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Визначення реальної вартості цифрових активів для цілей бухгалтерського обліку

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Анотація. Проведене дослідження пов'язане з визначенням підходів до оцінки реальної вартості цифрових активів, що отримані підприємством, контролюються ним і беруться на облік за тією чи іншою вартістю. Основна мета дослідження полягає у визначенні параметрів оцінки вартості отриманого активу від виду операцій (майнинг, бартер). У статті використовується метод опису, що дозволив встановити певні особливості облікового відображення криптовалюти в обліку залежно від виду операцій, визнання та варіанту оцінки вартості такого активу. Проаналізовано основні операції із використанням криптовалюти. Встановлено, що під час здійснення транзакцій із віртуальними валютами, криптовалютою, цифровими активами, особливу увагу варто приділити вимірюванню споживчої вартості певних товарів (активів). Проаналізовано різні підходи щодо застосування виміру споживчої вартості активів. Розглянуто можливості застосовування основних видів вартості, встановлено, що ні одна вичерпно не розкриває сутності вимірювання споживчої вартості цифрових активів, віртуальної валюти, криптовалюти. Запропоновано та обґрунтовано введення нового виду вартості, як атрибутивна. Розкрито основні варіанти оцінки криптовалюти залежно від операцій із такими активами та рекомендовано варіанти використання того чи іншого виду оцінки вартості. Здійснено обчислення атрибутивної вартості залежно від певних видів операцій. Встановлено, що запропонована атрибутивна вартість відображає пряму залежність від доходу та від реалізації активу, собівартості отриманого такого активу та його визнання для цілей оподаткування. Наведено реальний приклад розрахунку та застосування атрибутивної вартості за монетою Bitcoin Cash для складання звітності під час дооцінки активу

Ключові слова: об'єкт обліку, цифрові валюти, ідентифікація, облік криптовалюти, атрибутивна вартість, справедлива вартість

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Determining the Fair Value of Digital Assets for Accounting Purposes

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Abstract. The conducted study is related to the definition of approaches to assessing the actual costs of digital assets received by an enterprise, controlled by it and accounted for at a particular value. The purpose of the study is to determine the parameters for estimating the value of the received asset from the type of operations (mining, barter). The paper uses the description method, which allows establishing certain features of the accounting reflection of cryptocurrencies in accounting, depending on the type of operations, recognition and the option of estimating the value of such an asset. The main operations using cryptocurrencies are analysed. It is established that when making transactions with virtual currencies, cryptocurrencies, and digital assets, special attention should be paid to measuring the consumer value of certain goods (assets). Various approaches to measuring the consumer value of assets are analysed. The possibilities of applying the main types of value are considered, and it is established that none of them exhaustively reveals the essence of measuring the consumer value of digital assets, virtual currency, or cryptocurrencies. The introduction of a new type of value as an attribute value is proposed and substantiated. The main options for evaluating cryptocurrencies depending on operations with such assets are disclosed and options for using a particular type of value assessment are recommended. The attribute value is calculated depending on certain types of operations. It is established that the proposed attribute value reflects a direct dependence on income and on the sale of an asset, the cost of such an asset received and its recognition for tax purposes. A real example of calculating and applying the attribute value of a Bitcoin Cash coin for reporting when revaluing an asset is given

Keywords: accounting object, digital currencies, identification, cryptocurrency accounting, attribute value, fair value

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Introduction

To support innovation in the financial sector of Ukraine, it is necessary to develop principles for regulating the cryptocurrency market and prevent the criminal use of virtual currencies. First of all, licensing of business activities with virtual currency should be introduced. At the same time, licenses should be granted only if consumer protection is ensured, money laundering is prevented, and cybersecurity requirements are increased when working with cryptocurrencies. In order to de-shadow this sector, it is necessary to amend the tax code of Ukraine regarding the inclusion of income from operations with virtual currency in the objects of personal income tax.

The identification and recognition of an object in accounting, one or another type of asset, depends on its further accounting and determination of the tax base and reflection in the financial statements. In addition, it is especially important to study the satisfaction of needs with cryptocurrency. Cryptocurrency users have found in it a tool for saving savings from inflation, ease of use and anonymity. Therefore, it is important to study the formation of value of cryptocurrencies, since in the future it is not clear which method is worth using when measuring the value of such an asset.

In addition, organisations that work with virtual currencies in Ukraine must report suspicious transactions of their clients, which for its part will contribute to compliance with international standards on countering money laundering and terrorist financing and the proliferation of weapons of mass destruction FATF (*Financial Action Task Force*) [1]. Consequently, this will ensure the implementation of the tasks of the comprehensive programme for the development of the financial sector of Ukraine until 2021, related to the need to introduce financial and technological innovations and ensure transparency in the measurement of fair value. When making transactions with virtual currencies, cryptocurrencies, and digital assets, special attention should be paid to measuring consumer value. Each participant of the blockchain network in cryptocurrency finds satisfaction of their own needs.

V. Dyba considered theoretical approaches to estimating the value of intangible assets by various methods of obtaining calculated values, identified economic and accounting aspects that integrate various factors influencing the value of these assets. The author suggests that the category of value of intangible assets should be considered in two ways as: 1) a sign of costs for the production of an intellectual product, which is a quantitative characteristic of its consumer value expressed in money; 2) an economic category for assessing the usefulness of the results of social production of knowledge [2]. That is, in modern conditions, knowledge becomes a source of value, replacing labour as a source of added value. V. Babailov and D. Prikhodko proved that need is not a source of value formation – it only serves as a trigger for the mechanism of labour costs, the so-called "use value", which is not a value at all. The study analysed the establishment of labour costs as the only and true source of formation of any value in order to determine clear boundaries. This allows clarifying the subject of economics and ridding it of its uncharacteristic functions and, ultimately, leads to an increase in the efficiency of economic activity [3]. O.S. Streltsov, V.A. Cherkasov studied the economic essence of enterprise value and its management concepts. The analysis of interpretations of the concept of enterprise value by content and essential features in scientific and scientific-practical literature was carried out. The study determined the main characteristics of the enterprise's value as an object of management activity. The author's vision of the essence of the value of the enterprise and its management features was proposed. The origin of the theory of enterprise management, which takes into account its value, was analysed [4].

