JEL Classification: F02, F17

V. Babenko[1], V. Kutsak[2], A. Kharchenko[3]
[1] Doctor of Economics, Professor of International E-commerce and Hotel&Restaurant Business Department, V. N. Karazin Kharkiv National University, Kharkov, pl. Svobody, 4, 61022, Ukraine, e-mail: vitalinababenko@karazin.ua, ORCID: http://orcid.org/0000-0002-4816-4579
[2]0506828733, e-mail: varelia9567@gmail.com
[3]0668367077, e-mail: naska09@i.ua

INTEGRATION OF UKRAINE IN THE CONTEXT OF INTERNATIONAL GLOBALIZATION: STRATEGIC PERSPECTIVES

This article has formed the basis of the resulting indicators for analyzing the problems and prospects for the development of regional integration processes on the basis of theoretical and logical analysis, taking into account the strategic directions of development of the domestic economy and the world economy, which creates the basis for a comprehensive detailed analysis and makes it possible to justify strategic decisions in the formation of countries of associations in the system of world integration, increasing their efficiency and effectiveness.

Keywords: regional integration strategies; growth curves; integration processes; strategic positioning.
Table 3. Fig. 5. Ref.: 14 titles.

В. А. Бабенко[1], В. В. Куцак[2], А. П. Харченко[3]
[1]Доктор экономических наук, профессор кафедры международной электронной коммерции и гостиничного и ресторанного дела, Харьковский национальный университет имени В. Н. Каразина, 4, 61022, Украина, e-mail: vitalinababenko@karazin.ua, ORCID: http://orcid.org/0000-0002-4816-4579
[2] 0506828733, e-mail: varelia9567@gmail.com
[3]0668367077, e-mail: naska09@i.ua

ИНТЕГРАЦИЯ УКРАИНЫ В УСЛОВИЯХ МЕЖДУНАРОДНОЙ ГЛОБАЛИЗАЦИИ: СТРАТЕГИЧЕСКИЕ ПЕРСПЕКТИВЫ

В данной статье был сформирован базис результирующих показателей для анализа проблем и перспектив развития региональных интеграционных процессов на основе теоретико-логического анализа с учетом стратегических направлений развития отечественной экономики и мирового хозяйства, что создает основу для всестороннего детального анализа и дает возможность обосновать стратегические решения в вопросе формирования стран объединений в системе мировой интеграции, повышения их эффективности и действенности.

Ключевые слова: региональные интеграционные стратегии; кривые роста; интеграционные процессы; стратегическое позиционирование.
Табл. 3. Рис. 5. Библиогр.: 14 назв.

Formulation of the problem. The development of a managerial decision regarding the regional integration strategy of Ukraine based on the predicted values of its development scenarios in the international integration space depends on the quality of the forecast. The quality of the forecast is a set of such characteristics of the forecast that in the complex make it effective, useful in management, provide a reliable description of the process in a certain perspective and the possibility of reliable use of predictive outcomes for the development of managerial decisions. If the model is statistically qualitative, then predictive values can be used to develop a management solution confidently, otherwise, predictive values can be considered, but with a high probability of error in such values.

An object of the work. The purpose of this article is to to get strategic positions on the basis of the forecast of the development scenarios of integration of Ukraine and member countries of BRICS in the world integration space.

Statement of the main material. The analysis of regional integration processes involves the following stages: determining the socio-economic status of the country in the international economic space and forecasting the scenarios for their development of their integration. The description of these processes is reduced to the processing of the system of indicators that characterize them. Some of these indicators act as explanatory variables, others are called resulting signs. There may be a lot of explanatory variables; as a rule, they are related by close correlation relations, since some groups of indicators are different forms of representing the same common cause. These hypothetical general causes, which determine the observed values of recorded indicators, are called factors. Thus, the system of result indicators can be used with full confidence for the next stage of forecasting with the aim of obtaining on its basis scenarios for the development of the member countries of regional integration associations.

For forecast development, forecast models are used, namely — growth curves [1]. For further research we will use econometric modeling, which is based on the processing of retrospective statistical information, the evaluation of individual variables and their parameters.

