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# The problem of statistical assessment of the potential for the development of regional integration processes

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## ABSTRACT

The present article illustrates the use of integrated indices to evaluate the potential for the development of regional integration processes. The study examines a new research and methodological approach, which involves the use of an integral index of the potential for the development of integration processes, proposed with regard to the intensity of the influence of internal and external factors on integrative relations development. The application of the above-mentioned integrated index in a comparative analysis of the potential for the development of integration processes allows a comprehensive and quantitative description of the current regional integration processes taking place in the modern economy under certain regional models.

**Key words:** integrated index, regional integration, EU, NAFTA, ASEAN, APTA.

## 1. Introduction

Modern processes of economic integration development taking place at the global and regional level are of complicated and contradictory nature and differ in depth and rate. However, today all the countries of the world economy are involved in this process regardless of the level of economic development achieved.

Modern research conducted by international organizations like the World Bank, the World Trade Organization, the UN, regional banks of development and others provide sufficient statistical data and methodology that allow defining the scale, intensity and peculiarities of regional integration processes development. To find more information about research conducted by the UN, see Statistics Database COMTRADE

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with integration associations of the world included: http://www.unstats.un.org; comparative research of regional integration conducted under the program of the UN University (Regional Integration Knowledge System): www.cris.unu.edu/riks.

A number of regional organizations suggest a well-developed system of indicators that allow evaluating the level of development of regional integration processes using numerous best practices. The most widespread are as follows: indicators suggested by the European Commission (see http://ec.europa.eu); resource database of NAFTA Secretariat, which is used for studying the North American integration (see http://www.nafta-sec-alena.org/); indicators suggested by Asia Regional Integration Center (see http://aric.adb.org/) and Asian Development Bank (http://beta.adb.org/) applied to studying the integration processes taking place in Asia-Pacific region; Eurasian Development Bank uses its own methodology for studying the indicators of Eurasian integration (see http://www.eabr.org), which takes into account 3 types of indices: integration of a pair of countries (describes the intensity of ties between two post-Soviet countries), integration of the country as a part of a group of countries (characterizes the approximation of one post-soviet country to the biggest "regions" of the region), integration within the group of countries (characterizes the average level of interdependence between countries and dynamics of integration in time); Inter-American Development Bank uses a number of indicators to study the integration processes in the countries of Latin America. These indicators allow analyzing market shifts as well as public management indices, transparency development, democracy, etc. (see http://www.iadb.org).

Based on previous authors' research (O. Bulatova et al., 2019) this article suggests combining existing indices of regional integration development into a respective system of integral evaluation, which will allow conducting complex comparative analysis of potential for integration process development.

Defining modern scientific and methodological basis for international regional integration, classification of certain statistical instruments to evaluate these processes provided in previous research allows drawing up the conclusion that integration process development is influenced by many factors, both internal and external.

For comprehensive accounting and evaluation of potential for integration processes development it is reasonable to apply integrated indices that provide comprehensive and quantitative description of regional integration processes taking place in modern economy under certain regional models at the present moment.

## 2. Building the integrated index of the potential for integration process development

As the analysis conducted shows, there is a need to develop certain methods of defining potential for further integration processes development. B. Balassa (1967) defined statistical and dynamical effects that appear in national economy as the result of deepening integration relations. Statistical effects are the result of redistribution of foreign trade flow of goods, factors of production, the result of introduction of the liberalization regime, expansion of markets of integrated countries may lead to positive trade creation effect and negative trade diversion effect. In the long run, structural transformations in economies of integrated countries result in dynamic effects related to the development of business competition inside integration association, establishment of joint infrastructure, lowering transaction costs, etc.

Integration processes development entails both quantitative and qualitative changes that influence structural shifts taking place in integrated countries. It is worth mentioning that it is still quite problematic to distinguish the influence of regional integration itself and deepening interaction between the countries due to the global integration development. A scientific inquiry by P. Lombaerde, G. Pietrangeli, C. Weeratunge (2008) that uses a number of indices that allow measuring the level of integration development at the level of regional groups, evaluating the role of every country in certain integration association based on its contribution, comparing processes of regional integration in different regions, etc., may be considered as a solution.

The evaluation of the development of regional economic integration requires various indices that allow analyzing the depth of integration relations between the countries that form integration association. B. Russet (2009) considers economic interaction to be one of the regional integration criteria which is manifested in intraregional trade that imposes direct effect for every member.

However, the most common in terms of assessing the level of integration interaction, determining the nature of the development of regional integration processes and their effectiveness, is the method of multidimensional evaluation, which involves the construction of appropriate comprehensive indicators. Scientific researches in this direction are aimed at developing an optimal integrated indicator, the structure of which most fully allows to provide a comprehensive assessment of the development of integration processes. In particular, De Lombaerde, Philippe & Dorrucci, Ettore & Genna, Gaspare & Mongelli, Francesco (2011), emphasizing the complex nature of the development of regional integration processes, the multi-vector nature of the changes, they are characterized, emphasize the need for continuous comprehensive monitoring to assess the system of indicators combined into

appropriate integral estimates. In this respect, they propose a Composite Integration Index, which is a relative assessment of the level of development of the integration association and is based on 8 sectoral indices.

In a study by C.-Y. Park, R. Claveria (2018) it is proposed to apply the method of multidimensional evaluation to analyze the multifaceted measurement of regional integration processes based on the calculation of multidimensional regional integration index (MDRII), which includes 6 components (Trade and investment, Money and finance integration, Regional value chain, Infrastructure and connectivity, Movement of people, Institutional and social integration), combining 26 indicators (including integrated indices), which the authors tested to assess the development of integration processes at the level of individual countries.