H. Han, Yu. Yuan, F. Wang studied the approaches of central banks around the world (USA, Canada, Austria, Netherlands) regarding the monetary consequences of cryptocurrency recognition. Researchers paid special attention to the study of the social factor of using cryptocurrencies by individuals. Researchers conducted a survey to what extent respondents are willing to use a new type of digital asset [5]. M. Wang, M. Han, V. Huang found that a weak information environment can negatively affect the use of new assets. The authors made a relationship between the queries "cryptocurrency" in the Google search network and the actual exchange rate of cryptocurrencies to fiat money [6]. J. Lee, Yu. Yuan, F. Wang conducted research on the establishment of the current exchange rate for cryptocurrencies in Ethereum, studied the mining process and found that linear regression and polynomial regression are used to predict the next block of remuneration to the miner during the mining of the Ethereum cryptocurrency. It was proposed to distinguish cryptocurrencies by the line of use, which further affects their recognition in accounting [7]. M. Della Seta, E. Morelek, F. Tsuki found that short-term debt curbs moral risk and demonstrates that in a world where there is friction over financing and fair debt prices, short-term debt creates incentives to take risks. Investing in cryptocurrencies has an increased risk, since it is impossible to predict a further increase or decrease in activity on the crypto exchange of a particular coin, but the yield on such risky operations is an order of magnitude higher. Therefore, shareholders take a favourable risk and consider cryptocurrency as an asset that can bring certain benefits in the future [8].

Despite all the scientific developments in the topic of determining value, it is still poorly understood how to determine the value of a mining farm that creates digital assets. It is also unclear exactly how it is possible to apply well-known approaches in the valuation of property and intangible assets, such as cryptocurrencies, crypto assets, cryptocurrencies and digital assets, and tokens, to modern money. Thus, *the purpose of the study* consists in forming a definition of the real value of digital assets for accounting purposes, including the operations for which the cryptocurrency was received and by what parameter to estimate the value of the received asset. *The research objective* consists in studying the main approaches to assessing the value of cryptocurrencies, followed by the establishment of approaches to taxation of transactions, since when controlling such assets, it is necessary to pay taxes, the calculations of which are based on the initial or other value of assets.

Materials and Methods

In the course of the study, the description method was used to record certain features of the accounting reflection of cryptocurrencies in accounting. This allowed expanding the understanding of how digital assets (cryptocurrencies) should be recognised and identifying a new approach to value estimation, such as attribute value, which belongs only to cryptocurrency assets or digital assets.

The study is based on the analysis of regulations regarding the application of certain approaches to assessing property value. Among them, IFRS 13 "Fair Value Measurement", National Standard No. 1 "General principles of valuation of property and property rights", the Tax Code of Ukraine. Regulations standardise the procedure for evaluating and recognising certain assets and regulate the application of the value assessment itself. The scientific method of analysis made allowed determining the list of options for estimating objects of value, which later allowed identifying a new method for estimating the value of digital assets. A detailed analysis of the use of different methods of valuation revealed a discrepancy between the methods used for digital assets. The relationship between the recognition of an object and its taxation is established.

The complexity of the value measurement lies in the fact that under various conditions that contribute to the acquisition of a digital asset, the object of taxation also changes. Therefore, the recognition of digital assets was highlighted and the main operations with such assets in the enterprise were investigated. Three main operations related to assets are considered: registration, disposal, and reflection in the financial statements. Analysis and synthesis allowed forming a new approach to assessing the value of digital assets and in a practical way determining the value of such an asset using a new approach, forming research conclusions.

The use of a scientific comparison allowed establishing the relationship between the recognition of a cryptocurrency and the use of a certain approach in evaluating such an asset, depending on the operation that affected the control of such an asset. The measurement method allowed the study to establish a tax base and identify types of taxes and their rates when taxing digital assets. The results of previous studies and the synthesis and generalisation allowed determining the process of taxation of digital assets, identifying the types of taxes and their main rates.

Results and Discussion

Use value – a value for a particular user based on obtaining utility. Utility can be based on expected benefits, revenue, or the use of increased value. Consumer value depends on the user's specific judgments, standards, or requirements. Therefore, use value is synonymous with subjective value. Consumer value does not depend much or does not depend at all on finding out information about the market. It is considered and evaluated in legal disputes about the amount of compensation to the owner during its withdrawal or causing losses [9].

Fair value in the system of the International Financial Reporting Standard (IFRS) is devoted to a separate, rather specific standard – IFRS 13 "Fair Value Measurement", which defines that fair value is the price that can be obtained for the sale of a certain asset in a purchase/sale operation on the date of such operation. The main condition is that it is necessary to declare the price as openly as possible and compare the declared price with the price of an identical product from open sources of information [10].

Therefore, the fair value is based on determining the market price and does not take into account the specifics of the object being sold. For example, when comparing the cost of 1 gramme of gold and 1 litre of water, there is no doubt that the cost of precious metal (gold) will be higher. However, if the market conditions are significantly changed and such objects are compared in the conditions of a blazing hot Sahara Desert, it can be affirmed that a person would choose 1 litre of drinking water, instead of 1 gramme of gold. Therefore, it is important to determine the open market information and the conditions in which a particular resource asset is evaluated. The purpose of a fair valuation is to apply fair value in both conditions that should be considered common in the market. But it is important to understand what exactly are the usual conditions of the cryptocurrency market, for its implementation, acquisition, or exchange [11].

Considering fair value in terms of the accounting valuation category, it can be argued that the value of an asset is equal to the value of liabilities at a certain date and time. Because economists understand that USD 100 yesterday and today, and three days later are different USD 100, not at par value, but in practical (real). Market value – the value to which the seller agrees when selling an asset and the buyer when receiving such an asset, who is willing to pay the specified amount deliberately and without compulsion [12]. The market value and can only be determined for such property that can be transferred from one party to another.

To use the market value of an asset valuation, there are three main calculation approaches. The first approach is based on market research. It is based on comparing prices for products that are identical or similar, but are represented on the market by different buyers. The second approach is called income-based, which is based on the fact that the received property (asset) in the future could bring the owner a certain income from its maintenance. The third approach is called cost-based, based on determining the cost of creating such property. Therefore, further research may be related to the definition of digital cost, which is adaptive exclusively for digital assets.

