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**SCIENTIFIC AND METHODOLOGICAL  
APPROACHES AND INTEGRATED ASSESSMENT  
OF ECONOMIC SECURITY IN UKRAINE****A. MUZICHENKO<sup>1</sup>**<sup>1</sup>Pavlo Tychyna Uman State Pedagogical University**Keywords:**

economic security, threats, factor analysis, integrated assessment, security level, impact of factors, security measures.

**ABSTRACT**

This article offers the scientific and methodological approaches to integrated assessment of economic security on the basis of the indicators each of which reflects some aspects of the national security and establishment of the basic economic trends. The article is focused on the indicators of integrated assessment of the country's economic security that include the use of multiplicative form of integral index, standardization of the indicators, verification of the threshold values and weighting coefficients with the purpose of determining of the integral indices of economic security; the approbation by assessment of the economic security level in Ukraine has been performed.

**Statement of the problem.** The economic security of the country is an important component of the national security, but at the same time, it is a complex tenuously closed system that possesses its own structure, internal logic continuously changing under the influence of the internal and external factors, and this determines the relevancy and the need to improve the methodology of the integrated assessment of the country's economic security for the purpose of ensuring the appropriate identification of the disrupting factors and enabling the prompt response.

The analysis of the currently available formal approaches to integrated assessment of the country's economic security reveals a number of flaws that restrict the possibility of their usage and require an improvement of the methodological approaches. These flaws relate to both the composition of indicators, the difficulty in practical use due to their great variety, lack of statistical information, maladjustment to the current economic situation (change of the development strategy resulting from the military aggression in the east of the country, loss of markets and some industrial facilities, adaptation of a number of branches of industry to the war, demographic changes etc.) and integrated evaluation methodology yielding incorrect results of the integrated assessment.

The **purpose** of the article is to determine and monitor the threshold and optimal values of the indicators, identify the major threats, development of the program measures ensuring an acceptable level of economic security of the country in terms of its components.

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In order to enable the public authorities to make informed decisions, it is necessary to monitor the indicators (criteria) of economic security that primarily provide the actual monitoring, analysis and forecasting of the major groups of economic indicators.

**Review of the literature sources.** It is worth mentioning the following domestic and foreign authors whose works are devoted to these issues: V.M. Heyets, B.V. Gubsky, B.M. Danylyshyn, G.Y. Darnopykh, M. M. Yermoshenko, V. Cable, L. Kisterskiy, O.Y. Kononenko, E.D. Kormyshkyna, V.O. Kosevtsov, A.S. Lysetskiy, V.I. Muntiyan, E.A. Oleinikov, M.A. Pavlovskiy, G. Pasternak-Taranushenko, A.V. Stepanenko, A.I. Sukhorukov, A.M. Fedorysheva, L.G. Cherniuk, S. Shenfield.

Research of the literature sources suggest a contradiction about many theoretical and methodological aspects that require theoretical substantiation and development of a number of new categories, criteria and indicators that would make it possible to describe and analyze the basic trends of economic security and of the measures necessary to ensure it. It is the combination of the theoretical principles and concepts with practical activities that can generate a reliable mechanism ensuring the economic security.

Development of methodological guidance on the integrated assessment of the economic security is a scientific basis for setting specific goals of socio-economic policy in quantitative form; formation of the strategies (energetic, economic, social, environmental) for the future development; predicting the outcome of the intended measures.

The methods of assessing the national security enumerate the main indicators of its condition, their threshold values as well as determine the algorithm. It is based on a comprehensive analysis of indicators of economic security with the discovery of potential threats to economic security in Ukraine, and has to be used by the main executive authorities for the general integrated assessment of the economic security of Ukraine in the economy and specific branches of industry.

Research institutes or other institutions may determine the level of economic security within their authority in order to make managerial decisions on the analysis, avoidance and prevention of the existing and potential threats to the national interests in the relevant areas.

The defined indicators actually reflect the dynamic changes occurring in any process or characteristic, especially in case of monitoring the effectiveness of activities; the degree of sensitivity to changes; clear definition of positive or negative bias.

There are a number of criteria that can be used in the selection of the indicators for the integrated assessment of economic security. These criteria can be separated in groups according to the 10 main components of economic security (Table. 1, 2).