A comprehensive indicator that reflects the stages of development of the integration process (acquis communautaire, Single Market integration, Economic and Monetary Union, economic convergence) and is proposed to be used to assess the integration aspirations of EU countries, was developed by J. König (2017). In a research by Mursalova, Kh.N. (2019), the methodological aspects of the application of complex indicators to assess the effectiveness of integration associations are analyzed, while the author does not specify what such an indicator should be, what its structure and the features of the calculation are.

In a study by Makkonen, Teemu (2016), in terms of forming the structure of a comprehensive index to assess the level of regional integration is determined by the lack of existing indices, and therefore expediency of consideration the component that would reflect the development of science, technology and innovation (Science, Technology, and Innovation indicators), which are drivers of economic growth in the processes of integration interaction in particular.

In the work of Gor, Seth. (2017) an analysis of the integrated integration index for the African region is presented (African Regional Integration Index), which includes 16 indicators combined in 5 areas (trade integration, productive integration, free movement of people, financial and macroeconomic integration and regional infrastructure). Michaela Stanickova & Lukáš Melecký (2018) offer a composite weighted index of regional resilience to assess integration processes in EU regions. According to the authors, the most important factors to be taken into account in such an index are as follows: community links, human capital and sociodemographic structure, labour market, economic performance and innovation, science and research.

Comparative analysis of approaches to the structuring of integrated indices allows us to reach conclusion about the predominance of a functional approach in the systematization of components, which allows taking into account the specific stages of development of integration cooperation and areas of interaction.

This study proposes an approach to assessing the development of integration processes, taking into account the internal and external components of the impact. In order to build the integrated index of the potential for integration process development it is necessary to introduce certain notations. Let us assume that there is a population of integration associations $m$ and their level of development is characterized by the system of parameters (unique index). Let us set them as:

$Xi = (x_{i1}, x_{i2}, \ldots, x_{ij}, \ldots, x_{in})$, where

$i$ – index of integrated association being analyzed ($i = \overline{1, m}$),

$j$ – unique index which characterizes integration relations ($j = \overline{1, n}$).

Thus, $x_{ij}$ represents the value of $j$ index for integration association $i$.

When building integrated indices important methodical challenges are as follows: establishing the system of unique indices (parameters), which could provide suitable and comprehensive description of the stage of regional economic integration process development; choosing the form of integrated index itself, which will provide a generalized evaluation based on the system of unique indices built.

When addressing the first challenge, unique parameters may be seen as certain systematized indices that allow evaluating the depth of integration relations between the countries of the world. The systemization and classification of the system of unique indices prove that the level of integration processes development on the one hand is determined by intraregional factors that define scale, depth and specifics of integration relations development within existing regional integration associations characterized by the intraregional trade and its share in total external trade turnover, the share of high-tech export in total intraregional export, index of GDP per capita in integration association. On the other hand, it is determined by the influence of external factors that characterize the place and role of integration association in global processes (the share of integration association in the world trade turnover including high-tech export, investments, population, etc.). The choice of the above mentioned indices is based on the results of correlation-regression analysis. Its results are provided in Table 1.

**Table 1.** The results of correlation-regression analysis of intraregional trade development ($X_{intra}$) EU, NAFTA, ASEAN, APTA

**EU**

| Factors | Regression coefficient | Elasticity coefficient |
|---|---|---|
| GDP per capita, millions of U.S. dollars | 130.2647 | 1.305492 |
| ICT export, millions of U.S. dollars | 1.961292 | 0.152931 |
| Foreign Direct Investments, millions of U.S. dollars | -0.14551 | -0.277184 |
| Population, thousands | 29.04114 | 5.180026 |
| $R^2 = 0.9743$ | | |
| $X_{intra} = 130,26*GDP + 1,96*X_{ICT} - 0,15*FDI + 29,04*Pop - 1483424,58$ | | |

**NAFTA**

| Factors | Regression coefficient | Elasticity coefficient |
|---|---|---|
| GDP per capita, millions of U.S. dollars | 52.40168 | 2.119695 |
| ICT export, millions of U.S. dollars | 5.186308 | 0.560561 |
| Foreign Direct Investments, millions of U.S. dollars | -0.03817 | -0.16249 |
| Population, thousands | -6.20109 | -3.34038 |
| $R^2 = 0.9725$ | | |
| $X_{intra} = 52,4*GDP + 5,19*X_{ICT} – 0,04*FDI – 6,2*Pop + 1494523,34$ | | |

**ASEAN**

| Factors | Regression coefficient | Elasticity coefficient |
|---|---|---|
| GDP per capita, millions of U.S. dollars | 161.0476 | 1.82068 |
| ICT export, millions of U.S. dollars | 1.951287 | 0.492421 |
| Foreign Direct Investments, millions of U.S. dollars | -0.24749 | -0.76421 |
| Population, thousands | 0.035534 | 0.112483 |
| $R^2 = 9941$ | | |
| $X_{intra} = 161,05*GDP + 1,95*X_{ICT} – 0,25*FDI + 0,04*Pop - 117405,82$ | | |

