Asesorías y Tutorías para la Investigación Científica en la Educación Puig-Salabarría S.C.
José María Pino Suárez 400-2 esq a Lerdo de Tejada. Toluca, Estado de México. 7223898475
RFC: ATI120618V12

Revista Dilemas Contemporáneos: Educación, Política y Valores.
http://www.dilemascontemporaneoseducacionpoliticayvalores.com/
Año: VI Número: Edición Especial Artículo no.:7 Período: Diciembre 2018.

TÍTULO: Metodología de interacción entre los índices de desarrollo del entorno humano y social.

AUTORES:

1. Vladimir A. Morozov.

2. Zukhra R. Ziganshina.

RESUMEN: La salud física y espiritual son valores perdurables y vitales que se encuentran en la parte superior de la jerarquía de necesidades, las que tienen gran impacto en la calidad de los recursos laborales, la productividad laboral, la producción del producto nacional del país y la riqueza nacional de los estados. El artículo incluye el uso de métodos de cognición tanto empíricos como teóricos y se propone reflejar el nivel y la calidad de vida de la población en el entorno público. Se presenta la formalización funcional de grupos de indicadores de salud pública por niveles de compatibilidad, y las estadísticas sobre grupos de indicadores caracterizan la calidad de vida de la población y se construyen en una jerarquía del grupo espiritual y psicológico.

PALABRAS CLAVES: metodología, índices, interacción humana, entorno social, compatibilidad**.**

TITLE: Methodology of interaction between the human and social environment development indices

AUTHORS:

1. Vladimir A. Morozov.

2. Zukhra R. Ziganshina.

ABSTRACT: Physical and spiritual health are enduring and vital values that are at the top of the hierarchy of needs, which have a great impact on the quality of labor resources, labor productivity, production of the country's national product and national wealth of the states. The article includes the use of both empirical and theoretical cognition methods and aims to reflect the level and quality of life of the population in the public environment. The functional formalization of groups of public health indicators by levels of compatibility is presented, and the statistics on groups of indicators characterize the quality of life of the population and are constructed in a hierarchy of the spiritual and psychological group.

KEY WORDS: methodology, indices, human interaction, social environment, compatibility.

INTRODUCTION.

Currently, the following concepts are associated with lifestyle: “a way of life”, “standard of living”, “quality of life”, “lifestyle”. In essence, this is an extensive sphere of indicators of consumption of quantifiable material and spiritual values.

Many indices form an international assessment of human development and the environment, including: human development index; index of economic freedom; index of human happiness, etc.

The interrelations and mutual influence of many characteristics on the dynamics of the social environment and the development of each person therein are important. To do this, it is necessary to find the compatibility of a set of assessments, through their grouping, classification and hierarchy, which will allow not only externally on the numbers, but also internally implementing their interaction based on values. This will make it possible to elaborate a common vector of

development of a particular region, to rally the efforts of people in preserving nature and the entire civilization.

The section “Methodology” gives an idea of the cyclical model of the development of society [Lane J. E., Ersson S., 2000], which is presented in the form of seven subsystems of society, where each consists of the basis of many real organizations of a given orientation.

Organization, as a structural unit of a model, is represented by a processor of social development. On the basis of this model, the formation of groups of characteristics takes place, which make it possible to describe the state of vital activity of the regions and territories simultaneously from financial and economic, social, political, cultural-worldview and spiritual-cognitive points of view.

The interaction of indicators and characteristics of groups allows building a classifier of the participation of each indicator and its influence on their overall compatibility in assessing the quality of both the human and public environment development. To do this, one should improve the type of economy and the form of state power; to modernize the nature of the political regime and monitor the manifestation of the characteristics of socio-cultural policy; observe the principle of interethnic relations and the general harmony of this dynamic.

DEVELOPMENT.

Methods.

This research involves a combination of empirical and theoretical methods of knowledge with an emphasis on system modeling of various processes and their characteristics.

To identify the sources and causes of stagnation and degradation of individual regions, it is necessary to analyze the entire system of diverse relationships, determining the compatibility and incompatibility of process and results. In our case, a comparison of indicating indices of the human and environment development should be carried out on the basis of a cyclical model of development and renewal of society (Morozov, Vladimir, 2014).

A multi-level structural model of interaction between the types of territory (state) economy is formed based on this model (Fig. 1).