It is known that the economic-mathematical models of growth curves, which are different functions of time $y = f(t)$, are often used to describe the behavior of changing indicators in subsequent periods, while it is assumed that the influence of other factors is insignificant or mediated in comparison with the time factor t. It is known that a correctly selected model of the growth curve must correspond to the nature of the changes in the trends of the phenomenon under study [2]. The growth curve allows you to get aligned or theoretical values of the levels of the dynamic range. These are the levels that were observed in the case of the complete coincidence of the dynamics of the phenomenon with the curve. Forecasting based on the growth curve model is based on extrapolation, which is a continuation to the future trend that has been observed in past periods of time [3—6].

In order to predict the values of indicators of regional integration processes, the growth curves for the corresponding indicators were constructed using the Statgraphics Centurion application package.

The system of indicators that comprehensively describe the regional integration processes: y_2 — GDP per capita (at current prices/USD), y_8 — coal production (million m^3), y_{23} — total primary energy production (million tons n.), y_{27} — import of electricity (million kWh), y_{33} — wheat production (ths. tons), y_{35} — oilseeds production (ths. tons), y_{37} — sunflower seed production (ths. tons), y_{39} — sugar production beet (ths. tons), y_{42} — cattle (thousand head), y_{48} — structure of expenditures of the consolidated budget on science, technology and information technology (%), y_{52} — surplus (+) / deficit (–) of current operations account in % to GDP (%), y_{53} — ratio of exports and imports of goods and commercial services (%), y_{54} — export / import ratio), y_{58} — external debt as% of GDP (%).

With 14 indicators, it is quite difficult to provide an unambiguous assessment of the development of integration processes and compare its level to one or another country. To solve this problem in order to determine the level of development of regional integration in BRICS, it is proposed to calculate the integral indicators for each country from this association on the basis of data for the period from 2004 to 2018. The integral indicator represents the aggregated value of calculated14 basis indicators and is calculated with the help of construction method taxonomic index of the development of dynamic socio-economic processes V. Plyuta [7]. The characteristic property of an integral index is that its value is in the range from 0 to 1. The interpretation of this indicator is as follows: it accepts high values with close values of the indicators in the system to the reference and low values at far from it [2].

The interpretation of this indicator is as follows: for a particular country, it accepts higher values, the higher its social and economic status in terms of the development of integration. The results of calculating the integral indicators for the member countries of the BRICS integration association are presented in the table 1.

T a b l e 1. — The value of the integral indicator of the member countries of the BRICS integration

Forecasting period	Brazil	Russia	India	China	South Africa
The first period of forecasting	0.45	0.71	0.41	0.55206	0.42575
The second period of forecasting	0.45	0.71	0.41	0.55206	0.42575
The third period of forecasting	0.4379	0.71	0.419	0.55099	0.4348

[developed by the author]

Figure 1 provides a graphical interpretation of the values of the integral indicator of BRICS member countries in the future for three periods of forecasting.

