize that with an increase in such factor indicators as population (x1), purchasing power parity (x2) and inflation (x3), the effective indicator of the number of TNC subsidiaries in highly developed countries does not change.

With the increase of such indicators as the innovation index (x4), the corruption perception index (x5), the share of the tertiary sector of the economy (x7), the index of business freedom (x8) and the index of investment freedom (x9), the number of TNC branches also increases. Highly developed countries are characterized by high transparency of state institutions, developed infrastructure and favorable conditions for starting a business, so these

factors can significantly accelerate the process of TNCs expanding their capacities on their territory.

When the factor index of trade freedom index (x6) increases, the effective indicator of the number of TNC subsidiaries in highly developed countries decreases.

The innovation index factor indicator (x4) has the least effect on the change in the effective indicator of the number of TNC subsidiaries in the country. The factor indicator of the share of the tertiary sector of the economy (x7) has the greatest influence on the change in the effective indicator of the number of TNC subsidiaries in the country.

The regression model of the category of newly industrialized countries looks like this:

$$Y = 0,611_{x1} + 0,626_{x3} + 1,500_{x4} - 2,076_{x5} - 0,148_{x6} + 1,310_{x7} - 0,630 \quad (3)$$

Characterizing this model, we can conclude that with an increase in such factor indicators as purchasing power parity (x2), the index of business freedom (x8) and the index of investment freedom (x9), the effective indicator of the number of TNC subsidiaries in newly industrialized countries does not change.

With an increase in the factor index of population (x1), inflation (x3), innovation index (x4), the share of the tertiary sector of the economy (x7), the effective indicator of the number of subsidiaries of TNCs in newly industrialized countries increases. When the factor indicator increases, the index of perception of corruption (x5), the index of freedom of trade (x6), the effective indicator of the number of subsidiaries of TNCs in newly industrialized countries decreases.

The factor index of trade freedom index (x6) has the least effect on the change in the effective indicator of the number of TNC subsidiaries.

The factor indicator of corruption perception index (x5) has the greatest influence on the change in the effective indicator of the number of TNC subsidiaries in the country.

The regression model of the category of developing countries obtained during the regression analysis looks like this:

$$Y = -0,029_{x1} + 2,048_{x2} + 0,125_{x3} - -0,685_{x4} + 2,137_{x7} + 1,871_{x9} - 0,208 \quad (4)$$

Regarding the regression model of developing countries, we see that with an increase in such factor indicators as the corruption perception index (x5), the trade freedom index (x6) and the business freedom index (x8), the effective indicator of the number of TNC subsidiaries does not change.

With an increase in the factor indicator of purchasing power parity (x2), the share of the tertiary sector of the economy (x7), the index of investment freedom (x9), the effective indicator of the number of subsidiaries of TNCs in developing countries increases. With an increase in the factor indicator of population (x1), inflation (x3), innovation index (x4), the effective indicator of the number of subsidiaries of TNCs in developing countries decreases.

The factor indicator of population (x1) has the least effect on the change in the effective indicator of the number of subsidiaries of TNCs in developing countries.

The factor indicator of the share of the tertiary sector of the economy (x7) has the greatest effect on the change in the effective indicator of the number of subsidiaries of TNCs in developing countries.

The regression model of underdeveloped countries looks like this:

$$Y = -0,037_{x1} + 0,417_{x4} - 1,05_{x5} - 0,244_{x6} + 0,335_{x7} + 0,267_{x8} - 0,325 \quad (5)$$

In underdeveloped countries, with an increase in such factor indicators as purchasing power parity (x2), inflation (x3) and the index of investment freedom (x9), the effective indicator of the number of TNC subsidiaries in underdeveloped countries does not change.

With an increase in such factor indicators as the innovation index (x4), the share of the tertiary sector of the economy (x7), the index of business freedom (x8), the effective indicator of the number of TNC subsidiaries in underdeveloped countries increases. With an increase in the factor indicator of the population (x1), the index of perception of corruption (x5), the index of freedom of trade (x6), the effective indicator of the number of subsidiaries of TNCs in underdeveloped countries decreases.

