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CHAPTER 1
MODERN TRENDS IN PUBLIC ADMINISTRATION

INTERMUNICIPAL COOPERATION AS A KEY TOOL IN THE FORMATION OF A MODEL OF MULTIPLE MANAGEMENT OF REGIONAL DEVELOPMENT

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Abstract. *In Ukraine, there have been significant changes in regional development due to the conditions of the war and the need to form new tasks, implement urgent measures, projects to restore the territories of communities and regions, continuing the European integration course of Ukraine, decentralization reform and the implementation of standards, principles and current tools of good governance of the Council of Europe. The purpose of writing the article is to reveal the need for further development of inter-municipal cooperation to create territories of community cooperation, as points of economic growth and regional development, to overcome socio-economic challenges caused by the war, as models of multi-level management, public administration and targeted actions for the restoration of territories of communities and regions of Ukraine during the war and in the post-war period in accordance with European standards and best practices of democratic governance and territorial development. The following methods were used to determine the principles of inter-municipal cooperation in the management of regional development: the method of cognition (for the formation of theoretical principles for determining the essence of inter-municipal cooperation, development strategies); comparative analysis (in order to compare the effectiveness of the development strategy); abstract-logical (for the formation of theoretical generalizations and the formulation of research conclusions); graphic visualization (for the purpose of visualization of results and analysis). The Center for Good Governance Expertise of the Council of Europe, in its Recommendations regarding the formulation of policies on the Local Self-Government Restoration Plan dated June 30, 2022, emphasized the need to implement stronger forms of inter-municipal cooperation based on the principles of "smart" and "green" municipal (spatial) planning to overcome challenges caused by the conditions of the war, the key of which are changes in the population and the economic structure of communities. In the process of forming spaces of inter-municipal cooperation between communities of Ukrainian and European regions, as an important functional space and level of management of regional development, it is important to use the existing*

national and international experience in the development of community cooperation at the local, inter-territorial and international levels, the experience of developing these spaces in the territorial and cross-border cooperation, creating models and tools of municipal management and public administration for the post-war period of development of the territories of communities and regions on the basis of the application of standards, principles and current tools of "Good democratic governance" and the development of civil diplomacy.

Keywords: *public management; administration; inter-municipal cooperation; good democratic governance; regional development; territorial development; European territorial and cross-border cooperation; civil society; diplomacy.*

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Introduction. The government's action plan - 2023 envisages actions related to updating the State Strategy for Regional Development, planning the recovery and development of regions, accelerating sustainable economic growth based on 5 main principles, namely: 1. Immediate start and gradual development; 2. Increasing fair welfare; 3. Integration into the EU; 4. Reconstruction of what was better than it was, on a national and regional scale; 5. Stimulation of private investments: Implementation of 17 national programs, 850 projects for a total amount of financing - 750 billion euros by 2032.

The directions of the Recovery Plan of Ukraine have a comprehensive targeted program and project approach, covering such sections as taxation, budget policy, regional development, infrastructure restoration, answering the question "What needs to be done?".

But the existing temporary restrictions on the rights and legitimate interests of individuals and legal entities due to the introduction of martial law in Ukraine, challenges and problems that exist at the local level, in communities, namely: demographic losses in communities affected by military actions, destruction of physical infrastructure , property and business, the economic downturn, which has a significant impact on local budgets, the strengthening of regional disparities, the narrowing of the list of public services, the possibilities of multi-level management of the community territory and the need to continue the reform of public administration and decentralization, etc., require the search for answers to the question, "How is it do?" at the local level.

An urgent problem is the synchronization of the actions of the Recovery Plan of Ukraine with the strategies of the new program and budget period of the EU 2021-2027, the standards, principles, tools of effective governance of the Council of Europe and the principles of the White Book of European governance, on the one hand, and the comprehensive territorial approach of the State Regional Policy of Ukraine for the period until 2027, in which the types of territories that require special attention from the state and the use of special mechanisms and tools to stimulate their development are determined, one of which is inter-municipal cooperation.

Literature review. The study of problems of development of inter-municipal cooperation and multi-level management is of interest among domestic scientists

(among them: O. Amosov, N. Gavkalova, E. Syromolot, N. Vnukova, N. Mikula, M. Maksymchuk, S. Klyoba, V. Tolkovanov, V. Kuybida, A. Krupnyk, A. Orlova, A. Tkachuk, M. Izha, P. Nadolishniy, L. Prykhodchenko, S. Sakhanenko, etc.)

The issue of establishing horizontal interaction (cooperation, cooperation, partnership) between local self-government bodies in Ukraine for the sake of economic development and investment attraction in the regions is insufficiently studied. Only recently, with the support of a number of international projects, several round tables and seminars on this topic have been held in Ukraine, but there are no in-depth comprehensive studies and scientific publications on this topic. In particular, such authors as V.S. Kuybida, V.V. Tolkovanov [16; 42] and Bilokon Yu.M. [17] and solving problems of inter-municipal cooperation.

Such researchers as V. Tolkanonov, N. Kostina, and M. Shkilniak paid a lot of attention to the creation of a methodological and methodological basis for the cooperation of territorial communities [20; 41; 43].

It is clear that everything new needs some time to understand its meaning, to find opportunities for implementation. Therefore, researchers focus more on the applied aspects of establishing community cooperation [44], and only in recent years have scientific articles appeared devoted to the possibilities of economic growth of communities based on cooperation [6]. There is very little research on the use of such forms of cooperation as the delegation of tasks and the formation of joint management bodies.

The conceptual basis of the study of the institute of territorial communities is sufficiently comprehensively covered in the publications of O. Bobrovska [18], I. Degtyareva [21, p.141-148], V. Nebrat [35, p.34-49], K. Tyshchenko [41] and other domestic and foreign researchers. Institutional-legal and institutional-organizational aspects of the formation and development of the institution of territorial communities, including in Ukraine, are presented in the works of S. Grab [7, p.25-30], Yu. Kyrychenko [30, p.451-457], V. Nakonechny [36, pp. 283-289] and other scientists. Methodological and applied aspects of the functioning of the institute of territorial communities and its role in ensuring local development are analyzed by R. Lupak and A. Didych [32, p.248-252], K. Popova [21, p.290-297], S. Lipset [33, pp. 1-22], T. Vasyltsiv, I. Biletska, and O. Mulska [46, pp. 276-287].

At the same time, the challenges and problems of the development of community cooperation in the conditions of war and in the post-war period require a new theoretical justification and a reflection of their place in measures to restore communities and regions of Ukraine.

Aims. The purpose of writing the article is to reveal the need for further development of inter-municipal cooperation to create territories of community cooperation, as points of economic growth and regional development, to overcome socio-economic challenges caused by the war, as models of multi-level management, public administration and targeted actions for the restoration of territories of communities and regions of Ukraine during the war and in the post-war period in accordance with European standards and best practices of democratic governance and territorial development.

Methodology. The following methods were used to determine the principles of inter-municipal cooperation in the management of regional development: the method of cognition (for the formation of theoretical principles for determining the essence of inter-municipal cooperation, development strategies); comparative analysis (in order to compare the effectiveness of the development strategy); abstract-logical (for the formation of theoretical generalizations and the formulation of research conclusions); graphic visualization (for the purpose of visualization of results and analysis).

Results. The Recommendations regarding the formation of regional development policy on issues of the Local Self-Government Restoration Plan of the Council of Europe Good Governance Expertise Center emphasize the direction of actions regarding the implementation of an experimental policy of regional management of decentralization, on a pilot basis, with public participation, taking into account numerous European examples and options at the local or regional level , and actions regarding the development of the type of territories - "metropolitan zones", as a closer form of inter-municipal cooperation, around a large city or in the rest of the territory, with the need to provide financial support for their development in war and post-war times.

"Metropolitan zone" is an analogue of the name "agglomeration", which is reflected as a type of territory in the State Strategy of Regional Development of Ukraine for 2021-2027, namely: Agglomerations are territorial clusters of settlements (primarily cities) that form integral socio-territorial formations with the number population of more than 500,000 people. Agglomerations are areas of concentration of population, capital and business and have intensive economic, labor, cultural and household connections with the surrounding territories, are characterized by a high level of development of infrastructure, economy, and provision of services to the population [19].

Today, inter-municipal cooperation of Ukrainian communities is still not very developed. Thus, on the example of Poltava region, it can be noted that more than half of territorial communities do not participate in such cooperation practices in any way and do not have any agreement in the field of inter-municipal cooperation. Among the functional directions of cooperation (in those communities that still have agreements on cooperation), such a direction as "Coordination of activities and attraction of resources for the implementation of joint projects" became the most widespread (about 66% of agreements). Accordingly, intermunicipal cooperation in the field of local economic development is used very limitedly, which should be considered a significant underperformance of both regional and local authorities, because communities, in fact, underutilize opportunities, as well as resources and assets. which could be additionally localized for such purposes [1-7]. It is necessary to understand that the development of inter-municipal cooperation is a process that someone must manage and be responsible for, to carry out its constant support in accordance with the so-called life cycle of inter-municipal cooperation of the community (Fig. 1).

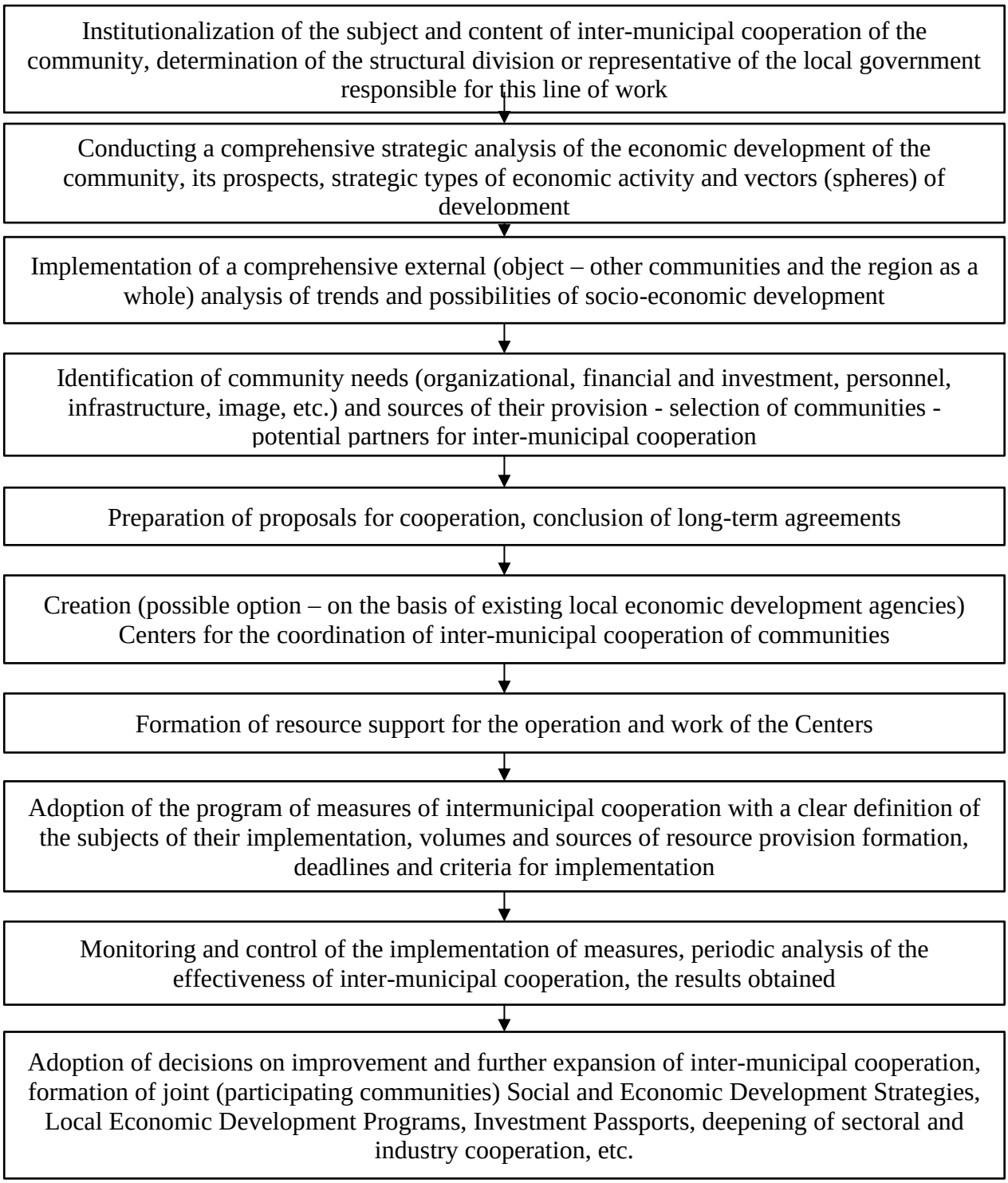

Figure 1. The life cycle of the development of intermunicipal cooperation of the territorial community

Source: author's development

Thus, following this set of sequential steps allows all the basic functions of management, such as analysis, planning, organization, motivation and control, to be used, and therefore has a high potential for effectiveness.

On the other hand, we are talking about more systemic advantages that the community receives in case of intensification of inter-municipal cooperation practices, namely:

• increasing the investment attractiveness of territories;
• improvement of prerequisites for creation of industrial parks, clusters, etc.;
• strengthening of benefits under the condition of participation in regional project competitions, grant and other programs of the state, region, international funds of external technical assistance;
• dissemination of relevant practices for participation in cross-border cooperation projects, cooperation of sister cities/territories, etc.;
• the transformation of economic cooperation into the implementation of joint projects for the development of social infrastructure, cultural and social development [22-24].

It should be noted a number of project initiatives for the recovery of Ukraine with the participation of leading European institutions, which promote and support the development of inter-municipal international cooperation between cities and communities of Ukraine and the EU, namely:

-The project "Promoting the comprehensive development of communities through analytics, dialogue and international cooperation", financed by the German Society for International Cooperation (GIZ) as part of the Support for Decentralization Reform in Ukraine (U-LEAD with Europe), the purpose of which is to promote the establishment of international cooperation between the cities of Ukraine and of EU countries, organization of study visits, creation of analytical manuals and assistance in the implementation of joint community projects;

-The "Bridges of Trust" initiative of the Council of European Municipalities and Regions (CEMR) together with the Association of Cities of Ukraine and with the support of "U-LEAD with Europe", under which 10 associations of local and regional authorities from EU member states as part of CEMR will contribute to the creation of 30 of new municipal partnerships for the reconstruction of Ukraine.

As you know, the cooperation of territorial communities is interpreted as relations between territorial communities, which are carried out on a contractual basis, based on the pooling of resources of cooperation subjects with the aim of solving common problems of local development [8-15; 25; 47]. Legislatively defined forms of inter-municipal cooperation are defined as: delegation to one of the subjects of cooperation by other subjects of cooperation to perform one or more tasks with the transfer of relevant resources to him; implementation of joint projects, which involves the coordination of the activities of cooperation subjects and their accumulation of resources for a specified period in order to jointly implement relevant measures; joint financing (maintenance) by subjects of cooperation of enterprises, institutions and organizations of communal form of ownership, infrastructure facilities; formation by subjects of cooperation of joint communal enterprises, institutions and organizations, joint infrastructure objects; formation of a joint management body by the subjects of cooperation for the joint performance of powers defined by law.

At the same time, it should be noted that local state authorities and local self-government bodies still have certain opportunities to intensify their influence on the processes of inter-municipal cooperation and strengthen the regional component of their own economic policy [26-29; 46; 48]. First of all, it concerns the establishment of an effective system of communications between local government organizations and

their executive bodies in order to form a common position regarding the strategy and tactics of economic development and its individual aspects. The main means for this is the regular holding of field meetings and round tables, the discussion of problematic issues, the creation and functioning of working groups. Separately, it should be emphasized the collegial participation in such events of all their participants, which would make it possible to eliminate one of the biggest shortcomings of the current interaction between various local authorities - the hierarchical component [37-39]. An important direction for the activation of inter-municipal cooperation in the field of local economic development is the implementation of educational projects, internships of relevant employees in the structural divisions of regional state administrations, the establishment of regular programs of professional development and retraining of personnel in the field of inter-municipal cooperation and international economic activity of communities (preparation of investment proposals, cooperation with investors , preparation of technical documentation for participation in projects, etc.).

At the same time, it is necessary to understand the entire spectrum of tools that can be involved by communities within the framework of the preparation and implementation of projects for the activation of inter-municipal cooperation in the field of local economic development (Fig. 2).

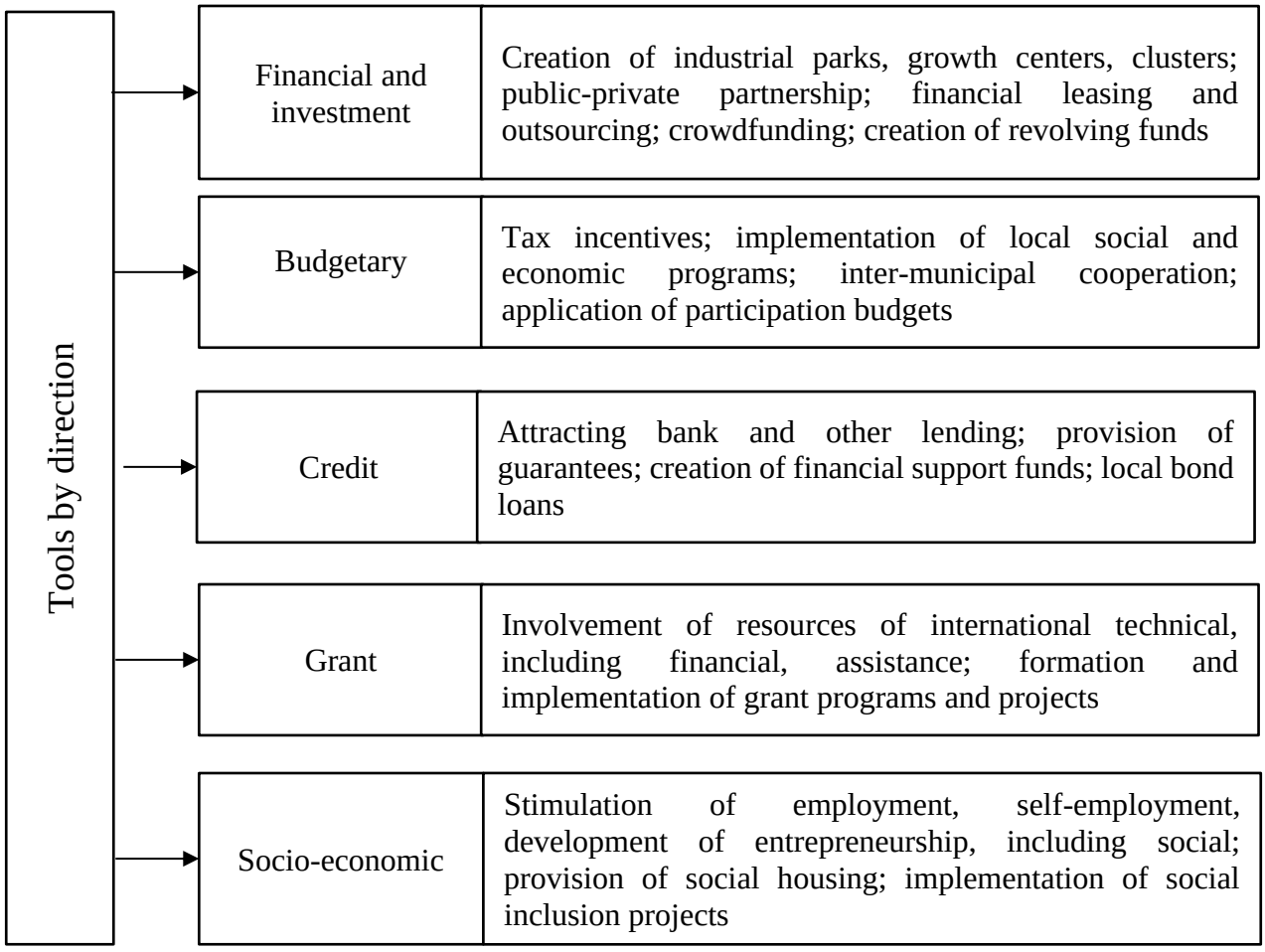

Figure 2. Toolkit for expanding inter-municipal cooperation of communities in the field of local economic development

Source: author's development

Thus, there is a sufficiently wide toolkit of activation and achievement of high efficiency of inter-municipal cooperation of territorial communities in terms of activation of local economic development of territories.