Vertically indicated are inter-level, or rather, multifunctional types of economy (institutional, systemic, informational, evolutionary, green, health economics, micro, meso, macro, mega, nano economics; market, state, traditional, mixed economy) only about 20 types of economies.

The main purpose of the model structure levels is: (7) - the formation of integration knowledge; (6) - globalization and analysis of universal values; (5) - a combination of the values of religious structures; (4) - a combination of ideological formats of behavior; (3) - the development of social institutions; (2) - development of financial and economic institutions; and (1) - the use of products of production and asset enterprises.

For a quantitative description of the interaction of factors of public health of the population (Szn), using the fundamentals of the compatibility theory (Morozov Vladimir, 2014), economics of interaction (Morozov, Vladimir, 2017) using mathematical methods in sociology and the general theory of systems (Sociology and society: global challenges and regional development [Electronic resource]: Materials of the IV Regular All-Russian Sociological Congress, 2012), seven main levels are distinguished in order of their hierarchy from a person to his values, from the standard of living (the first three levels of compatibility) to the quality of life (4–7 levels of compatibility): product and material (1); financial and economic (2); social (3); political (4); religious and theological (5); cultural and ideological (6); scientific and spiritual (cognitive) (7).

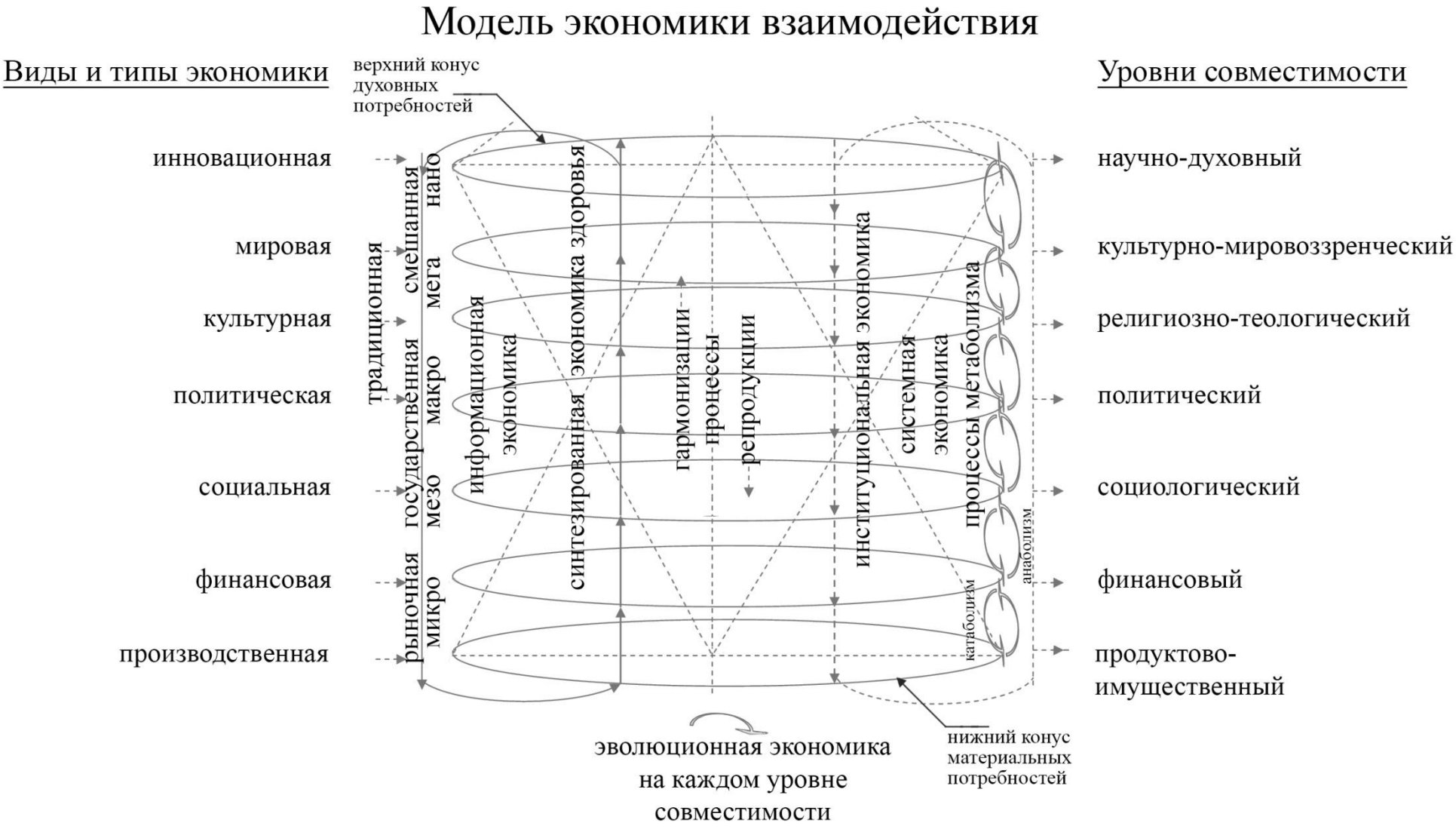
It is important to note, that the importance of indicators, i.e. the subordination or subordinance of the characteristics starts from level 1 (bottom) to 7. Level 7 is the main (according to the Venn scheme) in the compatibility of indicators. Here, we may talk of the synergistic effect of the functioning of the system, since the correct combination of seven levels of compatibility leads