Table 1

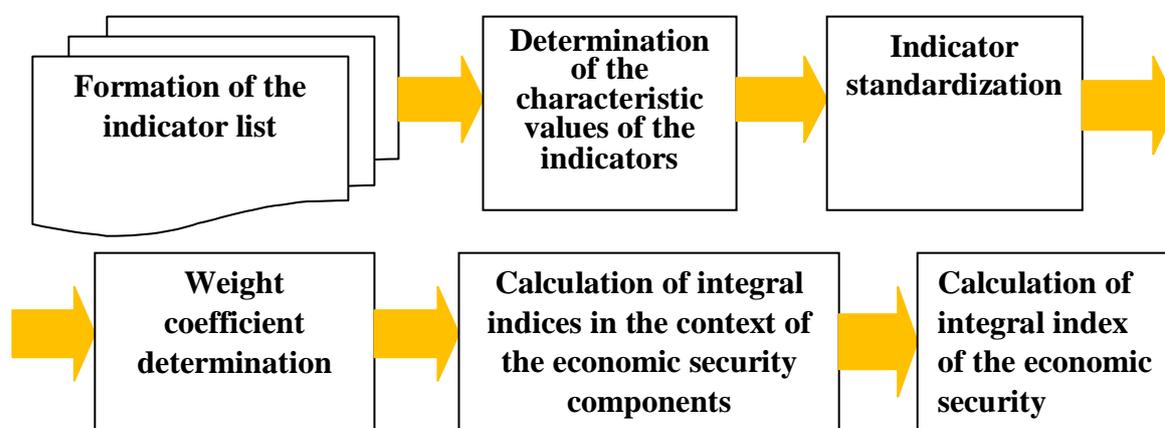
### The components of the economic security of the country

Components	Outcome
1. Economic security	resistance to internal and external threats, competitive advantages in the world economy ensuring the ability of the national economy to continue growth and sustainable development
2. Production security	effective usage, update and expansion of the existing production capacities in the country, facilitation of innovations in the production and fostering the competitive abilities of the national economy
3. Demographic security	development of the country with consideration of the collective generalized interests of the country, society and individuals according to the constitutional rights of the citizens of Ukraine
4. Energetic security	effective usage of the country's energy resources, availability of the sufficient number of energy producers and suppliers in the energy market, availability, differentiation and environmental safety of the energy resources
5. External economic security	minimization of the losses of the country resulting from the negative external economic factors and ensuring favorable conditions for economic growth due to an active integration of the economy into the world labor distribution
6. Innovational and investment security	encouragement of the domestic and foreign investors to invest the funds into the expansion of production in the country, promotion of the high-tech production, integration of the research and production sector with the purpose of increased efficiency, broadening of the national economy specialization by developing the products with a high percentage of added value
7. Macroeconomic security	balancing of the macroeconomic proportions
8. Food security	satisfying the need of each member of society in the quality food, reasonably priced and balanced nutrition
9. Social security	securing the decent and quality living standards of the population irrespective of the age, sex, income, facilitation of development of the human capital assets as the most important component of the economic potential of the country
10. Financial security	creating the conditions for stable social and economic development of the country, maintenance the country's resistance to financial shocks and distress, facilitation of the conditions for sustained integrity and consistency of the country's financial system

Calculation of integral indices in the context of the given subindexes (components of economic security) is based on the assessment of the certain indicators obtained from the statistical data as well as the respondents data received from the survey.

It should be noted that the division of indicators into the 10 components is rather tentative. Being specific indicators, some indicators, however, may reflect different aspects of sustainability.

The procedure of integrated assessment of economic security is depicted on Fig. 1.



**Fig. 1** - Scheme of the procedure of economic security integrated assessment

Source: author development.

The list of indicators is completed according to the principle of representation, that is, selection of the most important parameters influencing the country's economic security, reliability (reflect the relevant condition of the security component) and information accessibility (official statistics and public expert assessments are used during the calculation).

The set of indicators generated by means of correlation coefficients should be checked for the degree of density of the statistical links between their numerical series to avoid an enhanced effect when calculating the integral index. And the most important indicators (without which any security assessment would be incomplete) in the case of discovery of a considerable pair correlation of numerical series receive less weight.