The factor indicator of population (x1) has the least influence on the change in the effective indicator of the number of TNC subsidiaries in underdeveloped countries.

Among the selected indicators, such a factor indicator as the corruption perception index (x5) has the greatest effect on the change in the effective indicator of the number of subsidiaries of TNCs in developing countries.

Comparing all the models obtained in the course of the regression analysis, it is worth emphasizing that the general regression model contains all the factor indicators, if they increase, the resulting indicator changes, while each regression model by country category has several factors, the change of which there is no increase or decrease in the effective indicator. Some models have common features, for example, the corruption perception index (x5) has the greatest effect on the growth of the number of TNC branches as a performance indicator in newly industrialized countries and underdeveloped countries, which can be explained by the fact that these categories of countries have high corruption compared to others, which is quite inhibits their economic growth. Highly

developed countries and developing countries also have a common factor indicator, the increase of which contributes to the increase in the number of subsidiaries. This indicator is the share of the tertiary sector (x7) in the economy. For highly developed countries, its growth contributes to maintaining the position of leaders in the global market, since their development is based on a change in priorities, when the production of services exceeds the production of goods [38].

As for developing countries, in the structure of their economy, the tertiary sector does not significantly exceed the primary and tertiary sectors, but the countries remain industrial, because the structure of GDP is dominated by the export of goods.

Conclusions. So, having studied the consequential relations between the processes of economic globalization and the number of subsidiaries of the world's leading TNCs, we can conclude that their quantitative development significantly depends on the degree of involvement of the country in the globalized space. The results of the correlation analysis showed the existence of a relationship between TNCs and GDP as the main macroeconomic indicator, which demonstrates the participation of countries in export-import operations, which are the basis of economic interaction in the world. The results of the correlation analysis by industry confirmed the thesis that economic globalization contributes to the quantitative growth of TNCs due to an increase in GDP, regardless of what goods and services the TNC sells, and vice versa, TNCs are able to positively influence the volume of GDP, and therefore the scale of economic globalization.

The implementation of regression analysis and the construction of regression models demonstrated the specificity of the impact of economic globalization on the development of TNCs in countries with different socio-economic conditions. The specificity lies in the differences in the influence of one set of factor indicators on the value of the effective indicator of the number of foreign branches of TNCs in countries with different levels of socio-economic development and economic development. This, in turn, only confirms the controversy of the phenomenon of economic globalization, and recognizes that the increase of TNCs is possible only in those countries with high indicators of economic globalization. The development of countries in the world is asymmetric, therefore the spread of globalization processes is also uneven, as evidenced by the different reactions of countries' economies to their influence.

References:

1. Vasylieva D. V. (May 28-29, 2020) Orhanizatsiia dystantsiinoho navchannia uchniv 5-9 klasiv v umovakh tryvaloho karantynu [Organization of distance education for students of grades 5-9 in conditions of long-term quarantine]. *Problemy suchasnoho pidruchnyka*: Mizhnar. nauk.-prakt. internet-konf. Kyiv, pp. 21–22. (in Ukrainian)
2. Vidsotkove vidnoshennia mizhnarodnoi torhivli do VVP: informatsiia ofitsiinoho saitu Svitovoho banku [Percentage ratio of international trade to GDP: information from the official website of the World Bank]. Available at: https://data.worldbank.org/indicator/NE.TRD.GNFS.ZS (in Ukrainian)
3. Myronenko V. O., Nechytailo Yu. A. (April 6-7, 2023) Analiz statystychnoho zv'iazku zminnykh. [Analysis of the statistical relationship of variables]. *Molod i industriia 4.0 v XXI stolitti*: KhIKh Mizhnar. forumu molodi. Kharkiv, p. 218. (in Ukrainian)
4. Osnovna klasyfikatsiia krain svitu za rivnem sotsialno-ekonomichnoho rozvytku: ofitsiinyi sait OON [The main classification of the countries of the world according to the level of socio-economic development: the official website of the UN]. Available at: https://www.un.org/en/development/desa/policy/wesp/wesp_current/2014wesp_country_classification.pdf (in Ukrainian)
5. Poplavskyi A. V., Dehtiarenko K. Ye. (October 8-10, 2020) Ekspertni systemy kontroliu pokaznykiv VVP v umovakh poshyrennia hostroi respiratornoi khvoroby Covid-19 [Expert systems for monitoring GDP indicators in the conditions of the spread of the acute respiratory disease Covid-19]. *Kontrol u upravlinnia u skladnykh systemakh*: XV Mizhnar. konf. Vinnytsia, p. 111. (in Ukrainian)
6. Turlo N. P., Litvin O. H., Markhonos S. M. (2024) Valovyi vnutrishnii produkt yak indykator rivnia ekonomichnoho rozvytku (na prykladi Cheskoi Respubliky) [Gross domestic product as an indicator of the level of economic development (on the example of the Czech Republic)]. *Ekonomichnyi prostir*, no. 189, pp. 243–248. (in Ukrainian)
7. Obsiahy VVP za 2022 rik u riznykh krainakh svitu: informatsiia ofitsiinoho saitu Svitovoho banku [Volumes of GDP for 2022 in different countries of the world: information from the official website of the World Bank]. Available at: https://data.worldbank.org/indicator/NY.GDP.MKTP.CD (in Ukrainian)
8. Reitynh naibilshykh u sviti TNK za rivnem dokhodiv [Ranking of the world's largest TNCs by revenue]. Ofitsiinyi sait Fortune. Available at: https://fortune.com/ranking/global500/ (in Ukrainian)
9. Toyota Corporation. Available at: https://www.toyota.com/ (in Ukrainian)
10. Mercedes-Benz Group. Available at: https://www.mercedes-benz.com/en/
11. General Motors Company. Available at: https://www.gm.com/
12. Corteva Agriscience Company. Available at: https://www.corteva.com/
13. Olam Group. Available at: https://www.olamgroup.com/
14. Louis Dreyfus Company. Available at: https://www.ldc.com/
15. ArcelorMittal. Available at: https://corporate.arcelormittal.com/
16. BHP Company. Available at: https://www.bhp.com/

17. Glencore Company. Available at: https://www.glencore.com/
18. Pfizer Company. Available at: https://www.pfizer.com/
19. Johnson & Johnson Company. Available at: https://www.jnj.com/
20. Roche Company. Available at: https://www.roche.com/
21. Danone Company. Available at: https://www.danone.com/
22. Nestle Company. Available at: https://www.nestle.com/
23. PepsiCo. Available at: https://pepsico.com/
24. McDonald's Corporation. Available at: https://www.mcdonalds.com/us/en-us.html
25. Starbucks Corporation. Available at: https://www.starbucks.com/
26. KFC Corporation. Available at: https://global.kfc.com/
27. Dell Corporation. Available at: https://www.dell.com/
28. Cisco Corporation. Available at: https://www.cisco.com/
29. Siemens Company. Available at: https://www.siemens.com/
30. Nike Company. Available at: https://www.nike.com/
31. Puma Company. Available at: https://us.puma.com/us/en
32. Adidas Company. Available at: https://www.adidas.com/us
33. Caterpillar Company. Available at: https://www.caterpillar.com/ru.html
34. Hitachi Company. Available at: https://www.hitachi.com/
35. Rockwell Automation Company. Available at: https://www.rockwellautomation.com/en-us.html
36. Hal E. S. (March 24-25,2021) Krainy-tyhry: osoblyvosti strimkoho rozvytku [Tiger countries: features of rapid developmen]. *Visnyk naukovykh idei molodi*: Mizhnarod. nauk.-prakt. konf. molodykh vchenykh, aspirantiv ta studentiv. Pp. 86–88. (in Ukrainian)
37. Behun S., Voroniuk A. (2020) Mistse koreliatsiino-rehresiinoho analizu v upravlinni pidpryiemstvom [The place of correlation-regression analysis in enterprise management]. *Molodyi vchenyi*, no. 4 (80), pp. 277–278. (in Ukrainian)
38. Dunets I. (October 27, 2020) Tendentsii rozvytku pidpryiemnytstva v umovakh postindustrialnoho suspilstva [Trends in the development of entrepreneurship in post-industrial society. Innovative development and security of enterprises in the conditions of a neo-industrial society]. *Innovatsiinyi rozvytok ta bezpeka pidpryiemstv v umovakh neoindustrialnoho suspilstva*: Mizhnar. nauk.-prakt. konf. Lutsk, pp. 359–361. (in Ukrainian)
39. Makarenko M. B., Danilina T. O. (April 15-16, 2021) Udoskonalennia roboty zaliznychnoho transportu za dopomohoiu vykorystannia informatsiinykh komp'iuternykh tekhnolohii [Improving the operation of railway transport with the help of information computer technologies]. *Suchasni informatsiini tekhnolohii ta systemy v upravlinni*: III Mizhnar. nauk.-prakt. konf. molodykh vchenykh, aspirantiv i studentiv. Kyiv, pp. 126–127. (in Ukrainian)
40. Yanovska V., Parfentieva O. (November 22, 2023) Pidkhody do vymiriuvannia efektyvnosti lohistyky ta transportu [Approaches to measuring the efficiency of logistics and transport]. *Upravlinnia ta administruvannia v umovakh protydii hibrydnym zahrozam natsionalnii bezpetsi*: IV Mizhnar. nauk.-prakt. konf. Kyiv, pp. 702–705. (in Ukrainian)