them, when interacting, to an additional quality, since the communication channel of one level enhances the effect of other levels.

During the study of economic phenomena and processes, the positive and regulatory analysis is used. Accordingly, a positive and regulatory economics is distinguished. If positive economic studies phenomena as they are, then regulatory economics assumes the existence of value judgments.

To assess the compatibility of a number of regions, a reference area was selected and a weight function of the relative factors of public health was compiled. This allowed us to connect two different societies. The optimal form of this function can be selected using mathematical modeling. In our case, the normalization method was used. Mathematical modeling can be performed using the Monte Carlo method. If one needs to analyze the evolution of the system in time, then the fourth-order Runge-Kutta method can be applied.

The structural model of the economy of interaction.



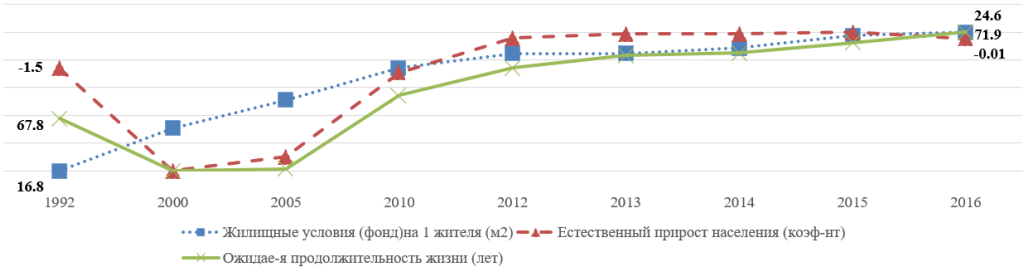
модель экономики взаимодействия	*interaction economy model*
виды и типы экономики	*types and types of economy*
верхний конус духовных потребностей	*upper cone of spiritual needs*
инновационная	*innovative*
мировая	*world*
культурная	*cultural*
политическая	*political*
социальная	*social*
финансовая	*financial*
производственная	*production*
традиционная	*traditional*
рыночная	*market*
государственная	*state*
смешанная	*mixed*
микро	*micro*
мезо	*mezo*
макро	*macro*
мега	*mega*
нано	*nano*
информационная экономика	*information economy*
синтезированная экономика здоровья	*synthesized health economics*
процессы гармонизации	*harmonization processes*
процессы репродукции	*reproduction processes*
институциональная экономика	*institutional economy*
системная экономика	*system economy*
процессы метаболизма	*metabolic processes*
эволюционная экономика на каждом уровне совместимости	*evolutionary economics at every level of compatibility*
нижний конус материальных потребностей	*lower cone of material needs*
уровни совместимости	*compatibility levels*
научно-духовный	*scientific and spiritual*
культурно-мировоззренческий	*cultural and ideological*
религиозно-теологический	*religious and theological*
политический	*political*
социологический	*sociological*
финансовый	*financial*
продуктово-имущественный	*product and material*

Results and Discussion.