For example, the market value is an estimate of such a digital asset, a certain crypto coin costs, for example, UAH 100, the market price for it is UAH 150, and the cost of its production at the moment is UAH 120. The sale of such a coin would bring UAH 30 of income (150-120). However, the situation on the crypto coin market is constantly changing and it is appropriate to use market valuation only for a specific asset at a certain time, but it is impossible to use the first and second approaches. Since the change in the conditions for creating a new crypto coin, due to the increase in the cost of electricity in Ukraine increases the prime cost, which reduces income, and whether it will be profitable in the market for an individual or a legal entity to purchase such a coin on a Ukrainian or foreign crypto exchange that was created (extracted) in Portugal, provided that electricity in that country is cheaper than in Ukraine.

According to the Ukrainian national valuation standards, there are the following main types of value (the value can be measured and expressed in the amount of cash):

- market value – the cost of purchasing a particular asset at a reasonable price that suits the buyer;
- present value – the value of an asset at a specific date and time of its valuation. Usually, the actual price valid on a specific date is used;
- liquidation value – the value of alienation of an object, provided that there is a certain period of operation of the object until the moment of disposal and write-off. This variety is adaptive to objects that have been in operation and are represented on the secondary property market;
- reproduction cost – the current amount of costs for creating such an asset at this particular time, taking into account current conditions;
- special value – calculation of the value of an asset based on the market value with the addition of the seller's premium;
- estimated cost – the cost determined by the established algorithm and depends on the input data involved in the calculation.

Of the above value variations, none reflects the real value of the cryptocurrency in order to determine exactly for how much money one person would agree to transfer their crypto assets to another. In other words, it is proposed to introduce an additional type of value, such as attribute value. "Attribute value" should be understood as the necessary essential inherent property of an item assigned to a particular digital asset at the time of alienation. This is a new economic assessment in the digital economy.

The exchange rate of a cryptocurrency expressed in monetary terms by the value of a particular crypto coin in dollar terms does not reflect its real value, since there is high volatility of such assets. Therefore, it is necessary to use the attribute value to express a certain value of the crypto coin in monetary terms. According to the goals of holding such digital assets, it is necessary to apply a certain approach to determining the value. Depending on operations with cryptocurrencies, it is suggested to use the following types of value. Thus, when conducting operations for depositing and crediting crypto coins to the balance sheet of an individual or enterprise, the initial cost must be used. If any person has decided to keep their savings in cryptocurrency, then it is necessary to apply an attribute value to operations to save value.

When determining the object of taxation, depending on the purpose of storing and accumulating cryptocurrencies, it must be recognised as a payment instrument or a credit instrument (financial investment). If cryptocurrencies are recognised as a commodity, then during operations using such a medium of exchange, such assets are recognised as goods and credited to the balance sheet at fair value. At the reporting stage, it is necessary to evaluate all digital assets at an overvalued value. Therefore, revaluation operations during the occurrence of an increase in the value of an object, it is necessary to carry out a revaluation, which in the future should be recognised as passive income. Thus, the tax base for such operations with cryptocurrencies will be passive income, at the basic passive income rate of 5%. When drawing up reports, if the accounting object, which is a crypto product (crypto coins), is recognised as a commodity in the implementation of certain operations, then such a specific product must be evaluated at the lowest cost.

When performing operations with cryptocurrencies and digital assets related to the disposal of such accounting objects, it is necessary to evaluate them by the repayment value. Consequently, there is an increase in the market value of capital – this is an increase in the cost of assets. When it comes to taxation, it is usually defined as net income from the sale of assets or income from the sale of an investment or property. Therefore, it is necessary to tax such operations with cryptocurrencies related to asset disposal and capital gains at the usual income tax rate of 18% and a military tax of 1.5%. When performing operations with cryptocurrencies and recognising such operations with cryptocurrencies as barter transactions, it is necessary to apply the basic income tax rate of 18% and 1.5% of the military tax. Table 1 shows the main options for evaluating cryptocurrencies when performing certain operations with such assets. The main types of operations and definitions of such assets in accounting, in relation to their recognition, are analysed. The main options for estimating the value depending on the recognition of digital asset accounting objects are given.

Table 1. The main options for evaluating cryptocurrencies depending on operations with such assets

Type of operation	Recognised as	Valuation option	Taxation
Depositing (crediting to the balance)	Crypto asset, digital asset	Initial cost	18% PIT*; 18% income tax; 1.5 MT*
	Payment instrument, credit instrument, financial investment (store of wealth)	Attribute value	(5%, 9%, 18%) dividend, 18% income tax; 1.5% MT
	Medium of exchange – crypto product (commodity)	Fair value	20% VAT*
Preparation of reports	Crypto asset, digital asset	Revalued cost	20% VAT, but if it is retired or used in non-economic operations
	Payment instrument, credit instrument, financial investment (store of wealth)	Attribute value	Additional assessment (passive income) – 5%
	Medium of exchange – crypto product (commodity)	Lowest cost	No data available
Disposal of digital assets	Crypto asset, digital asset	Real cost	20% VAT (retiring or further use in non-economic operations)
	Payment instrument, credit instrument, financial investment (store of wealth)	Repayment process	Capital gains of 18%; 1.5% MT
	Medium of exchange – crypto product (commodity)	Barter agreement	Income tax 18%; 1.5% MT

Note: * PIT – personal income tax; MT – military tax; VAT – value added tax

Source: compiled by the authors

Next, the study considers the recognition of cryptocurrencies as an intangible asset. When performing sales operations with such an asset, it is necessary to reflect its disposal in the accounting records. The sale of a cryptocurrency, which is recognised as an intangible asset, is subject to VAT. The tax base is the contractual (actual) value, but not lower than the book value according to accounting data (clause 188.1 of the Tax Code of Ukraine). Therefore, in the case of a cheap sale, the residual value of an intangible asset has a direct impact on the amount of VAT liabilities. And markdowns/revaluations directly affect the residual value. That is, markdowns, reducing the book value, also reduce the VAT base. And additional valuations – increasing the accounting value, increase the VAT calculation base [13].

The payer is obliged to charge compensating tax liabilities if the intangible asset is intended for use or begins to be used in non-taxable/non-economic operations (of course, if a tax credit was formed during their acquisition) (clause 198.5 of the Tax Code of Ukraine) [14]. According to the tax legislation of Ukraine, when determining the tax base, a balance sheet approach is applied, which is based on a preliminary estimate of the value that was determined at the beginning of the reporting period. Therefore, additional valuations/markdowns even in this case have a decisive impact on the amount of VAT tax liabilities.