Список використаних джерел:

1. Васильєва Д.В. Організація дистанційного навчання учнів 5-9 класів в умовах тривалого карантину. *Проблеми сучасного підручника*: матеріали Міжнар. наук.-практ. інтернет-конф. (м. Київ, 28-29 травня 2020 р). Київ, 2020. С. 21–22.
2. Відсоткове відношення міжнародної торгівлі до ВВП: інформація офіційного сайту Світового банку. URL: https://data.worldbank.org/indicator/NE.TRD.GNFS.ZS (дата звернення: 27.03.2024).
3. Мироненко В.О., Нечитайло Ю.А. Аналіз статистичного зв'язку змінних. *Молодь і індустрія 4.0 в XXI столітті*: матеріали XIX Міжнар. форуму молоді (м. Харків, 6-7 квітня 2023 р). Харків, 2023. С. 218.
4. Основна класифікація країн світу за рівнем соціально-економічного розвитку: офіційний сайт ООН. URL: https://www.un.org/en/development/desa/policy/wesp/wesp_current/2014wesp_country_classification.pdf (дата звернення: 27.03.2024).
5. Поплавський А.В., Дегтяренко К.Є. Експертні системи контролю показників ВВП в умовах поширення гострої респіраторної хвороби Covid-19. *Контроль у управління у складних системах*: матеріали XV Міжнар. конф. (м. Вінниця, 8-10 жовтня 2020 р). Вінниця, 2020. С. 111.
6. Турло Н.П., Літвін О.Г., Мархонос С.М. Валовий внутрішній продукт як індикатор рівня економічного розвитку (на прикладі Чеської Республіки). *Економічний простір*. 2024. № 189. С. 243–248.
7. Обсяги ВВП за 2022 рік у різних країнах світу: інформація офіційного сайту Світового банку. URL: https://data.worldbank.org/indicator/NY.GDP.MKTP.CD (дата звернення: 21.03.2024).
8. Рейтинг найбільших у світі ТНК за рівнем доходів: інформація офіційного сайту Fortune. URL: https://fortune.com/ranking/global500/ (дата звернення: 21.02.2024).
9. Toyota Corporation. URL: https://www.toyota.com/ (дата звернення: 23.03.2024).
10. Mercedes-Benz Group. URL: https://www.mercedes-benz.com/en/ (дата звернення: 23.03.2024).
11. General Motors Company. URL: https://www.gm.com/ (дата звернення: 23.03.2024).
12. Corteva Agriscience Company. URL: https://www.corteva.com/ (дата звернення: 23.03.2024).
13. Olam Group. URL: https://www.olamgroup.com/ (дата звернення: 23.03.2024).
14. Louis Dreyfus Company. URL: https://www.ldc.com/ (дата звернення: 23.03.2024).
15. ArcelorMittal. URL: https://corporate.arcelormittal.com/ (дата звернення: 23.03.2024).