**APTA**

| Factors | Regression coefficient | Elasticity coefficient |
|---|---|---|
| GDP per capita, millions of U.S. dollars | 79.12081 | 0.991164 |
| ICT export, millions of U.S. dollars | 3.253449 | 0.690553 |
| Foreign Direct Investments, millions of U.S. dollars | -0.04201 | -0.14778 |
| Population, thousands | -0.29826 | -5.20732 |
| $R^2 = 0.9948$ | | |
| $X_{intra} = 79,12*GDP + 3,25*X_{ICT} – 0,04*FDI – 0,3*Pop + 709704,6$ | | |

Calculations allowed setting the system of unique parameters that build the integrated index. To be able to compare all the unique parameters it is necessary to standardize them. This will allow combining them in the integrated index. Authors suggest calculating standardized evaluation using this formula:

$$P_{ij} = \frac{x_{ij} - x_{\min}}{x_{\max} - x_{\min}}$$

where:

$x_{ij}$ – the value of the unique index $j$ for integration association $i$,

$x_{min}$, $x_{max}$ respectively, minimum and maximum value of the unique index j.

The calculation of standardized evaluation using the above mentioned formula is carried out when the increased value of certain parameter leads to the increase of the integrated index itself (*incentive index*).

On the contrary, if the increase in the unique parameter leads to the decrease in the final integrated value (*disincentive index*), then the following formula should be used:

$$P_{ij} = \frac{x_{\max} - x_{ij}}{x_{\max} - x_{\min}}$$

It becomes clear that certain unique indices describing different aspects of integration relations do not equally affect its overall state. As a result, when building an integrated index of evaluation of potential for integration processes development it is necessary to define the value of every unique index mentioned above, i.e. coefficient of significance for $\alpha_{ij}$.

**Table 2.** Building the system of unique indices

| **Intraregional factors** | | **External factors** | |
|---|---|---|---|
| Intraregional trade (export) per capita, U.S. dollars | $X_{Intra}$ | The share of regional trade of an integration association in the world trade, % | $X_{Intra}S$ |
| The share of intraregional trade and its share in total external trade turnover, % | *ITS* | The share of investments of an integration association in world volume of investments, % | *FDIS* |
| The share of ICT in intraregional export, % | $X_{Intra\ ICT}$ | The share of GDP of integration association in world GDP, % | *GDPS* |
| Index of investments per capita, U.S. dollars | *FDI* | The share of population of integration association in population of the world, % | *PopS* |
| GDP of integration association per capita, U.S. dollars | *GDP* | The share of ICT export of integration association in the world export, % | $X_{ICT}S$ |

If talking about the challenge of choosing the form of integrated index it appears that different types of weighted average are widely used in scientific research while building an overall index: arithmetical average, geometric average, square root average and some others. According to the analysis of practical application of different types of average it is advisable to consider the index of geometric weighted average as a form of an index while building integrated indices, when monotonous increase in certain parameter leads to the improvement of its state and overall index of its state requires maximization. This index may be written as:

$$I_i = \prod_{j=1}^{n} (P_{ij})^{\alpha_j} \quad \text{where in} \quad \alpha_j \geq 0 \quad \text{i} \quad \sum_{j=1}^{n} \alpha_{ij} = 1 \quad .$$

The advisability of using this type of average to calculate the integrated index of integration processes development is proved by the provisions of axiomatic approach (monotonicity axiom, positive linear homogeneity, multiplicative axiom and identity axiom) described in the index theory by I. Fisher. Taking into account all of the above, the overall integrated index of the potential for integration process development should be:

$$IPD_{\text{i}} = \frac{I_{int_{\text{i}}} + I_{ext_{\text{i}}}}{2}$$

where:

- $IPD_i$ – overall integrated index of the potential for integration processes development;
- $I_{inti}$ – intraregional component of the potential for integration processes development;
- $I_{exti}$ – external component of the potential for integration processes development.

The subindex that characterizes the influence of an intraregional component of overall integrated index of integration processes development should be calculated as follows:

$$I_{\text{int}_i} = \sqrt[5]{P_{X\,\text{int}\,ra_i} \cdot P_{ITS_i} \cdot P_{X\,\text{int}\,ra\,ICT_i} \cdot P_{FDI_i} \cdot P_{GDP_i}}$$

The subindex that characterizes the influence of an external component on overall integrated index of integration processes development should be calculated as follows:

$$I_{ext_i} = \sqrt[5]{P_{X\,\text{int}\,raS_i} \cdot P_{PopS_i} \cdot P_{X\,ICT\,S_i} \cdot P_{FDIS_i} \cdot P_{GDPS_i}}$$

The algorithm of calculating the integrated index of the potential for integration processes development is described in Figure 1. The suggested index ranges from 0 to 1, its proximity to 1 shows significant potential for integration processes development.