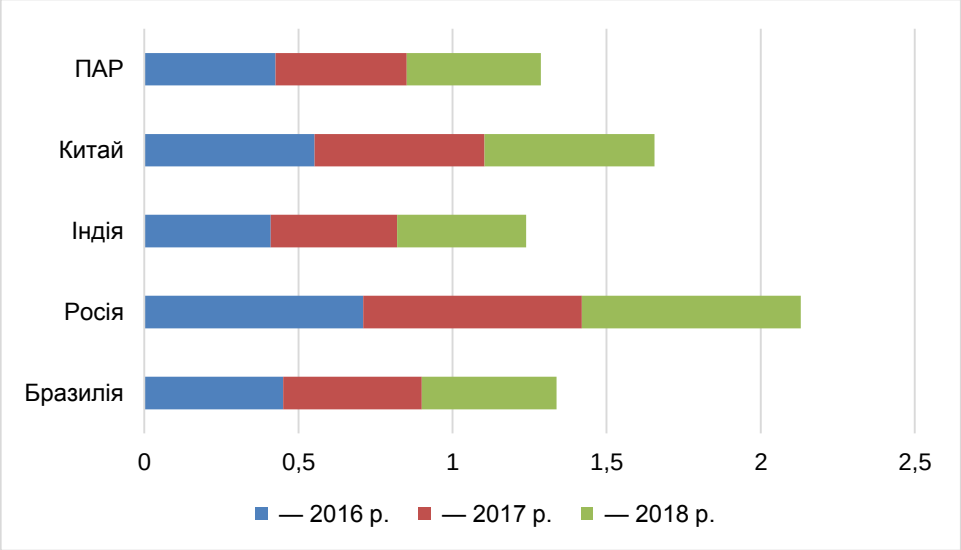

Figure 1. — Predictive values of the integral indicator in the context of the development of regional integration processes for BRICS member countries for the period 2016—2018 [developed by the author]

For a comparative analysis of the socio-economic development of Ukraine with the BRICS member countries, it is necessary to calculate the growth curves for finding the values of the forecast indicators - components of the integral indicator for Ukraine [8—14]:

$$y_2 = 1/(0.000086 + 0.001248/t);$$

$R^2 = 91.3902$, $F = 95.53$, $DW = 1{,}4348$ (the model has a relative quality);

$$y_8 = 1/(0.0126544 + 0.0000058t^2);$$

$R^2 = 5.18528$, $F = 0.49$, $DW = 1.4988$ (the model has a relative quality);

$$y_{23} = \text{sqrt}(5914{,}01 + 65.7001t^2);$$

$R^2 = 64.4638$, $F = 16.33$, $DW = 1.4341$ (the model has a relative quality);

$$y_{27} = \text{sqrt}(135959 - 61180.4\ln(t));$$

$R^2 = 87.2807$, $F = 61.76$, $DW = 1.0037$ (the model has a relative quality);

$$y_{33} = 1/(0.000044 + 0.000051/t);$$

$R^2 = 60.6004$, $F = 13.84$, $DW = 2.6129$ (the model has a relative quality);

$$y_{35} = \exp(7.6865 + 0.6074\text{sqrt}(t));$$

$R^2 = 93.8207$, $F = 136.65$, $DW = 3{,}0758$ (the model has a relative quality);

$$y_{37} = (44.8133 + 14.7625\text{sqrt}(t))^2;$$

$R^2 = 86.7539$, $F = 58.94$, $DW = 2{,}40329$ (the model has a relative quality);

$$y_{39} = \text{sqrt}(2.6558 - 377205t^2);$$

$R^2 = 1.72207$, $F = 0.16$, $DW = 1{,}7633$ (the model has a relative quality);

$$y_{42} = \text{sqrt}(1.3709 + 7.4802/t);$$

$R^2 = 97.849$, $F = 409.42$, $DW = 1.5771$ the model has a relative quality);

$$y_{48} = \text{sqrt}(0.3981 + 1.1889/t);$$

$R^2 = 62.4338$, $F = 14.96$, $DW = 2.3116$ (the model has a relative quality);

$$y_{52} = 1.894 - 0.6622t;$$

$R^2 = 65.2175$, $F = 16.88$, $DW = 1.7669$ (the model has a relative quality);

$$y_{53} = 4.03692 - 3.2296\text{sqrt}(t);$$

$R^2 = 55.3534$, $F = 11.16$, $DW = 1.6952$ (the model has a relative quality);

$$y_{54} = \exp(-0.1808 + 0{,}1151/t);$$

$R^2 = 17.5479$, $F = 1{,}92$, $DW = 1{,}448$ (the model has a relative quality);

$$y_{58} = \exp(3.4819 + 0.3929\ln(t));$$

$R^2 = 89.0649$, $F = 73.30$, $DW = 1.9924$ (the model has a relative quality).

On the basis of the obtained equations, it is necessary to calculate the forecast values for each resulting indicator characterizing the integration processes of Ukraine (table 2).