The characteristic values that determine the level of economic security have been developed for each indicator of the components of the economic security of Ukraine. The characteristic values of each indicator range from 0 to 1 (or from 0 to 100%) divided into five intervals:

$Y_0$  - minimal or absolutely unsafe level of economic security and the level of economic security equal to 0;

$Y_c$  - critical level of economic security and the level of economic security equal to 0.2, or 20% of the optimum value;

$Y_{dang}$  - dangerous level of economic security and the level of economic security equal to 0.4, or 40% of the optimum value;

$Y_{un}$  - unsatisfactory level of economic security and the level of economic security equal to 0.6, or 60% of optimal value;

$Y_{sat}$  - satisfactory level of economic security;

$Y_{opt}$  - optimal level of economic security and the level of economic security equal to the optimal value.

The indicators may vary by type (favorable, destructive or mixed), the informational bias and interpretations of the characteristic values are enabled by standardization.

Assigning the characteristic features to a certain value of the indicator of economic security component (see below) is enabled by means of the analog method (the indicator values in the countries recognized as leading in this area are deemed optimal, determination of average values, namely "satisfactory level" and "unsatisfactory level", is provided by grouping and summarizing the indicator values achieved in other countries); legal and regulatory criteria (critical or optimal level is determined in accordance with the threshold set forth in the national legislation or by the relevant international organizations) or expert assessment.

**Indicators of economic security** are the real statistical indicators of the economy development that offer a complete characteristic of the phenomena and trends in the sphere of economy. Particular attention should be paid to the following general indicators of economic security:

Table 2

### 1. Production security

Indicator name	Indicator parameters				
	$Y_c$	$Y_{dang}$	$Y_{un}$	$Y_{sat}$	$Y_{opt}$
Average correlation of the scope of gross value added of the industry of Ukraine and the gross value added of the industry of the certain European countries, %	20	30	40	60	80
Degree of deterioration of the main industrial assets, %	50	40	45	20	30
Percentage of the high-tech production in the total amount of the produced industrial products, %	1	2	3	5	7
Labor intensity of the industrial production, %	4	8	10	15	20
Total construction work performed, %	10	20	40	60	90
Harvesting capacity of the main grain and legume crops, hundred kilograms per hectare of the harvest area	15	20	25	35	45

**2. Demographic security**

Indicator name	Indicator parameters				
	$Y_c$	$Y_{dan}$ g	$Y_{un}$	$Y_{sat}$	$Y_{opt}$
Estimated population, % up to 1990	85	90	95	97	100
Expected duration of life since the birth, years	66	68	70	75	78
Coefficient of the natural population increase, per 1 thousand people of the existing population	-2	-1	0	1	1,5
Percentage of the aged people in the total number of population (as of the end of the reporting period), % (aging coefficient)	11	13	15	17	18
Potential support ratio, %	35	36	38	40	45
Total coefficient of migration increase, decrease (-) (per 10 thousand people)	-2,0	-1,0	0,0	1,0	2,0

**3. Energetic security**

Indicator name	Indicator parameters				
	$Y_c$	$Y_{dang}$	$Y_{un}$	$Y_{sat}$	$Y_{opt}$
Percentage of the own sources in the total fuel and energy resources of the country, %	40	50	60	70	80
Deterioration of the main production funds of the fuel and energy enterprises, %	5	10	15	20	30
Ratio of investments into the fuel and energy enterprises to gross domestic product, %	0,5	1,0	1,5	2,0	2,5
Energy intensity of the gross domestic product, kg of reference fuel/hryvnias	0,7	0,5	0,45	0,35	0,25
Natural gas reserve, months	2	2,5	3	4	4,5
Hard coal reserve, months	2	2,5	3	4	4,5
Percentage of renewable sources in the total primary energy supplied, %	2	3	3,5	4	6

**4. Foreign economic security**

Indicator name	Indicator parameters				
	$Y_c$	$Y_{dang}$	$Y_{un}$	$Y_{sat}$	$Y_{opt}$
Export-import coverage ratio, times	0,85	0,9	0,95	0,97	1
Share of the raw materials export and export of low degree process in products in the total amount of export of goods, %	0,1	3	5	8	15
Share of import in the home consumption of the country, %	5	7	10	12,5	15
Trade condition index (pricing index), %	85	90	95	105	110
Load of the transit capacities of the oil transporting system, %	50	60	70	80	90
Load of the transit capacities of the gas transporting system, %	50	60	70	80	90

