Methodology for the assessment
of socio-economic conflictogenity of society

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Abstract. The article presents the definition of socio-economic conflictogenity of society and the methodology for the assessment of its dynamics in the country or in any particular region based on the set of objective and subjective signs of public conflictogenity. As follows from the results of the calculations made by the given method, socio-economic conflictogenity of society had been increasing until 1998. In 1994–1999 the level of conflictogenity was in a precritical zone. The highest level of conflictogenity with its values reaching the critical area was observed in 1998, when along with other problems of the transition period Russian society had to face an economic crisis. In general, socio-economic conflictogenity of society has been on a downward trend since 2000. However, some increase in conflictogenity was observed in 2005, 2009 and 2015, due to salary arrears and, consequently, high protest activity of the population in 2005, impact of the global financial crisis in 2009, and international sanctions imposed on Russia in 2015.

Keywords: socio-economic conflictogenity, assessment, integral indicator, level.

Introduction

The diagnostics of tension in society requires the use of specific tools. The academic literature presents methodologies for the assessment of social tension that differ in approaches to understanding social tensions as well as to identifying main determinants. Methods based on the results of public opinion polls are most frequently applied for studying social problems, implying the use of multiple indices and their aggregate indicators. The available methods for measuring social tension are oriented to be primarily used within organizations, large and small social groups; many of them are aimed at measuring social feeling, social well-being on the basis of psychological tests. Methods that are well-known in Russian sociology are based on survey results. They comprise methods for calculating "well-being coefficient" (P. D. Chornobay [13]), for measuring social feeling among the youth (Ye. V. Davydova

[2]); for assessing the level of tension (Yu. M. Plyusnin [6], D. A. Shmonin [14]); "multi-indicator" method for measuring social tension in communities of socio-territorial type (I. Pirogov [5]), etc.

It should be noted, however, that the application of survey methods solely makes it difficult to make forecasts and to develop preventive measures. There are known methods for the assessment of social tension on the basis of statistical data (A. Davydov, R. Popov and A. Susarov, S. Pereslegin, A. Shvakov and Yu. Shvakova [4, 7]). The use of statistical data allows for identifying trends of increasing social tension, but these data are accessible to users with a certain time delay.

P. A. Sorokin proposed to examine society integrally from the perspective of objective socio-cultural systems, as well as with regard to a subjective factor, the inner world of an individual [8], applying a range of methods (empirical, rationalistic, intuitive). Taking into account that the human personality is formed under the influence of many factors of socio-cultural environment, the human behaviour should be also examined considering a multitude of interacting factors. This is especially true in the context of globalization of society, accompanied by the growing complexity of socio-economic relationships [3] with the formation of new leverages over political and social forces. The owners of natural and financial resources gain greater global leverage. The assessment of socio-economic tensions in society acquires the utmost importance, as, on the one hand, social tension is inextricably linked with the economic constituent and, on the other, the state of the country's economy depends heavily on the social stability of society.

Socio-economic conflictogenity of society

Socio-economic conflictogenity of society comprises the total of social, socio-psychological and economic tensions and responses of the society to them, which under certain conditions lead to the intensification of conflicts. It reflects a turbulent and potentially dangerous state of relations in social and economic spheres, social and economic differences within large social groups and in society at large.

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Socio-economic conflictogenity of society is intensified due to the destabilization of the situation in the country, the shortage of goods and products, legal insecurity, low incomes, change in the national mindset, reappraisal of values, etc. The role of networking cooperation is enhancing; the velocity of social changes is increasing. Objective, virtual and subjective realities are coexisting in the information society. Social and economic systems become increasingly unstable.

The diagnostics of socio-economic conflictogenity of society makes it possible to identify the negative phenomena and processes in the socio-economic sphere as well as the response to them, to establish hazardous levels of socio-economic tension in society.

The signs of conflictogenity are described by the system of indicators of different levels. At first, every sign is described by particular indicators. Concurrently each of the signs can be reflected by more than one indicator. For example, criminality can be characterized by such indicators as the number of crimes, the number of persons involved in crimes, the number of crime victims, etc. All these indicators describe one phenomenon and, in fact, one objective sign of conflictogenity (criminality), which reflects the contradiction between the criminal underworld and the bulk of the population. Similarly, the emotional reaction of the population is characterized by particular indicators in the form of the assessments of public moods, current life situation, the degree of satisfaction with personal life, personal protest potential, confidence in the future, etc.

The procedure for constructing aggregate, complex indicators and the integral indicator is defined in the methodology for the diagnostics of the dynamics of socio-economic conflictogenity of society.