T a b l e 2 — Predictive values of indicators of regional integration processes in Ukraine

Indexes	The first period of forecasting	The second period of forecasting	The third period of forecasting
y_2 — GDP per capita (at current prices/USD)	5273.44	5505.73	5721.77
y_8 — coal production (million m^3)	74.1302	73.3416	72.5086
y_{23} — total primary energy production (million tons n.)	123.995	130.45	137.081
y_{27} — import of electricity (million kWh)	173.329	160.143	146.996
y_{33} — wheat production (ths. tons)	20828.1	20971.2	21095.4
y_{35} — oilseeds production (ths. tons)	17861.5	19463.8	21141.2
y_{37} — sunflower seed production (ths. tons)	9206.83	9611.92	10009.9
y_{39} — sugar production beet (ths. tons)	14534.9	14206.8	13843.7
y_{42} — cattle (thousand head)	4465.73	4411.71	4364.88
y_{48} — structure of expenditures of the consolidated budget on science, technology and information technology (%)	0.705135	0.699711	0.695027
y_{52} — surplus (+) / deficit (–) of current operations account in % to GDP (%)	-6.05218	–6.71436	–7.37655
y_{53} — ratio of exports and imports of goods and commercial services (%)	-7.1509	–7.60773	–8.04731
y_{54} — export / import ratio)	0.842656	0.842035	0.841503
y_{58} — external debt as% of GDP (%)	86.3272	89.085	91.7167

[developed by the author]

The calculated regression equations allow us to determine the integral indicator characterizing regional integration processes for Ukraine in a similar perspective period, in table 3.

T a b l e 3 — Results of the calculation of the integral indicator of regional integration processes for Ukraine

Forecasting period	The first period of forecasting	The second period of forecasting	The third period of forecasting
The value of the integral indicator	0.329325	0.32826	0.311371

[developed by the author]

In fig. 2 one can see a graphical visualization of values of calculated integral indicators, calculated by the taxonomic index method. This allows for a comparative analysis of the strategic positions of the development of integration of Ukraine and the BRICS member countries.

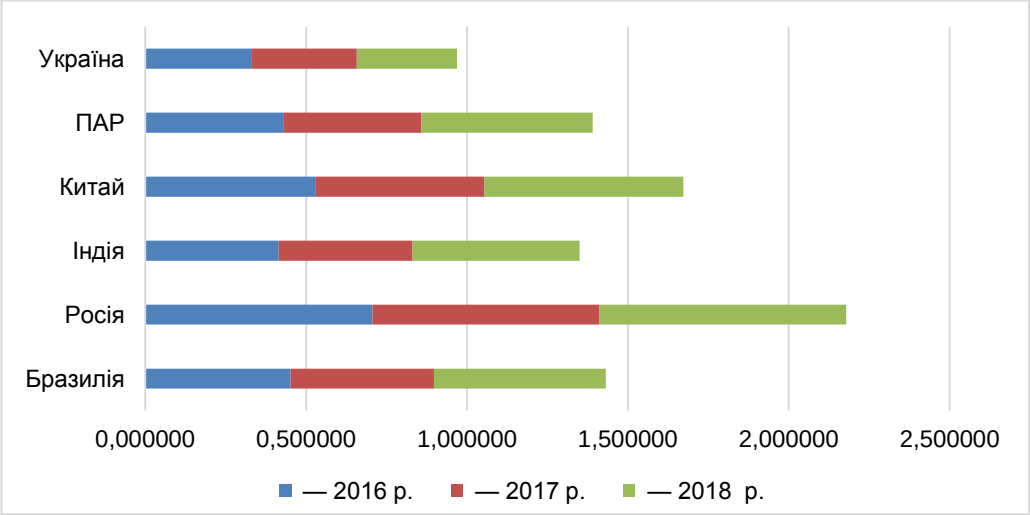

Figure 2. — The value of the integral indicator reflecting the state of socio-economic indicators of the development of integration of Ukraine and the BRICS member countries in the forecast period (2016—2018) [developed by the author]

Analysis of fig. 3 shows that Ukraine has the smallest value of the product of integrated indicators for the three forecast periods and the closest integral indicator for Ukraine in the forecast period to India, South Africa and Brazil. The average "remoteness" is observed with China, and Russia remains the most remote criterion under consideration. That is, on the state of socio-economic development of integration indicators, Ukraine is in the worst position (0.97), almost 50% ahead of India, South Africa and Brazil, with slight fluctuations in the value of the integral indicator (1.35, 1.39 and 1.43 respectively). Next place is China with a value of 1.67. Russia's leader, its integral indicator is 2.18. That is, for parity cooperation, Ukraine should improve its socio-economic situation on the basis of GDP per capita improvement and other basic indicators presented in Table 2.