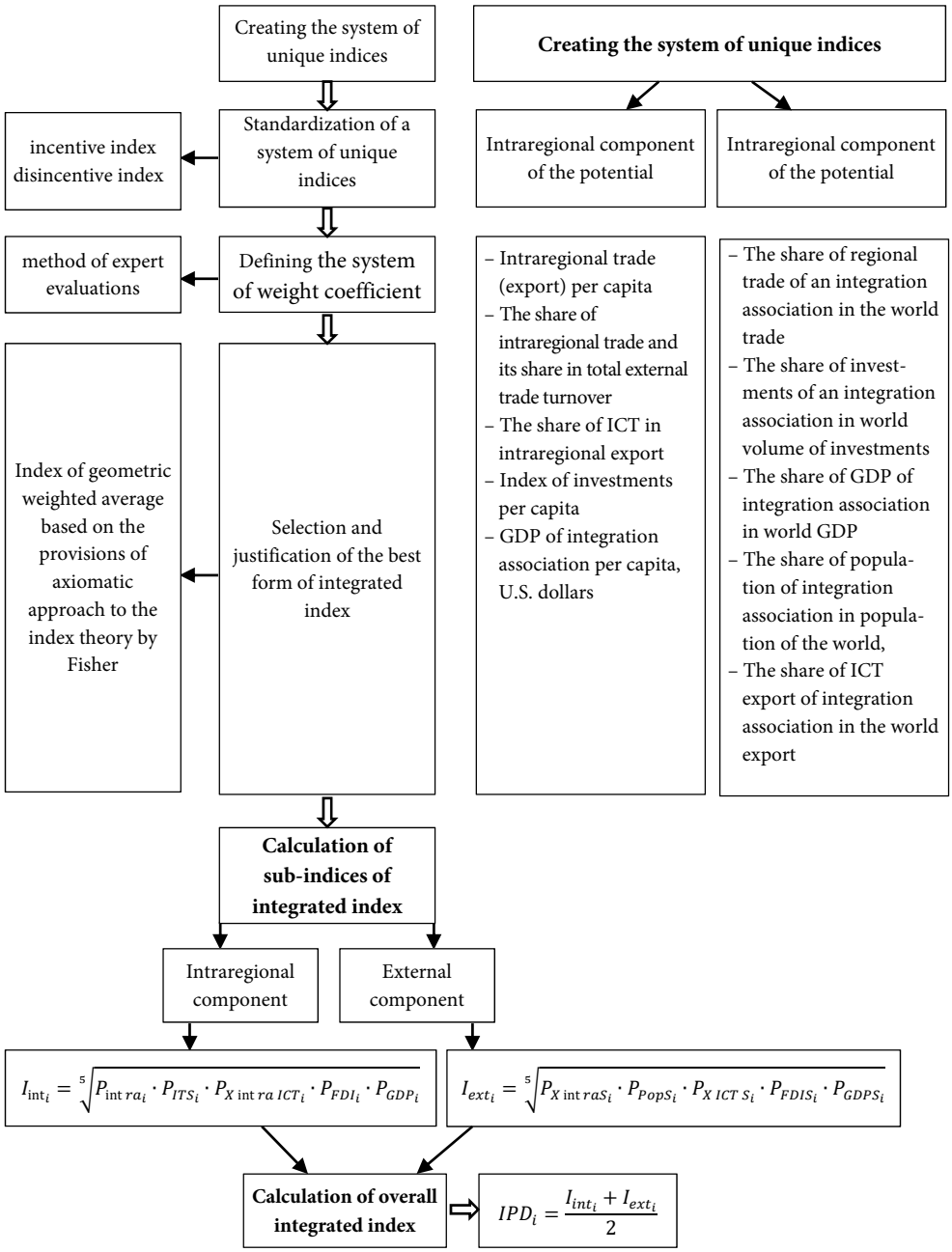


**Figure1.** The algorithm of building an integrated index of the potential for integration processes development

Using the integrated index for comprehensive comparative analysis of the potential for integration processes development allows taking into account the intensity of influence of many factors (both internal and external), which in its turn allows providing a comprehensive and quantitative description of economic integration processes that take place in the world economy under certain regional models.

## 3. Evaluation

Using the suggested method the authors calculate the integrated index of the potential for integration processes development for EU, NAFTA, ASEAN and APTA with regard to the intensity of the influence of factors that determine the intraregional component of the potential for development of integration processes as well as factors that allow evaluating the external component of the potential for integration processes development determined by the role of an integration association in the world economy.

UNCTAD database was used for calculations systematized in Tables 3-4. Integrated indices of the potential for integration processes development calculated are provided in Table 5 and in Figure 2.