The Declaration of the Alliance emphasizes, among other things, the focus on the principles of the European Charter of Local Self-Government, the State Strategy for Regional Development of Ukraine for 2021-2027, the improvement of proper local/regional governance, the provision of the opportunity for local self-government to assume a leading role in restoration and reconstruction together with the government of Ukraine, the EU and other international partners, in particular in the assessment of reconstruction needs, further planning and implementation of reconstruction strategies based on integrated planning at the territorial level, using systemic approaches for ecological, green, smart and inclusive territories, organized according to the principle of "rebuild better", further European integration and access of local and regional authorities of Ukraine to European networks [19].

Intermunicipal cooperation (IMC) is a special form of interaction, a system of legally established mutually beneficial relations between two (three - in the case of their creation of a local Association of Territorial Communities) and more territorial communities bordering each other, implemented through relevant local self-government bodies with the participation of of local executive power and aim to achieve certain common goals for improving the quality of life of communities and economic growth.

In general, the following signs of MMS can be identified:

1. The presence of common interests, the desire and the possibility of joint use of resources to increase efficiency.
2. The presence of formally established legal relations between at least two local self-government bodies or at least three, if a local Association of local self-government bodies is created on the basis of the Law [23].
3. Commonality of boundaries between the relevant administrative and territorial units.
4. Availability of legal personality and jurisdiction in the relevant territory. Availability of powers and the ability to exercise them.
5. Only own (self-governing) powers can be the subject of the MMP. Powers delegated by the state can be the subject of MMC only on the basis of relevant legislative acts.
6. Voluntariness of mutual relations (except for cases established by law).
7. Duration of these relations in time and definiteness in space.
8. Mutual benefit, in particular economic and mutual exchange of resources.
9. Sometimes subjects have to voluntarily delegate a part of their own powers to another body or legal entity for the benefit of the common and their own good [22].

"Territorial and cross-border cooperation" is a standard of good governance of the Council of Europe representing the European framework convention on cross-border cooperation between territorial communities or authorities of 1980. Madrid, which provides for the conclusion of standard framework agreements, treaties, statutes on the development of cross-border cooperation in forms in accordance with national legislation Contracting parties, in the Ukrainian legislation in the form of Euroregions, the association of Euroregional cooperation, the European association of territorial

cooperation, the cross-border association, which are essentially a model of multi-level management of regional development, which is based on inter-municipal cooperation of communities of adjacent/non-adjacent regions , which carry out joint actions aimed at establishing and deepening economic,social, scientific, technological, ecological, cultural and other relations [36].

In the draft Law, which was presented by the subcommittee on cooperation of territorial communities and regions of the VRU, on improving the participation of local self-government in cross-border cooperation, it is proposed to define four types of cross-border cooperation, namely:

1. Interregional cooperation is carried out between subjects of cross-border cooperation that exercise executive power in the regions, cities of Kyiv and Sevastopol and/or represent common interests of territorial communities of villages, towns, cities, regions with relevant subjects of such relations of other states within the limits of competence defined national legislation and relevant cooperation agreements;
2. Inter-territorial cooperation is carried out between village, settlement, city councils in Ukraine with the relevant subjects of such relations of other states within the competence defined by national legislation and relevant agreements on cooperation;
3. Cross-border cooperation is carried out between subjects of cross-border cooperation of Ukraine, which exercise their powers on the territory directly adjacent to the state border, and relevant subjects of such relations of neighboring states within the scope of competence determined by national legislation and relevant cooperation agreements. One of the forms of such cooperation can be the Euroregion.
4. The Euroregion is formed in accordance with bilateral or multilateral agreements on cooperation with the aim of establishing and deepening economic, social, scientific, technological, ecological, cultural and other relations between subjects and participants of cross-border cooperation of Ukraine and other states. Euroregions can be reorganized into other forms of cross-border cooperation.

It should be noted that this Draft Law of Ukraine provides for the creation of regional programs for the development of cross-border cooperation as a complex of interrelated tasks and measures of a long-term nature, aimed at the development of cross-border cooperation in the region, which are carried out at the expense of the local budget of Ukraine and other sources, not prohibited by legislation, and agreed according to the terms of execution, composition of performers, resource provision.

Conclusions. The development of inter-municipal cooperation, as a standard of proper governance of the Council of Europe and a tool of multi-level management of regional development in Ukraine, has a huge practice and is a magnet for the creation of various models of management of the development of inter-regional, inter-territorial, border, cross-border and international cooperation of communities and regions of Ukraine and the EU.

In the context of the acquisition of the status of Ukraine as a candidate for EU membership, and further steps and actions of the Government of Ukraine, regarding the synchronization of regulatory, legal, program and budget policies of Ukraine and the EU, the development of inter-municipal cooperation can significantly strengthen

the socio-economic development of post-war reconstruction and development of communities and regions of Ukraine, and accelerate the European integration movement of Ukraine.

The renewal of the state regional policy by directing actions to the development of inter-municipal cooperation, and strengthening the participation of local self-government in the development of cross-border cooperation, should be based on the application of multi-level management of the development of the territory on the 12 principles of proper democratic governance; development of tools for development and influence on regional development, based on monitoring challenges and problems in the development of territories and strengthening public participation; development of a training system and development of network partnerships from among experts, officials, beneficiaries within the framework of application of standards, principles and tools of proper democratic governance; the implementation of the methodological approach - the "dynamic triangle" of setting standards,

Continuation of the experimental policy of multi-level management of regional development and projects of territorial and cross-border cooperation, on a pilot basis, including in the format of the Information Center of AEPR at Semen Kuznets National University of Ukraine, will contribute to the realization of the vision of AEPR regarding the development of border regions as a laboratory of European integration.

Author contributions. The authors contributed equally.

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CHEMICAL AND PHYSICAL METHODS OF CHOCOLATE PROCESSING: ADMINISTRATION PROCESS

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Abstract. *From the harvesting of the cocoa beans to the formulation of the final chocolate product many complex changes occur. The properties and behavior of the fat and the dramatic change in flow characteristics are most notable. The purpose of the work is to clarify the relationship between the types, composition, methods of preparation and consumption of chocolate and its impact on human health. In order to achieve the goal, we set the following work tasks: to get acquainted with the history of the origin of chocolate; to investigate the indicators of chocolate quality; evaluate informational, quantitative characteristics of chocolate; to determine the effect of chocolate on the human body, to conduct qualitative reactions to individual chemical substances included in the composition of chocolate.These changes occur in part during the refining process which includes roasting, winnowing, grinding and conching. Most notable in influencing the product is conching which is the agitation of chocolate coupled with aeration and heat. This treatment is a time and energy consuming process but has a remarkable mellowing effect on the flavor and promotes a decrease in viscosity of the final product. The escape of undesirable volatiles derived from oxidative and carbonyl reactions catalyzed by heat and aeration have been implicated. Research methods: study of literary and electronic media, generalization of the material found, sociological survey, chemical experiment, analysis of the obtained results. The physical effects brought about during conching encompass more than a simple mixing. Included, in addition to the chemico-physical aspects of conching itself, are the aspects of the cocoa bean, fermentation and roasting which may influence the product The scientific novelty of the obtained results: qualitative reactions were carried out on individual chemical substances included in the composition of chocolate. The methodological basis of the research is fundamental principles of the system approach, relevant aspects of market and technical research and state regulation of chocolate products studied with application economic-statistical and physico-chemical methods. It is used in the work the following methods of the developed product: statistical, organoleptic, method determination of protein content in the finished product, method of determining the indicator glycemic The composition of chocolate was theoretically investigated. In the perspective of further research, we plan to expand the assortment of porous chocolate due to the creation of new flavors (Ex. porous chocolate with caramel flavor, fruit flavors based on white chocolate mass).*

Keywords: *cocoa beans, chocolate product, conching, chemico-physical aspects of conching itself, chocolate coupled with aeration and heat, simple mixing; administration process.*

JEL Classification: Q16, H19

Formulas: 1; fig.: 1; table: 0; bibl.: 18

Introduction. The appeal of chocolate is at least half a millenium old. Early historical evidence reveals that the cocoa tree first thrived in the tropical parts of the Americas where it was grown by the Aztecs of Mexico and the Mayas in Central America. The Mexicans called the fruit of the tree "cacavacentli" and the drink prepared from it "chocolatl". As a drink, the fermented and sun-dried beans were first hand-husked, roasted, then ground and mixed with maize, annatto, vanilla, chili or some other spice. The resultant semi-liquid paste was formed into small cakes, dried, then broken, dissolved in hot or cold water and consumed.

In 1502, Christopher Columbus saw a cargo of beans in a trading ship off the Gulf of Honduras, and the first specimens to reach the Old World were those he took to Spain as a souvenir of his fourth voyage. The Spaniards thought the prized drink bitter, so they mixed it with sugar and in this form it became popular in Spain. The fame of chocolate gradually spread throughout Europe, reached America in the seventeenth century, and even though "chocolate houses" and drinking clubs no longer exist, the popularity of chocolate remains.

The per capita consumption of confections, in which the category of chocolate products is included, is still highest in the European countries even though each American consumes 7.0 kg of confections per year. Pennsylvania alone in 1972 was responsible for 42.2% and 13.2% of net United States sales of chocolate and confectionery items, respectively In another census report[4] total value of United States sales of chocolate candy in 1978 amounted to 2.2 billion dollars[2].

The earliest industrial attempts to produce cocoa mass took place during the seventeenth and eighteenth centuries. Cocoa beans were roasted in iron pots, the shells removed by hand sifters, and nibs ground to mass in a mortar or on a curved grinding stone. These instruments and others were the ancestors of modern chocolate technology tools.

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Fermentation begins when the pods are split and the acidic, sugar-containing pulp is inoculated with a wide range of microorganisms originating from fruit flies, farmers' hands and pod walls. Anaerobic yeasts begin to flourish and dominate the flora of the mass for approximately 2 days, and metabolic heat and pectin esterase activity eventually cause the pulp to break down and "sweat." The pH of the environment rises as the sweatings are drained and as citric acid is metabolized by the organisms. found certain lactic acid bacteria usually if not always present in the early stages of fermentation.

Whether acetic acid directly affects the flavor of chocolate is a matter of debate. When pulp was sterilized before fermentation and roasted in the normal manner, the resultant chocolate flavor was considered unchanged. He concluded that normal concentrations of acetic acid were necessary for normal chocolate flavor. Much more important than its direct, potential contribution to taste, however, was the influence of acetic acid on bean death. It is not until acetic acid penetrates the twenty or more bean shell layers (testa) and enters the cotyledons that the beans cease to respire. Bean death is characterized by a loss in cellular segregation, or an increase in cell wall permeability. It is only after bean death that critical enzymesubstrate reactions take place. These reactions are vital to the subsequent development of chocolate flavor.

A brief synopsis of these reactions is in order. Annikova found that proteolysis and sucrose hydrolysis are rapid after bean death, and moreover, the concentrations of both free amino acids and reducing sugars reached maximum values at about the same time during fermentation. These flavor precursors are extremely important during later processing steps. It is also recognized that some amino acids present due to proteolysis react and form complexes with oxidized polyphenols (quinones) and if allowed to remain uncombined, the inherent bitterness of some amino acids, peptides and polyphenolic compounds would affect chocolate flavor adversely.

The addition product is able to catalyze the oxidative deamination of amino acids without the intervention of polyphenol oxidase:

$$\text{½protein} \longrightarrow \text{proteaseamin oacids} + \text{½O2} \longrightarrow \text{ketoacid} + \text{NH3} \qquad (1)$$

Annikova have confirmed the formation of peptide-polyphenol complexes in fermented beans by demonstrating the presence of substances which react like tannins as well as proteins.

The histology of the seed (bean) before, during and after fermentation has been well documented by light microscopy Borysenko. The fresh, unfermented cotyledon

or nib is comprised of three types of cells, namely, the epidermal, pigment and storage cells. The epidermal cells are of a monocellular structure, elongated and brown, containing unidentified particles of 2–4 μm. Pigment cells are responsible for color since they contain anthocyanins, theobromine, caffeine and polyphenols. Their mass represents approximately 10% of the cotyledons. The storage or parenchyma cells, which contain cocoa butter, aleurone (protein) granules, enzymes and starch grains, are by far the most predominant cell type and comprise the balance of the seed mass[2].

During fermentation, the color of the cotyledon first changes from a speckled purple appearance to a more uniform purple color as a result of the diffusion of anthocyanins into cells which originally did not contain the pigments. Eventually the color fades as enzymes degrade the cyanidin glycosides under anaerobic conditions. When oxygen has gained access to the cells during the oxidation-condensation phase, the purple color changes to brown. The presence of purple pigment in dried, fermented beans indicates that fermentation was incomplete or imperfect. The shell or testa, although not used as a routine quality index of fermentation, also changes dramatically throughout the process. What was originally a white, closely fitting skin will become a pale brown, crisp, more readily removable shell. It was originally, and is still, believed by some that the sole object of fermentation was to free the beans from the pulp, prevent germination and facilitate shell removal. While this is largely true, it is essential to realize that fermentation is critical for flavor optimization as well[3].

Recent scanning electron microscopy (SEM) studies by Borysenko of raw, roasted, unfermented and fermented cocoa beans revealed differences in morphology as a result of bean treatment. A six-day microbial fermentation caused the testa to change from a leathery and continuous, closely adhering skin to a friable, more easily removable shell. Changes in the cotyledons were less obvious. When beans were roasted at 150° C for 20 min, the testa and endosperm became porous and brittle, and cellular contents of the germ and cotyledon became thermally coagulated. Also noted in the roasted shell were dissolution of the cutin layer accompanied by hairline fissures in the surface. Both these developments, as well as the increase in porosity, undoubtedly contribute to shell brittleness, and facilitate shell removal. Observations by SEM of the cocoa bean during various treatments may be considered useful in the future quality control evaluations. Certain plant structures, such as tracheary elements (spiral vessels) and bordered and simple pits are easily.

After fermentation, the beans are dried. Lopez and believe that proper drying is as important as proper fermentation, for without it beans grow moldy and off-flavors are produced. Moisture must be reduced to about 6% and the dehydration process must not be too rapid. It has been found that artificially dried cocoa beans contain higher concentrations of acetic acid than beans dried slowly in the sun, and that chocolate prepared from them possesses a distinct “fruity” flavor, presumably due to the formation of acetate esters. Kolomiets found propionic acid always eveloped during fermentation, and noted this acid and others of low molecular weight increased in absolute amounts during the transition from fermentation to drying. They attributed this behavior to changes in dominant microbial populations and not to unrepresentative sampling. A complete report on bean drying by natural and artificial means has been

given by[4].

When fermented beans are between 6 and 7% moisture, they are bagged, transported to the manufacturing country and stored in a cool atmosphere of not more than 80% relative humidity. The chocolate manufacturer is at this time responsible for sampling and testing the incoming product. The cut test and flavor test are the two basic quality assurance measures of the plant. Unfortunately, these tests are not totally objective in nature, and as a result, reports vary depending on the grader.

Trends in recent years have brought about changes in the processing procedure of cocoa beans. More and more processed products, i.e., liquor and powder, are being imported into manufacturing countries. As developing countries industrialize the trend accelerates. Kolomiets has now nearly completed the switch to 100% liquor, and Brazil, in particular, is also gradually replacing more and more beans with liquor.

It is not difficult to see how this switch is associated with a loss of quality control by the manufacturer. Syrokhman states several criticisms concerning the imported liquor products (Fig. 1).

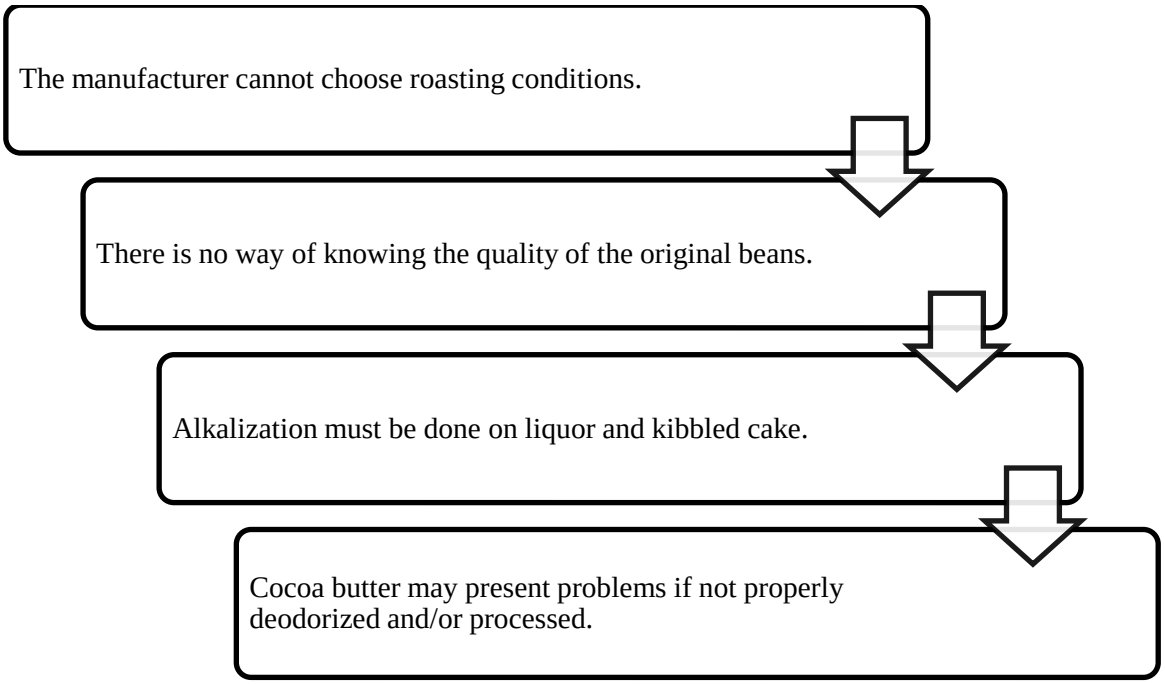

Figure 1. Basic comments on imported liquor and vodka products by Syrokhman

On the positive side are the savings to the manufacturer in cleaning, winnowing and grinding machinery. The cost to transport the bean shells also vanishes; this can amount to considerable cost savings since the shell comprises about 12% of total bean weight. Cooperation between the producing and manufacturing countries is continually improving, so that many of the earlier sanitation and production problems have been largely eliminated [5]

When beans are imported, they must be stored and/or cleaned, roasted, winnowed and refined. The roasting process has evolved throughout the years from the solid fuel or gas-heated rotary drum roaster to the hot air batch roaster to the continuous model whereby cascading beans meet a transverse flow of high-temperature air. Roasting is usually a “long time-low temperature” or “short time-high temperature” process, with

temperatures up to 150° C and roasting times up to 40 min being common. Roasting conditions are dependent on the type of bean, when and where it was harvested, treatment received after harvesting and the type of flavor required in the finished product.For example, flavor beans such as Caracas and Maracaibos require a heat treatment in the range of 131–146°C, while other beans such as Ghanas may receive a heat treatment in the range of 146–184°C. Discharged beans must be rapidly cooled to prevent overroasting so that no sharp, disagreeable odor is imparted to the finished chocolate.

Conventional bean roasting is performed on the whole, dried, fermented bean. The roasting process causes additional moisture to be lost through the bean layers; the bean shrinks as the shell loosens, and as a result the shell is easily removed when the beans are cooled. The texture of the cotyledon also becomes friable during the heat process so that it can be ground more easily. Syrokhman illustrated by SEM the brittleness typically encountered as a result of roasting at high temperatures. First, hairline cracks or fissures appeared on the outer roasted seed coat surface. These were accompanied by melting or dissolution of the cutin layer. Second, holes or pores exposing parenchyma cells developed on the surface closest to the cotyledon. The unroasted undersurface, by contrast, was smooth and uninterrupted. These developments, together with cotyledon shrinkage upon cooling, quite likely were responsible for shell brittleness. As pointed out by the authors, in cases of questionable roasting procedures and temperatures of processed beans, SEM analysis could be used to provide qualitative indicators such as the relative extent or degree of roasting as evidenced by the appearance and size of surface cracks and the melting of surface cutin.

Chemically, the number and types of reactions occurring in the beans during roasting are of great magnitude. If beans are not roasted the resultant product will not have a characteristic chocolate flavor. On the other hand, roasting as a single process is insufficient to develop a full flavor. Typical chocolate flavor is dependent on the chemical precursors formed during fermentation coupled with the thermal reactions of compounds in the later stages of manufacture. Much work has been done to isolate and characterize the flavor compounds generated during roasting, and no one compound has been found to be responsible for typical, roasted chocolate flavor.