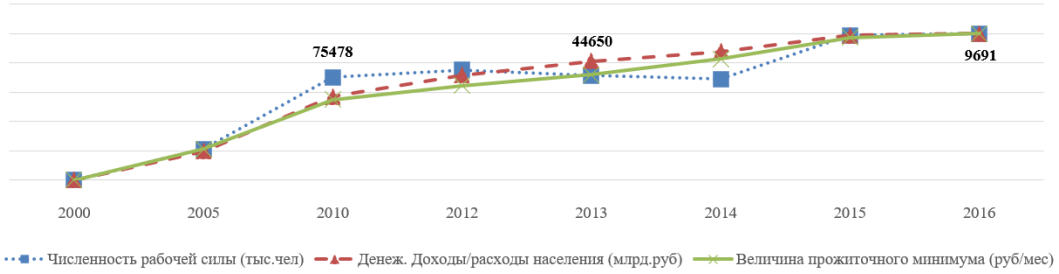
If we choose three key characteristics for each level of compatibility (Figure 1), which, depending on the goals, may be refined, the picture “level – quality” of the life of the population of the territories can be presented as a simplified example in the following composition of indicators.

Characteristics of public health factors (in terms of compatibility levels) reflecting the level and quality of life:

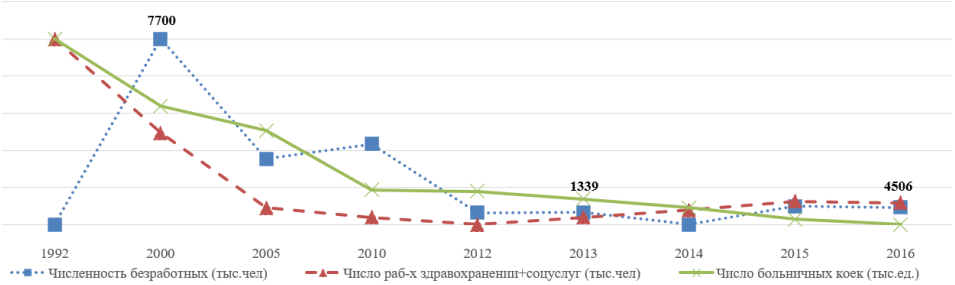
1
- v_1 – living conditions and consumption of basic food products
- v_2 – natural population growth
- v_3 – life expectancy from birth to death



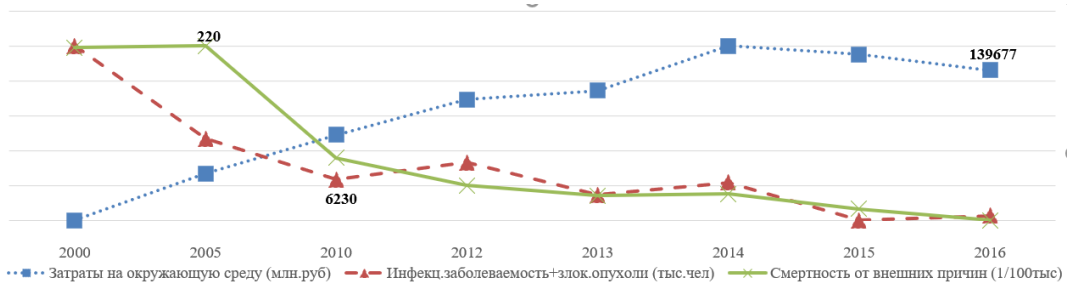
2
- d_1 – economically active and inactive population in terms of age
- d_2 – cash incomes and expenditures of population
- d_3 – the subsistence minimum



3
- c_1 – the number of employed and unemployed (economic activity of the population)
- c_2 – the number of employees in health care
- c_3 - the number of hospitals (beds) of sanatorium-resort organizations, pharmacies, dispensaries and orphanages



4
- k_1 - expenditures for environmental protection
- k_2 - incidence of infectious diseases and malignant neoplasms
- k_3 - mortality from external causes

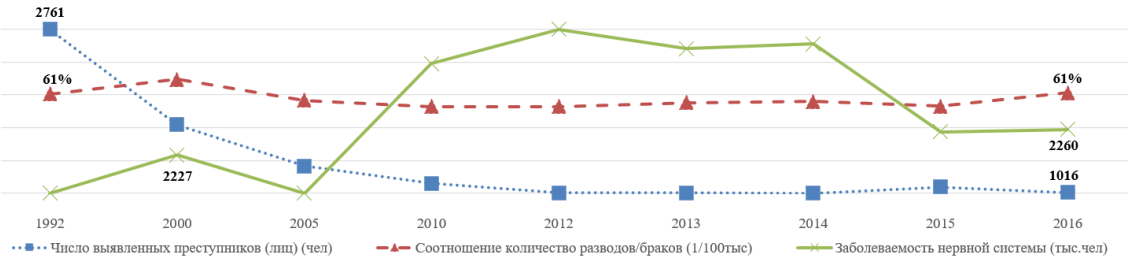


5

m_1 – the number of registered robberies and murders

m_2 – the number of marriages, divorces and abortions

m_3 - incidence of the nervous disorders (including alcoholism and drug addiction)