With the help of the calculations, strategic positions can be obtained based on the forecast of the scenarios for the integration of Ukraine and the BRICS member countries in the world's integration space. The positions of the countries are determined in the space of the resulting factor, namely, GDP per capita from other factors, such as coal production, total primary energy production, electricity imports, wheat production, oilseeds, sunflower, sugar beet, cattle, structure expenditures of the consolidated budget on science, technology and information technologies, surplus (+) / deficit (–) of current operations account in % to GDP, ratio of exports and imports of goods and commercial services, ratio e Export and import of goods, external debt in % of GDP.

Space should be conventionally divided into four sectors. Each sector represents a strategic development scenario in the context of regional integration processes.

Thus, it is expedient to consider four positions (scenarios of development) of countries in the aspect of regional integration processes. Strategic positioning of Ukraine and the

BRICS member countries is proposed to be presented as a matrix of scenarios for the development of regional integration processes, which contains four strategic development (strategic) scenarios in terms of regional integration processes: I — low strategic position, II and III — average strategic position and IV — high strategic position.

In the first scenario, countries that are characterized by the lowest values of the resulting indicator, namely GDP per capita at the lowest values of partial indicators, should be considered. In the second scenario, the positions of countries are characterized by high values of the integral index with the smallest values of partial indicators. According to the third scenario, low values of the integral index are foreseen with sufficient values of partial indicators. The fourth scenario of development includes countries with high values of the integral indicator with significant values of partial indicators.

Consider the scenario of the development of Ukraine and the BRICS member countries in the aspect of the development of integration in the first period of the forecast based on their strategic positions (Fig. 3).

Thus, in the first perspective period of the scenario for the development of regional integration, Ukraine, in its strategic position, falls into the first group together with India. A closer alignment is observed with the second group of countries, which is Brazil and South Africa, which occupy an average strategic position. China and Russia are among the most "advanced" fourth group with a high strategic position. According to indicators characterizing regional integration processes in the international economic space, Russia is the most distant country from Ukraine. Thus, the least resources are needed to establish economic relations with the countries of the first and second groups, namely India, Brazil and South Africa.

The scenario for the development of Ukraine and the BRICS countries in the second period of the forecast is represented by the location of their strategic positions (Fig. 4).

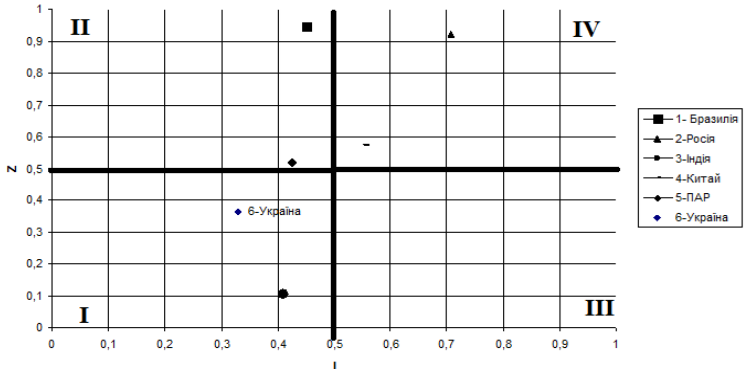

Figure 3. — Strategic positioning of Ukraine and the BRICS member states in the first year of forecast [developed by the author]

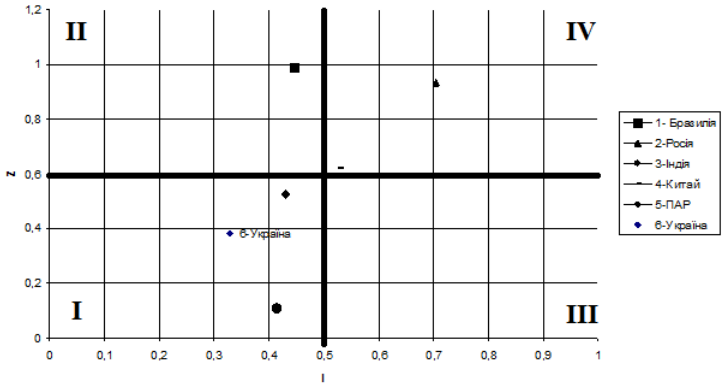

Figure 4. — Strategic positioning of Ukraine and the BRICS member countries in the second year of the forecast [developed by the author]