**Table 3.** Dynamics of indices of intraregional component of the potential for integration processes

| Years | Indices of intraregional component of the potential for integration processes | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Intraregional trade index (export) per capita, U.S. dollars | | | | The share of intraregional trade in total external trade turnover , % | | | | The share of ICT in intraregional export, % | | | | Index of investments per capita, U.S. dollars | | | | GDP of integration association per capita, U.S. dollars | | | |
| | APTA | ASEAN | EU | NAFTA | APTA | ASEAN | EU | NAFTA | APTA | ASEAN | EU | NAFTA | APTA | ASEAN | EU | NAFTA | APTA | ASEAN | EU | NAFTA |
| 2000 | 15,0 | 186,5 | 3333,5 | 1647,2 | 8,0 | 22,9 | 67,7 | 55,8 | 5,1 | 23,5 | 67,4 | 44,5 | 101,6 | 490,7 | 4761,9 | 7783,4 | 915 | 1188 | 18274 | 28357 |
| 2001 | 15,6 | 161,3 | 3342,8 | 1509,6 | 8,5 | 22,3 | 67,3 | 55,1 | 6,1 | 22,6 | 70,2 | 44,8 | 110,4 | 486,4 | 4958,6 | 7239,1 | 948 | 1131 | 18446 | 28953 |
| 2002 | 19,3 | 170,2 | 3572,2 | 1464,9 | 9,2 | 22,7 | 67,5 | 56,1 | 7,9 | 22,8 | 71,7 | 45,0 | 120,4 | 528,7 | 5629,9 | 5842,3 | 1028 | 1251 | 20024 | 29586 |
| 2003 | 27,0 | 197,1 | 4294,2 | 1518,2 | 10,1 | 22,8 | 68,6 | 55,9 | 8,7 | 24,3 | 69,5 | 44,1 | 127,7 | 595,3 | 7218,4 | 7170,2 | 1153 | 1386 | 24271 | 30735 |
| 2004 | 37,6 | 243,8 | 5176,4 | 1711,5 | 10,7 | 23,7 | 68,5 | 56,1 | 9,3 | 23,4 | 69,1 | 46,7 | 143,2 | 674,3 | 8208,7 | 8020,0 | 1327 | 1542 | 27915 | 32613 |
| 2005 | 47,9 | 283,4 | 5533,3 | 1888,7 | 11,1 | 24,2 | 67,8 | 55,9 | 9,5 | 22,8 | 67,0 | 45,7 | 160,2 | 773,4 | 8789,0 | 8479,3 | 1535 | 1709 | 29069 | 34724 |
| 2006 | 57,3 | 325,4 | 6289,1 | 2042,8 | 10,9 | 24,0 | 68,1 | 53,9 | 9,0 | 21,8 | 72,0 | 45,3 | 180,8 | 978,3 | 11096,0 | 9686,1 | 1783 | 2021 | 30914 | 36678 |
| 2007 | 71,0 | 365,7 | 7289,8 | 2130,3 | 11,1 | 24,3 | 68,1 | 51,3 | 9,4 | 22,1 | 68,0 | 45,5 | 207,1 | 1284,7 | 14306,6 | 10966,7 | 2195 | 2383 | 35601 | 38221 |
| 2008 | 85,8 | 425,7 | 7921,9 | 2243,5 | 11,5 | 25,1 | 66,9 | 49,5 | 10,1 | 21,2 | 68,4 | 46,7 | 221,4 | 1339,3 | 12505,4 | 7504,8 | 2543 | 2733 | 38182 | 38704 |
| 2009 | 74,1 | 329,7 | 6043,4 | 1683,6 | 11,8 | 23,9 | 66,3 | 48,0 | 10,5 | 20,1 | 70,7 | 50,3 | 280,1 | 1513,4 | 13605,9 | 9210,2 | 2543 | 2733 | 38182 | 38704 |
| 2010 | 99,9 | 431,3 | 6606,0 | 2075,6 | 12,3 | 24,4 | 64,5 | 48,7 | 10,3 | 20,3 | 70,4 | 51,7 | 336,3 | 1920,2 | 13566,7 | 10404,3 | 3211 | 3318 | 33707 | 38542 |
| 2011 | 116,5 | 510,5 | 7634,2 | 2367,9 | 11,9 | 24,6 | 63,5 | 48,3 | 9,6 | 20,7 | 68,4 | 52,0 | 379,0 | 2105,2 | 13944,9 | 10193,9 | 3812 | 3806 | 36353 | 39993 |
| 2012 | 115,5 | 522,8 | 7051,0 | 2450,0 | 11,4 | 25,3 | 61,7 | 48,6 | 10,3 | 20,9 | 67,7 | 52,0 | 434,5 | 2437,3 | 15484,8 | 11339,3 | 4128 | 3981 | 34177 | 41134 |
| 2013 | 122,1 | 531,8 | 7351,6 | 2505,6 | 11,3 | 25,7 | 61,2 | 49,2 | 10,8 | 20,4 | 68,8 | 52,5 | 483,2 | 2603,7 | 16167,3 | 13541,8 | 4512 | 4062 | 35557 | 42201 |
| 2014 | 127,7 | 521,9 | 7532,6 | 2618,0 | 11,4 | 25,2 | 62,6 | 50,2 | 12,0 | 19,2 | 70,6 | 52,5 | 533,1 | 2822,2 | 16869,0 | 14518,1 | 4860 | 4049 | 36698 | 43383 |
| 2015 | 123,2 | 445,0 | 6558,6 | 2394,5 | 11,7 | 24,1 | 62,3 | 50,4 | 13,1 | 18,8 | 71,0 | 53,3 | 586,0 | 2875,9 | 17001,1 | 14597,6 | 5053 | 3891 | 32272 | 43660 |
| 2016 | 114,5 | 420,5 | 6633,4 | 2288,4 | 11,7 | 23,4 | 63,4 | 50,3 | 12,9 | 19,0 | 70,2 | 53,2 | 640,7 | 2980,0 | 16861,8 | 16509,7 | 5121 | 4036 | 32405 | 44079 |
| 2017 | 130,1 | 471,2 | 7241,5 | 2428,9 | 12,2 | 23,2 | 63,2 | 50,1 | 14,6 | 18,7 | 70,6 | 52,0 | 714,9 | 3501,7 | 19828,3 | 19204,8 | 5582 | 4297 | 33941 | 45793 |
| 2018 | 144,1 | 521,4 | 7965,9 | 2569,4 | 12,5 | 23,6 | 63,6 | 49,4 | 14,6 | 22,9 | 71,9 | 53,8 | 761,9 | 3640,6 | 19682,2 | 17921,7 | 6116 | 4543 | 36553 | 47856 |