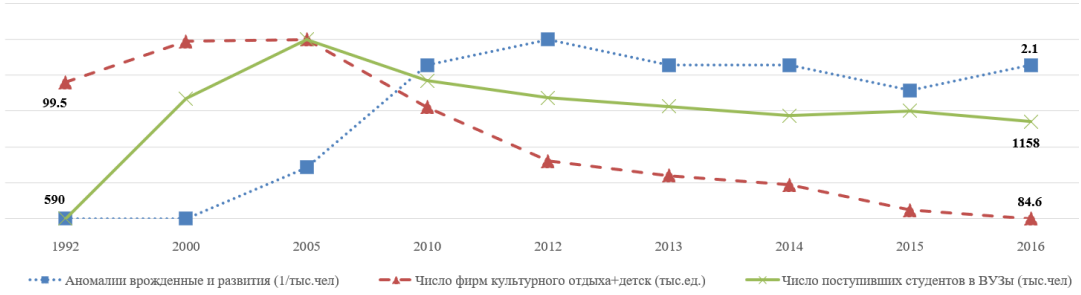


6

t_1 – congenital and development abnormalities

t_2 – the number of cultural organizations, tourist centers, children's health institutions, sports facilities

t_3 – adult literacy rate, number of enrolled students

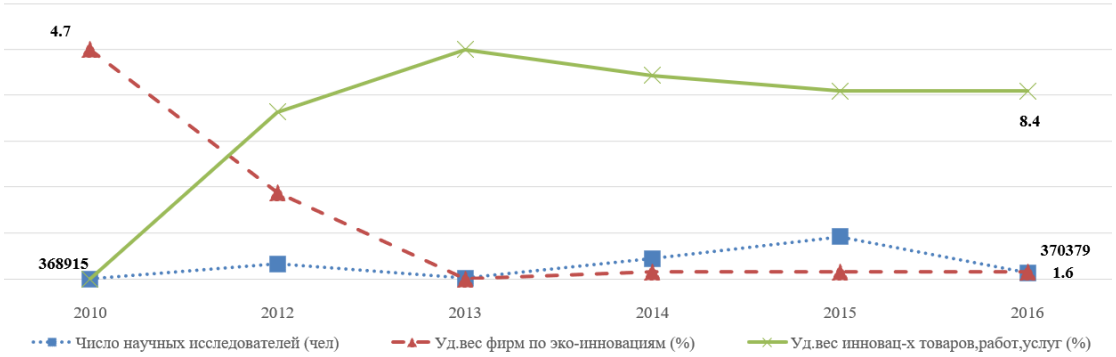


7

i_1 – number of employees engaged in research and development

i_2 – the proportion of firms for eco-innovation

i_3 – the proportion of innovative products, works and services in the general volume



The functional formalization of groups of indicators of public health may look as follows (according to compatibility levels):

$$S_{\text{zn}} = \text{F}(V_p; D_{\min}; C_m; K_3; M_{id}; T_D; I_m \ ,$$

Vp — (level 1) natural consumption and provision of the average life expectancy of the population;

Dmin — (level 2) economic and financial support of the subsistence minimum;

Cm — (level 3) provision of the employed able-bodied population and provision of children and retired with the socio-economic infrastructure;

K3 — (level 4) institutional-legal and material state support to and provision of social strata of the population along with the maintenance of public safety;

Mid — (level 5) the moral and spiritual movement of religious and cultural organizations in the recovery of people from moral abnormalities (murder, robbery, divorce, abandoned children, abortions);

TD — (level 6) mass cultural movement and training in the integration and globalization of interethnic values of the quality of life of people;

Im — (level 7) improvement of the environment and the person himself through the implementation of scientific discoveries and increase of the range and share of innovative products.