For the purpose of personal income tax, the total monthly (annual) taxable income of the taxpayer includes passive income, which includes income received in the form of dividends. Taking into account the above, for certain operations with cryptocurrencies where the attribute value is used, the method of determining it is proposed as follows:

$$AV = EB * (1 - T) - S \quad (1)$$

where: AV – attribute value; EB – income from the sale of a digital asset on a specific date; T – tax rate; S – the cost of the received digital asset in the past.

An example of calculating the attribute value for the Bitcoin Cash coin for reporting during additional evaluation is presented below. First, it is necessary to define the initial data. Thus, the income from depositing a digital asset on a certain date is USD 254 or UAH 7,112 (as of 06.11.2020). The tax rate is 5%. The cost of the received digital asset in the past – USD 220 or UAH 6,160 (as of 05.10.2020).

$$AV = 7112 * (1 - 0.05) - 6160$$

The attribute value to reflect the additional valuation in the financial statements is UAH 596.4. The main problems are related to accounting for transactions with cryptocurrencies, crypto assets, crypto coins, and digital assets – when they are used during changes and act as a medium of exchange.

It is appropriate to consider the accounting of cryptocurrency exchange operations from two sides. The first side is an exchange for similar assets. That is, when cryptocurrency is exchanged for cryptocurrency (Bitcoin – Bitcoin Cash; Ethereum – XRP). An exchange for non-similar assets is considered an exchange of cryptocurrency for other assets, for example, stablecoins (digital gold, digital oil, digital dollar (Tether), litecoins. For example, the exchange of Bitcoin Cash – Tether; Ethereum – WMZ.

According to Part 2 of Article 715 of the Civil Code [15] and Part 2 of Article 293 of the Economic Code [16], the main participants in the contract (parties) are two sellers and two buyers at the same time. Since the first seller is the seller of a particular product and declares its value, and the other acts as a buyer who agrees with the declared value, but instead of money provides another product and declares such a value that satisfies him as the seller of the second product (buyer of first product) and another person of the buyer of the second product (seller of the first product). As soon as the property (goods) reaches the buyer, property rights are immediately transferred and counterclaims are automatically credited. Special attention should be paid to the date of transfer/receipt of the goods when performing such a barter operation. Since it is the final operation that closes the obligations under the contract.

The contract mainly specifies the value of the asset (goods, property), taking into account the fair value of barter. However, if it is not possible to reliably provide a value assessment of the alienation of property (digital assets), it is proposed to use the attribute value. As for exchange operations for non-similar assets, it is necessary to reflect two operations in accounting. The first transaction reflects the recognition of an asset and liabilities, and the second – an increase in the value of such an asset by the amount of a monetary supplement for it and the recognition of accounts receivable formed as a result of a sale transaction. After that, in the accounting of the two parties to the agreement, it is appropriate to carry out and reflect the offset of counter-debts.

Conclusions

The list of main types of cost measurement is analysed. It is established that none of them exhaustively reflects the main features of measuring a digital asset. Thus, it is proposed to introduce an additional type of value, an attribute value. This is a new method for estimating the value of digital assets, virtual currencies, and cryptocurrencies. The study substantiates the calculation of such an attribute value based on income from the sale of such an asset on a certain date, the tax rate. For individuals, it is necessary to apply personal income tax; for legal entities, it is appropriate to use income tax. Special attention should be paid to determining the cost of the received digital asset during calculations.

The paper presents the main operations with cryptocurrencies and substantiates the use of each type of value depending on the operation. The main operations with such assets include: depositing (crediting to the balance sheet); reflection of cryptocurrencies during reporting, and disposal of digital assets. Cryptocurrencies, in this case, can be recognised as intangible assets that are registered as a result of past events. Operations as a result of which the company controls such intangible assets can include: acquisition at its own expense, contribution to the authorised capital, or a barter operation related to exchange for a similar or non-similar asset.

Therefore, special attention should be paid to determining the tax base for digital accounting objects. In addition, the issue of establishing the role of state bodies in regulating various transactions that arise between legal entities and individuals on the territory of Ukraine, when the payment instrument is cryptocurrency or other types of virtual money, remains unclear.

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Моделі рольового складу команди для комплектації ІТ-компанії на платформі нечітких множин

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Анотація. Нині у глобальній Світовій економічній кризі й пандемії Covid/SARS-19, питання розвитку та функціонування компаній на дистанційній роботі і навчанні студентів, є актуальними як ніколи. Криза COVID-19, окрім Світової пандемії, завдала нищівного удару по економіці держави та організацій. Недостатній рівень забезпечення проведення досліджень, недосконалість організаційної структури та організації управління науково-технічною діяльністю у IT-проектах обумовлюють необхідність перегляду та удосконалення наявної системи управління такими проектами. Метою дослідження є розробка комплексних моделей підвищення об'єктивності рольової оцінки компетенцій претендентів під час комплектації складу фахівців для ІТ-компанії в умовах невизначеності на платформі нечітких множин. У процессі дослідження були використані такі теоретичні методи наукового пізнання: метод синтезу та анлізу інформації, статистичний метод, метод максимізації та метод Max-диз'юнкції. У дослідженні розглянуто розроблену модель оцінки компетенцій претендентів при комплектації рольового складу фахівців ІТ-компанії із використанням платформи нечітких множин. Проведено аналіз наявних проблем підбору персоналу, людських чи трудових ресурсів у корпораціях, діяльність яких пов'язана з розробкою програмного забезпечення різного спрямування. Наведено приблизний склад ролей у сучасних ІТ-компаніях із рекомендованими соціонічними типами інформаційного метаболізму для кожного конкретного виконавця ІТ-проекту. Механізм стимулювання в умовах специфічних обмежень дозволяє вдосконалити систему преміювання ІТ-персоналу та диференціювати такий персонал із використанням засобів проектного менеджменту. Авторами статті розроблено нечітку модель оцінки компетенцій претендента на будь-яку посаду в ІТ-корпорацію. Наведено лінгвістичні змінні, базис правил нечітких продукцій і укладення залежностей вихідної змінної від вхідних даних розробленої нечіткої моделі

Ключові слова: рольова оцінка персоналу, компетенції, команда, ІТ-компанія, нечітка логіка, нечітка модель

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Models of Team Composition for the Staffing of an IT Company on a Fuzzy Set Platform