Methodology for the diagnostics of the dynamics of socio-economic conflictogenity of society

This methodology is designed to determine time variations of the level of socio-economic tension in the country or in a particular region, of the socio-economic

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response of the population and the business community. The diagnostics of the dynamics of socio-economic conflictogenity is performed according to the following algorithm:

1. *Detection of signs of socio-economic conflictogenity*

The signs of conflictogenity (types of socio-economic tensions) are identified on the basis of public opinion polls conducted under one and the same programme over the period under review (monitorings). The population survey reveals i signs of socio-economic conflictogenity, which are systematically organized into three groups according to the constituents of conflictogenity:

1) objective signs of conflictogenity (s_{1i}) – signs of objective reality that evoke negative emotions in the significant part of the population over the time period under review $(t = 1, 2, ..., T)$;

2) signs of virtual conflictogenity (s_{2i}) – population assessments of the phenomena and processes of virtual reality that form negative public reaction;

3) signs of subjective reality (s_{3i}) – subjective emotional and behavioural public response to objective and virtual realities, including the following:

- signs of the emotional reaction of the population, i.e. signs of the negative emotional and mental reaction of the population to tensions existing in society and physiological consequences of such reaction;

- signs of the behavioural reaction of population, i.e. signs of the behavioural response of the population and the business community aimed at reducing socio-economic tension in the society.

The signs of subjective conflictogenity are divided into two groups, as both emotional and behavioral public responses are the issues of distinct interest. Moreover, there are significant discrepancies in the public response and, as a consequence, in the initial information and the technique for constructing the indicators of conflictogenity.

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2. *Identification of quantity indicators characterizing the signs of conflictogenity*

Numerical values of indicators characterizing various signs of conflictogenity are identified on the basis of the official statistics and the results of public opinion polls in accordance with the type of conflictogenity feature.

Quantitative values of the indicators s_{1i} reflecting the objective signs of conflictogenity over *t* years in the period under review are defined on the basis of the state statistical data. The values of indicators for virtual and subjective conflictogenity (s_{2i} и s_{3i}) by *t* years in the period under review are set according to the monitoring data obtained from public opinion polls. The indicators of the virtual and emotional responses of the population represent the share of the population with a negative image of reality and a negative emotional response. The indicators of the behavioural public response comprise the behavioural reaction of the population and the business community. The behavioural response of the business community is characterized by the indicators of official statistics, while the behavioural response of the population is defined by the indicators formed on the basis of sociological polls.

3. *Normalization of values of the indicators characterizing the signs of conflictogenity*

The analyzed indicators have different units of measurement and varying degree of variation, therefore, in order to make a generalized characteristic of the conflictogenity it is necessary to construct aggregate indicators of conflictogenity. For this purpose, they need to be converted into a comparable form using normalization. The normalization is made for average levels or mean-square deviation of each indicator over years of the period under review, with the deviation being established from the average level of the indicator in the period under review or mean-square deviation:

$$\hat{s}_{jiv}^{t} = \frac{s_{jiv}^{t}}{\bar{s}_{jiv}}, \qquad\qquad \hat{s}_{vij}^{t} = \frac{s_{jiv}^{t}}{\sigma_{jiv}},)$$

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where s_{jiv}^t, $\hat{s}_{jiv}^t$ – observed and standardized values of v indicator of i sign of j group, characterizing conflictogenity in t time period;

$\bar{s}_{jiv}$ – average value of v indicator of i sign of j group, characterizing conflictogenity over the whole period under review;

σ_{jiv} – average mean-square deviation of v indicator of i sign of j group, characterizing variability of the sign of conflictogenity in the period under review;

$t = 1, 2, \dots, T$ – years of the period under review;

$v = 1, 2, \dots, V$ – number of indicators reflecting i sign of conflictogenity;

$i = 1, 2, \dots, n$ – number of conflictogenity signs;

$j = 1, 2, \dots, 3$ – groups of signs of objective, virtual and subjective conflictogenity.

However, linear z-transformation of the initial data is reasonable in case of a significant variation of the signs:

$$z_{jiv}^t = \frac{s_{jiv}^t - \bar{s}_{jiv}}{\sigma_{jiv}}.$$

Mean correction that allows for setting zero of coordinate system is needed to dispose of minus numbers:

$$k_{jiv}^t = \frac{z_{jiv}^t + A}{2A},$$

where z_{jiv}^t, k_{jiv}^t – observed and standardized values of v indicator of i sign of j group, characterizing public conflictogenity in t year;

A – constant for assigning positive values to standardized variables.

Transformation of time series (normalization and mean correction) allows for obtaining standardized values of each indicator by t years of the period under review.