Probably the first chemical event to occur during roasting is the distillation of some undesirable low-boiling compounds. It is generally believed that many of these compounds are water-soluble, and therefore miscible with the water vapor phase. Stekolshchikov measured free and bound acetic acid in Nigerian cocoa beans before and after continuous roasting at 120°C for 20 min. They found a decrease in free acetic acid but an almost corresponding increase in acetic salts. The result was that total acidity remained the same. Stekolshchikov also noted very little loss of acetic and propionic acids from the shell during roasting.

Hundreds of other compounds have also been detected in headspace volatiles and in other fractions of roasted cocoa beans. Many of these compounds are aldehydes, ethers, phenols, nitriles, sulfur compounds, pyrazines, ketones, alcohols, furans and esters (Stoll *et al*., 1967; van Praag *et al*., 1968; van der Wal *et al*., 1971; Vitzthum *et al*., 1975). Analysis of the bean constituents before and after roasting shows that, of the

major constituents, free amino acids, peptides and reducing sugars undergo the most change while alkaloids, polymeric phenols and lipids are practically unaffected (Diemair *et al*., 1959b; Kleinert, 1965; Zak and Keeney, 1976). This strongly suggests that non-enzymatic carbonylamine reactions play an important role in the chocolate flavor complex. have shown that the reducing sugars are essentially destroyed during roasting, and the amino acid fraction is partially degraded. They attributed this partial degradation to the relatively low content of reducing sugars and potential reducing sugars (sucrose) in the system. Stekolshchikov found that alkylpyrazine formation in Ghana cocoa beans was linear up to 30 min roasting time at 150°C. They also determined that the total alkylpyrazine content of typically well fermented bean varieties was approximately twice that of lightly or nonfermented varieties following an equivalent roast. Pyrazine concentrations in roasted beans were found to be primarily influenced by the level of ketoses resulting from fermentation. An excellent review on the non-enzymatic browning reactions which occur during cocoa bean roasting is given by Foster [8].

Ponomaryev have described chocolate as a favorite source for the isolation and identification of pyrazines. The basic fraction of cocoa compounds contains many pyrazines; however, the neutral fraction and headspace have a characteristic cocoa aroma which includes many other compounds. As many as twenty-two pyrazines were reported by van der and in a review of pyrazines thirty pyrazines were reported in cocoa products. In the review, pyrazines were noted as one of the few classes of compounds which are associated with desirable food flavor properties. The concentration of pyrazines may be dependent on the level of the roasted bean which varies with the variety [7].

Aims. The purpose of the work is to clarify the relationship between the types, composition, methods of preparation and consumption of chocolate and its impact on human health.

Methodology. Cocoa was one of the first products in which thiazoles were identified. At least two of the volatile compounds have been identified. In a review paper, Ponomaryev indicated that the formation of thiazoles appears to require carbonyls as well as amino acids. Therefore, the initial reactions involving reducing sugars and amino acids appear to be prerequisites for flavor development. Most pyrazine and thiazole identification has been conducted on washed cocoa beans and information is lacking in the final conched product. The unique flavor and aroma attributed to pyrazines and thiazoles therefore warrant further investigation.

The role of sulfur compounds as an important flavor constituent is well accepted. Their low flavor threshold enables these low molecular weight compounds to be detected at trace levels. Analysis of fermented and dried cocoa by Prytulska and Romanenko demonstrated that a methyl-S-methionine sul-phonium salt was present and it decomposes readily to dimethyl sulfide. This dimethyl sulfide has been isolated in cocoa aroma[6].

After roasting, beans are cooled, and the shells and dense germs are separated from the nibs. The principle of winnowing, in general, depends on the density of the shells and nibs which can be separated by a combination of grating and vibrating

screens together with controlled air currents. More recently the rotary sieve air separator has been replaced by a bank of flat vibratory sieves; from the end of each of these sieves a separate air lift removes the lighter shells. Although complete separation is the aim of every manufacturer, this is never realized and, as a result, shell in clean nibs is allowed at 1.75% by weight under Food and Drug Administration regulations.

Alkalization is one of several routes which may be taken by the manufacturer to modify the final chocolate. As previously mentioned, van Houten in 1828 first soaked nibs in solutions of potassium carbonate prior to drying. Romanenko realized that improved wettability, or dispersibility, in addition to pleasant taste and darker color, was gained by this process. In the alkalization of nibs today, alkalies such as bicarbonate, carbonate, sodium, ammonium or potassium hydroxide, and magnesium oxide or carbonate can be used in dry form or in aqueous solution on nibs, liquor or cocoa. In the case of nibs, for each one hundred parts by weight used (as such or before shelling), the total quantities of such alkalies must not be greater in neutralizing value than the neutralizing value of three parts by weight of anhydrous potassium carbonate. Nibs are then subjected to a water-removal process after they have rested in the alkali for a length of time. Whether the water-removal treatment involves a simple drying or a full roast depends on the sample's history.

The chemistry of the alkali process is extremely complex. Among the more important changes are the increase in pH of the beans from 5.2 to 5.6, with the resultant liquors ranging in pH between 6.8 and 7.5. The initial and final pH will depend on such factors as the type of beans and their degree of fermentation, the type and amount of alkali used, the ratio of alkali to nib or liquor and other processing details. A darker color is another result of the alkali treatment. A darker color does not mean a stronger flavor, however. Alkali-treated chocolate and cocoa actually exhibit milder flavors than their untreated counterparts because the free acids generated during fermentation are neutralized. Prytulska Tannins in cocoa beans such as flavone and flavanol are responsible for the different color formations found in alkalized products.

The nibs, alkalized or not, are next ground by a series of grinding plates or stones. It is during this process that a phase inversion takes place. As the grinders shatter cellular structure, the fat globules release their fat. The frictional heat generated during this process causes the fat to melt and coat the nonfat particles in a more or less continuous phase. The resultant liquor is the base from which all chocolate is made.

Chocolate liquor blends, additional cocoa butter and sugar are mixed together, with or without milk solids, emulsifiers and flavors, and the mixture is further ground or refined. To refine the particles and to disperse them in the liquid cocoa butter, roll-refining is the most widely accepted method used today. The refining process establishes the particle size of the finished product. The lower limit of particle sizes which can be detected by the tongue is approximately 20–30 μm . Prytulska and Romanenko However, particles are never completely within this range, as no industrial process can totally eliminate coarser particles[6].

Results and discussion. The refining process is a disruptive one whereby the homogeneity of the chocolate suspension is impaired. Since the surface area of the nonfat particles is greatly increased, it becomes necessary to control the frictional heat

generated so as not to scorch the chocolate, but more importantly, not to eliminate a large proportion of volatile compounds which otherwise might contribute favorably to chocolate flavor.

The first and most obvious requirement of the conching process is re-establishment of a homogeneous mix after the disruptive effect of refining. The chocolate from the refiners, in the form of flakes and crumbs, must be worked so that it is transformed to a fluid paste.

It is desirable to review several of the more common conche types before discussing the functions of the process. Romanenko was a sea shell-shaped stone trough whose granite roller constantly moved the chocolate back and forth. This longitudinal conche is the oldest type of conche in use today and most closely resembles the original. It is common practice to process chocolate for 2 to 3 days, even up to 5, in the longitudinal model.

As labor and material costs increased, it became necessary to economize the process. Designed for reducing the time of treatment, the rotary conche accomplished mixing by means of a rotary stirrer which caused movement in a horizontal as well as in a vertical plane. Another modern high speed conche was ruggedly designed to work chocolate in wet and dry states. This unit has three horizontal agitator shafts with blades designed to both lift and shear the mass, and is jacketed for precise temperature control[7]. Dry conching in specially designed rotary conches is another relatively new development which shortens the time requirement while still achieving satisfactory results. The principle utilized in this process is to work the dry powder from the refiners against itself, with little or no addition of cocoa butter during the working. Because of the greater surface area exposed by a powder (as opposed to a fluid), and the local generation of frictional heat Syrokhman, evaporative chemical processes are facilitated.

There is much speculation within the trade that many of the conventional techniques universally used in the production of chocolate will be replaced by completely new processing methods. One such emphasis is being placed on continuous processing techniques. In the conching cycle, liquor is continuously pumped and sheared into a thin turbulent film Zadorozhnyi. As this film falls, it meets air which is moving upward. The air picks up moisture and unwanted volatiles from the chocolate and discharges these volatiles. A variation of this technique has been studied by, Ponomaryev who found that degassing thin layers of unconched chocolate under reduced pressure reduced the amount of volatile constituents present in the chocolate.

Syrokhman claims that new units called flavor reactors will eventually replace traditional conching. In this equipment, individual compounds or mixtures of compounds are subjected to the treatment essential for odor and flavor formation. Fat, which normally impedes the removal of steam volatile components and the formation of new flavor compounds, is absent.

A majority of manufacturers, however, still rely on traditional batch-conching methods to enhance the flavor and texture of chocolate.

Even though benefits of conching were recognized, no one knew with certainty the causes of improvement. The functions attributed to the conche were: expulsion of

the moisture still retained in the mass, loss of tannic acid and free acetic acid, and full development of aroma and homogenization of the processed mass to give the smooth texture. It was not until published results of his investigation of the process and suggested that the causes of improvement of the chocolate were the removal of air, a loss of moisture and volatile acids, and the smoothing of particles. Acetic acid was known to be liberated because its odor was very prominent in the air above a conche. Aasted also asserted that caramel would not form because the temperature was not high enough and the oxidases would not be effective due to their destruction during the roasting period. He also reported that the bitter-flavored theobromine and caffeine were not affected by conching[5]. However, he believed that oxalic acid was the most important of the acids in the cocoa beans as far as chemical changes were concerned. He stated that the oxalic acid increase during conching could be determined analytically. However, the total acid content was lower at the end, even when volatile acids were disregarded. Furthermore, he reported that the oxalic acid determination was not very reliable. To summarize Aasted's findings, one can say that conching has the following effects: reduction of acetic acid, total acid, tannins, water and proteins which get tanned and precipitate. As a result the pH increases from 4.9 to 5.7.

While Aasted measured different variables, Syrokhman, Zadorozhnyi, analyzed the factors controlling the development of a conched flavor. These factors are agitation, aeration, temperature and time. While a minimum agitation is required, violent mixing would only control the time required to accomplish the end result and to what extent forced aeration is required at a given temperature. The combinations of all these processing variables are infinite and when one considers the number of possible bean blends and conche designs it is easy to see how complex the analysis of conching can become[6].

Conclusions. The complexity of processing cocoa beans into chocolate is realized by the studies reviewed here. With the changing economic and marketing conditions of the bean-producing countries constantly before the chocolate processors, more detailed elaboration of the factors which control flavor and texture is extremely important[4,5].

Understanding the process of conching should lead to a more rational approach to conche design. This was the purpose of research conducted in Germany and reported by Ponomaryev. He placed emphasis on physical and physico-chemical processes of chocolate manufacture which he felt had been underrated for a long time. He emphasized that conching was a process where chemical changes are as important as the physical ones. There was little doubt in his mind that dispersion processes played a major part and that chemical changes occur not only in the volatile components but also in the non-volatile cocoa components such as polyphenols, carbohydrates and protein compounds. Unfortunately, he reported no data on these changes[7].

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ADMINISTRATION OF MEASURES FOR THE RESTORATION OF SOILS TRANSFORMED AS A RESULT OF MILITARY OPERATIONS

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Abstract. *The Earth is a wealth of society. Its role in addressing the food problem cannot be overstated. It is known that the population's demand for staple food products doubles on average every thirty years. The solution to this incredibly complex task primarily depends on the efficiency of land utilization. Observations are conducted using ground-based methods, primarily field-based techniques, and remote sensing tools. The establishment of correlation relationships between ground-based and remote sensing methods is carried out on dedicated test sites. The purpose of the article is to provide proposals for implementing measures for the restoration of lands transformed as a result of military actions. The methodology should include modern mathematical support, including principles of database creation, automated data processing and retrieval systems, and methods for real-time and long-term forecasting. For an accurate assessment of such transformations and the implementation of targeted regulation of soil processes, there is a need to organize systematic monitoring services to observe them. The absence of such monitoring can lead to irreversible degradation of the soil cover, which would later require enormous costs and time for restoration. It is clear that from both economic and socio-environmental perspectives, it is more practical and advantageous to prevent adverse changes rather than trying to remedy them later. By processing such information, it is possible to identify optimal natural conditions for various activities, predict both positive and negative factors for agricultural operations, and take measures to reduce the impact of negative factors on human life and activities. It is known that for a long time, observations were only conducted on changes in the state of the natural environment caused by natural factors. Large balanced ecological systems, geosystems, change extremely slowly under the influence of natural processes. These gradual evolutionary changes occur only over time measured by historical epochs. The deteriorating ecological situation in Ukraine, including the agroecological state of the soil cover, emphasizes the need for the State Agrochemical Service to transition from soil agrochemical surveys to comprehensive soil-agrochemical monitoring of agricultural lands. Such monitoring belongs to the ecological monitoring type and consists of three main components: soil surveys (including laboratory analysis), assessment of their agro-ecological condition, prediction of changes in relevant indicators, and soil fertility management, which refers to the specific properties of soils that distinguish them qualitatively from their parent geological formations.*

Keywords: *scientific and technological progress, soil formation process, degradation of the soil cover, anthropogenic factors, ecological systems, seasonal variations in vegetation biomass, technogenic transformation of soils.*

JEL Classification: H19, Q34
Formulas: 5; fig.: 1; tabl.: 0; bibl.: 17

Introduction. Natural changes in the environment, both short-term and long-term, are extensively observed and studied by existing geophysical services in many countries, including hydro-meteorological, seismic, ionospheric, gravimetric, magnetometric, and other services.

In order to distinguish anthropogenic changes from other natural changes, there has been a need to organize specialized research on the alterations of the biosphere under the influence of human activities [3].

The system of repeated investigations of one or more environmental components in space and time, with a defined purpose and according to a prepared program, has been proposed to be called "monitoring."

The term "monitoring" emerged prior to the United Nations Stockholm Conference on the Human Environment (Stockholm, June 5-16, 1972). The initial proposals for such a system were developed by experts from the Scientific Committee on Problems of the Environment (SCOPE) in 1979.

Indeed, the term "monitoring" is not just a new definition for the already existing geophysical services but refers to a system that is synthesized to detect anthropogenic effects on the environment, utilizing information and certain elements from the existing geophysical services.

When considering the main objectives formulated for the Global Environmental Monitoring System (GEMS) in terms of detecting environmental changes due to anthropogenic influences, it is important to note that there may not be any contradictions in the monitoring goal in the provided definition. However, efforts to detect and prevent natural disasters of meteorological or hydrological nature are carried out by existing meteorological and hydrological services, while the prevention of diseases is the responsibility of relevant health services and so on. These services certainly need to be developed, but it may not be appropriate to merge them into a single monitoring system [4].

It is worth noting that the system for monitoring anthropogenic changes in the natural environment is not fundamentally a new system that requires the organization of a network of new observation stations, lines, telecommunications, data processing centers, etc. It is an integral component of the comprehensive environmental monitoring and control system, which has already been developed in several countries.

Indeed, the system for monitoring pollution can and should be integrated into an existing environmental monitoring and control service, utilizing its experience, station network (with the addition of necessary new elements), telecommunications lines, and data processing centers, while developing specific components for pollution monitoring. This approach allows for the efficient use of resources and expertise already available within the established environmental monitoring framework.

As already noted, to ensure the functioning of a monitoring and control system for the environment that can detect changes caused by human activities, detailed information about natural fluctuations and changes in the environment is necessary. Conducting monitoring requires obtaining (or having) such information [5].

Monitoring encompasses the following main directions of activity:

1. Observing the factors that influence the environment and its condition.

2. Assessing the actual state of the natural environment.
3. Forecasting the state of the surrounding natural environment and evaluating its condition.

Therefore, monitoring is a system of observations, assessment, and forecasting of the environmental state that does not involve managing the quality of the environment or forecasting its state to prevent deterioration. It is evident that the organization of a monitoring system is a necessary condition for proper environmental quality management.

National monitoring refers to a monitoring system within a specific country. Such a system differs from global monitoring not only in terms of scale but also in the primary objective of obtaining information and assessing the state of the environment in national interests. For example, an increase in air pollution levels in specific cities or industrial areas may not have significant implications for assessing the state of the biosphere on a global scale. However, it is an important issue for implementing measures within that particular region and at the national level.

Certainly, a global monitoring system should be based on national monitoring subsystems and include elements of these subsystems. There is no need to fully incorporate these subsystems into the global system, as they are responsible for national issues and considerations.

Sometimes the terms "transboundary" or "international" monitoring are used. It is most appropriate to use these terms for a monitoring system that is utilized in the interests of multiple countries. They can be used to address issues related to the transboundary transfer of pollution between nations and similar matters.

Therefore, monitoring is a multifunctional information system. Its main tasks include: observing the state of the biosphere, assessing and forecasting its condition, determining the intensity of anthropogenic impact on the environment, identifying factors and sources of such impact, assessing the intensity of their influence.

Monitoring serves as a valuable tool for understanding and managing environmental changes, as well as for developing strategies to mitigate the impact of human activities on the biosphere.

Let's consider a universal scheme of an environmental monitoring information system that is applicable to the overall system as well as to any specific geophysical service within the system (such as a hydro-meteorological service or a pollution monitoring system). Since pollution monitoring is a relatively new element in the environmental monitoring system, let's focus on it in more detail.

The most universal approach to defining the structure of a monitoring system for anthropogenic changes in the natural environment is to divide it into blocks (Fig.1).

The figure illustrates individual blocks of the system, as well as direct and feedback connections between these blocks.

The "observation" and "state forecasting" blocks are closely related, as environmental forecasting is only possible with representative information about the actual state (direct connection). On one hand, the construction of a forecast involves knowledge of the patterns of natural environment changes, the availability of a scheme, and numerical calculation capabilities. On the other hand, the direction of the forecast

largely determines the structure and composition of the observed system (feedback connection).

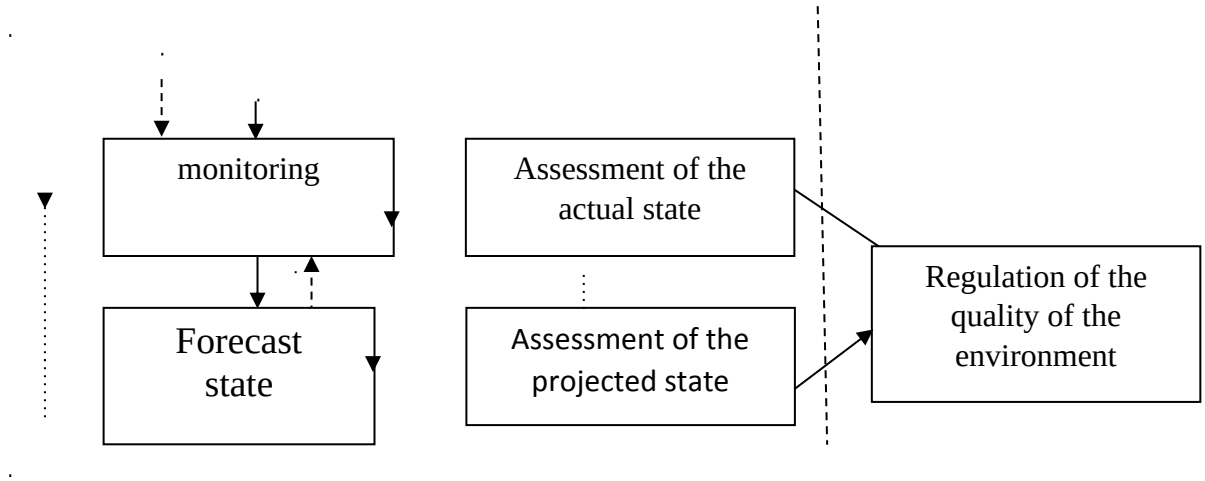

Figure 1. Monitoring Block Diagram

Data characterizing the state of the natural environment obtained from observations or forecasts should be evaluated depending on their application in different fields of human activity (using specially selected criteria). The evaluation aims to determine the damage caused by impacts on the environment, as well as to identify optimal conditions for human activities and refine existing ecological reserves. The purpose of such assessments is to determine permissible anthropogenic loads on the environment.

Observations of the environmental state should include monitoring of anthropogenic sources and factors (including pollution sources, harmful radiation, etc.), as well as the state of biosphere elements (including the response of organisms to impacts and changes in their structural and functional indicators). This involves gathering data on the pristine (or background) state of biosphere elements.

Soil monitoring is a system of observations, quantitative assessment, and control of soil and land use with the aim of organizing management for their productivity. It is, as mentioned before, a component of environmental monitoring and is part of the monitoring system for related environments and the biosphere as a whole. It is important to note that soil pollution, as the object of observation, has several significant specific characteristics.