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Abstract. Nowadays, in the conditions of global economic crisis and the Covid/SARS-19 pandemic, the issues of development and operation of companies in remote work and student education are more relevant than ever. The COVID-19 crisis, aside from the global pandemic, has dealt a crushing blow to the economy of states and organisations. Insufficient level of research funding, imperfection of the organisational structure and management of research activities in IT necessitate the revision and improvement of the existing management system for such projects. The purpose of the study is to develop comprehensive models for improving the objectivity of role assessment of applicants' competencies when completing a list of specialists for an IT company in conditions of uncertainty on the fuzzy set platform. The following theoretical methods were used in the study: information synthesis and analysis, statistical method, the maximisation method, and the Max-disjunctive method. The study considers the developed model for evaluating the competencies of applicants when selecting specialists for IT company using the fuzzy set platform. The analysis of existing problems of recruitment of personnel, human or labour resources in corporations whose activities are related to the development of software is carried out. The approximate composition of roles in modern IT companies with recommended socionic types of information metabolism for each specific performer of an IT project is given. The incentive mechanism under specific restrictions allows improving the bonus system for IT personnel and differentiate such personnel using project management tools. The authors of the paper have developed a fuzzy model for assessing the competencies of an applicant for any position in an IT Corporation. Linguistic variables, the basis of the rules of fuzzy products, and the conclusion of dependencies of the output variable on the input data of the developed fuzzy model are presented

Keywords: role assessment of personnel, competencies, team, IT company, fuzzy logic, fuzzy model

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Introduction

The construction of fuzzy economic models for the operation of the human-machine system and the use of computer systems is one of the most important problems of science in a context of uncertainty. The modern global labour market in the IT sector is developing very dynamically, small outsourcing companies and large corporations that are aimed at developing multi-vector application software are being created. Given the high degree of competition, the methods used for forming executive personnel in IT corporations are constantly being improved and unified.

Despite the implementation by existing IT corporations (NetCracker, Lohika system, Luxoft, SoftServe, etc.) of a flexible Agile policy of material and non-material incentives (free training, internships under the guidance of experienced mentors, moderators, tutors, provision of comfortable working conditions and flexible work schedules, financing entertainment events for the development of corporate spirit, payment for internships and advanced training courses), the current problems today are high staff turnover, reduced quality of work, unprofessionalism among both novice and already experienced IT employees [1-2]. This problem is caused by the imperfection of existing methods for assessing the professional abilities of candidates for senior and production positions in IT corporations. The exiting methods fail to fully take into account the specifics of the interaction of a number of psychological and professional factors [3-4].

In recent decades, computer programmes have gained popularity in predicting the overall results of complex operations and the sequence of possible variable events in human-machine systems. For example, Ukrainian scientists S.D. Bushuev, V.V. Morozov, use a socionic approach that is popular in the West to assess the competence of managers (technical, behavioural, contextual, and additional) [5-6]. V.V. Avdeev suggests a different approach, which also (but from a different perspective) uses socionics [7]. V.A. Rach, A.V. Biryukov propose an approach to the contextual assessment of the competence of IT project management teams based on the ICB and NCB UA [8]. G.S. Cherepakha uses a product and environmental approach, which is based on determining the requirements for the management system of the IT project team based on such factors of project uniqueness as the implementation environment, the personality of each member of the team, the professional activity of the team and the product of the IT project [9]. The advantage of this approach is its focus not on making generalised recommendations for managing average IT teams, but on making decisions on the problem of effective planning and development of each team for the real conditions of a particular IT project. A.V. Shakhov offers a role-based approach – an individual style, which should be understood as the entire system of distinctive features of a given person's activity, due to the characteristics of their personality, taking into account the risks of complementary (pyramid) IT teams [10].

Most foreign and Ukrainian specialists, experts in the field of management and team building use the model by R.M. Belbin [11-12]. When forming a long-term project team, the personality types of team members are taken into account, according to the Myers-Briggs typology. The involvement of various personality types in the use of the brainstorming method is considered. The interaction of different personality types during the use of the generalised method of activating creativeness is studied in detail. In particular, using the testing tool for selecting candidates, it is possible to determine the applicant's qualifications for any position in an IT company. The role assessment test by R. M. Belbin is quite universal. It is simple and straightforward, which is a tool for diagnosing the role composition of the group and the quality of performance of roles by participants in the IT team. Advantages: prevention of conflicts during interaction. Highlighting the role structure of an efficient team, understanding the need to distribute roles in a group. Disadvantages: strict distribution of roles hinders the development of the group [12].

It is difficult to select people according to the specified criteria and at the same time maintain the requirements for personal professionalism. There are other types of tests and role questionnaires for potential latent applicants, but their content is similar. Modern methods of selecting employees in the field of IT, as a rule, are not focused on obtaining a comprehensive assessment of the applicant's abilities. This assessment should include not only professional qualities, technical skills, personal characteristics, work experience, but also psychological characteristics, type of information metabolism, compatibility of a potential employee with the work team. As a result, the conclusion about the correspondence of the candidate's role to a certain position in an IT company should be based on the results of testing, questionnaires, and interviews, without formalising uncertainties and reasoned consideration of the personal makings and potential of the applicant for any position [13].

Purpose of the study. Development of comprehensive models for improving the objectivity of role assessment of applicants' competencies when hiring specialists for an IT company in conditions of uncertainty on the fuzzy set platform.

Methodology

The methodological basis of this study is theoretical and mathematical methods of scientific cognition. In the process of research, the following theoretical methods were used: synthesis and analysis of information, statistical method, and a theoretical review of scientific literature on the subject matter was also carried out. The maximisation and the Max-disjunction methods were also used.

The method of information analysis and synthesis was used to consider questions about the specifics of the software development in modern IT companies. Using the methods of synthesis and analysis, it was determined that this process is characterised by a high mental and logical load on workers. In addition, using the method of synthesis and analysis, the composition of roles in modern IT corporations was considered and analysed. The statistical method was also used to consider these roles.

In the process of analysis, it was determined that TIMs (types of human information metabolism) with a highly developed function – the logic of fuzzy sets – are better suited for analytical and complex mental tasks; and employees with developed ethics and extraversion are better suited for performing tasks related to communication with people, establishing interpersonal contacts and learning. During the theoretical analysis of scientific literature, research papers by Ukrainian scientists were considered. It was found that the majority of foreign and Ukrainian specialists, experts in the field of management and team building use the model by R.M. Belbin [12] in their studies. The psychotypes of team members were considered in accordance with the Myers-Briggs typology.