16. BHP Company. URL: https://www.bhp.com/ (дата звернення: 23.03.2024).
17. Glencore Company. URL: https://www.glencore.com/ (дата звернення: 23.03.2024).
18. Pfizer Company. URL: https://www.pfizer.com/ (дата звернення: 23.03.2024).
19. Johnson & Johnson Company. URL: https://www.jnj.com/ (дата звернення: 23.03.2024).
20. Roche Company. URL: https://www.roche.com/ (дата звернення: 23.03.2024).
21. Danone Company. URL: https://www.danone.com/ (дата звернення: 23.03.2024).
22. Nestle Company. URL: https://www.nestle.com/ (дата звернення: 23.03.2024).
23. PepsiCo. URL: https://pepsico.com/ (дата звернення: 23.03.2024).
24. McDonald's Corporation. URL: https://www.mcdonalds.com/us/en-us.html (дата звернення: 23.03.2024).
25. Starbucks Corporation. URL: https://www.starbucks.com/ (дата звернення: 23.03.2024).
26. KFC Corporation. URL: https://global.kfc.com/ (дата звернення: 23.03.2024).
27. Dell Corporation. URL: https://www.dell.com/ (дата звернення: 23.03.2024).
28. Cisco Corporation. URL: https://www.cisco.com/ (дата звернення: 23.03.2024).
29. Siemens Company. URL: https://www.siemens.com/ (дата звернення: 23.03.2024).
30. Nike Company. URL: https://www.nike.com/ (дата звернення: 23.03.2024).
31. Puma Company. URL: https://us.puma.com/us/en (дата звернення: 23.03.2024).
32. Adidas Company. URL: https://www.adidas.com/us (дата звернення: 23.03.2024).
33. Caterpillar Company. URL: https://www.caterpillar.com/ru.html (дата звернення: 23.03.2024).
34. Hitachi Company. URL: https://www.hitachi.com/ (дата звернення: 23.03.2024).
35. Rockwell Automation Company. URL: https://www.rockwellautomation.com/en-us.html (дата звернення: 23.03.2024).
36. Гал Е.С. Країни-тигри: особливості стрімкого розвитку. *Вісник наукових ідей молоді:* матеріали Міжнарод. наук.-практ. конф. молодих вчених, аспірантів та студентів (м. Вінниця, 24-25 березня 2021 р). С. 86–88.
37. Бегун С., Воронюк А. Місце кореляційно-регресійного аналізу в управлінні підприємством. *Молодий вчений*. 2020. № 4 (80). С. 277–278.
38. Дунець І. Тенденції розвитку підприємництва в умовах постіндустріального суспільства. *Інноваційний розвиток та безпека підприємств в умовах неоіндустріального суспільства:* матеріали міжнар. наук.-практ. конф. (м. Луцьк, 27 жовтня 2020 р). Луцьк, 2020. С. 359–361.
39. Макаренко М.Б., Даніліна Т.О. Удосконалення роботи залізничного транспорту за допомогою використання інформаційних комп'ютерних технологій. *Сучасні інформаційні технології та системи в управлінні:* матеріали III Міжнар. наук.-практ. конф. молодих вчених, аспірантів і студентів (м. Київ, 15-16 квітня 2021 р). Київ, 2021. С. 126–127.
40. Яновська В., Парфентьєва О. Підходи до вимірювання ефективності логістики та транспорту. *Управління та адміністрування в умовах протидії гібридним загрозам національній безпеці*: матеріали IV Міжнар. наук.-практ. конф. (м. Київ, 22 листопада 2023 р). Київ, 2023. С. 702–705.

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