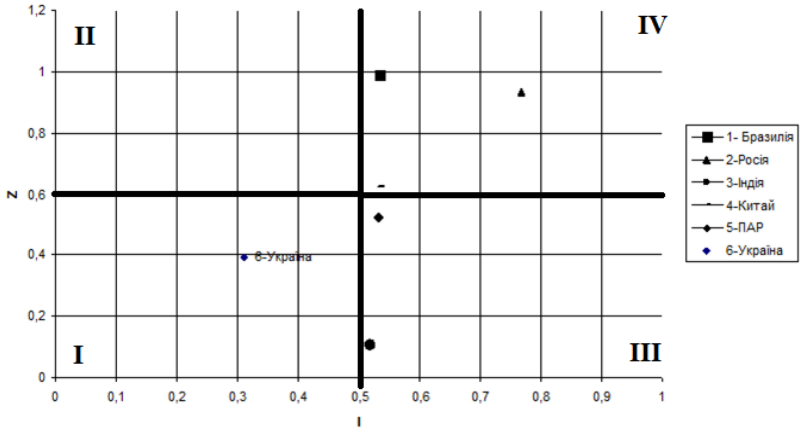

Figure 5. — Strategic positioning of Ukraine and the BRICS member countriesin the third year of forecast [developed by the author]

In the second year of the forecast, we see some changes in the development scenarios of BRICS member countries. Thus, India, with a view to reducing the level of the integral indicator, has changed its strategic position and moved from the second group to the first. At the same time, all other countries, despite the decrease in the value of the integral indicator, did not exit from their strategic position of the previous forecast period and remained in the previous groups. That is, the least cost-effective scenario of the development of Ukraine's integration in the second period of the forecast may be expected with representatives of the first group, namely India and South Africa. The greatest level of costs for economic relations in the second year of the forecast requires integration with Russia [15].

Strategic positions of Ukraine and BRICS countries in the third forecast period are presented in Fig. 5.

Analyze the scenario of development of Ukraine and the BRICS member countries in the final period of the forecast. In the third year, we see significant changes in the strategic positions of the countries under study as compared to previous periods. So in the first group only Ukraine remains. India and South Africa moved to the third group, and Brazil — to the fourth. China and Russia have not left the fourth strategic group. Thus, in the third year of forecasting, the most advantageous scenario of integration will be cooperation with India and South Africa, and the least attractive — with Russia.

Conclusions. On the basis of the received forecast of development scenarios of Ukraine and the BRICS member countries in the world integration space it is expedient to determine the priority scenarios of their development in the aspect of regional integration. Thus, according to indicators characterizing regional integration processes in the international economic space in all projected periods, Russia is the most distant country from Ukraine.

In the first promising period of forecasting Ukraine is expected to have the least cost-effective international cooperation with India, in the second — with India and South Africa, in the third — also with India and South Africa, but with additional costs compared with the first period.

References

1. *Бабенко, В. О.* Чинники впливу на розвиток інтеграційних процесів у глобальній системі міжнародної торгівлі / В. О. Бабенко, В. І. Сідоров, В. О. Петухова // International Scientific-Practical Conference Economic Development Strategy in Terms of European Integration: Conference Proceedings, May 27, 2016. — Kaunas : Baltija Publishing. — P. 40—43.

2. *Голіков, А. П.* Економіко-математичне моделювання світогосподарських процесів : навч. посіб. для студентів вищих навч. закладів. — 2-ге вид. — Харків : ХНУ ім. В. Н. Каразіна, 2006. — 144 с.