4. *Construction of aggregate indicators for each sign*

As the signs of conflictogenity are often reflected by more than one indicator, the average standardized value for indicators of i sign shall be determined:

$$K_{ji}^t = \frac{1}{V} \sum_{v=1}^V k_{jiv}^t,$$

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where K_{ji}^t – value of the aggregate indicator of i sign of conflictogenity of j group of signs in t year. The aggregate indicator takes on the values from 0 to 1;

k_{jiv}^t – standardized value of v indicator of i sign of j group of signs, characterizing conflictogenity in t year;

$v = 1, 2, \ldots, V$ – number of indicators reflecting i sign of conflictogenity.

5. *Assessment of the quality of aggregate indicators for each sign*

The quality of aggregate indicators is assessed based on correlation coefficients of the analysed indicators characterizing i sign and an aggregate indicator. The aggregate indicator shall not integrate indicators with a negative correlation coefficient. Additionally, indicators with low values of the correlation coefficient require special attention.

6. *The formation of complex indicators of j group of conflictogenity signs.*

The overall assessment for the group of signs allows for obtaining the complex indicator of conflictogenity, which generalizes the set of signs in each of j groups of socio-economic conflictogenity of society.

The complex indicators of the signs of socio-economic conflictogenity in j group are determined as the average value of aggregate indicators for i signs in each t year:

complex indicator of objective signs of conflictogenity

$$K_1^t = \frac{1}{g} \sum_{i=1}^{g} K_{1i}^t;$$

complex indicator of virtual conflictogenity

$$K_2^t = \frac{1}{f-g} \sum_{i=g+1}^{f} K_{2i}^t;$$

complex indicator of subjective conflictogenity

$$K_3^t = \frac{1}{m-f} \sum_{i=f+1}^{m} K_{3i}^t;$$

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where K_1^t, K_2^t, K_3^t – values of complex indicators corresponding to objective ($j = 1$), virtual ($j = 2$), subjective ($j = 3$) signs of socio-economic conflictogenity of society in t year. Complex indicators K_1^t, K_2^t, K_3^t take on the values from 0 to 1;

K_{1i}^t – value of the aggregate indicator of the *objective i* sign of conflictogenity ($i = 1, ..., g$) in t year;

K_{2i}^t – value of the aggregate indicator of the virtual i sign of conflictogenity ($i = g + 1, ..., f$) in t year;

K_{3i}^t – value of the aggregate indicator of the subjective i sign of conflictogenity ($i = f + 1, ..., m$) in t year. It is defined as an average indicator of the emotional response of the population and the behavioural response of society;

$i = 1, ..., m$ – total amount of signs of conflictogenity;

$t = 1, ..., T$ – years of the period under review.

7. *Assessment of the quality of complex indicators for groups of conflictogenity signs*

The quality of complex indicators of conflictogenity is assessed similarly to the quality assessment of aggregate indicators, i.e. by the coefficient of correlation of the complex indicator and aggregate indicators. The complex indicator shall not generalize aggregates having inverse or weak correlation.

8. *Construction of the integral integrator of socio-economic conflictogenity of society*

The integral integrator of conflictogenity in t year is determined on the basis of complex indicators of conflictogenity in the same year:

$$I^t = \frac{1}{3}(K_1^t + K_2^t + K_3^t),$$

where I^t – values of the integral integrator of conflictogenity in t year;

K_1^t, K_2^t, K_3^t – values of complex indicators corresponding to objective, virtual, subjective signs of socio-economic conflictogenity of society in t year.

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The integral indicator of conflictogenity can take on the values from 0 to 1. Based on the lookback analysis of the conflictogenic situation in the country in the analysed range it is possible to allocate three levels: 1) from 0 to 0.3 – relatively calm zone; 2) from 0.3 to 0.7 – zone of significant conflictogenity; 3) from 0.7 to 1.0 – critical zone. In modern conditions, considering the effect of the means of network information impact on the growth rate of public tension, it is reasonable to divide the critical zone into two parts. In this case, the limits of the allocated zones are set as follows: 1) from 0 to 0.3 – relatively calm zone; 2) from 0.3 to 0.6 – zone of significant conflictogenity; 3) from 0.6 to 0.7 – precritical zone; 4) from 0.7 to 1.0 – critical zone of the level of the integral integrator of socio-economic conflictogenity of society. The introduction of the precritical zone of socio-economic conflictogenity is required for taking urgent actions, making administrative decisions constraining the rate of increase and reducing socio-economic conflictogenity of society.

The diagnostics of socio-economic conflictogenity of society allows for obtaining values of complex indicators and the integral indicator of conflictogenity in the country or in a particular region over the years of the period under review.