One may describe the interaction of public health factors (Szn). It is represented by conditional formalization in the form of a combination of socio-spiritual characteristics ($F_{кж}$), reflecting the quality of life, and socio-economic ($F_{уж}$), reflecting the standard of living:

$$S_{zn} = \frac{F_{кж}}{F_{уж}};$$

where $F_{кж}$ and $F_{ужс}$ are functionally expressed as:

$$F_{ужс} = \sqrt{(C_V V_p(v_1, v_2, v_3, ...))^2 + (C_D D_{\min}(d_1, d_2, d_3, ...))^2 + (C_C C_m(c_1, c_2, c_3, ...))^2 + (\frac{1}{2} C_K k_3(k_1, k_2, k_3, ...))^2};$$

$$F_{кж} = \sqrt{(\frac{1}{2} C_K k_3(k_1, k_2, k_3, ...))^2 + (C_M M_{id}(m_1, m_2, m_3, ...))^2 + (C_T T_D(t_1, t_2, t_3, ...))^2 + (C_I I_m(i_1, i_2, i_3, ...))^2};$$

C_I, C_T, C_M, C_K, C_C, C_D, C_V — the share of the influence of factors of public health;

$C_I<C_T<C_M<C_K<C_C<C_D<C_V$ — a condition for the functioning of a spiritually democratic society.

$S_{zm} = 1$ — balanced compatibility;

$S_{zm}< 1$ — incompatibility, intellectual and spiritual degradation of society;

$S_{zm}>\infty$ — developmental compatibility, spiritual and cognitive development of society.

If the number indicators seems to be much, then for closer interdependence of economies, the levels of compatibility and compactness of inter-level economies can form compact groups, including the main (objective-objective) and auxiliary (significantly affecting) indicators, respectively groups: 1 - financial and economic indicators which significantly affect social development (levels 1 and 2); 2 - socio-economic indicators that determine the prospects and strategy of social development of communities (social groups, nations and ethnic groups, levels 2–3); 3 - socio-political indicators, centralizing and mobilizing (motivational-coercive) social communities (levels 3–4); 4 - cultural and social indicators that determine the desired traditions, moral codes and scenarios of the ethics of the development of society (levels 5–6); 5 - innovative and production indicators reflecting the renewed quality of consumed products (level 7 of the first cycle and level 1 of the next cycle).

Here, we should say about the synergistic effect. Perhaps the term “cooperative effect” is closer to the economy. That is, this effect is achieved by the interaction of a group of factors and is much stronger than the sum (synthesis) of effects. The synergy effect (cooperation) is sometimes conditionally denoted by the formula "1+1=3". We apply a consistently parallel model, including the various mechanisms (economics), we need for continuous development of the subject and

transforming it into the required directions and stages, on the way to achieving the goals set and solving related tasks.

We previously reviewed examples of groups (3 conditional) of public health factors and their characteristics by seven levels of compatibility. It is worth noting that all factors (Morozov, Vladimir, 2014) must be taken per capita. For most parameters, this leads to the need for normalization to the population of the object under consideration; for example, factor v_1 does not require such normalization.

To assess compatibility for a number of regions, it is necessary to select a reference area, the compatibility level of which is known (for example) from third-party studies. Let us introduce relative factors (indicators) of public health of the population of the territory under consideration relative to the reference one. So, for example, the first factor v_2 will correspond to the relative factor v_2:

$$v2 = \frac{v2_{local} / N_{local}}{v2_{etalon} / N_{etalon}},$$

where v2local is the natural population growth in the studied region, Nlocal is the total population of the territory, v2etalon is the natural population growth in the reference area, Netalon is the total population of the reference area.

The negative factors (indicators) of health require individual consideration; for example, m2 - the number of marriages and divorces, abortions. In this case, the relative factor must be calculated as follows:

$$m2 = \frac{1 - m2_{local} / N_{local}}{1 - m2_{etalon} / N_{etalon}},$$

where v2local is the number of marriages and divorces, abortions in the studied region, Nlocal is the total population of the territory, m2etalon is the number of marriages and divorces, abortions in the reference area, Nlocal — is the total population of the reference area. Thus, instead of absolute

health factors, we consider relative factors calculated on the basis of data from a reference territory. We can calculate the effectiveness (developmental compatibility) using the following expression:

$$S_{local} = \frac{1}{\sqrt{7}} \sqrt{\begin{array}{l} z1(c_{v1}v1 + c_{v2}v2 + c_{v3}v3)^2 + z2(c_{d1}d1 + c_{d2}d2 + c_{d3}d3)^2 + \\ + z3(c_{c1}c1 + c_{c2}c2 + c_{c3}c3)^2 + z4(c_{k1}k1 + c_{k2}k2 + c_{k3}k3)^2 + \\ + z5(c_{k1}k1 + c_{k2}k2 + c_{k3}k3)^2 + z6(c_{m1}m1 + c_{m2}m2 + c_{m3}m3)^2 + \\ + z7(c_{i1}i1 + c_{i2}i2 + c_{i3}i3)^2 \end{array}} \cdot S_{etalon} .$$