**Table 4.** Dynamics of indices of external component of the potential for integration processes

| Years | Indices of external component of the potential for integration processes | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | The share of integration association in the world trade, % | | | | The share of GDP of integration association in world GDP,% | | | | The share of investments of an integration association in world volume of investments, % | | | | The share of population of integration association in population of the world, % | | | | The share of ICT export of integration association in the world export, % | | | |
| | APTA | ASEAN | EU | NAFTA | APTA | ASEAN | EU | NAFTA | APTA | ASEAN | EU | NAFTA | APTA | ASEAN | EU | NAFTA | APTA | ASEAN | EU | NAFTA |
| 2000 | 7,4 | 6,7 | 38,0 | 19,0 | 6,9 | 1,9 | 26,5 | 35,0 | 3,5 | 3,5 | 31,5 | 43,8 | 41,5 | 8,5 | 7,9 | 6,8 | 10,4 | 17,0 | 27,3 | 21,2 |
| 2001 | 7,6 | 6,2 | 40,0 | 18,5 | 7,3 | 1,8 | 27,0 | 36,3 | 3,8 | 3,5 | 32,5 | 40,7 | 41,4 | 8,6 | 7,9 | 6,7 | 11,3 | 16,7 | 29,2 | 20,2 |
| 2002 | 8,4 | 6,3 | 40,7 | 17,0 | 7,7 | 1,9 | 28,2 | 36,1 | 4,3 | 3,9 | 37,7 | 33,8 | 41,4 | 8,6 | 7,8 | 6,7 | 14,8 | 16,8 | 27,8 | 17,3 |
| 2003 | 9,3 | 6,3 | 41,6 | 15,3 | 7,8 | 1,9 | 30,6 | 33,7 | 3,7 | 3,6 | 38,9 | 33,6 | 41,3 | 8,6 | 7,7 | 6,7 | 18,4 | 16,5 | 26,0 | 15,4 |
| 2004 | 10,2 | 6,2 | 40,9 | 14,3 | 8,0 | 1,9 | 31,4 | 32,1 | 3,6 | 3,5 | 38,5 | 32,9 | 41,3 | 8,6 | 7,7 | 6,7 | 21,4 | 16,0 | 25,8 | 14,1 |
| 2005 | 11,1 | 6,3 | 38,8 | 14,1 | 8,7 | 2,0 | 30,3 | 31,9 | 3,8 | 3,8 | 38,2 | 32,4 | 41,2 | 8,6 | 7,6 | 6,7 | 24,5 | 11,6 | 26,9 | 13,9 |
| 2006 | 11,9 | 6,3 | 37,9 | 13,7 | 9,4 | 2,2 | 29,9 | 31,4 | 3,5 | 3,9 | 39,3 | 30,4 | 41,1 | 8,6 | 7,5 | 6,7 | 25,7 | 11,3 | 27,3 | 13,5 |
| 2007 | 12,6 | 6,2 | 38,2 | 13,1 | 10,4 | 2,4 | 30,6 | 29,3 | 3,2 | 4,1 | 39,9 | 27,3 | 41,0 | 8,6 | 7,5 | 6,7 | 28,7 | 14,6 | 22,7 | 12,6 |
| 2008 | 12,8 | 6,1 | 36,8 | 12,6 | 11,1 | 2,5 | 30,0 | 27,4 | 4,1 | 5,2 | 41,8 | 22,5 | 40,9 | 8,6 | 7,4 | 6,6 | 29,8 | 13,6 | 22,4 | 12,7 |
| 2009 | 14,0 | 6,5 | 36,7 | 12,8 | 12,4 | 2,6 | 28,3 | 27,8 | 4,5 | 5,0 | 38,8 | 23,8 | 40,8 | 8,6 | 7,3 | 6,6 | 31,5 | 14,5 | 19,8 | 12,4 |
| 2010 | 15,0 | 6,9 | 33,9 | 12,8 | 13,7 | 3,0 | 25,7 | 26,8 | 4,8 | 5,8 | 34,7 | 24,3 | 40,7 | 8,6 | 7,3 | 6,6 | 32,7 | 14,6 | 18,6 | 11,9 |
| 2011 | 15,3 | 6,8 | 33,2 | 12,5 | 14,8 | 3,1 | 25,0 | 25,3 | 5,3 | 6,2 | 34,7 | 23,3 | 40,6 | 8,6 | 7,2 | 6,6 | 33,8 | 13,8 | 18,4 | 11,6 |
| 2012 | 15,9 | 6,8 | 31,4 | 12,8 | 15,8 | 3,2 | 23,1 | 25,7 | 5,5 | 6,5 | 34,5 | 23,4 | 40,4 | 8,6 | 7,1 | 6,6 | 35,1 | 14,0 | 15,9 | 11,4 |
| 2013 | 16,5 | 6,7 | 32,1 | 12,8 | 16,9 | 3,2 | 23,4 | 25,9 | 5,7 | 6,5 | 33,3 | 26,0 | 40,3 | 8,6 | 7,1 | 6,6 | 37,2 | 14,4 | 15,3 | 11,0 |
| 2014 | 17,3 | 6,8 | 32,4 | 13,1 | 18,0 | 3,2 | 23,6 | 26,2 | 6,0 | 6,8 | 33,2 | 26,8 | 40,2 | 8,6 | 7,0 | 6,6 | 36,4 | 14,6 | 15,3 | 10,9 |
| 2015 | 18,8 | 7,0 | 32,6 | 13,9 | 19,9 | 3,3 | 22,0 | 28,1 | 6,6 | 6,9 | 33,0 | 26,8 | 40,0 | 8,6 | 6,9 | 6,5 | 37,1 | 14,9 | 14,0 | 10,9 |
| 2016 | 18,2 | 7,1 | 33,5 | 13,8 | 20,1 | 3,4 | 21,8 | 28,2 | 6,8 | 6,8 | 30,6 | 28,4 | 39,9 | 8,6 | 6,9 | 6,5 | 35,2 | 15,1 | 14,4 | 10,9 |
| 2017 | 18,0 | 7,4 | 33,3 | 13,4 | 20,7 | 3,4 | 21,5 | 27,8 | 6,6 | 6,9 | 31,2 | 28,8 | 39,8 | 8,6 | 6,8 | 6,5 | 35,5 | 15,3 | 14,0 | 10,3 |
| 2018 | 17,9 | 7,4 | 33,3 | 13,2 | 21,6 | 3,5 | 21,9 | 27,6 | 7,1 | 7,4 | 31,3 | 27,4 | 39,6 | 8,6 | 6,7 | 6,5 | 38,0 | 12,2 | 14,5 | 10,0 |