Firstly, soil is the least mobile natural environment compared to, for example, the atmosphere or surface waters. The migration of pollutants in the soil occurs relatively slowly. As a result, high levels of soil contamination with certain substances are localized in the areas where they are released into the external environment. Additionally, gradual changes in the chemical composition of soils can occur, disrupting the integrity of the geochemical environment and living organisms.

The most intensive pathway for the transport of pollutants reaching the soil can occur through the atmosphere, in cases where contaminants from the soil enter the atmosphere through evaporation or with dust. Another relatively rapid pathway for the spread of pollutants is their leaching through surface waters. However, not all of these

transport mechanisms play a significant role in soil pollution. Under the influence of physicochemical factors and primarily through the activity of microorganisms, the decomposition of organic pollutants takes place. In some cases (such as soil contamination with benzo(a)pyrene, pesticides, and other substances), it is even possible to establish an equilibrium between their input into the soil and their degradation within the soil.

The concept and technical-economic justification for soil monitoring in Ukraine have been developed at the O.N. Sokolovsky Kharkiv Institute of Soil Science and Agrochemistry (UNDIGA) under the guidance of Academician V.V. Medvedev [32]. Its necessity is determined by four main factors:

The exceptional importance of maintaining soils in a state that preserves their capacity to regulate biogeochemical cycles, which serve as the foundation for human and biosphere life-support systems.

The significance of monitoring and preventing the negative development of soil formation processes that occur extensively across agricultural territories due to unsustainable human activities, resulting in dehumification, erosion, overuse, contamination, acidification, waterlogging, salinization, excessive peat extraction, and other detrimental phenomena.

The necessity for substantial improvements in soil fertility, productivity, and the quality of agricultural products, aiming to maximize the benefits from land reclamation and chemical treatments, overcome stagnation in crop yields, and enhance the overall quality of agricultural production.

The inability to establish an adequate assessment of the current state of the soil cover based on the available information, due to outdated soil survey data, limitations in scope, narrow target audience orientation, lack of data coordination, and the diversity of methodologies used by hydrogeological and reclamation expeditions, hydro-meliorative, sanitary-epidemiological services, and others. Consequently, there is a need for rational investment to address soil degradation phenomena.

Aims. The purpose of the article is to provide proposals for implementing measures for the restoration of lands transformed as a result of military actions.

The objects of monitoring include major soil types, subtypes, genera, species, and varieties, which are selected within a soil province and reflect the mosaic nature of the soil cover, as well as all types and levels of anthropogenic pressures. Permanent monitoring points include natural objects such as forests and reserves, high-level reference objects of agricultural land use (state farm experimental stations, stationary trial plots, farms implementing contour-meliorative farming systems), and ordinary farms. Considering that reliable assessment of soils, especially the prediction of their fertility, requires information on climate, parent rock materials, water (surface or, in extreme cases, the first horizon of groundwater), quantity and quality of crop production, these components are also included in the objects of monitoring. This approach allows for the integration of soils with other environmental elements, and with a similar development of monitoring for fauna, flora, and humans, it provides a comprehensive understanding of the state of the biosphere.

The reliable diagnosis of soil conditions requires the following information:

changes in the structure of the soil cover, transformations of land use, assessment of the rate of change in key soil properties (organic matter content, pH, cation exchange capacity, physical, water, air, and nutrient regimes, biological activity of soils, pollution levels); evaluation of erosion intensity, indicators of meliorative state (quality of irrigation water, level and mineralization of groundwater, salinization of soils as a whole and the root zone, secondary salinization, rates of reclamation of drained peatlands, transformation of organic substances, secondary ironization), and finally, the assessment of effective soil fertility.

The list of field and laboratory analytical works depends on the minimum required number of indicators that comprehensively characterize the aforementioned processes. The frequency of studies depends on the dynamics of indicators under natural and anthropogenic conditions. The total number of monitored indicators is 115. One complete monitoring cycle lasts for 5 years. Special types of operational reporting should be provided for indicators that characterize crisis environmental situations such as erosion, pollution, and product quality.

Methodology. Observations are conducted using ground-based methods, primarily field-based techniques, and remote sensing tools. The establishment of correlation relationships between ground-based and remote sensing methods is carried out on dedicated test sites. The methodology should include modern mathematical support, including principles of database creation, automated data processing and retrieval systems, and methods for real-time and long-term forecasting.

Results. The main sources of radiation pollution are nuclear power plants, nuclear fuel production facilities, nuclear weapon storage facilities, nuclear waste processing plants, and waste disposal sites.

Radiation monitoring is an information and technical system for the observation, assessment, and forecasting of the radiation state in the biosphere.

The main and potential sources of radiation pollution in peacetime are nuclear power plants, nuclear fuel production facilities, nuclear weapon storage facilities, nuclear waste processing plants, waste disposal sites, and others.

Currently, there are 14 operating nuclear reactors in Ukraine. A significant portion of Russia's nuclear power plants are within the potential transboundary impact zone in the event of an emergency situation. In medicine, industry, and scientific institutions, tens of thousands of radioactive sources are used. A significant amount (approximately 800 PBq) of radionuclides is located within the Shelter Object of the Chernobyl Exclusion Zone [6].

Despite significant efforts to enhance the safety of nuclear reactors and other nuclear facilities, they all remain sources of nuclear hazards and potential sources of radiation contamination in the environment.

The main pollutants in radiation contamination (such as in the aftermath of a nuclear accident) are radioactive emissions (in the first hours following the accident) and internal exposure from radionuclides entering the human body through food and water.

The main objectives in developing methods for comprehensive radiation monitoring are as follows:

1. Development of air sampling methods, measurement of specific α-, β-, and γ-activities, and procedures for dose assessment.

2. Development of γ-spectrometry methods and corresponding dose assessment procedures.

3. Strategy and techniques for sample collection, measurement of specific activity, and dynamic modeling for assessing collective dose.

Currently, there is a wide range of equipment available for sampling and measuring the activity of air samples. However, there is still no methodology that fully satisfies the requirements for post-accident radiation monitoring. In particular, there is no technique that allows for separate measurements of different chemical forms of radioiodine. Significant improvements are needed in the methodology for chemical separation and measurement of pure α- and β-emitters in emergency conditions.

There is a wide range of equipment for γ-spectrometry; however, this equipment is designed for measuring natural and long-lived radionuclides. In the case of short-term assessments, the power of exposure dose rate can be very high, reaching up to 1 mSv/h. In such fields, standard germanium detectors do not work due to high pulse loads, and spectrometers based on sodium detectors do not have sufficient energy capabilities required for spectrometry of fresh radioactive fallout.

For the majority of the population in Ukraine living in contaminated areas, the main source of effective collective dose is food consumption. For example, 70-90% of Cs-137 intake is associated with the consumption of milk.

Long-term radiation doses to the population from Cs-137 and Sr-90 in food products depend on the different chemical behavior of radionuclides in the soil. After deposition on the soil, cesium is fixed in the mineral fraction of the soil and becomes less available to plants. It is believed that the process of fixation in the mineral fraction of the soil is completed within the first few years, although a significant portion of Cs-137 remains in chemical forms that are readily available to plants [7].

Radiation monitoring methods should include both the assessment of the contamination source and the evaluation of environmental contamination in the close zone (up to 5 km) and the distant zone (up to 100 km). Specific timeframes, data formats, procedures for data transmission and utilization for dose prediction, and decision-making recommendations should be developed.

The "GAMMA" radiation monitoring system has been developed since 1994 within the TACIS program. The implementation of the first stage of this project involves the creation of a network of three radiation monitoring stations in the vicinity of the Rivne, Zaporizhia, and Inchalin (Belarus) nuclear power plants.

The main objectives of the GAMMA system are:

- Detection of significant exceedances of radiation levels in the monitored areas.
- Notification of responsible personnel about such exceedances and providing them with the necessary information to take protective measures.

The GAMMA-1 system in Ukraine includes a national center (Information and Crisis Center, ICC) located in the Ministry of Ecology and two local centers in Rivne and Zaporizhia. Additionally, the system comprises:

- 27 power dose rate γ-radiation monitoring stations installed in the vicinity of the

Rivne nuclear power plant.
- 11 power dose rate γ-radiation monitoring stations installed in the vicinity of the Zaporizhia nuclear power plant.
- 1 automatic station for monitoring α-β-activity of aerosols, located 5 km away from the Rivne nuclear power plant.
- 1 automatic station for monitoring γ-activity of water at the Rivne nuclear power plant.
- 2 automatic meteorological monitoring stations (at the Rivne and Zaporizhia nuclear power plants).

Information from the respective sensors regarding radiation doses is transmitted to the local centers via radio channels and then relayed to the national center through dedicated telephone lines. The Ministry of Emergency Situations of Ukraine and regional subdivisions of the ministry in Rivne and Zaporizhia also have real-time access to the GAMMA-1 system (online mode).

From 1992 to 1997, a pilot project of the remote monitoring system for nuclear power plants was implemented at Unit 5 of the Zaporizhia nuclear power plant. The goal of the remote monitoring system was to obtain and transmit independent information about the state of the nuclear power plant to the ICC in real-time. This project was carried out within the cooperation program with the Federal Ministry of Environment of Germany.

In 1997, the German side provided computer and switching equipment for the reception, processing, and visualization of parameters at the ICC. The installation of a dedicated telephone line between the ICC and the Zaporizhia nuclear power plant was carried out, enabling the automatic real-time transmission of data to the ICC.

The Ministry of Ecology and Natural Resources plans to expand the remote monitoring system to all nuclear power plants in Ukraine (with the proper support from Germany and the European Union). In parallel with the GAMMA system, the European Union has developed and implemented the RODOS system (Real-Time On-line Decision Support System) as part of the TACIS program. RODOS is a European real-time decision support system for external emergency response in the event of nuclear accidents. The RODOS project involves scientists from over 40 institutions in Central and Eastern European countries, Ukraine, Russia, and Belarus.

The main objectives of the RODOS system are to provide tools for processing and managing large volumes of meteorological and radiation information, to assess and forecast the radiation situation in the event of an accident, and to model the use of countermeasures and response options during emergencies.

Discussion. The methodology defines the sequence of obtaining primary baseline information necessary for assessing the radiation situation in areas affected by radioactive contamination [8].

The land use survey consists of two stages: the first stage involves conducting γ-survey, which allows for precise determination of optimal sampling locations, and the second stage involves soil sample collection at these optimal locations. The **γ-survey** is conducted using calibrated and validated SRP-68-01 instruments at a distance of 1 meter from the ground surface. Prior to the survey, comprehensive data collection and

analysis of all available information on the area are conducted, based on which the subsequent strategy for refining the radiation situation is determined.

If reliable information is available regarding the contamination density determined by express methods and the results of γ-spectrometry, then conducting only a control sample collection, consisting of 3-4 samples, may be sufficient. After processing and comparing the results with previously obtained data, this can serve as a basis for either proceeding with further refinement work or discontinuing it. In cases where the available information raises doubts, a comprehensive refinement of the radiation situation is conducted. It is also necessary to consider the absolute values of contamination density in agricultural fields. Areas where contamination density exceeds 5 Ci/km^2 should be surveyed in more detail. The ratio of work volumes between contamination densities below 5 Ci/km^2 and above 5 Ci/km^2 should be 1:2. The level of detail in the survey in each agricultural field is determined by specialists from the Department of Environmental Protection and Natural Resources, using regional and provincial maps of radioactive contamination.

The cartographic basis for conducting γ-survey consists of land use plans executed at scales of 1:10,000 and 1:25,000. These plans should indicate the boundaries of fields, meadows, pastures, and forests, transportation routes, hydrographic network, contours of settlements, field and crop rotation designations, soils, and other supplementary information that characterizes each specific land use area. It is also necessary to have information about soil cultivation practices for each field after 1986. The cartographic basis used for soil-agrochemical surveys in agricultural fields is highly suitable for conducting γ-survey. However, unlike the previous method, the peculiarity of γ-survey lies in considering the entire field as the elementary plot, with route lines marked every 200 meters. The start and end points of the route should be placed no closer than 50 meters from the field boundary. While moving along the route, the surveyor performs indicative measurements using the SRP-68-01 instrument. The measurement results are recorded as follows: in case of minor changes in instrument readings (up to 30%), the background gamma values are marked on the plan along the route line every 200 meters. If, during continuous observation, the difference between instrument readings exceeds 30%, this result is recorded on the measurement plan, and additional surveying is conducted within a radius of 20-30 meters around it to determine the size of the anomalous spot and to map it on the cartographic basis.

After completing the first stage of the survey, the second stage, which involves soil sample collection for assessing surface radioactive contamination, begins. In conditions of homogeneous background gamma radiation, where the difference between individual measurement readings does not exceed 30%, one sample is collected within the field. A composite sample is formed by combining individual soil samples taken from 2 or 3 fields in the crop rotation if the contamination is uniform across the area. The sampling locations within a specific field are preferably distributed evenly, taking into account micro-landscape features.

If there are one or several anomalous spots covering more than 10% of the total field area, it is necessary to collect samples in these locations. In the areas where sampling is deemed permissible, the dose rate is measured at a height of 1 meter and

0.03-0.04 meters above the ground surface using instruments such as DRG-01T, DBG-06T, and IR-02. The location is considered suitable for sample collection if the dose rates at the specified heights differ by a factor of 1.3.

The selected location should be flat, homogeneous, and open. Individual soil samples are collected using a known area auger to a depth of 20 cm. The composite sample consists of no fewer than 5 individual samples with a total volume of 1500-3000 cm3.

Each individual sample is weighed, excluding the label, and its mass is recorded in the catalog (record). The contamination density calculation is performed using the following formula:

$$P = 2.7 * 10^{11} * \frac{A*M}{m*s*n} \qquad (1)$$

where: A - activity of the sample on the day of measurement, in Becquerels (Bq), M - mass of the composite sample, in kilograms (kg), m - mass of the individual soil sample, in kilograms (kg), s - area of the sampling device, in square meters (sq. m), n - number of individual soil samples.

To determine the contamination density of the territory with plutonium, measurements are conducted on intact areas using a standard ring with a diameter of 140 mm and a height of 50 mm. After collection, each ring is packaged in the same manner as the soil samples obtained using the auger.

To determine the contamination density, a comprehensive radiological survey of all farms located within the territory of radioactive contamination was completed using the methodology in 1988. However, as proven by the Ukrainian Institute of Agricultural Radiology, the most straightforward, significantly more productive, and reasonably accurate method for comprehensive radiological survey of agricultural lands and its refinement is the method of converting gamma survey data into soil contamination density with radiocesium through a proportionality coefficient. This coefficient is determined by the following formula:

$$K = \frac{An}{R\gamma} \qquad (2)$$

where K - experimentally determined proportionality coefficient between gamma background and soil contamination density; An - average contamination density determined by spectrometric analysis of 10-15 soil samples, Ki/km^2; Rγ - gamma background measured by the SRP-68-01 device at the center of the sampling area at a height of 1 meter above the ground, mR/h.

To experimentally determine the proportionality coefficient K for specific types of agricultural lands (fields, meadows, pastures) in typical locations based on the nature of the soil cover and contamination, test plots measuring 10x10 meters are selected. Within these plots, 10-15 soil samples are collected using a soil auger to a depth of 20 cm, and the gamma background radiation level is measured at the center of each plot using the SRP-68-01 device. The collected soil samples are dried, mixed, and the concentration of the radionuclide is determined through spectrometric analysis. To convert the obtained results to kg of soil, the specific mass of the soil is also determined. The soil contamination density is calculated using the formula:

$$A_n = 2 * 108 * C_{sr} * d \quad (3)$$

where: An - soil contamination density by the radionuclide, Ki/km^2; Csr - average radionuclide concentration in dry soil, Ki/kg; d - specific mass of soil, g/cm^2.

The soil contamination density can also be calculated using another formula:

$$A = \frac{C_{sr} * m * 31.85 * 10^8}{r} \quad (4)$$

where: Csr - average radionuclide concentration in dry soil, Ki/kg; m - average mass of the soil sample in the auger volume, kg; r - radius of the auger, cm.

By substituting the calculated average contamination density value into the formula (2), the proportionality coefficient between the gamma background radiation and the contamination density is determined. The average value of the proportionality coefficient (based on the number of experimental test plots) is used for calculating the soil contamination density in the specific region.

Once the experimentally justified and weighted proportionality coefficient is obtained, you can proceed with conducting a comprehensive radiological survey or refining the contamination density of the soils based on the previous survey data (e.g., from the 1988 survey) or by conducting another round of γ-survey.

The measurements of γ-background using the SRD-68-01 device are substituted into the formula:

$$A_n = K * P \quad (5)$$

After simple calculations, the contamination density indicators of the soil with radiocesium are obtained. Based on these indicators, cartograms, field contamination information, and radiological passports are compiled for each agricultural enterprise.

Based on the contamination density cartograms, all fields should be divided into three groups: up to 5 Кі\км^2, 5-10 Кі\км^2, and 10-15 Кі\км^2. If possible, within each group of fields, it is advisable to carry out land reclamation considering the soil contamination density and the specific accumulation of radiocesium by agricultural crops.

The results of the radiological survey are also used for the preliminary assessment (prediction) of the potential for obtaining agricultural crops, meat, and milk with levels of radionuclides that exceed the permissible limits.

Conclusion. In conclusion, the deteriorating ecological situation in Ukraine, including the agroecological state of the soil cover, emphasizes the need for the State Agrochemical Service to transition from soil agrochemical surveys to comprehensive soil-agrochemical monitoring of agricultural lands. Such monitoring belongs to the ecological monitoring type and consists of three main components: soil surveys (including laboratory analysis), assessment of their agro-ecological condition, prediction of changes in relevant indicators, and soil fertility management, which refers to the specific properties of soils that distinguish them qualitatively from their parent geological formations.

Unlike soil agrochemical surveys, which have been conducted periodically every 5 years since 1965 by regional design and search stations for chemicalization in almost all farms, comprehensive soil-agrochemical monitoring raises this crucial area of

agrochemical service to a higher scientific and methodological level, primarily through prediction and quality assessment of soils using a combination of agrochemical, agrophysical, and toxicological indicators.

Considering this, it is advisable to study and apply the experience of foreign countries in organizing agricultural landscapes in soil monitoring (USA), mitigating the negative consequences of chemicalization (Japan, the Netherlands, Sweden), radioecological research (Japan, Sweden), marketing nature conservation technologies (Germany, Japan), computational techniques for monitoring (USA, Bulgaria), organizing quality water supply and product quality control (France, Austria), providing climate information to consumers (France, the UK), and conducting environmental education work (Germany, Switzerland).

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DIRECTIONS MANAGEMENT OF ECONOMIC SECURITY OF THE STATE IN THE CONTEXT OF GLOBALIZATION PROCESSES

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Abstract. *For the current state of Ukraine's economy as an independent state and its establishment as a subject of the world community, the problems of ensuring sustainable socio-economic development, formation of a mechanism for counteracting internal and external threats, raising the living standards of the population, and developing the system of international economic interdependence are particularly relevant. As the world experience shows, damage to economic interests is caused by various attempts: disruption of the normal state of international trade (application of embargoes, introduction of excessive quantitative and tariff restrictions, artificial increase or decrease in prices for certain goods), creation of obstacles to the international movement of technologies, violation of commercial practices, etc. In the current conditions of development of the Ukrainian economy, especially against the background of globalization, this problem is particularly acute. At the same time, the problem of economic security in the context of further globalization is gaining the status of the highest priority in public policy. It is of exceptional importance in the argumentation of political decision-making. Scientific and conceptual foundations of economic security ensure the formation of appropriate policies at the level of the state or lower organizational levels. The system of ensuring economic security involves continuous monitoring of socio-economic processes in terms of their impact on the state of economic security, assessment of strategic programs and regulations from this perspective, and analysis of the effectiveness of current decisions in the field of economic policy. The aim of the article is to study the main areas of management of the economic security of the state in the context of globalization processes. The article analyzes the conceptual foundations and conceptual and categorical apparatus of the problem of ensuring economic security of Ukraine in modern conditions, analyzes the peculiarities of economic security of Ukraine in the processes of world globalization, and identifies the main directions of economic security management in the context of globalization processes.*

Keywords: *economic security, state, globalization, business processes, system-structural approach, management.*

JEL Classification: E6, H83, M21, F52

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Introduction. In the context of accelerated globalization of the world economy, one of the most important economic problems in Ukraine is the growth of threats, in particular, to the economic security of the state. Problems in the field of economic security do not allow creating conditions for economic growth, complicate effective economic restructuring, and have a negative impact on the financial, tax, insurance, and budgetary processes of the country.

In addition, global experience shows that without an active regulatory role of the state, there can be no efficient, socially oriented market economy, let alone effective economic security. There is not a single country with a highly developed economy where the state has eliminated itself from regulating key socio-economic processes [1].