In general, the study analysed the existing problems of recruitment of personnel, human or labour resources in corporations whose activities are related to the development of software in various areas. An approximate composition of roles in modern IT companies with recommended socionic types of information metabolism for each specific performer of an IT project is provided. The incentive mechanism under specific restrictions allows improving the bonus system for IT personnel and differentiate such personnel using project management tools. At the final stage, a fuzzy model for evaluating the competencies of an applicant for any position in an IT corporation was developed, including linguistic variables, the basis of fuzzy product rules, and the conclusion of dependencies of the output variable on the input data of the developed fuzzy model.

The development of the fuzzy model was carried out using the platform of the Fuzzy Logic Toolbox application package of the Matlab system, by sequentially performing the following stages: introduction of production rules that reflect the relationship between input and output data; formation of linguistic variables; setting functions for belonging variables; fuzzification of estimates of input variables; aggregation; activation and accumulation of conclusions and defuzzification of output variables of the fuzzy model [14-15]. The implementation of the aggregation operation was based on the maximisation method implemented in Matlab as Max. When the results were activated, the weight values for all input variables of the fuzzy model were assumed to be equal units. When accumulating, the Max-disjunction method was used to combine all the degrees of truth of the conclusions of the rules.

Results and Discussion

The specifics of software development in modern IT companies are characterised by a high mental and logical load on employees. The variability and dynamism of the IT market and tight deadlines for developing IT projects are the reasons for the need to decompose all functional stages of software creation between employees. This allows reducing the time required for software development and significantly increase the cost of an IT project. An example of the composition of an IT team in modern IT companies with a description of functional responsibilities and recommended types of information metabolism [14-16]. Since the type of human information metabolism (hereinafter referred to as TIM) is a sociotype, type of personality, that is, an innate type of human thinking structure that has a priority influence on its internal abilities, external implementation, it must be taken into account when evaluating the competencies of specialists in any field. The TIMs of employees of an IT corporation are shown in Table 1.

Table 1. Composition of roles in modern IT corporations

Role	Functional responsibilities	Results of work	TIM
Sales manager	Representative work. Search for clients, create and use personal connections to receive tenders and orders	Attracted customers	EIE, ESE, SEE
Project manager	Creation of the technical task structure, taking into account the customer's requirements. Calculation of the price and deadlines for completing tasks. Coordination of the production process	Technical and economic plan of the project	LSE, LIE, ILI
Software architect	Development of the project part of the order, decomposition of tasks and implementation of abstraction models and design templates	Project abstraction model	LII, ILI

Table 1, Continued

Role	Functional responsibilities	Results of work	TIM
Team lead	Distribution of priorities of tasks and responsibilities between the development team, monitoring the implementation of the project	Command execution of the work schedule	SEE, LSI
Business analyst	Coordination with the customer of all details, wishes, and requirements regarding the software being developed	Detailed list of requirements in general form	ESE, EII, ESI
Systems analyst	Formalisation of the list of agreed software requirements, taking into account the specifics of the subject area	Clear terms of reference	LSI, LSE
Technical writer	Draws up instructions and software specifications based on the generated terms of reference	List of specifications	ILI, SLI
UI designer	Development of a prototype graphical interface for a software product	Prototype interface	IEE, IEI
UE specialist	Development of a model of user interaction with the technical characteristics of the programme and the application	User interaction model	EII, ILE
Junior developer	Writing, modifying, and unit testing low-complexity code	Functional programme code for individual modules	LII, ILE, LIE
Middle developer	Writing, modifying, and unit testing medium-complexity code	Functional programme code for individual modules	LII, ILE, ILI
Senior developer	Writing the most responsible code, correcting mistakes made by less experienced software developers	Debugged programme code for the entire project	ILI, LII
Tester	Performing various types of testing in manual mode (White, Black, Grey-box)	Bug reports	SLI, ILI
Automation tester	Development of software scripts for automating the software testing process	Software testing automation scripts	ILE, SEE
QA engineer	Search and implement methods to improve the quality and speed of the software development process	Reduce software development time	SEI, ESE, EIE
Integration engineer	Integration of the developed software product into the customer's infrastructure, advising software maintenance personnel	Implemented software product	ESI, LSE, ESE
Support manager	Conducting training consultations and providing feedback from the customer with the development team	Trained employees on the customer's side	LSE, EIE, EII

Source: [15]

The TIM column contains abbreviations of the corresponding recommended socionic types of specialists, consisting of combinations of three letters. The first letter defines the most significant, four-dimensional "basic" function (L – logic, S – sensorics, E – ethics, I – intuition), the second – identifies a three-dimensional "creative" function (L – logic, S – sensorics, E – ethics, I – intuition), the third-determines the attitude of perception of the world (I – introversion, E – extraversion).

As can be seen from Table 1, for analytical and complex mental tasks, TIMs with a highly developed function – the logic of fuzzy sets – are better suited for analytical and complex mental tasks; and employees with developed ethics and extraversion are better suited for performing tasks related to communication with people, establishing interpersonal contacts and learning. However, the proposed TIMs for the corresponding positions in the table are not categorical, but only recommended, since any person is able to work in the above roles by gaining experience and relying on their strong skills and functions [15]. The problem, in this case, may be the specifics of further career development. Since the position may require more time and effort, which is not always justified in a real IT company.

The human factor is crucial at the stage of evaluating the competencies and knowledge of the applicant for the applied role and position. The company's focus on managing "human resources" and "staff of IT employees", without taking into account organisational and professional cultures, individual characteristics of team members and other poorly identified and measurable characteristics of IT teams, often leads to conflicts, difficulties "out of the blue" and failure of the entire IT company [17]. In IT projects, the role of the human factor increases, the presence of a person as a component of the product of an IT project [18-19]. The stage of forming an IT team involves "lapping" its members with each other professionally, creating community and compatibility within the team itself in the IT corporation. At the stage of development of an IT project team, disagreements and conflict situations often arise in its environment, it lacks unity, cohesion and responsibility in the orientation of the mission, goals and objectives of the IT company. The stage of normalisation of the IT project team involves finding mutual understanding between team members in the IT company regarding their functions and responsibilities. As a result, disagreements stop, and the team stabilises [20-22]. This stage consists of the following elements:

- assessment of theoretical knowledge of the subject area;
- assessment of practical skills in working with software and software development tools;
- evaluation of completed cases in the portfolio of the applicant for a particular position.