3. *Sidorov, V. I.* The Forecasting of the Development of Integration Processes in the Global System of International Trade / V. I. Sidorov, V. A. Babenko, V. O. Petuhova. — Наука XXI века: актуальные направления развития : сб. науч. ст. IV Междунар. заоч. науч.-практ. конф., посвящ. 85-летию Самар. гос. экон. ун-та, 30 сент. 2016 г. / редкол.: Г. Р. Хасаев, С. И. Ашмарина (отв. ред.) [и др.]. — Вып. 2 : в 2 ч. — Самара : Изд-во Самар. гос. экон. ун-та, 2016. — Ч. 2. — С. 159—161.

4. *Babenko, V. A.* The forecasting of Ukrainian Integration in the International Integration Space / V. A. Babenko, O. Y. Prikhodko, Y. O. Garmash // Міжнародний бізнес як фактор розвитку : Всеукр. наук.-практ. конф. (21 квітня 2016 р., м. Харків). — Харків : ХНУ імені В. Н. Каразіна, 2016. — С. 51 — 54.

5. *Babenko, V.* The place and perspectives of Ukraine in international integration space / V. Babenko, M. Pasmor, Ju. Pankova, M. Sidorov // Problems and Perspectives in Management. — 2017. — Vol. 15, Issue 1. — P. 80-92. DOI 10.21511/ppm.15(1).2017.08.

6. *Babenko, V. O.* Forming of informatization strategic prospects for Ukraine in conditions of world economy globalization / V. O. Babenko, V. O. Petuhova, A. S. Perepelitsia // Scientific Bulletin of Polissia. — 2017. — № 2 (10). — Vol. 1. — P. 24—34. — DOI:10.25140/2410-9576-2017-1-2(10)-24-34.

7. Мировой атлас данных [Электронный ресурс] // Мировая и региональная статистика, национальные данные, карты и рейтинги. — Режим доступа: http://knoema.ru/atlas. — Дата доступа: 10.12.2018.

8. Товарна структура зовнішньої торгівлі України [Електронний ресурс] : стат. інф. // Держ. служба статистики України. — Режим доступу: http://www.ukrstat.gov.ua. — Дата доступу: 10.12.2018.

9. Федеральная служба государственной статистики [Электронный ресурс] : офиц. сайт. — Режим доступа: http://www.gks.ru/. — Дата доступа: 10.12.2018.

10. BRICS Joint Statistical Publication: 2015; Brazil, Russia, India, China, South Africa / Rosstat. — M. : Statistics of Russia, 2015. — 235 p.

11. The Global Competitiveness Report 2014—2015 / [Full Data Edition is published by the World Economic Forum within the framework of The Global Competitiveness and Benchmarking Network]; Editor Prof. Klaus Schwab [World Economic Forum], Prof. Xavier Sala-i-Martín [Chief Advisor of The Global Competitiveness and Benchmarking Network]. — Geneva : World Economic Forum, [Printed and bound in Switzerland]. — 2015. — 565 p.

12. Statistics South Africa [Електронний ресурс] // Official web-site. — Режим доступу: http://www.statssa.gov.za/10.

13. *Babenko, V.* Modern imperatives of the development of the integration of foreign economic policy of Ukraine in the modern world economic space: monograph /V. Babenko, V. Sidorov, Ju. Pankova. — International economic relations and sustainable development : monograph / edited by Dr. of Economics, Prof. O. Prokopenko, Ph. D in Economics T. Kurbatova. — Ruda Śląska : Drukarnia i Studio Graficzne Omnidium, 2017. — 272 p. — P. 51—70.

14. The Global Competitiveness Report 2014—2015 / [Full Data Edition is published by the World Economic Forum within the framework of The Global Competitiveness and Benchmarking Network]; Editor Prof. Klaus Schwab [World Economic Forum], Prof. Xavier Sala-i-Martín [Chief Advisor of The Global Competitiveness and Benchmarking Network]. — Geneva: World Economic Forum, [Printed and bound in Switzerland]. — 2015. — 565 p.

15. *Babenko, V.* Analysis of development of international integration under conditions of globalization on the basis of discriminant analysis / V. Babenko, D. Babenko // Актуальні проблеми та перспективи трансформації міжнародних економічних відносин і світового господарства : матеріали XIV Міжнар. наук.-практ. конф., 20-21 квітня 2018 р. (Хмельницький-Сатанів). — Хмельницький : ХНУ, 2018. — 180 с. — С. 87—89.