Neglecting economic security can lead to catastrophic consequences: the decline of economic sectors, bankruptcy of enterprises and undermining the nation's life support system with the subsequent loss of sovereignty. These problems have arisen primarily due to the inconsistency of the country's social and economic development and the lack of scientific justification for the ongoing reforms.

A comprehensive study of these problems, calculation of possible outcomes, formulation of the goal of reforms and assessment of socio-economic consequences are necessary, which in turn will contribute to economic security.

Literature review. The study of the essence of economic security at the state and regional levels in the context of globalization is studied in the works of D. Burkaltsev, Z. Varnalii, O. Vlasiuk, V. Yevdokymenko, Y. Zhalil, O. Nosova, A. Mokii, N. Mikula, A. Sukhorukov, Y. Kharazishvili, I. Shkola, M. Fleichuk. While studying the contribution of scholars to the development of this issue, it should be noted that a wide range of theoretical and applied issues require further development, research and improvement.

Aims. The purpose of the article is to study the main directions of managing the economic security of the State in the context of globalization processes.

Methodology. For the decision of this aim such methods of research were used: supervision and generalization; organization of all basic elements; method of scientific generalization, that gave an opportunity to set forth conclusions.

Results. For the current state of Ukraine's economy as an independent state and its establishment as a member of the global community, the problems of ensuring sustainable socio-economic development, forming a mechanism to counter internal and external threats, improving living standards, and developing a system of international economic interdependence are particularly relevant. The totality of these problems and the algorithm of their solution are closely related to the category of "security", which means "mastery of the situation" in Greek. Changes in internal and external factors of the national economy development actualize the study of the issue of ensuring the economic security of the state.

Today, Ukraine is an integral part of the global economic space, which is characterized by a high level of internationalization of economic relations. The integration of the economic system is a natural process.

Economic integration implies a number of structural changes in the internal system, which in turn implies the complication and differentiation of many political

and economic processes not only at the national but also at the regional level. Therefore, the essence of economic security in the context of globalization at the national and regional levels is determined by the ability of the economic system to prevent threats at both the global and local levels.

That is, economic security should be viewed as a complex and multifactorial system that is the material basis for the formation of other components of national security. The state must ensure a level of security that guarantees internal and external stability necessary for normal economic functioning, achievement of a high level of competitiveness and active participation of the country in the international division of labor.

The next step in the study of economic security is to analyze its components. Components are the elements that are necessary to create effective and reliable security. Usually, economic security is represented by internal and external subsystems, which have their own components:

- external subsystem of economic security - technological, commercial, financial;
- internal subsystem of economic security - production and technical, food and raw materials, energy, environmental, information (Fig. 1).

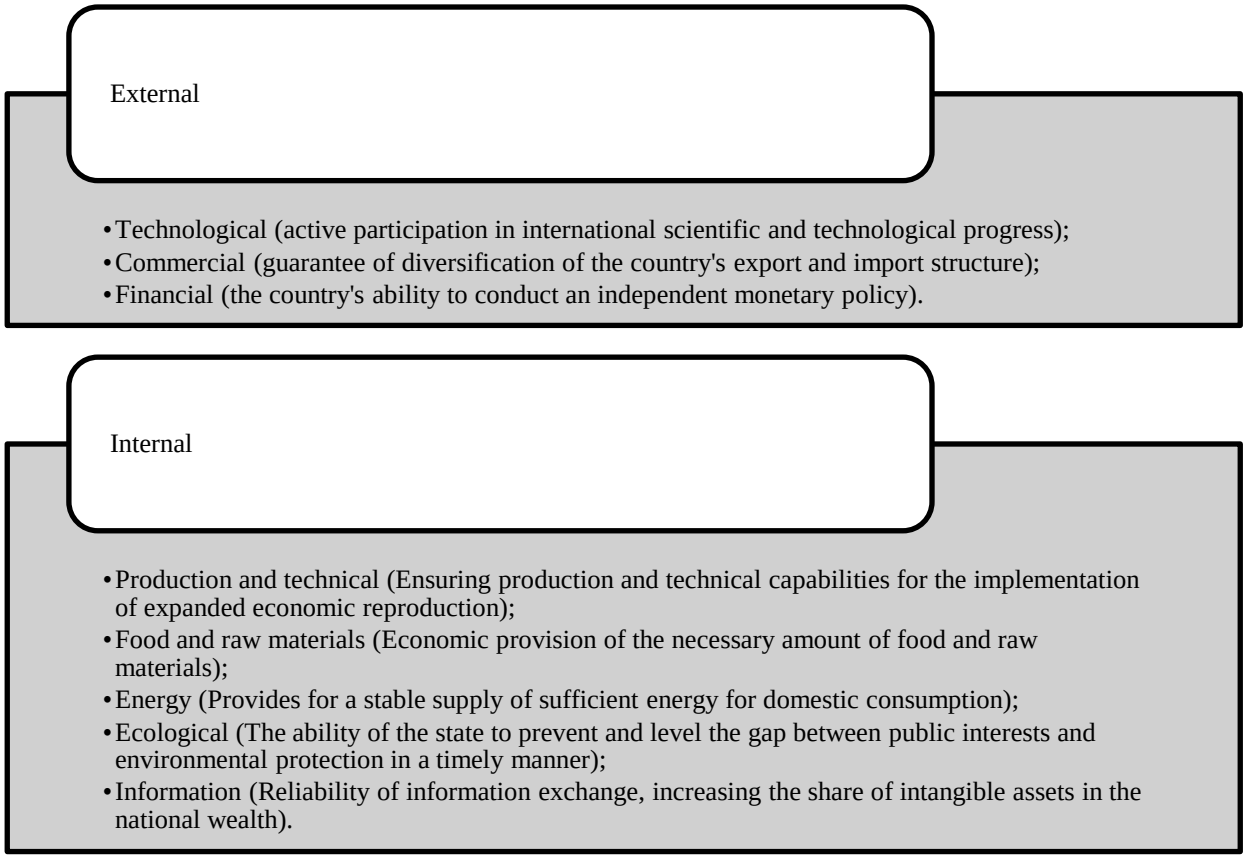

Figure 1. Components of economic security of the state

Source: developed by the author based on [1-17]

The economic integration of the state can also be seen as a process of formation of a new organic whole, where a new system of relations based on new principles is created between its regional components. It should be emphasized that a system of connections is formed between the components, which has the character of an integral structure.

Globalization at the regional level is determined through the manifestation and actualization of a number of phenomena, such as: internationalization of a large number of economic and production processes; creation of more effective forms of economic activity; reorientation of production to new markets; access to the global information space with its characteristic free distribution of information, technologies and knowledge; increasing the value of innovations; universalization of standards; access to global capital markets; access to a wider range of services; qualitatively new attitude to the use of labor force; creation of new principles of recruitment and formation of labor resources; association of infrastructures (transport, information banking, etc.); creation of qualitatively new requirements for factors of production and their distribution; free distribution of the results of economic activity, development of trade; a change in the traditions and throwing qualities of the population; intensification of migration processes; social and demographic changes [2].

The conceptual and methodological planning of the directions of ensuring the economic security of the State in the context of globalization, which is a multifaceted category and consists of a structure (set) of a significant number of interrelated and interdependent system components, requires the application of a system-structural scientific approach.

The etymological essence of the systemic-structural approach is based on the understanding of the essence of the "systemic approach", which makes it possible to determine the most valuable structural and dynamic properties of an object that determine its integrity. The systemic approach defines a fundamentally new way of conducting research, which makes it possible to identify the typology as fully as possible, to determine the structure and logic of interconnections of the elements of the object to determine the integrity of its functioning. At the same time, the structure is a set of stable relationships between a set of components of an integral object. Thus, the system-structural approach, which was studied in detail in Chapter Three as one of the leading methods in the methodology of ensuring the economic security of the state, makes it possible to determine the structure of the system and interrelationships as an element of the economic system of the state, typology, logic, and sequence of these interrelationships [3].

The systemic-structural approach to ensuring economic security is a qualitatively new level of cognition of the object and process of ensuring economic security of the State as a structure of the State's economic security system and the process of the mechanism for ensuring economic security, which are a set of methods, measures, means, and instruments for ensuring economic security of the State.

Despite the fact that the basic levels of economic security are the level of the State as the macro level and the level of the enterprise as the micro level with stable defined subjects of economic security management and its provision, the meso level should be

given great importance as it is a set of production and economic complexes that create the potential of the domestic economy and competitive products. According to the systemic-structural approach, economic security is a polystructural, multi-level, hierarchical system that combines a horizontal (functional-component) system of components (and a vertical structure of a hierarchy of levels), which has a complex hierarchical structure [4].

In a structured management activity, planning is the basis for forming a set of actions to ensure economic security. Planning in ensuring economic security determines the prospect and future state, ways and directions of implementing the economic security strategy. Accordingly, strategic planning in ensuring economic security is actions and decisions to develop strategic directions and tasks necessary for the implementation of the strategy of integrated competitive development in ensuring the economic security of the state. Strategic planning outlines areas of action for a comprehensive solution to the problems of functioning in the domestic and foreign economic markets: ways of international cooperation, institutional, regulatory and legal support and other areas.

Accordingly, the strategic planning of the main dominant directions of ensuring the economic security of the state is formed taking into account both the vertical hierarchy and the horizontal structure, and each direction can be formed and implemented at the appropriate level of the hierarchy (institutional level of the macro level of the state), or with the participation and constructive interaction of several different levels. At the same time, the main strategic directions of ensuring economic security are aimed at increasing the overall level of economic security of the state and the state of each individual component of economic security [5].

Economic security policy, as it existed until recently in the West, was predominantly defensive and dealt with the defense economy, aspects of trade and investment that could threaten national security, such as arms exports or investments by a foreign organization in another country's military production; export controls; cybersecurity and data protection.

Today, the vector of economic security of developed countries is changing - in 2017-2022, they resorted to developing and strengthening offensive policies (financial import/export restrictions, organized boycotts, asset freezes, economic sanctions, deterrence and response to economic coercion, trade/technology/travel bans, embargoes, no-fly/no-movement zones, blockades, strengthening the resilience of supply chains, combining economic security with resilience (the erosion of the modern international order encourages states to prioritize the protection of their own interests over collective benefits).

Multilateral economic diplomacy and global summits (G7, G20) play an important role in the implementation of this policy. This trend in the development of economic security policy has been observed recently in Ukraine. Thus, economic security is one of the most dynamic policy areas, the scope of which is rapidly expanding. In Ukraine, the issue of economic security has been a key element of the national security paradigm since the first years of independence, attracting considerable attention of domestic experts and scholars.

Strategic planning of the areas of economic security is a complex category and involves close interaction of components, subjects, measures, and means, which is why there is a comprehensive study of the areas and the formation of a general mechanism for ensuring the economic security of the state with a set of tools, measures, and means that accumulate human, financial, technical, and human resources in ensuring economic security and direct them in accordance with the defined areas of strategic development. Thus, the complexity of the methodology determines the complexity of directions, forms the complexity of measures, which in turn are implemented through the complex action of the mechanism of ensuring the economic security of the state and give an overall economic and social effect.

In addition, ensuring the economic security of the State is based on strategic management and two main components as prerequisites for the effectiveness of the strategy: the need to ensure the security of the integration process and increase competitiveness. Ensuring economic security in the current conditions of globalization, European integration and the impact of the factors of the ongoing economic crisis is a systemic and complex issue, since it cannot be realized by implementing separate fragmentary measures [6].

To ensure the economic security of the state, it is necessary to systematically organize a set of actions at different levels of government, initiate changes in foreign and domestic economic strategy and policy, and form a set of directions for ensuring the economic security of the state in accordance with the chosen vector of economic political development and the adopted strategy for ensuring economic security. At the same time, all levels should interact in this matter, from the international level, which performs regulatory functions, to the state institutional level and to the level of individual industry-forming enterprises.

Thus, according to the results of the empirical analysis, the main directions in ensuring economic security in these components are as follows: international cooperation, institutional, regulatory, information, infrastructure, research, innovation, education, organizational, management (development management), and production and technological directions.

Ensuring the security of the integration process combines such areas of ensuring the economic security of the state as international cooperation, institutional, regulatory, informational and infrastructural [7].

Given this information, it is possible to formulate the main measures to ensure Ukraine's economic security (Table 1).

Since integration is a special stage in the process of internationalization of economic processes, leading to the creation of a new integral economic complex and determined by the interpenetration and interweaving of national production processes, which leads to profound structural changes in the economies of the participating countries, it is necessary to ensure the security of integration, namely the need for purposeful regulation of integration processes, the formation of an institutional and regulatory framework and bringing it in line with existing international norms and standards.

The international cooperation direction determines the activities of the Government, the Verkhovna Rada, and the Cabinet of Ministers in establishing close cooperation with international organizations and active economic, political, and cultural integration of the country into European cooperation, as well as intensifying the work of domestic industries in the international market.

Table 1. Key measures to ensure the economic security of the state

№	Main events	Management level	
		National level	Regional
Information and analytical activities			
1	Monitoring the vulnerability of economic interests	Monitoring threats to Ukraine's economic interests	Monitoring the level of socio-economic development of the regions
2	Current and forecast economic development estimates	System of indicators for assessing the economic development of Ukraine	System of indicators for assessing the economic development of Ukraine
Measures of regulatory influence			
1	Improving the legal framework for institutional reforms	Adoption of laws, codes, decrees of the President of Ukraine, resolutions of the Government of Ukraine, etc.	Adoption of resolutions of the legislative and executive authorities of the regional level within their competence
2	Eliminating crisis trends	In the country as a whole, in individual industries, regions	In the region, cities, and enterprises within the scope of competence
Direct action measures			
1	Crisis recovery programs	Ukraine	Region (administrative area)
2	State regulation of regional development	Developing and implementing targeted programs for socio-economic development of the regions	Participation in the implementation of state targeted programs for the socio-economic development of regions and attraction of extra-budgetary funds
3	Countering threats to the country's interests	Improvement of the financial system, lobbying for the interests of domestic producers in the international market, and maximizing the level of regional economic development	Improving the economic, social and budgetary efficiency of regional (administrative) management

Source: developed by the author based on [4-17]

The institutional direction determines the work of state legislative and executive authorities in the development of state institutions and economic relations in the domestic market and when entering foreign markets, monetary trade policy, and the development of mechanisms for regulating the domestic market.

The regulatory and legal direction defines and regulates changes in the current legislation that need to be made to ensure economic security and sustainable development, initiated by the state itself, represented by state legislative bodies, as well as by business, associations, unions of enterprises, the public and citizens' associations.

The information direction regulates the changes that need to be made to ensure the information security of the country, its economy and public life. Such changes are primarily related to the formation and implementation of information policy and information management as a new level of development of civil society and public consciousness [8].

The research and innovation education area determines the vectors of development of the innovation and scientific and educational sphere aimed at scientific and technological innovation development, training of highly qualified specialists and specialists with the necessary qualifications to meet the needs for human resources and compliance with international standards of knowledge-intensive products, processes and production technologies, management of production, marketing and other processes. This area forms the innovation and human resources potential, which is also its main resource for dynamic growth.

Infrastructure determines priorities in the development of the country's transport, logistics, and communication infrastructure. This area is directly managed by state and local governments, local communities, and enterprises. The infrastructure direction requires significant material resources and coordination of joint actions of all structures, and it is strategically important because it allows raising the level of overall economic development not only of the economy but also of social life and is the basis of economic development, while the level of economic security is its effective indicator [9].

The organizational direction determines measures to organize interaction between various structures, state and non-state, economic entities of various forms of ownership in the direction of organizing joint measures to ensure the economic security of the state, their coordination, formation of a set of joint actions and practical implementation of the mechanism for ensuring economic security.

The management direction in ensuring economic security determines at the conceptual and methodological level the basic modern directions of development management, which outline and determine the vectors of economic development in general and, through its development, increase the competitiveness of enterprises and their products and improve the production, technical and innovative level, make them progressive and competitive in the world market, and, accordingly, as a result of all these changes, the level of economic security increases. The development management direction belongs to the areas of long-term perspective strategic planning, and its results have a prolonged effect and provide not only economic, social but also synergistic effects.

The production and technological direction is realized by the efforts of the state and the enterprises that form it, both at the level of individual entities and their associations. The production and technical direction is the condition, safety, and production and technical capacities of enterprises that constitute their main production potential and production base. In fact, the level and state of production forms all other spheres of activity of a production enterprise, it is the basis - the base of the economy, and the state and level of not only the production component but also the economic security of the state in general depends on it [10].

At the same time, in order to ensure economic security and European integration processes, it is necessary to amend legislative acts in order to ensure the economic security of the country, monitor the state of economic security and the processes of the country's accession to the GATS and WTO and other international organizations, strengthen control over the conclusion of international agreements and their ratification, and others.

Conclusion. The current trend in ensuring the economic security of the State is the adoption of intra-sectoral agreements and programs to ensure economic security at the level of industries and intra- and inter-sectoral development. The subjects of regulatory and legal support of economic security that should initiate and implement this area are the state legislative and executive authorities, relevant ministries and departments, business associations and unions, which together can collectively lobby for appropriate changes to the country's legislation and develop mechanisms for its implementation, the public and citizens' associations through influence on the electoral process and the formation of the legislature both at the micro level of individual enterprises as labor collectives, trade unions.

Research, education, innovation is related to the state of innovative scientific and technological development of the country, the level of vocational education in Ukraine, the level of creation and development of technologies, the volume and importance of fundamental and applied research and research work, the creation of world-important innovations and their implementation in the production process, commercialization of innovations, the level of transfer of innovations outside the country, etc.

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CHAPTER 2
LEGAL RELATIONS: FROM THEORY TO PRACTICE

IMPLEMENTATION OF INTERNATIONAL EXPERIENCE OF LEGAL REGULATION AND STATE MANAGEMENT OF ENSURING THE ECONOMIC SECURITY OF THE STATE IN UKRAINE

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Abstract. *In modern conditions, the problem of implementing the international experience of public administration and legal regulation to ensure the economic security of the state is extremely acute, since in many spheres of social life we use the experience of the countries of the world without taking into account the peculiarities of the implementing country. The purpose of the article is to provide recommendations for Implementation of international experience of legal regulation and state management of ensuring the economic security of the state in Ukraine. The basis of the research methodology is the study of legal acts of the countries of the European Union, the United States of America, Japan, China and others in the context of ensuring economic security. The main methods that were used are the method of analysis and synthesis, comparative analysis, generalization and visualization. The main systems and models of national security of the countries of the world were systematized. Studying the international experience of public administration in ensuring the economic security of the state made it possible to single out their common (all the studied countries take care to minimize risks in important areas of public life) and distinctive (not all states have separate legal acts regulating the process of public administration in the sphere economic security) features, to analyze the peculiarities of the state management mechanism for ensuring the economic security of America, Europe and Asia. The main threats that negatively affect the economic security of Ukraine were systematized. The main areas of ensuring economic security have been systematized in accordance with the adopted "National Security Strategy of Ukraine" and the results of the analysis of the legislation of the leading countries of the world. The obtained research results should be used to improve the state management mechanism for ensuring economic security in Ukraine.*

Keywords: *economic security; economic security of the state; implementation; models of national security; threats.*

JEL Classification: H19, H56, K33

Formulas: 0; fig. 2; tabl. 0; bibl. 21

Introduction. In the current conditions of market transformations, it is important for any country in the world to ensure the economic security of the country. That is, the protection of its national interests from encroachments by other states and the negative impact of internal and external factors. The problem of implementing the international experience of public administration in ensuring the economic security of the state is extremely acute, since in many spheres of public life we use the experience of the countries of the world without taking into account the peculiarities of our country.

Literature review. For many years, such scientists as E. Buchwald, Z. Gbur, I. Dragan, V. Yedynak, M. Yermoshenko, N. Kukharska, Y. Koval, S. Lazarenko, S. Pyrozhkov, N. Prytula, I. Mihus, H. Sytnyk, N. Slovatska have been actively engaged in the study of international experience of public administration in the field of economic security.

However, consideration of the implementation of international experience of public administration of ensuring the economic security of the state in Ukraine has not been sufficiently covered in the domestic scientific literature. This is what led to the relevance of this study.

Aims. The purpose of the article is to provide recommendations for Implementation of international experience of legal regulation and state management of ensuring the economic security of the state in Ukraine.

Methodology. The basis of the research methodology is the study of legal acts of the countries of the European Union, the United States of America, Japan, China and others in the context of ensuring economic security. The main methods that were used are the method of analysis and synthesis, comparative analysis, generalization and visualization.