**5. Investment and innovation security**

Indicator name	Indicator parameters				
	$Y_c$	$Y_{dang}$	$Y_{un}$	$Y_{sat}$	$Y_{opt}$
Gross accumulation of the main capital, % gross domestic product	18	20	23	25	30
Ratio of the cost of the newly implemented fixed capital and the capital investments, %	55	65	70	75	85
Integral index of the investment opportunities of the business environment, %	50	60	70	80	90
Ratio of the net increase of the direct foreign investments and the gross domestic product, %	4	4,5	5	6	7
Share of the products sold at the competitive markets of the country, % of the total amount of products (as of the beginning of the year)	50	55	60	70	80
Size of the economy of Ukraine, % in comparison with the world gross domestic product	0,15	0,2	0,5	1,5	2,5
Cost of scientific researches and scientific and technical work covered by the government, % gross domestic product	0,2	0,3	0,5	0,75	1
Number of employees performing the scientific and technical researches in comparison to the number of the occupied population (per 1 thousand people)	5	10	13	17	22
Share of the enterprises implementing the innovations in the total number of the industrial enterprises, %	5	10	15	25	35
Share of the realized innovational goods in the total industry, %	3	7	15	20	25

**6. Macroeconomic security**

Indicator name	Indicator parameters				
	$Y_c$	$Y_{dang}$	$Y_{un}$	$Y_{sat}$	$Y_{opt}$
Ratio of growth rate of the gross domestic product of Ukraine and the growth rate of the gross domestic product of the developing countries, scores	-2	-1,5	-1	1	2
Consumer price index (till December of the last year)	-2	-1	-0,5	1	2
Ratio of the income of the population and the gross domestic product, %	40	43	45	50	53
People's tendency to save, %	3	5	8	10	12
Ratio of salary and social aid as well as other current transfers, times	1	1,1	1,2	1,4	1,6

**7. Social security**

Indicator name	Indicator parameters				
	$Y_c$	$Y_{dang}$	$Y_{un}$	$Y_{sat}$	$Y_{opt}$
Ratio of the average nominal monthly wage and the living wage per one capable person, times	1,5	1,8	2	2,5	3
Ratio of the average retirement and the living wage of the persons who have become incapable, times	1	1,5	1,5	1,75	2
Share of the summary budget spent for healthcare, % gross domestic product	3	4,5	5,5	6,5	7
Share of the summary budget spent for education, % gross domestic product	3	4,5	5,5	6,5	7
Total number of the secondary school pupils, % as compared to the total number of the resident population aged 6 - 17	55	60	65	70	80
Occupation of the population aged 15 - 70, % of the population of the relevant age category	50	53	55	58	60

**8. Financial security**

Indicator name	Indicator parameters				
	$Y_c$	$Y_{dang}$	$Y_{un}$	$Y_{sat}$	$Y_{opt}$
Ratio of the bank loans and deposits in the foreign currency, %	50	70	80	85	90
Share of the foreign capital in the authorized capital of the banks, %	10	12	15	18	20
Ratio of the long term loans and deposits (for over a year), times					
Profitability of the assets, %	-1	0	0	0,5	1
Ratio of the liquid assets and the short term obligations, %	0,5	0,65	0,8	0,85	1
Ratio of the bank loans and deposits in the foreign currency, %	50	70	80	85	90
Insurance integration degree (insurance premiums and gross domestic product), %	1	2	4	6	8
Degree of capitalization of the listed companies, % gross domestic product	15	30	40	50	70
Ratio of the scope of official international reserves and the scope of the gross foreign debt, %	20	36	41	45	50
Ratio of the budget deficit/surplus and the gross domestic product, %	-6	-5	-4	-3	-2
Deficit/surplus of the budgetary and non-budgetary funds of the nationwide management sector, % and the gross domestic product, %	-3	-2	-1	-1	0
Redistribution degree of the gross domestic product in the summary budget, %	18	19	20	23	25
Index of change of the official currency exchange rate of the national currency and the USD, average per the certain period of time	90	94	95	96	97

Table 3

**Weight coefficients for calculation of the integrated index of economic security**

Sub indices of economic security	Weight coefficient
Production security	0.1218
Demographic security	0.0913
Energy security	0.1148
External economic security	0.1095
Investment and innovation security	0.1089
Macroeconomic security	0.1224
Food security	0.1007
Social security	0.1013
Financial security	0.1294

The integrated index for each component is calculated according to the following formula:

$$I_{j1} = E_i a_{ij} \cdot z_{ij1} \quad (1),$$

in which  $a_{ij}$  are the weight coefficients determining the degree of contribution of the  $i$ - index into the integrated index;

$z_{ij1}$  are the standardized values of the introductory values.