Assessment of theoretical knowledge of the applicant's subject area consists in conducting testing on priority topics and areas of the IT corporation. Such testing can be carried out based on the use of both free web resources of electronic testing (Let's test, Opentest) and paid analogues of local orientation (VegaTest). The test results are formalised and the level of competence is evaluated by the company's experts [14; 23]. Assessment of the applicant's practical skills consists of completing a test task with a clear technical task, specifications, and using specified technologies and tools. The duration of such a task, depending on the role or position, varies from 3 to 14 days. The result obtained is evaluated by an expert, which may be a Senior developer or Team lead [24-25].

Algorithm for evaluating the applicant's technical knowledge and competencies:

1) analysis of the applicant's resume (places and work experience, completed cases, positions held, functional responsibilities);
2) professional 360-degree testing [26];
3) organisation of an assessment center with imitation of typical business tasks at the training [27];
4) target orientation assessment;
5) formalisation of the obtained results for each candidate [28].

Therefore, it is possible to develop a fuzzy model of role assessment of the competencies of applicants for vacancies in an IT company. Based on the results obtained: assessments of the psychological, technical and organisational potentials of the applicant, a fuzzy model for assessing the final competence of a candidate for a certain position in an IT company is constructed. The use of fuzzy sets for solving such problems brings the mathematical model of evaluating the effectiveness of an IT project as close as possible to the logical reasoning of qualified specialists. This, for its part, allows the study to define the assessment of competencies as a product of the result of a particular project [29].

The generated linguistic variables and their belonging functions are shown in Table 2. The developed fuzzy model contains 64 logical rules (Table 3). Conclusions of the surface estimate of the fuzzy model of the dependence of the competence level assessment on input variables were obtained in the course of modelling (Fig. 1-3). Fuzzy output surface data allows the study to establish the dependence of the values of the output variables on the values of the input variables of the fuzzy model when fixing other variables at the main level [16; 21]. This dependency can serve as the basis for software implementation of the corresponding fuzzy algorithm for automated assessment of competencies of applicants for the role. The developed fuzzy model allows obtaining the value of the applicant's competence assessment for each point belonging to a three-dimensional surface and reflects qualitative transitions between parameter values like "depressions" and "bursts".

Table 2. Linguistic variables and their belonging functions

Name of a linguistic variable	Terms of variable (symbolic view)	Branch definition of the affiliation function
Assessment of the applicant's psychological skills (APS)	Low (l)	X, 0, 20
	Minimum (m)	X, 10, 60
	Sufficient (s)	X, 50, 85
	Perfect (p)	X, 85, 100
Assessment of the applicant's technical skills (ATS)	Low (l)	X, 0, 20
	Minimum (m)	X, 10, 55
	Sufficient (s)	X, 50, 90
	Perfect (p)	X, 85, 100

Table 2, Continued

Name of a linguistic variable	Terms of variable (symbolic view)	Branch definition of the affiliation function
Assessment of the applicant's organisational skills (AOS)	Low (l)	X, 0, 30
	Minimum (m)	X, 15, 45
	Sufficient (s)	X, 40, 80
	Perfect (p)	X, 70, 100
Competence level (CL)	Low (l)	Y, 0, 0.33
	Average (a)	Y, 0.16, 0.7
	High (h)	Y, 0.55, 1

Table 3. Fuzzy product rule base for an IT project model

Variable name	Rule number 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
APS	l	m	s	p	l	m	s	p	l	m	s	p	l	m	s	p
ATS	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l
AOS	l	l	l	l	m	m	m	m	s	s	s	s	p	p	p	p
CL	l	l	l	l	l	l	l	a	l	l	l	a	l	l	a	a
Variable name	**Rule number** 17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
APS	l	m	s	p	l	m	s	p	l	m	s	p	l	m	s	p
ATS	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
AOS	l	l	l	l	m	m	m	m	s	s	s	s	p	p	p	p
CL	l	l	l	a	l	l	a	a	l	l	a	a	l	l	a	h
Variable name	**Rule number** 33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
APS	l	m	s	p	l	m	s	p	l	m	s	p	l	m	s	p
ATS	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s
AOS	l	l	l	l	m	m	m	m	s	s	s	s	p	p	p	p
CL	l	l	l	a	l	l	a	a	l	a	a	a	l	a	a	h
Variable name	**Rule number** 49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
APS	l	m	s	p	l	m	s	p	l	m	s	p	l	m	s	p
ATS	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
AOS	l	l	l	l	m	m	m	m	s	s	s	s	p	p	p	p
CL	l	l	a	a	l	a	a	h	a	a	h	h	a	h	h	h

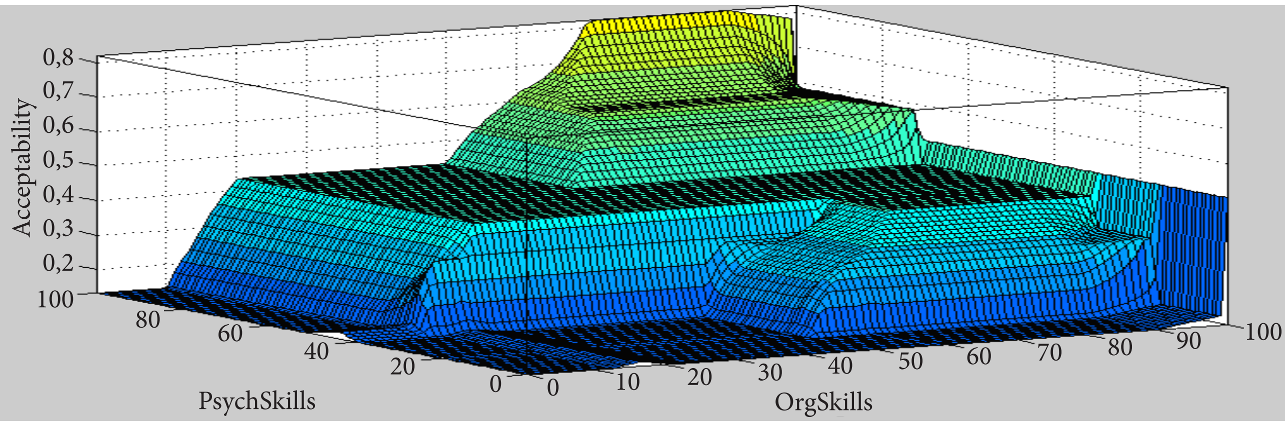

Figure 1. Three-dimensional visualisation of a fuzzy model for assessing the level of competence of an applicant based on their psychological and organisational skills