Conclusion

The testing of the given methodology has been made on the statistical data [12] and sociological polls data [1, 9, 10, 11]. The integral indicator of socio-economic conflictogenity has been constructed as a result. The dynamics of the integrator is presented in *figure 1*. As follows from the graph, socio-economic conflictogenity of society had been increasing until 1998. In 1994–1999 the level of conflictogenity was in a precritical zone ($I = 0.6 - 0.7$). The highest level of socio-economic conflictogenity with its values reaching the critical area was observed in 1998, when along with other problems of the transition period Russian society had to face an economic crisis, which also had a significant impact in the first half of 1999. In the following six months the level of public tension started to decrease. Additionally, some increase of public conflictogenity was observed in 2005 and 2015. The intensification of

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socio-economic conflictogenity of society was caused by salary arrears and, consequently, high protest activity of the population, by impact of the global financial crisis in 2009, and international sanctions imposed on Russia in 2015. In general, socio-economic conflictogenity of society has been on a downward trend since 2000.
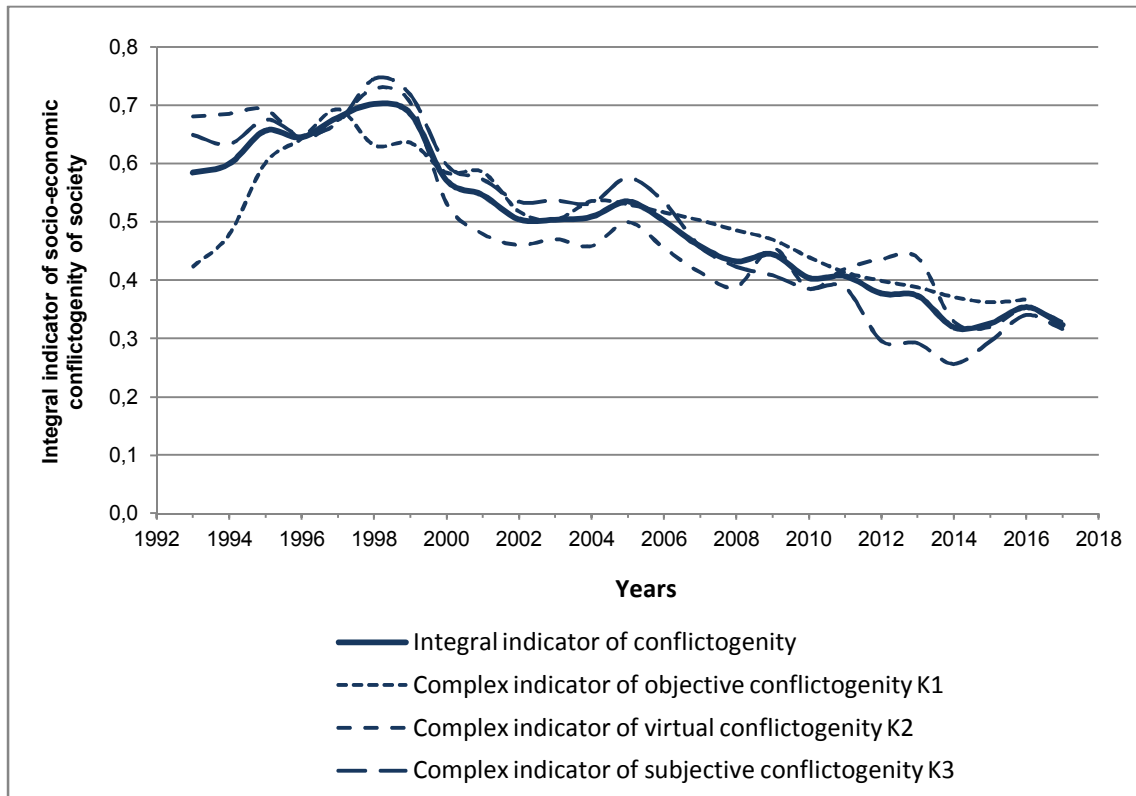

Figure 1 – Dynamics of the integral indicator of public conflictogenity

The dynamics of complex indicators K_1, K_2 и K_3 is presented in the same graph, which also shows that the integral indicator reflects the dynamics of objective and virtual conflictogenity, as well as the dynamics of public response (subjective conflictogenity). The integral indicator of socio-economic conflictogenity of society depends for 97% on subjective conflictogenity (correlation index $R = 0.98$), for 89% on virtual conflictogenity ($R = 0.94$), and for 80% on objective conflictogenity ($R = 0.90$). Concurrently, in almost all years up to 2006 the public response (subjective conflictogenity) was, in general, more intensive.

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