This expression allows us to calculate the effectiveness (development compatibility) of the Slocal territory based on a comparison with the health factors of the model territory and its compatibility Setalon. The coefficients cv1, cv2, cv3, cd1 are weights that must be carefully determined. They are subject to certain restrictions: within one level, the sum of the weight coefficients should be 1: cv1+cv2+cv3=1, cd1+cd2+cd3=1, cc1+cc2+cc3=1, etc. This requirement is consistent with the fact that all compatibility levels have the same contribution to the definition of system compatibility; for example, it is impossible to create a system with developmental compatibility only at the expense of a part of compatibility levels (for example, the first 4: product and material, financial, social and political, while the remaining 3 levels are stagnant).

The weighting factor determines the contribution of a particular public health factor to the compatibility of the system. Each coefficient can be within certain limits, and the specific value for the calculation must be determined from the conditions of consideration of a particular region; for example, cm1= 0.4÷0.5, cm2=0.3÷0.4 cm3=0.1÷0.3, which indicates the greater importance of the factors cm1 and cm2.

The values of the coefficients are determined from social and statistical studies on the impact of certain factors of public health on the development of society. Clarification of factors is subject to expert evaluation.

The coefficients z1, ..., z6 consider the main significance of the level and are necessary to take into account the specific features of the studied territory; for example, historical or natural. In most cases, they are equal to one. As described earlier, the numerical values of Slocal correspond to the following processes: Slocal = 1; Slocal <1; Slocal> 1.

In summary, a very convenient and efficient method for calculating the compatibility of the development of a system based on a reference region has been proposed. After a punctual study of the object, determining all its health factors and specifying weighting factors, we can calculate the compatibility of development for the studied region. Moreover, a more careful consideration of the factors of public health and further study of the influence of public health factors v1, v2, v3, d1, ..., i2, i3 on the developmental compatibility may help us determine their necessary and sufficient numerical values to ensure compatibility S=1. Thus, it will be possible to refuse to consider the reference region and determine the compatibility of the development of the socio-political subject as such without consideration of third-party structures and the involvement of third-party research.

As a result, the methodology described allows us to comprehensively, and most importantly, effectively from all points of view of human and society's development, in dynamics, assess compatibility - the effectiveness of the object's development (from the organization for the whole society inclusive) based on the accounting and adjustments of the subject's economic, as well as social, political, cultural and innovative mechanisms. The priorities of the types of the economy included in this structure were determined (Fig. 1).

CONCLUSIONS.

An important aspect in reaching effective interaction between the types of economies is a coordinated policy of targets and conditions (value approach) in the federal-regional programs, plans, financial and economic requirements and stimulants.

The interaction of the structures of the national economy must be constantly recurring in the self-organizing principles of action. The main condition is to formulate plans and programs for the development of the national economy starting from the upper levels of compatibility.

Acknowledgements.

The work is performed according to the Russian Government Program of Competitive Growth of Kazan Federal University.

BIBLIOGRAPHIC REFERENCES.

1. Lane J. – E., Ersson S. (2000). The New Institutional Politics: Performance and Outcomes. London and N.Y. Routledge.
2. Morozov, Vladimir (2014). «Exploring Compatibility \ foundations of a theory» (Quickstone Publishing UK, England).
3. Morozov, Vladimir (2017). Interaction: an Interdisciplinary Perspective. Foundations of a Teory of Compatibility continued: Exploring Compatibility.
4. Sociology and society: global challenges and regional development [Electronic resource]: Materials of the IV Regular All-Russian Sociological Congress. Section IV. Mathematical modeling and data analysis in sociology. / ROS, IP RAS, Academy of Sciences of the Republic of Belarus, ISPPI. - M.: ROS, 2012. - CD ROM.

DATA OF THE AUTHORS.

1. Vladimir A. Morozov. Lomonosov Moscow State University, Faculty of Economics (Moscow, Russia). Email: mva55.00@mail.ru

2. Zukhra R. Ziganshina. Kazan Federal University, Institute of Management, Economics and Finance. Email: zr_ziganshina@mail.ru

RECIBIDO: 6 de noviembre del 2018. **APROBADO**: 17 de noviembre del 2018.