The integrated indicator ( $I_j$ ) for each area for determination of the standardized values of the indicators is calculated according to the following formula:

$$I_j = (I_{j1} + I_{j2}) / 2 \quad (2)$$

The integrated indicator of economic security of Ukraine is calculated according to the formula:

$$I_j = \sum b_j \cdot I \quad (3),$$

in which  $b_j$  are the weight coefficients of the economic security components.

The weight coefficient of the  $j$  - component is determined by the experts as the ratio of the total score assigned by the experts of the certain area and the total score.

Also, these coefficients may be determined by principal components method on the basis of the integrated indices of certain sectors of the economy. The use of this approach makes it possible to determine the dynamics of the integral indices of the components of economic security of Ukraine as a whole.

6 of the 10 components of economic security are below the lower threshold value (investment, innovation, social, demographic, financial and energy security), which signifies unfavorable trends in the country's economy.

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Two components of economic security (macroeconomic and foreign economic security) barely exceed the lower threshold, and only two components of economic security (financial and food security) are within the acceptable range.

Ukraine's economic development trends suggest that there is a **reduction in the real gross domestic product** in the country. In 2014, Ukraine's gross domestic product was reduced by 6.8% compared to 2013, and supposedly, it will keep down and reach the bottom-line in 2015. The economic recovery will start in difficult conditions due to the destruction of economic complex by foreign aggression. According to the State Statistics Service of Ukraine, the highest rate of decline in gross added value in 2014 was registered in the construction industry (-19.9%), mining industry (-4.2%), wholesale and retail trade (-12.8%), water supply (-12.1%), processing industry (-12.0%), professional, scientific and technical activities (-11.0%), electricity and gas supply industry (-8.1%), transport, storage, postal and courier business (-6.6%), financial and insurance area (-4.5%), information and communication industry (-3.9%).

A slight increase in gross added value in 2014 was achieved in healthcare and social assistance area (+ 3.9%), agriculture, forestry and fisheries (+2.9%), public administration and defense, compulsory social insurance (+ 2.6%). However, the progress in the mentioned areas of the economy does not compensate for the overall economic decline in 2014.

The nominal gross domestic product per capita in 2014 in Ukraine decreased by USD 951 and constitute USD 2979, which is 2.8 times less than in Belarus, 3.4 times less than in Romania, 4.8 times less than in Poland, and 12.1 times less than in the EU countries. This speaks of a deep crisis and infeasibility of the Ukrainian model of economic development as well as the increase of the economic gap with other countries.

Worsening of the foreign economic situation caused by the military operations in the Donbass region has led to a decline in the foreign economic activity. Reduction of the export of goods and services in 2014 has reached 14.6%, reduction of import constituted 28.0% compared to 2013. There have been no positive structural changes in the export and import of goods. Reduction of industrial goods production by the exporters has resulted in a significant curtailment of the export. The highest rate of decrease was registered in metallurgy (the production was reduced by 14.5% and the export was curtailed by 13.1% compared to 2013), machine building industry (-20.6% and -30.4% respectively), production of chemicals (-14.2% and -28.2% respectively).

Reduction in gross savings of the fixed capital in 2014 was 23.0%, and the downfall tendency has continued up to the point of the 2013 values (-8.4%). This is the evidence of a continuing stagnation in the investments and a systemic reduction of the investment potential of the national economy. The share of investment in gross domestic product has fallen to the point of 14.0% of gross domestic product (in 2013 it was 16.9%). The capital investments in 2014 were reduced by 11.8% after the downfall of 2013. The domestic enterprises meet 71.5% of capital investment requirements by their own funds. The Ukrainian economy really needs to improve the investment opportunities to attract the foreign investments. In 2014, only 2.7% of capital investment expenses were covered by the foreign investors. Besides, the reduction of direct foreign investment into the economy of Ukraine in 2014 constituted 12.2 billion dollars or 21.0% compared to 2013. The long-term stagnation of investment processes significantly limits the recovery potential of the national economy.