Results. Taking into account the fact that the national security system is the basis of the entire security of Ukraine, it is economic security that occupies a prominent place in it. It performs certain functions, functions according to certain principles, is the material basis of the national sovereignty of our state, which in turn determines the possibilities for ensuring other types of security.

That is, economic security is the basis for the functioning of all its other elements that are part of this system (macroeconomic, military, financial, technical, food, personnel, social, demographic, investment, scientific and technological, energy, foreign economic, industrial, environmental, etc.). Given the multifaceted nature of the concept of "economic security", it is worth defining it.

Economic security contributes to the creation of a reliable state provided with all necessary means, protection of national and state interests in the field of economy.

It should be noted that the economic security of the state consists of various types of security in different spheres of management: macroeconomic, financial, foreign economic, investment, scientific and technological, energy, industrial, demographic, social, food security. In addition, the policy of economic security is determined on the basis of certain principles that create a political and legal basis for assessing external and internal threats, the formation of national economic interests and economic security strategies.

Comparing the legislation of Ukraine and Germany, France, Great Britain, etc. The following components of economic security can be identified by the member states of the European Union: industrial, demographic, energy, foreign economic, investment, macroeconomic, food, social, financial security.

Taking into account the concept and structure of economic security, it is possible to talk about the strategy of development and improvement of economic security of Ukraine and comparison of this strategy with the criteria for the development of the countries of the European Union. Comparing the interpretation of the concept of "economic security" in Ukraine and certain countries of the European Union, it can be said that economic security is generally considered as a component of the national security and is aimed at eliminating and preventing internal and external threats to ensure a sufficient standard of living for the population, while creating interaction between public authorities and relevantbusiness entities [1].

Based on this, we believe that it is worth considering the systems and models of national security that arebeing implemented in the countries of the world (Fig. 1).

On Fig. 1 we see that there are the following systems and models of national security that are applied in countries around the world:

– American – focused on a combination of external and internal security, which is used as a model by most states;

– Japanese – with an emphasis on internal social security;

– Chinese, which is the most concentrated expression of the security systems of states engaged in the construction of a socialist society;

– systems inherent in states that have recently gained independence, as well as making a deep reorientation of their development [2].

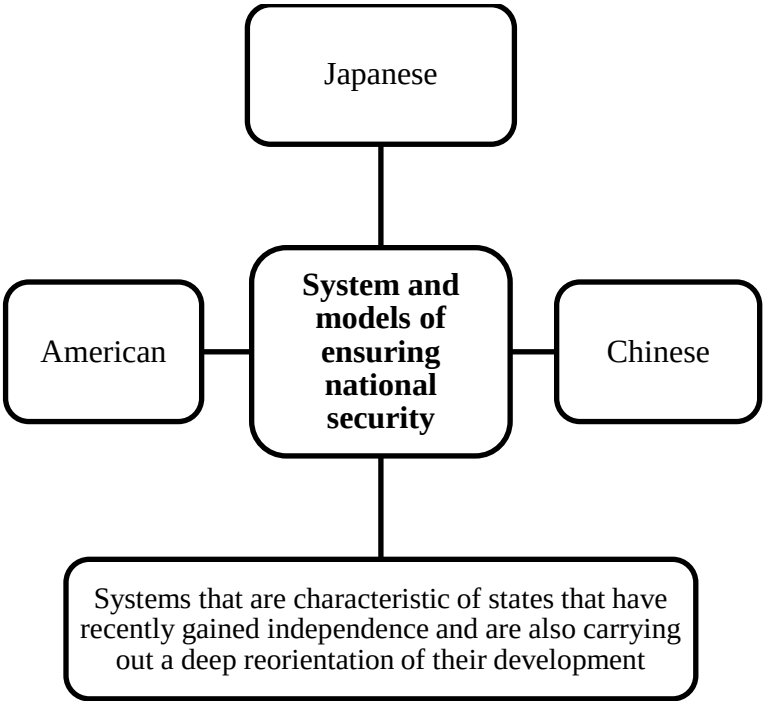

Figure 1. Systems and models of national security of the countries of the world

Source: compiled by the author based on [3-4]

In the concept of economic security, along with the traditional provision on the protection of secrets from foreign special services, the provisions on ensuring national economic interests in competition with rivals in the world arena and on the protection of "leading positions in technological spheres" were introduced as the main goals,and the "protection of economic power" is directly associated with the implementation of measures to ensure economic security.

In the space of the European Union, economic security is considered and refers to the position of unification in the world economic system. It is the EU that dictates the importance of European integration in order to achieve a high level of competitiveness in the context of globalization. The ultimate goal of the EU is to ensure economic security in the EU and the formation of a fully integrated Europe with the same standard of living for all member states. We propose to consider the features of individual countries of the world in the process of ensuring economic security (Fig. 1).

From the above Figure 2 shows that each of the analyzed countries of the world uses normative legal acts, international treaties, and the legislative framework in the process of state regulation of the country's economic security. Each of the countries of the world in its own way carries out the process of state regulation in the field of economic security of the country. In some countries, there is no legislative framework for ensuring economic security (Germany, Great Britain, France, Italy, Czech Republic, Bulgaria, Hungary, Poland, Slovakia, Latvia, Lithuania, Estonia), and in others it has and plays an extremely important role in ensuring the economic security of the country (Spain, Romania).

It should be noted that the main directions to which the methods of state regulation in the countries of the world are directed are as follows: reducing the vulnerability of the economy to external negative manifestations; development of an appropriate legislative framework; creation of conditions for fair competition; ensuringcurrency control; stability of the national currency; creation of favorable conditions for entrepreneurial activity; protection of domestic producers. The leading countries of the world are taking effective steps to minimize risks in important spheres of public life. The effectiveness of the implementation of certain measures is explained by the fact that before deciding on something, it is necessary to know what exactly the government's policy should be aimed at in the first place [8]

In the context of the socio-economic cohesion of the EU member states, the Lisbon Strategy plays an important role. According to the above-mentioned document, the main priorities in the direction of strengthening the economic security of the EU member states and the European continent as a whole should be: the principle of joint programming, which is used in international cooperation projects, improving innovative participation in the direction of increasing the competitiveness of economic regions as a whole, the development of rural areas and the extension of territorial unity through the extensive development of a large part of the EU regions. The EU member states have significant positive experience in implementing European integration strategies at the regional level. Abroad, self-governing bodies have a rich arsenal of tools and levers of economic, legal and financial influence on defending regional interests and ensuring the socio-economic security of territories.

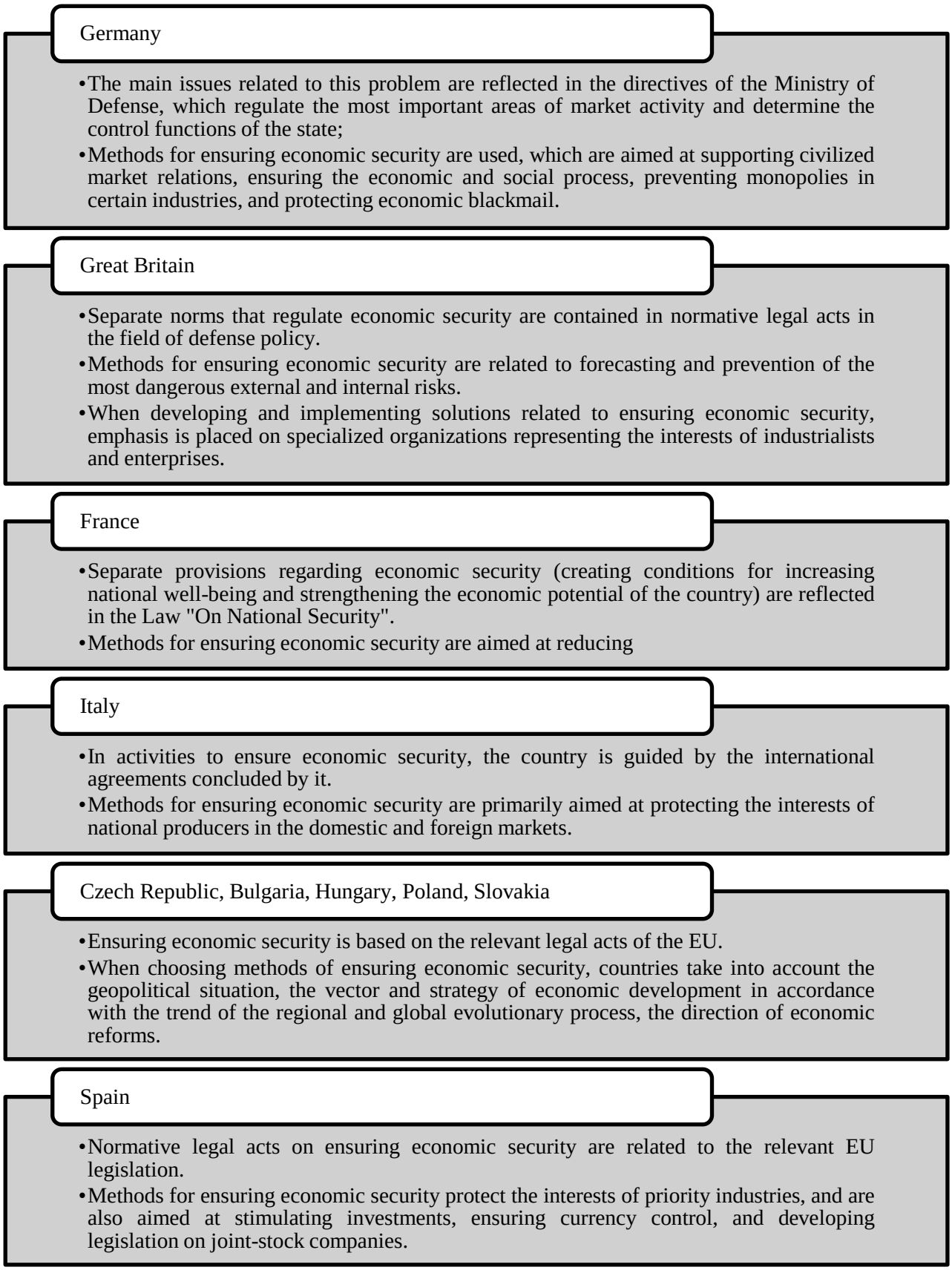

Figure 2. Features of individual countries of the world in the process of ensuring economic security

Source: compiled by the author based on [5-21]

The U.S. administration has developed an export strategy that includes 65 specific recommendations to help the private sector expand exports of U.S. goods. In 1999, the U.S. National Security Strategy was developed, in which one of the main goals is to promote America's economic prosperity. At the present stage, the new US National Security Strategy was published on May 26, 2010, the main purpose of which is national renewal to restore American global economicand political leadership.

In the United States, there has been a stable fiscal relationship between the center and the regions for a long time. Such economic policy is developing and constantly improving. This is primarily due to the separation of powers between different levels of government. The states have virtually the same rights in the tax sphere as the federation as a whole. In order to equalize the opportunities of the regions under the control of the US Congress, transfers, as well as targeted, block and program subsidies are allocated. One of the means of regional policy of the United States is budget financing of the development of certain sectors of the local economy [9].

Analyzing the concept of economic security of the United States, it is necessary to emphasize its main directions as ensuring national economic interests in competition with rivals in world markets, protecting the interests of the state in high-tech spheres, as well as strengthening its capabilities to fulfill international obligations in trade, economic and other spheres. The U.S. National Security Strategy explicitly states that in order to maintain a high level of combat capability of the armed forces, it is necessary to increase the efficiency and competitiveness of the economy, open new foreign markets and create new jobs. It is expedient to take into account the experience of Japan, where scientists in the 1980s proposed an analytical method for assessing the "national strength" of the state.

The "national strength" of a state is determined, firstly, by the ability to contribute to the international community, to its economic, financial, scientific and technical spheres of activity, and secondly, by the ability to survive in crisis and extreme international conditions. Thirdly, the ability to promote and defend their national interests, relying on all components of a "comprehensive national force", in particular by means of force pressure [10].

The modern Japanese approach to solving the problems of economic securityis based on two principles: preservation and development of the country's economic power; formation of a favorable global environment that will ensure the maximum realization of national interests. Thus, there is quite a lot in common in the categories of "economic security" and "national strength", a special place is occupied by the ability to survive in crisis situations [11].

As international experience shows, the key element of the system of ensuring the economic security of the state is an effective mechanism for determining threats to national economic interests that pose a direct threat to the national economic system, thereby violating the macroeconomic balance and the process of social reproduction.

The basis of the presented systems of economic security in different countries is the regulatory framework for the regulation of domestic and foreign economic operations, including the participation of foreign capital in the national economy, as

well as institutional support for the protection of national economic interests in the context of international integration.

It should be borne in mind that in the formation of the concept of economic security of any state, the starting point is the concept of "threat", which is a key category in most of the foreign studies in this area of economic science. Assessment of real and potential threats to the economic security of the state requires systematic monitoring of macroeconomic phenomena and analysis of their impact on the level of economic security of the state. In this context, as foreign experience shows. A significant role is played by the so-called "think tanks". In particular, in the United States, these issues are largely dealt with by the RAND Corporation, in the Netherlands – by the Hague Center for Strategic Studies, in the UK – by the DEMOS analytical center [12].

Such think tanks, which exist in countries with developed economies, at the request of the relevant government structures that make management decisions aimed at ensuring the economic security of the state, at the initial stage analyze and monitor the situation in a particular security sector, and provide preliminary recommendations. Next, it is necessary to create working groups to develop threat scenarios and generate management decisions. The possibility of effective counteraction to external threats to the economic security of the state arises only under the condition of internal balance of national economic interests and the ability to timely prevent internal threats to the economic security of the state. The main difference in the Western and post-Soviet approaches to ensuring economic security is that in Western scientific thought, the initial category of economic security at both the macro and meso- and micro levels is the external threat, while scientists distinguish both external and internal threats with an emphasis on internal ones, since the long-term effect of internal threats that turn into systemic threats. Which is extremely relevant for post-Soviet countries with economies in transition, makes the national economy more vulnerable to external threats [13].

The catalyst for potential threats to the economic security of highly developed countries is their high resource dependence on partner countries, while in modern conditions the most acute problem is energy dependence. Based on this, different countries find different ways to solve this problem: through diversification of sources of raw materials, cooperation of energy-importing countries, search for alternative energy sources, development of energy-saving technologies, energy saving, creation of strategic reserves, etc. In any case, countries with a high level of economic development (the United States, Japan, and the member states of the European Union) have developed a preventive approach to ensuring the economic security of the state, the most important and difficult task of which is to forecast and prevent threats, rather than to analyze its negative consequences after a security breach that has already occurred [14].

Based on the results of a detailed analysis of the experience of highly developed countries in ensuring the economic security of the national economy, it should be noted that the main directions of the state policy in the sphere of economic security of the national economy should be aimed at creating conditions for minimizing the

emergence of threats, and not the use of economic measures of situational response to them.

Discussion. In order to implement the international experience of public administration in ensuring the economic security of the state in Ukraine, it is necessary to identify the main threats and propose ways to solve them, taking into account the experience of the world's leading countries. The main threats that have a negative impact on the economic security of Ukraine include:

– insufficient efficiency of the branches of government: contradiction of the current legislation and legal unresolved issues of economic development, in particular market transformation of the economy, establishment of an effective competitive environment, imbalance of human resources, inseparability of relations between business and government under the dominance of the latter:
– cheap labor;
– "shadowing" of the economy;
– low level of capitalization of banks;
– corruption;
– energy intensity of production;
– outdated equipment;
– the outflow of "ums"
– imperfect legislative framework;
– monopolization of the economy;
– physical and moral wear and tear of equipment;
– consideration of the country in the international arena as a "raw material appendage";
– lack of targeted use of international financial assistance.

According to the adopted "National Security Strategy of Ukraine", the main condition for the new quality of economic growth is to ensure economic security by:

- control over export-import activities aimed at supporting important priorities for Ukraine and protecting domestic producers;
- combating illegal economic activity, counteracting the uncontrolled outflow of national material, financial, intellectual, information and other resources;
- increasing the resilience of the national economy to negative external influences, diversification of foreign markets, trade and financial flows;
- ensuring the readiness of the economy to repel Ukraine's armed aggression;
- legal protection in international institutions of property interests of individuals and legal entities of Ukraine and the Ukrainian state, violated by Russia;
- stabilizing the banking system, ensuring transparency of monetary policy and restoring confidence in domestic financial institutions;
- systematic counteraction to organized economic crime and "shadowing" of the economy on the basis of the formation of advantages of legal economic activity and, at the same time, consolidation of institutional capacities of financial, tax, customs and law enforcement agencies, identification of assets of organized criminal groups and their confiscation;

- creating the best conditions for investors in Central and Eastern Europe, attracting foreign investment in key sectors of the economy, in particular in the energy and transport sectors, as a tool for ensuring national security;
- development of the military-industrial complex as a powerful high-tech sector of the economy, capable of playing a key role in its accelerated innovative modernization;
- de-oligarchization, demonopolization and deregulation of the economy, protection of economic competition, simplification and optimization of the taxation system, formation of a favorable business climate and conditions for accelerated innovative development;
- ensuring the integrity and protection of infrastructure in crisis situations that threaten national security and a special period;
- effective use of budgetary funds, international economic assistance and resources of international financial organizations, effective control over the state of public debt [15].

We can state that the effectiveness of the process of managing economic security depends both on the level of adequacy of state institutions to the tasks assigned to them by the Constitution, and on the nature and scale of external threats and challenges. As you know, along with the protection of the sovereignty and territorial integrity of Ukraine, ensuring the economic security of the state is the most important function of the state and the cause of the entire Ukrainian people. In the context of globalization, not all states have retained control and distribution functions in the state economy and, most importantly, the ability to defend the interests of their own citizens and the economy, contrary to any other interests. The ability of the state, at its own discretion, to implement economic policy in the interests of exclusively its own citizens determines the level of ensuring its economic security. That is, the proper level of economic security is achieved through the implementation of a single state policy (including economic), supported by a system of coordinated measures adequate to internal and external threats. Without such a policy, it is impossible to achieve a way out of the crisis, to make the mechanism for managing the economic situation in Ukraine work.

Giving a general description of the current state of development of the economic security sector in all the countries under consideration, it is possible to separately distinguish relatively stable economic systems (Great Britain, Italy, Spain, the Netherlands, Germany, France). These countries are mainly focused on improving the efficiency of the economy and at the same time maintaining the existing level of personal economic security of their citizens. As for the new EU member states (Bulgaria, Poland, Romania, Slovakia, Hungary, Czech Republic), it can be said that they have already completed the reforms of the "first generation" (with an emphasis on restructuring and re-subordination) and have reached the final stage of reforms of security structures. The analysis of approaches to the economic security of the state in the countries of the European Union convincingly shows that the level of security depends on many factors.

In order not to find itself in the position of a state without its own independent economic future, Ukraine needs to carry out purposeful work to overcome the economic crisis, prevent real threats, fight corruption and criminal elements in the economy. In this regard, it is very important not only to understand the essence of economic security at all levels (international, national, regional, personal), but also specific actions of management structures to bring the level of economic security of Ukraine closer to the European level.

Of course, the adaptation of any foreign experience to the conditions of Ukraine is quite laborious and is not a copying of the entire regulatory system, but only a step-by-step introduction of individual elements, tools, methods, programs. The experience of foreign countries should be borrowed based on the similarity of tasks, goals, and priorities of national strategies. It is necessary to take into account the level of economic development, development of institutions of management, provision and control over security, using a systematic approach and comparative analysis.

Conclusions. So, from the above study, we can conclude that each of the countries that was analyzed has formed its own idea of economic security, identified the problems that are inherent in its economic system and, with the help of methods of state regulation, implements effective steps to overcome negative trends. As of today, ensuring economic security should be the main direction of our country's foreign policy. If we are considering the possibility of implementing the international experience of public administration in ensuring the economic security of the state in Ukraine, it is worth remembering that this process is too time-consuming. That is, Ukraine should not copy the entire system of public administration of the world's leading countries, but it is necessary to take into account certain, separate elements in building its own concept and creating its own effective model, which will be aimed at achieving economic efficiency.