**Table 5.** Integrated indices of the potential for integration processes development calculated

| Years | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Intraregional component of the potential for development of integration processes** | | | | | | | | | | | | | | | | | | | |
| APTA | 0,0641 | 0,0669 | 0,0878 | 0,1073 | 0,1177 | 0,1487 | 0,1487 | 0,1419 | 0,1487 | 0,1477 | 0,1487 | 0,1487 | 0,1496 | 0,1514 | 0,1526 | 0,1457 | 0,1446 | 0,1493 | 0,1569 |
| ASEAN | 0,2277 | 0,2224 | 0,2264 | 0,2215 | 0,2228 | 0,1977 | 0,1920 | 0,2265 | 0,2262 | 0,2287 | 0,2335 | 0,2268 | 0,2382 | 0,2449 | 0,2498 | 0,2439 | 0,2405 | 0,2388 | 0,2297 |
| EU | 0,6002 | 0,6130 | 0,6722 | 0,7013 | 0,7141 | 0,7104 | 0,7113 | 0,7283 | 0,7386 | 0,7386 | 0,7166 | 0,7232 | 0,7072 | 0,7097 | 0,7105 | 0,6881 | 0,6871 | 0,6883 | 0,6931 |
| NAFTA | 0,6687 | 0,6499 | 0,6373 | 0,6248 | 0,6144 | 0,6192 | 0,5883 | 0,5597 | 0,5300 | 0,5450 | 0,5712 | 0,5632 | 0,5772 | 0,5978 | 0,6022 | 0,6059 | 0,6197 | 0,6129 | 0,5898 |
| **External component of the potential for integration processes development** | | | | | | | | | | | | | | | | | | | |
| APTA | 0,1874 | 0,1948 | 0,2026 | 0,2711 | 0,3434 | 0,3897 | 0,4092 | 0,4387 | 0,4494 | 0,4715 | 0,4986 | 0,5182 | 0,5357 | 0,5487 | 0,5607 | 0,5775 | 0,5681 | 0,5734 | 0,5797 |
| ASEAN | 0,0790 | 0,0644 | 0,0393 | 0,0305 | 0,0425 | 0,0108 | 0,0133 | 0,0400 | 0,0270 | 0,0356 | 0,0429 | 0,0365 | 0,0398 | 0,0428 | 0,0454 | 0,0441 | 0,0449 | 0,0528 | 0,0300 |
| EU | 0,6498 | 0,6626 | 0,7095 | 0,7338 | 0,7467 | 0,7410 | 0,7404 | 0,6791 | 0,6656 | 0,6243 | 0,6007 | 0,6022 | 0,5558 | 0,5491 | 0,5513 | 0,5129 | 0,5177 | 0,5183 | 0,5255 |
| NAFTA | 0,5566 | 0,5218 | 0,4260 | 0,3598 | 0,3535 | 0,3919 | 0,3748 | 0,3158 | 0,2800 | 0,3018 | 0,3217 | 0,3141 | 0,3214 | 0,3388 | 0,3448 | 0,3490 | 0,3677 | 0,3622 | 0,3504 |
| **Overall integral index of the potential for integration processes development** | | | | | | | | | | | | | | | | | | | |
| APTA | 0,1257 | 0,1309 | 0,1452 | 0,1892 | 0,2306 | 0,2692 | 0,2790 | 0,2903 | 0,2990 | 0,3096 | 0,3237 | 0,3335 | 0,3427 | 0,3500 | 0,3567 | 0,3616 | 0,3563 | 0,3614 | 0,3683 |
| ASEAN | 0,1534 | 0,1434 | 0,1328 | 0,1260 | 0,1326 | 0,1043 | 0,1026 | 0,1333 | 0,1266 | 0,1322 | 0,1382 | 0,1317 | 0,1390 | 0,1439 | 0,1476 | 0,1440 | 0,1427 | 0,1458 | 0,1298 |
| EU | 0,6250 | 0,6378 | 0,6909 | 0,7175 | 0,7304 | 0,7257 | 0,7259 | 0,7037 | 0,7021 | 0,6815 | 0,6587 | 0,6627 | 0,6315 | 0,6294 | 0,6309 | 0,6005 | 0,6024 | 0,6033 | 0,6093 |
| NAFTA | 0,6126 | 0,5859 | 0,5316 | 0,4923 | 0,4839 | 0,5055 | 0,4816 | 0,4377 | 0,4050 | 0,4234 | 0,4465 | 0,4387 | 0,4493 | 0,4683 | 0,4735 | 0,4774 | 0,4937 | 0,4876 | 0,4701 |