The fixed assets are enormously obsolete in both moral as well as physical terms. The low investment activity problem is exacerbated in the conditions of depreciation of the fixed assets in the economy of Ukraine. In 2014, the overall degree of depreciation of the assets in all areas of economy has reached 77.3% (as of early 2014). The depreciation of fixed assets was 56.9% in the industry, 63.6% in telecommunications, 61.9% in electricity and gas supply, 57.1% in the mining industry, and some branches of industry have almost exhausted their amortization potential (the depreciation degree in the transport industry has reached 96.7%). This level of depreciation of fixed assets proves their technological obsolescence. Most of the sectors of industry of Ukraine urgently need almost a complete upgrade of production facilities to correspond to the modern technological base.

The substantial reduction of domestic demand goes on. The consumer price index in 2014 has increased by 24.9% (against 0.5% in 2013) and the industrial product prices have risen 31.8% (against 1.8% in 2013). The reduction of final consumer expenditures for the year was 7.4% (in particular, 9.6% in the household sector), and the retail turnover downfall in 2014 has reached 8.6% (in 2013 it has increased by 8.6%). Given the expected high inflation rate in 2015 (33.5-40.1%), the compensatory factors maintaining an effective demand should be developed.

**Conclusions.** The low integral level of the economic security in Ukraine is largely caused by a number of indicators falling below the lower threshold, namely:

- in the macroeconomic security there is a high level of “grey” economy; informal capital replenishment; excessive levels of “grey” intermediate consumption;

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- in the investment security there is a small degree of growth of the foreign direct investment (equity) to the gross domestic product;

- in the innovation security there is a low level of scientific and technical work expenditures; scientific and technological downfall; low proportion of professionals performing the scientific and technical work; low share of the enterprises engaged in innovation activity in the total number of industrial enterprises; low share of the enterprises that have implemented innovations in the total number of industrial enterprises; low share of companies that have implemented innovative products in the total number of industrial enterprises; small proportion of sales of the innovative products in the total amount of the realized industrial production;

- in the financial security there is a low level of gross international reserves of the National Bank of Ukraine (in the import); a threshold level of the lost shadow revenue; high cost of bank loans; insufficient financing of the real sector of the economy; low share of loans allocated for the processing industry;

- in the foreign economic security, the level of innovation products in the export of goods is critically low; there is a tendency to a high import dependence; a significant proportion of the imported goods in the country's domestic consumption;

- in the social security, a high level of shadow wages in comparison with the official wages is maintained; low subsistence rate to the average wages; significant pension expenditures in comparison with the gross domestic product; a high level of deficit of the Pension Fund of Ukraine in comparison with the gross domestic product;

- in the food security, the production of milk and dairy products is quite insufficient;

- in the demographic security, there is a high crude mortality, infant mortality, morbidity; a significant demographic burden of incapable population in comparison to the number of capable population;

- in the energy security, there is a high output ratio of the shadow economy; a large share of gas import from a single country in the total volume of the gas import; a large share of oil import from a single country in the total oil import;

The official statistical research conducted on the basis of the given indicators suggests a tendency to the formation of a dangerous rate of curtailing of the domestic market, and even more dangerous rate of decline of the living standards of common people.

Improvement of the economic security of Ukraine depends on immediate implementation of a fundamentally new economic development model.

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To ensure the economic security it is necessary to do the following: develop a reliable system of economic security that would provide the monitoring and identification of threats to the economic security, create the strategy and tactics for the prevention and neutralization of these threats; generate an optimum economic model and implement a total economic restructuring; correctly identify the national competitive advantages and use them effectively in the foreign economic activity; diversify the sources and routes of oil and gas transfer to Ukraine and promote the energy saving policy; facilitate the development of scientific and technological progress, identify the benchmarks to mobilize the domestic investment resources; improve the quality of state and economic management and carry out the activities aimed at socialization and humanization of economic transformation; eliminate the "shadow" economy by effective legal, administrative and economic measures.

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