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CHAPTER 3
THEORETICAL AND PRACTICAL ASPECTS OF MODERN PSYCHOLOGY

PSYCHOTHERAPY AND PSYCHOEDUCATION AT WORK WITH PSYCHOTRAUMA IN THE CONDITIONS OF WAR

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Abstract. *The article is devoted to an actual problem of our time - the work of psychologists and psychotherapists with psychotraumas during the war. The purpose of the article is to determine the features of psychotherapy and psychoeducation in working with psychotraumas in war conditions. A separate task of the research was the development of a methodical approach to the harmonization of the psychological state of a traumatized person and obtaining criteria for the formation of components of such a state during the war. Useful psychological techniques are proposed and necessary psychological help for psychological trauma during the war is detailed. A complex of scientific and educational cycles of psychoeducational video materials is presented, which change the war frame to a resource one, which is actively introduced into the educational process and implemented in applied professional activities in various fields of psychological science and practice, etc. The article presents a set of practical exercises, methods of neurolinguistic programming, individual practices of working with oneself, key mistakes in war conditions, ways of transitioning from a state of decline to a state of elevation. Ericksonian hypnosis is proposed in the treatment of post-traumatic stress disorder - a complex mental condition that arises as a result of trauma. The experience of hypnotherapy as a therapy with an artificial lie for the sake of a positive result is presented. Erikson's hypnotherapy is a psychotherapeutic approach that uses a hypnotic trance to help the patient use their own mental associations, memories, and life potential to achieve their therapeutic goals. Hypnosis is an altered state of consciousness similar to sleep. This is the fixation of attention on comfortable associations, etc. Thus, the obtained data can be useful in determining the directions of work with psychotraumas during the war and in the future should be considered as targets of social and medical support in the creation of differentiated psychorehabilitation programs.*

Keywords: *war, peace, victory, psychotherapy, psychoeducation, faith, willpower, method of neurolinguistic programming, psychotrauma, psychological help, educational process*

JEL Classification: I15, H56

Formulas: 0; fig. 0; tabl. 1; bibl. 16

Introduction. In this difficult time of war for Ukraine, the work of psychologists and psychotherapists is needed more than ever, and will be needed even more in the future. Now colleagues from all over the world who have experience of working in war conditions, in various traumatic and crisis situations come to our aid. The team of the Lviv regional branch of the Society of Psychologists of Ukraine together with colleagues from Dnipro State Medical University, Dnipropetrovsk State University of Internal Affairs and Kharkiv National Pedagogical University named after H. S. Skovorody with the participation of psychotherapists from America, Europe, and New Zealand (Robert Dilts, Judith Delozier, Richard Bolsteda, Michelle Rouge, Kimberly Progaska, Teresa Cianciolo, Art Giser, Steven Gilligan, Susie Smitt, Brian Van Der Horst), developed useful psychological techniques and detailed the necessary psychological help for psychotraumas in war conditions.

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Literature review. There are not so many works related to the "psychological factor" of victory in the literature (Cooke P. J, 2016). The study is devoted to this problem (Khomulenko T., 2019).

Aim. The purpose of the research is to determine the features of psychotherapy and psychoeducation in working with psychotraumas in war conditions.

A separate task of the research was the development of a methodical approach to the harmonization of the psychological state of a traumatized person and obtaining criteria for the formation of the components of such a state during the war.

Methodology. The team of the Lviv Regional Branch of the Society of Psychologists of Ukraine, headed by the Deputy Dean of the Faculty of Philosophy for Research, Doctor of Psychological Sciences, Professor of the Department of Theory and History of Political Science of the Ivan Franko National University of Lviv Nataliya Zhigaylo together with colleagues from the Dnipropetrovsk State Medical University (Professor Oleksandr Shevchenko), Kharkiv National Pedagogical University named after G. S. Skovorody (Professor Tamara Khomulenko, Professor Borislav Khomulenko) and Dnipropetrovsk State University of Internal Affairs represented by Professor Oleksiy Shevyakov, with the participation of foreign psychotherapists, developed useful psychological techniques and detailed the necessary psychological assistance for psychological trauma in war conditions.

The conducted study provided for the informed consent of its participants and fully satisfied the main bioethical norms of the Declaration of Helsinki, the Council of Europe Convention on Human Rights and Biomedicine, the leading provisions of the WHO and the Ministry of Health of Ukraine, as well as the ethical standards established by the Ethics Committee of the Dnipropetrovsk State University of Internal Affairs cases (protocol No. 10 dated June 2, 2023). Basic research methods include historical and comparative methods, methods of generalization and interpretation of the findings of different authors, retrospective and comparative analysis.

Results. he advice of specialists is unified and supplemented by us. We believe that replacing this feeling with faith in victory will help to overcome fear. It is very important to take informative breaks from reading the news, and instead fill yourself

with positivity, prayer, and don't forget to drink plenty of water. It is also important to keep your body in shape: do sports, work physically, set aside 70 minutes for continuous walking every day, and doctors also advise taking vitamin C. Make every effort to balance sleep, because only sleep restores emotions. Among other things, we provide information support, help others, save ourselves with humor and play, hug - it adds confidence, smile - it makes us healthier, make plans for the future and say as many peace-making slogans as possible: "God", "Love", "Victory", "Peace" ", "Thank you", "Glory to Ukraine! Glory to heroes!" (Zhigaylo N.,2023).

There are also clear, specific, step-by-step instructions for getting out of the trauma state (according to Sid Jacobson). It is necessary to answer the following basic questions: "What happened?", "What do you need?", "What are you planning?". The main filters are deletion, distortion, generalization. In times of danger, one should be in a coach state, i.e. focused and mobilized. Trying to return to the "learned state of mind" - to the state in which you were resourceful - to inspire. You can go to this state with the help of a verbal code, for example, "everything will be fine", "everything is fine", etc.

Another block of advice (from Michelle Rouge) deals with how to cope with trauma, how to help yourself and others. The explanation is based on the "hero's path" based on the example of John McCain, a famous politician and public figure who was once a prisoner of war. Three things helped him survive: faith in God; self-belief; faith in one's country.

The operational meaning of faith is to believe in something outside of you, in something that supports you, to trust in something that has no result yet. Ways out: make an oath to yourself; take the intention; take concrete steps. It is necessary to learn to pass from the state of crash (tension) to the state of coach (concentration) with the help of visual exercises, contact with the surrounding, concentration on the object. It is important to find the center in yourself - grounding (Sheviakov O., 2022).

The resources for this are higher forces, the memory of our ancestors, Ukrainian culture, society, and internal dialogue ("I", something unique in me). After that, according to experts, an inner state of calm sets in.

Experts have also singled out practical recommendations for reassurance. The sympathetic nervous system helps to survive, escape from danger, and the parasympathetic helps to relax. You need to do breathing exercises, yawn, laugh, move; do qigong and tai chi exercises, engage in body-oriented psychotherapy, normalize sleep (Shevchenko O.,2020).

The complex of practical exercises, formed by Kimberly Prohaska, explains which interesting instructive cases can be singled out to improve one's psychological state. For example: "the war "cured" everyone from covid."(Prohaska K.,2015)}. Also, experts emphasize that teenagers and children experience injuries the hardest, but each of us is characterized by cognitive errors, in particular, thoughts that nothing will ever recover. But you need to remember: there is always hope and faith that everything will be fine. "We will need the experience of successful strategies of the past to build future strategies, and the most healing power is the power of human relationships," experts explain.

Methods of neurolinguistic programming, individual practices of working with oneself, key mistakes in war conditions, ways of transition from a state of decline to a state of elevation were formulated by psychologist Borislav Khomulenko (Kharkiv). "In extreme conditions, we abandon the usual way of life, as a result of which the mind leaves the state of basic equilibrium. Therefore, it is important to return to our usual daily life. Humor is very important in war, and helping where we can is just as important. All this creates a background emotional balance. Providing informational support (even if it is for self-reassurance), finding your key actions, making plans for the future - all these steps contribute to the production of the hormone of happiness (dopamine)," explains Boryslav Khomulenko.

The specialist also adds that those people who have existing meanings survive in difficult conditions (according to Viktor Frankl) - energy is given to content. "It is also important to overcome the inner evil in oneself. And there is also an interesting fact - in a state of war, people rarely get sick," stressed Boryslav Khomulenko.

PhD specialist in neuropsychology, behaviorist, author of methodological developments on innovative approaches in working with people with ASD, Down syndrome, intellectual development and behavioral disorders, Teresa Cianciolo shared her experience of working with children with special needs in war conditions. "During the war, we continue to worry about our children, perform routine work. Children with special needs need special attention. They need visual stimuli and signals. They are sensitive to the emotional state of their parents - they mirror it. A safe place for such a child is on the floor in the corner. It is important to hug tightly, cover with a blanket, hold hands, train a sense of security. Analyze what actions the child performs during repetition (for example, playing on a gadget). The gadget performs a calming function, although it is not a protection as such, but the child's attention switches," the expert explains. According to her, it is also important to repeat the phrase that will serve as a mantra: "we are a family", "we are safe". Repeat it the same way every time so that it circulates in the child's brain. "The child must have his duty, for example, to bring water, to make sure that the grandmother drinks the medicine. This will protect her from chaotic actions. It is also important to apply any form of activity, to take into account the individual characteristics of the child," Teresa Cianciolo emphasized and emphasized that the experience of working with children with special needs can be useful for all children (Blynova, O., 2018).

American psychologist and psychotherapist Steven Gilligan (a follower of Milton Erikson) believes that if we want to help someone with trauma, we need to start with ourselves, with our own condition. The scientist recommends five steps that help healing: focus your attention on one point in yourself; remember your values, your goal, your positive intentions; tune into yourself, connect with your breath, meditate, pray; think about what we can do.

Stephen Gilligan cites examples of people who survived the war: a priest who once carried the wounded - for him it was an experience of spiritual transition; a doctor who worked on the front and came up with the idea of the placebo (he didn't have enough painkillers, so he gave the wounded salt water and said it was morphine, and it really worked). All these are mechanisms of communication with life. If the victim is

under a lot of tension, it is possible to unblock it through a connection with someone from relatives, a loved one, ancestors, with someone whom she sympathizes with. It is also worth trying to feel grounding and connection with positive memories (from childhood, from a pleasant event). This is an example of a simple and powerful resource that will help to heal - we are looking for a connection with the positive in the past, present and future. Stephen Gilligan advises: “Never look the enemy in the eye. Never cling to a problem, because that is a sure way to become a problem yourself. It is important to believe: "I will win", "I can do it".

An interesting case: the former Prime Minister of Israel, Golda Meir, was asked with whom she consults in a problematic situation. She answered: "With my grandmother (who is no more) and with my granddaughter (who is no longer)." That is, the connection with the past, present and future will help us overcome all the difficulties of life. The main message of Stephen Gilligan: "There is a power inside a person that is greater and deeper than pain!" The speaker expressed his admiration for the unity of our people and the example of heroism demonstrated by Ukrainians (Kuznetsov O., 2018).

The experience of psychologists and psychotherapists in wartime was shared by Suzy Smitt, who told how to control the brain in stressful situations and shared the most effective and simple tools. It is possible to reduce the level of stress with the help of the following exercises: breathing in a square for a minute; wiggle your toes; name 5 things that surround; 4 things we hear; 3 things that can be felt by touch; 2 things you can smell; 1 thing we taste.

There is also a 6-second technique: smile and thus break the connection with the stress inside. Affirm to yourself: "my mind is alert, but my body is relaxed." Breathe deeply. This technique can be used for children - their attention and learning process improves; while driving a car; when the heart beats faster, etc. "There is almost no good news on TV, so most of us are stressed from watching the news," the speaker rightly observed. - Therefore, "when watching TV, immediately apply this technique." There is also stress on a certain tone of voice. A simple way to get rid of insomnia (when thoughts are spinning in your head) is to say to yourself in a commanding voice: "Stop!" (add a "stop" sign in your imagination), take a deep breath, and say to yourself: "I can handle everything." Moving your eyes in a circle is one of the techniques for getting rid of obsessive thoughts. The figure-of-eight, split injury, and other important techniques were also introduced by Susie Smitt, and indicated that each technique should be repeated 12, 24, 36 times.

Psychologist and psychotherapist Art Giser believes that if you are surrounded by people full of pessimism and fear, you very quickly become the same. Conversely, it is worth activating positive emotions to get out of a state of fear. The specialist taught how to work with energy; clean your energy field; manage your inner spirit; strengthen your immune system; direct your energy to relatives, loved ones, those you love. In particular, the magnet technique was presented, with the help of which you can cleanse yourself of negative energy and attract positive energy. In the framework of the report, the expert presented valuable recommendations and techniques for restoring the inner state of a person, in particular, the interesting "lake" technique.

Richard Bolstead from New Zealand continued to share his experience as a psychotherapist working with war trauma. He presented the process of healing an injury using the rapid eye movement technique. (This technique has been scientifically proven to work at the DNA level). Future children are born with a protective response to stress, and this technique can also be used in air raids and bombings as first aid. According to the specialist, stability (stress resistance) is an important value. How our brain perceives an event is more complex than the event itself. Richard Bolstead gave an interesting example about a mouse that a girl presented to a boy when they met. On this basis, he developed a phobia. And although the mouse never caused him harm, the same processes took place in the cerebral cortex as during a threat to life.

The speaker also emphasized the importance of the "cinema" technique. The technique of "havening" (safety zone) is very effective for post-traumatic syndrome and allows you to consolidate your own stress resistance and emotional sphere, helps our intelligent brain to make decisions again, relax. In this process, we use stroking movements (face, shoulders, palms) and mental exercises (counting, humming, etc.). At the end, we repeat the phrases: "I am safe", "Inner peace", "Calm". At the same time, serotonin and oxytocin are released, which reduce tension and increase the feeling of security. Hugs, by the way, perform the same function. This technique is fast, simple and effective.

Today's events also show us the advantages of a horizontal career (polyprofessionalism) over a vertical one. And apprenticeship and mentoring are no less relevant today than they were in ancient times during transitional periods. And finally, the reward for those who have passed the initiation is a new habitus - a new appearance, new abilities and a new place in life. It should be too. Only a temporary suspension of the normal rules can hinder us, when what is allowed and what is not allowed has changed places. And mass media? In ancient times, a person undergoing initiation received information in the form of signs about the success of the ritual. And the mass media sometimes give us false signals (for example, the dubious quality of statistics) and thus lead us astray.

Everything that happens to us during the War shows that we are undergoing initiation. Initiation is a type of ritual, initiation into members of a community of people united by some common features. For example, fans of the same group of objects or phenomena of reality. The latter are called a totemic community. So totemic communities are the key to unraveling what is happening to us. But perhaps already disappearing, as well as totems and his cults. But if we remember that the totem, the object of veneration of a group of people can be any phenomenon of reality, then we can talk about the recent superiority of such "destructive cults" as the cult of money, the cult of power, the cult of competition, the cult of the foreign (alien). And maybe it's time to change the objects for veneration and go to another level of development, where everything that was a totem (object of veneration) will become a taboo (prohibition)? And perhaps now is the time to honor not material but spiritual values, not striving for superiority but striving for perfection, not confrontation but consensus, not competition but cooperation, not rivalry but solidarity, not War but Peace?

The life scenario during the war often turns out to be similar to mythological plots.

"Passion of Christ" is the path of sacrifice.

"The Hero's Journey" is the way to victory.

The path is easier to pass when you know the plot. And it is War that gives such knowledge, because it is War that is complete sacrifice and heroism.

And yes, on the path of initiation, as well as on the path of sacrifice, it is easier if you know what:

• after the "Last Supper", a friend and disciple (apostle Peter) may renounce, but then repent and become spiritually closer;

• and the kiss of another friend can be treasonous (however, there is an explanation for betrayal - a passion for silver, and self-punishment - the best remorse);

• the way of the cross ends with resurrection, and what you carried (conditional cross) becomes life-giving - so keep it as a talisman;

• in the process of crucifixion, there is always a "last whistle", which should be kept in your heart as a relic and a guarantee of protection.

The one who has gone through the war has not only gone through the path of sacrifice ("Passion of Christ"), which we do not choose, but must understand that it is necessary to go through the victorious path of the "Hero's Journey". And heroes are not born, heroes are raised. And in order to become a victorious hero, War becomes such an Educator for us. In order to stay on the hero's path, you need to know his stages well.

1. First, the potential Hero receives a call from the outside world in the form of difficult circumstances or requests from others to begin the path of trials. In addition, the Hero must hear an internal response-agreement in the form of a feeling-calling. All this should be heard and accepted. It is about a life situation that causes awareness of one's mission in the world and a feeling of being filled with energy for its implementation.

2. Next, the Hero may go through a stage of doubt about:

- is it time to start your journey?
- is this my mission?
- will I be able to do something else?

3. Doubts are usually dispelled by the mentor. A person, a book, a seminar, etc. can act as such for the Hero.

4. Having started his path of trials and tribulations for the sake of a high goal, victory over the forces of "darkness", the Hero must cross the "border of the unusual", i.e. go beyond the comfort zone, pass the "point of no return", which means that the way it was in his life will no longer be the same.

5. On the victorious path, the Hero necessarily overcomes various objective and subjective obstacles (obstacles, fears, etc.). In this way, he learns valuable lessons, passing through the "territory of death". The result is a "gift of power" as a new skill, a new strategy.

6. The Hero must successfully test the "new weapon", perfecting the mastery of new capabilities and finally defeating the enemy.

7. The Hero's victory is completed by returning home with "gifts", which means that he must make the new experience part of his everyday life and share it with others.

Practical advice from foreign specialists is shown in the table. 1

Table 1. Practical advice from foreign experts

Expert	Recommendations
S. Jakobson	1. It is necessary to answer the following basic questions: "What happened?", "What do you need?", "What are you planning?". 2. To be focused and mobilized 3.Try to return to the resource condition
M. Ruzh	Faith in God will help you survive; self-belief; faith in one's country. To believe in something outside of you, in something that supports you, to trust in something that has no result yet. It is important to find the ground. The resources for this are higher forces, the memory of our ancestors, Ukrainian culture, society, and internal dialogue
K. Prohasko	Instructive cases can be singled out to improve your psychological state. For example: "the war "cured" everyone from covid"
V. Frankl	Those who have sense survive
S. Hilligan	Steps to help with healing: 1. Focus your attention on one point in yourself. 2. Remember your values, your goal, your positive intentions. 3. Tune into yourself, connect with your breath, meditate, pray; 4. To think about what we can do.
S. Smitt	It is possible to reduce the level of stress with the help of the following exercises: ● breathing in a square for a minute; ● move your toes; ● name 5 things that surround; ● 4 things we hear; ● 3 things that can be felt by touch; ● 2 things you can smell; 1 thing we taste.
R. Bolsted	The "havening" technique (safety zone): we use stroking movements (face, shoulders, palms) and mental exercises (counting, chanting, etc.). At the end, we repeat the phrases: "I am safe", "Inner peace", "Calm".
B. van der Horst	A security strategy must be developed; ● fill the space with employment; ● you can even write articles; It is important to discuss values with others.

Conclusions. Summarizing, it is worth noting: "Panic, fear - faithful companions of the enemy and defeat; faith in victory is a strong and motivating factor of victory itself, and the most powerful resource of victory is three things: faith in God; self-belief; faith in one's country. It is important to fulfill your immediate duties, to help others, to return to the "learning state of mind", to a state in which you are resourceful. After all, after the darkness of the night, the light of a new day always comes." I express my heartfelt gratitude to the state leadership, servicemen of the Armed Forces of

Ukraine, volunteers, journalists, and people of good will for the heroic defense of our Motherland.

Thus, the obtained data can be useful in determining the directions of work with psychotraumas during the war and in the future should be considered as targets of social and medical support in the creation of differentiated psychorehabilitation programs.

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PSYCHOLOGICAL WELL-BEING AND STRATEGY TO COUNTER PROFESSIONAL BURNOUT AMONG LAW ENFORCEMENT OFFICERS

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Abstract. *The psychological health of law enforcement officers has always been of primary importance. During the performance of official duties, law enforcement officers often face long-term trauma, stress and emotional overload, which can impair their psychological well-being and lead to professional burnout. The purpose of the study is to analyze the psychological well-being and strategies for combating professional burnout of law enforcement officers in order to develop recommendations for improving their mental state and improving the quality of work. The research was conducted by surveying employees of law enforcement agencies during a week (July 2023) using a Google form. The 111 people took part in the survey, including 66.7% of men (74 people) and 33.3% of women (37 people). The article deals with psychological training developed specifically for employees of law enforcement agencies with the aim of ensuring their psychological health and providing self-help tools. This training is aimed at helping employees in solving their psychological needs in the conditions of long-term traumatization and stressful service environment. The effectiveness of training on the psychological well-being of employees of law enforcement agencies is being investigated. According to the results of the survey after the training, more than 80% of the participants noted an improvement in their psychological state and a decrease in the level of stress. Analysis of the results provides important recommendations for supporting law enforcement officers and improving their psychological well-being. Ensuring psychological well-being and combating professional burnout is becoming an urgent task that requires attention and action from both the employees and the management and state bodies to ensure the quality and efficiency of the work of law enforcement agencies. The survey found that workers face significant levels of stress and burnout due to the complexity of their jobs. The need for psychological support and stress management tools is essential. Building psychological well-being includes developing strategies that include self-esteem, psychological support, and other ways to manage stress. Summing up, the conducted survey and training indicate the need to overcome the problem of professional burnout and improve the psychological well-being of law enforcement officers through the development and implementation of special strategies and psychological support programs.*

Keywords: *psychological well-being; professional burnout; law enforcement officer; psychological health; mental support; countermeasure strategies.*

JEL Classification: I14, K32, Z19
Formulas: 0; fig. 6; tabl. 1; bibl. 10

Introduction. Professional burnout becomes a serious threat to the psychological well-being of law enforcement officers, affecting the quality of service delivery and threatening their physical and emotional state.