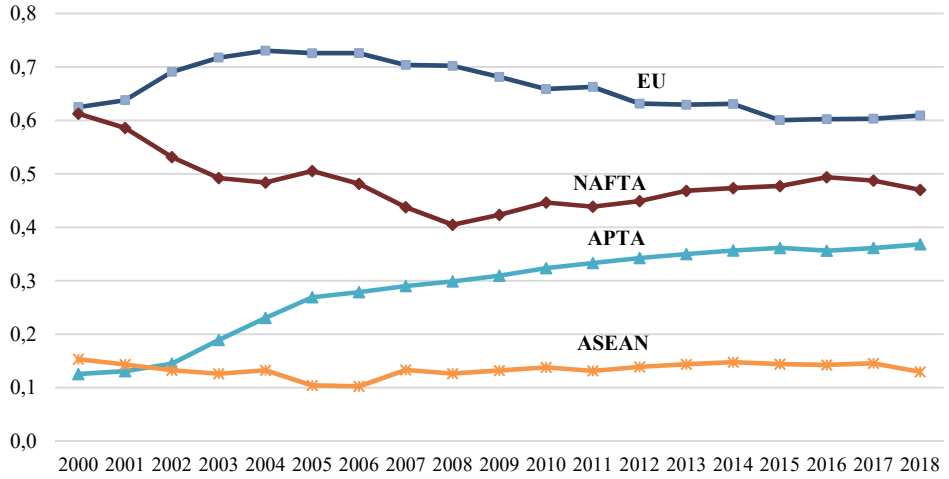


**Figure 2.** Dynamics of integrated index of potential for integration processes

Despite the obvious fact that the existing trend in integration cooperation development loses its ground, the EU, compared to other organizations, is still an association with the highest rate of the potential for development. Starting from 2007, the intraregional factors determined the nature of changes in integration cooperation inside the association. There is a tendency of decreasing sub-indices of both internal and external components, although the changes take place with a different rate. In particular, the decrease in the external component outpaces a similar decrease in the internal component. Thus, the index of the external component decreased by 29% (in 2018 compared to 2006 with top value of indices), while the internal one increased by 3.6%.

NAFTA is characterized by a relatively high level of potential for integration development, which, unlike the EU, is characterized by somewhat different laws of the change of the integral index. Thus, during the period of 2000-2008, there was a decrease in the level of development of integration processes, the integral indicator decreased by 34.7%, from 0.613 in 2000 to 0.405 in 2008, which is the lowest value of the potential of integration cooperation. In the period 2008-2018, there is an increase in the level of the integrated indicator, which increased by 16.1%, but is lower by 23.3% compared to the level of 2000.

So far, ASEAN is characterized by a low potential of the development of integration processes, which mostly consist of the indices of the intraregional component, whose value stays the same from 2000 until 2018 (0.23-0.25). At the same time, there are no significant changes in the dynamics of the integrated indicator. It is worth noting the

decrease in the level of development potential of integration processes (for 2000-2018, a decrease of 15.3%).

APTA is characterized by the most intensive and accelerated growth rate of the potential for the integration processes development (the integrated index increased 2.93 times from 0.126 in 2000 to 0.368 in 2018). The development of integration processes APTA is associated with the most rapid growth of the external component of development, the integral value of which became 3.1 times higher, reaching the level of 0.58 in 2018, which is the maximum value of the external component of the development of the potential of integration processes in the analyzed associations.

## 4. Conclusion

In order to evaluate the potential for the integration processes development, it is advisable to apply integral indicators as they allow providing a comprehensive and quantitative description of processes of economic integration that take place in the world economy at a certain moment of time.

Today, there is no single model of a regional trade agreement, so in most cases each country or integration association applies an integrated approach to exploiting the possibilities of integration agreements regarding access to new markets, expansion of investment opportunities, reduction of transaction costs, establishment of unified technical norms and requirements, protection of intellectual property, establishment of a unified competitive policy, transparency of the mechanism of state regulation. Such an integrated approach as a whole contributes to the deepening of integration cooperation with partner countries and creation of predictable political conditions that influence the development of trade and economic cooperation with all regions within the framework of certain economic space between states, and thus the expansion of continental and transcontinental integration cooperation.

The greatest impact on the development of regionalization of the world economy with further building of the world's global space will be imposed by deepening and expansion of the most developed models of regional integration, which have already existed the world economy - European, North American and Asian-Pacific models. Involvement of other countries in this process, on a regional, continental or transcontinental basis, through the creation of free trade areas and other forms of "soft" integration will contribute to the deepening of the development of "new regionalism" and the emergence of totally new integrational entities that will no longer be of regional but of transcontinental nature, which corresponds to the level of international meta-regions in the world economy. Countries of the world choose their own strategy for participation in the processes of regional integration, depending on challenges determined by their level of socio-economic development, the existing potential, the

nature of the development of external relations, etc. Considering the integration component of the strategy of further development of the countries of the world, it is necessary to pay attention to two aspects: first, to the features and lines of deepening the integration cooperation right inside the existing integration association; second is to define the lines of the integration policy towards other countries involved in the cooperation under continental and transcontinental models.

The study of further development of continental and transcontinental models of regional integration is a logical extension of the analysis of models of international economic integration development, which encompasses not only trade and economic, but also other spheres (first of all, an industrial one). At the same time, existing fair restrictions objectify further study of the development of transcontinental integration just in terms of the implementation of trade and economic cooperation, as deeper forms of integration will face institutional constraints.

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