One of the key problems is the lack of proper attention to the psychological health and stress state of law enforcement personnel, which leads to a deterioration in the quality of work and a decrease in professional efficiency. The second problem is the limited psychological resources and self-help strategies available to law enforcement officers to prevent and overcome professional burnout.

The issues that require immediate solutions are the development and implementation of effective strategies to combat burnout, as well as increased attention to psychological well-being. Eliminating the above-mentioned problems will contribute to the preservation of psychological health and increase the efficiency of the work of law enforcement officers.

It is important to investigate psychological factors that affect the state of mental health of law enforcement officers, and to determine possible ways to improve this situation.

The creation of effective strategies for combating professional burnout will be a significant contribution to maintaining the psychological well-being of law enforcement officers.

Literature review. Analysis of the latest research on psychological well-being and strategies to combat professional burnout of law enforcement officers shows the relevance of this problem in the context of modern challenges and requirements [4-5]

Research shows that professional stress, traumatic events and demands associated with work in law enforcement agencies have a significant impact on the mental health of law enforcement officers. It is known that such factors as frequent interaction with stressful situations can lead to a high level of burnout among law enforcement officers [2-6].

Researchers have found that providing psychological support and psychological services to law enforcement personnel is becoming an increasingly important task in maintaining their mental well-being. Much of the research focuses on the development and effectiveness of programs and methods of psychological assistance for law enforcement officers. This includes individual consultations, group sessions, stress resistance training and relaxation techniques [1-10].

One of the key strategies to prevent professional burnout is to promote the development of psychological resilience and adaptation of employees to stressful situations. Research points to the importance of increasing employees' awareness of their own mental health, teaching effective stress management strategies, and developing social support networks [2-5].

In particular, some researchers emphasize the importance of working with stress resistance and increasing awareness of stressors in the work environment. Current research is also examining the impact of new technologies, such as virtual reality, on reducing stress and improving psychological well-being [6].

The conclusion is that psychological well-being and strategies to combat professional burnout of law enforcement officers are relevant and important aspects

Aims. The purpose of the study is to analyze the psychological well-being and strategies for combating professional burnout of law enforcement officers in order to develop recommendations for improving their mental state and improving the quality of work**.**

Methodology. The research was conducted by surveying (we formulated 5 questions) law enforcement officers during a week (July 2023) using a Google form. The 111 people took part in the survey, including 66.7% of men (74 people) and 33.3% of women (37 people). The age structure of the respondents is presented in Figure 1.

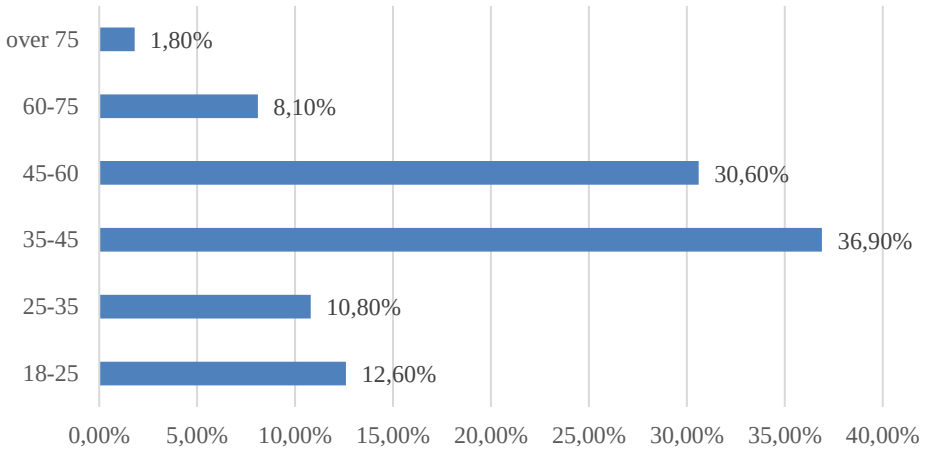

Figure 1. The age structure of the respondents

Results. The psychological well-being of law enforcement officers plays a key role in their professional life and general well-being. This concept includes emotional state, attitude to work and social relations that can affect their general state of mind.

It is important to note that the work of military personnel is extremely difficult and traumatic. They face a heavy workload, a high level of stress, and may witness or participate in events that leave a psychological mark. In such conditions, psychological well-being is especially important.

The psychological well-being of law enforcement officers is affected by various factors, which include stress, traumatic events, working conditions, psychological support, etc.

Factors affecting psychological well-being include:

- *Job specifics*: law enforcement officers often face high levels of stress and traumatic events. They may witness violence, accidents, crimes, etc., which affects their psychological well-being;
- *Workload*: intensive work, long working hours, demands for speed and accuracy can lead to overload and exhaustion;
- *Conflicts*: internal and external conflicts that may arise in the work environment have a negative impact on psychological health;
- *Lack of support*: lack of psychological support and stress management skills can lead to loss of psychological well-being;
- *Injuries and previous experiences*: personal injuries or negative work experiences can leave a mark on the employee's psychological well-being;

- *Combat dimension*: in the case of performing combat tasks, psychological well-being may be impaired due to the impact of combat stress;

- *Tension and fears*: constant readiness for danger and increased tension can affect psychological health.

Ensuring the psychological well-being of law enforcement officers is an important component of their success and health, and also contributes to the quality of their work and the general safety of citizens.

Aspects such as providing access to psychological help and counseling for employees who may encounter traumatic events are important to ensure the psychological well-being of law enforcement personnel; learning stress resistance and stress management techniques that help to resist the negative effects of stress; support from colleagues, family and friends, which helps to solve emotional problems and reduces the impact of psychological stress; learning your own self-care strategies, including eating a balanced diet, being physically active, and getting regular rest.

Countering professional burnout is an important part of ensuring the psychological well-being of law enforcement officers. Various strategies and techniques can be applied to reduce the risk of burnout and increase resistance to stress (table 1).

Table 1. Strategies and techniques to counteract professional burnout and ensure psychological well-being

Method	Content
Psychological support	Professional psychological support and counseling helps to manage stress and traumatic events, as well as to develop stress resistance
Psychological training	Special training and stress management skills can be included in the preparation of employees before performing important tasks
Preservation of work-personal balance	It is important to develop work-life balance skills. Taking time to restore and maintain personal relationships helps prevent burnout
Self-esteem	One must consciously treat one's physical and psychological state, take measures to maintain health, including regular physical activity, balanced nutrition and rest
Team support	Supporting colleagues and creating a supportive work environment are important for overcoming stress and increasing psychological well-being
Everyday self-help practices	Relaxation, meditation, breathing exercises and other practices help reduce stress and increase resistance to burnout
Providing access to resources	Providing access to the necessary resources to help employees cope with stress and traumatic events is an important element in combating burnout
Support and recognition system	Recognition and support from management and the organization help employees feel the importance of their work and improve psychological well-being

With the aim of practical implementation of the above-mentioned strategies and methods of combating professional burnout, we have developed a training aimed at providing practical skills and tools to employees of law enforcement agencies to increase their psychological well-being and work efficiency.

The purpose of the "Psychological health and self-help" training was to prevent emotional burnout, secondary traumatization, fatigue, increase the level of resilience (viability) of law enforcement officers, improve the skills and abilities of self-care and self-help

The following methods were used: informative messages, mini-lectures, demonstration, practical exercises, group work, case studies. The training is based on 6 modules:

1. Mental health of law enforcement officers, main aspects, factors and impact on work and personal life.
2. Techniques of self-regulation and stress management.
3. Resource-oriented model of stress management; internal and external resource processes. Exercises: resource personality, resource environment, resource thinking.
4. Development of resilience: strategies for strengthening psychological stability, adaptation to traumatic situations and preservation of one's own well-being.
5. Psychological self-help techniques at home and at work.
6. Recovery after prolonged traumatic activity: strategies and resources.

The training participants got acquainted with the basic principles of psychological health and learned practical methods for effective self-help. In addition, the training included a module on appropriate response to stressful situations and methods of psychological support for colleagues in difficult situations, consideration of situational cases and discussion of specific situations,

Participants were given the opportunity to participate in practical exercises and scenarios that helped them develop self-regulation and stress-resilience skills. The training also provided an opportunity for the exchange of experience and mutual support between the participants.

Before conducting the training, we conducted a survey among the employees of law enforcement agencies in order to determine their current attitude to psychological well-being and professional burnout. The results of this survey became the basis for further development and improvement of the training, taking into account the needs and expectations of the audience.

According to the results of the survey, the following answers were received.

On the first question “Does your mental health affect your performance at work?” (Figure 2).

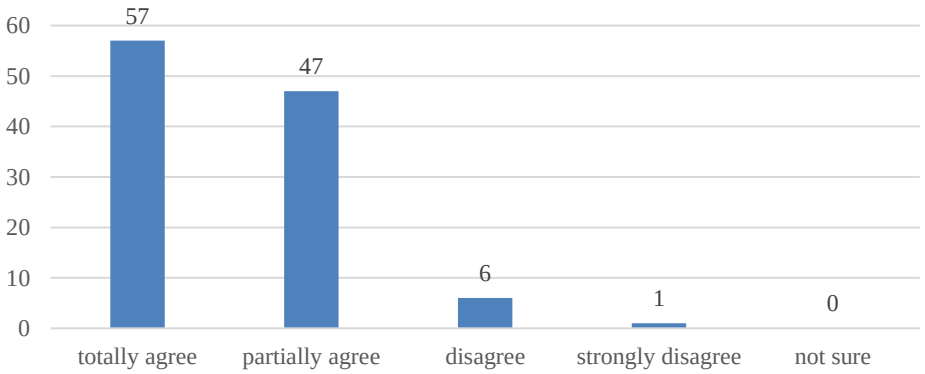

Figure 2. Respondents' answers to questions “Does your mental health affect your performance at work?”

The answers to this question indicate a close connection between the mental health of employees and their productivity at work:

- The majority of respondents (57) strongly agree that mental health has a strong impact on their productivity. This may indicate that most workers recognize the importance of taking care of their mental health in order to be successful at work..
- A significant percentage of respondents partially agree (47), which may mean that they consider mental health as a factor that partially affects their productivity.
- There were fewer respondents who disagreed (6) and strongly disagreed (1), indicating that a minority believe that mental health has no or little effect on their performance.

From this we can conclude that in most cases employees consider their mental health as an important factor affecting their work productivity

On the second question "How often do you perform work-related tasks outside of working hours?" (Figure 3).

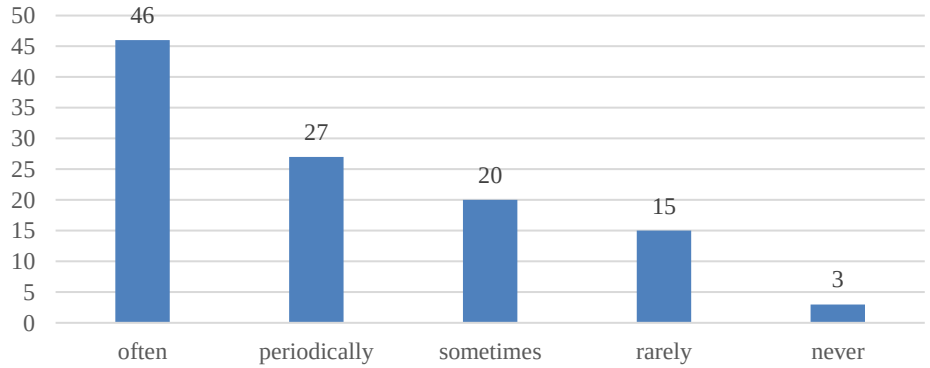

Figure 3. Respondents' answers to questions "How often do you perform work-related tasks outside of working hours?"

Based on the results of the survey, it can be concluded that a significant part of employees performs work-related tasks outside of working hours. This can be a sign of being overworked or involved in work outside the working scheduleIt is important to consider that such practices can affect the work-personal balance and psychological well-being of employees. Such results also indicate the possibility of stress and burnout among these workers.

Regarding the third question "Do you experience insomnia due to work load?", the answers were as follows Figure 4.

The answers to this question indicate different levels of impact of workload on insomnia:

- Often (15) and occasionally (32) respondents may experience insomnia due to workload. This means that a significant number of workers periodically experience stress and anxiety, which can affect their sleep quality.
- Sometimes (29) and rarely (28) respondents may also experience insomnia, but to a lesser extent, which may indicate a lower level of impact from work load.
- Never (6) respondents claim that work load does not affect their sleep quality.

Overall, these responses suggest that work load affects the quality of sleep of workers, but that this effect varies and depends on the individual characteristics of each person.

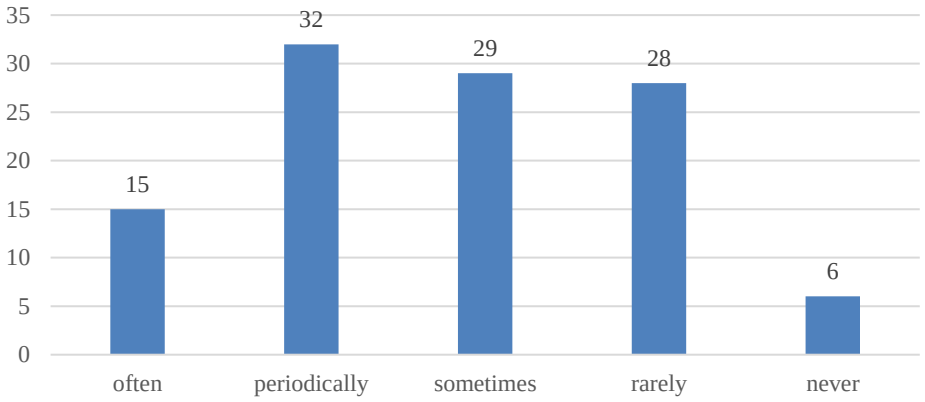

Figure 4. Respondents' answers to questions "Do you experience insomnia due to work load?"

Answers to the fourth question "Do you have access to resources for stress, depression, anxiety and other mental health issues?" (Figure 5).

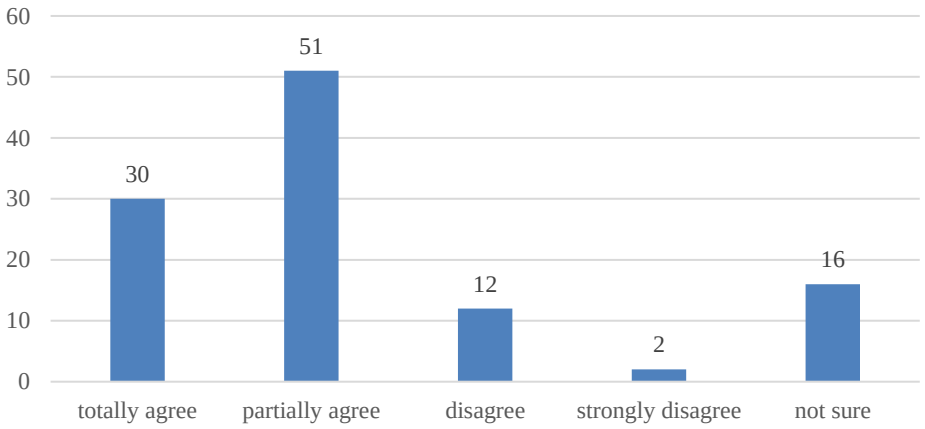

Figure 5. Respondents' answers to questions "Do you have access to resources for stress, depression, anxiety and other mental health issues?"

After analyzing the responses of the survey participants, the following conclusions can be drawn:

- 20% of all respondents fully agree with the availability of resources.
- Partially agree with the availability of resources - 34%.
- Disagree with the availability of resources - 8%.
- Strongly disagree with the availability of resources - 1%.
- Not sure - 14%.

These data show that more than half of the survey participants feel at least partially supported and have access to mental health resources. However, there are also groups that have different perspectives on the availability of these resources. The findings

indicate a diversity of opinions and beliefs among respondents and can inform further research and initiatives to improve access to resources for mental well-being.

Survey results for the fifth question "Please rate your degree of professional burnout on a scale from 1 to 10" (Figure 6).

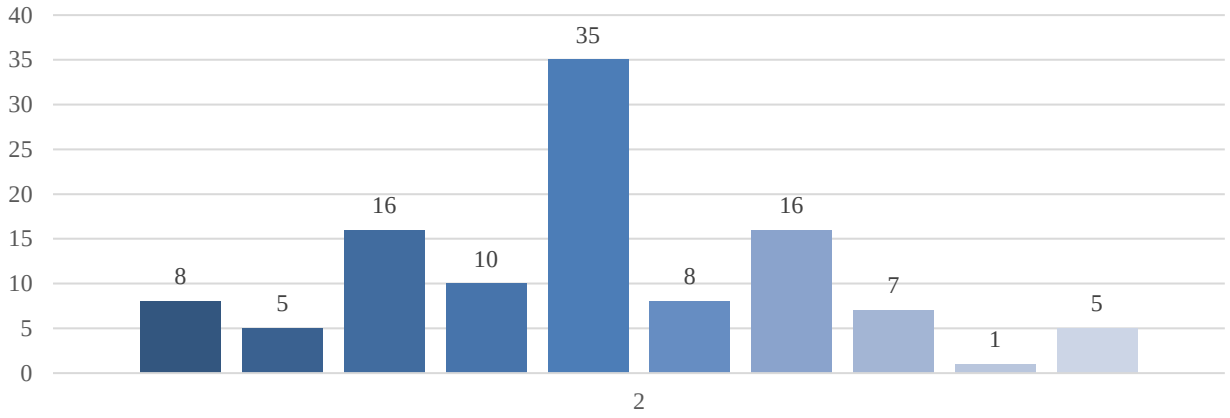

Figure 6. Respondents' answers to questions "Please rate your degree of professional burnout on a scale from 1 to 10"

The obtained results indicate a different level of professional burnout:

- A low level of burnout (1-3 points) was noted by 29 employees.
- A moderate level of burnout (4-6 points) was recorded in 53 employees.
- A high level of burnout (7-10 points) is observed in 29 employees.

In general, the results of the survey allow us to identify the problems of professional burnout among law enforcement officers and the need to develop strategies and programs to prevent burnout and increase the psychological well-being of this category of specialists.

Based on the results of the survey and taking into account the needs and expectations of the participants, we developed and conducted a special training This training was aimed at providing law enforcement officers with the necessary skills and strategies to maintain psychological well-being and combat burnout. During the training, the participants received information about the psychological aspects of work in law enforcement agencies, effective methods of stress management, and also learned to use various self-support techniques. The main goal was to help employees improve their psychological well-being and maintain efficiency in their professional activities.

The choice of priority strategies for combating professional burnout may depend on the individual needs and specific situations of law enforcement officers. However, the main and general strategies they would likely choose include:

1. Ways of self-help and self-regulation, as this allows them to manage stress more effectively and maintain psychological well-being.
2. It is important for many to have trustful communication with colleagues and the possibility of receiving psychological support.
3. Stress management skills are a priority because it helps to resist the negative effects of stress.
4. Regular self- esteem and detection of signs of burnout help to take timely measures to restore mental health.

5. Professional psychological support can be important, especially for those dealing with high levels of stress and traumatic situations.

The choice of priority strategies for combating professional burnout may depend on the individual needs and specific situations of law enforcement officers.

It is important to note that the best strategy may be a combination of several approaches adapted to the specific needs and capabilities of the employee.

These recommendations can help create favorable conditions for the formation of psychological well-being and combating professional burnout among employees of law enforcement agencies.

Conclusions. Ensuring psychological well-being and combating professional burnout is becoming an urgent task that requires attention and action from both the employees and the management and state bodies to ensure the quality and efficiency of the work of law enforcement agencies.

The survey found that workers face significant levels of stress and burnout due to the complexity of their jobs. The need for psychological support and stress management tools is essential. Building psychological well-being includes developing strategies that include self-esteem, psychological support, and other ways to manage stress. Summing up, the conducted survey and training indicate the need to overcome the problem of professional burnout and improve the psychological well-being of law enforcement officers through the development and implementation of special strategies and psychological support programs.

Author contributions. The authors contributed equally.

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