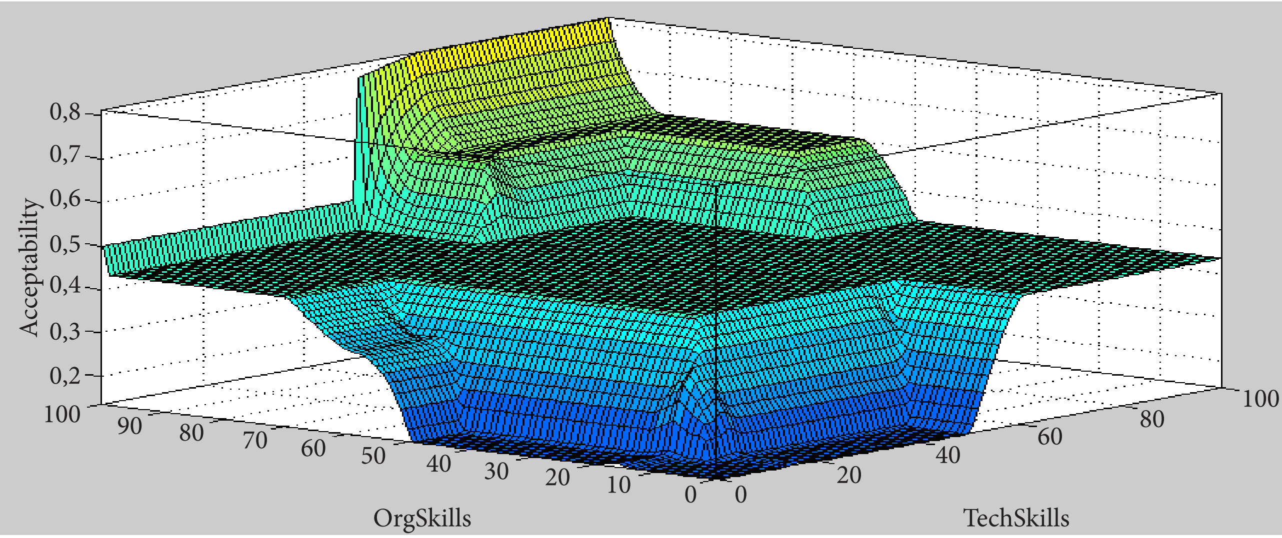

Figure 2. Three-dimensional visualisation of a fuzzy model for assessing the applicant's level of competence based on their technical and organisational skills

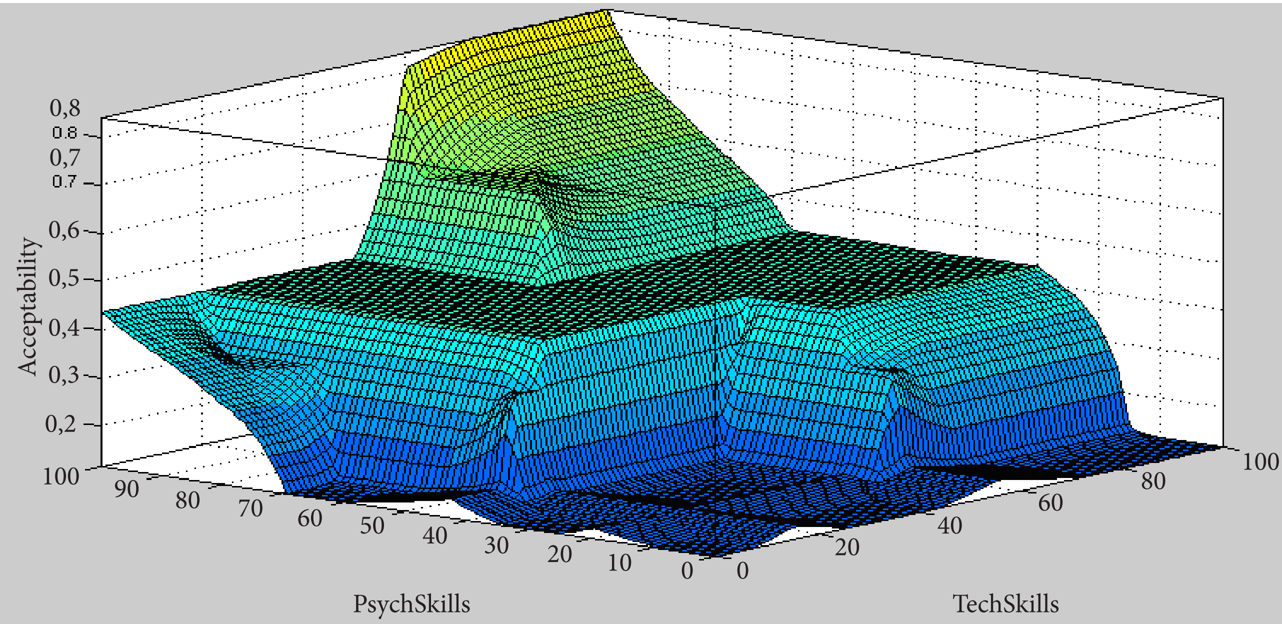

Figure 3. Three-dimensional visualisation of a fuzzy model for assessing the level of competence of an applicant based on their psychological and technical skills

Data on the fuzzy surface allows finding out whether the value of unreliable changes in the original fuzzy models is exhausted in the case of fixed changes at the main level. Such a contribution can become the basis for software implementation of a certain fuzzy algorithm for automatic assessment of the applicant's compliance with a certain position. The fuzzy model is constructed in such a way that it is possible to determine the value of the applicant's competence assessment for each point belonging to a three-dimensional surface, and display qualitative transitions between the parameter values in the form of "depressions" and "bursts".

Conclusions

Consequently, based on the fuzzy model developed by the authors of the study for assessing the competencies of an applicant for a role or position in an IT company, the time required to determine their labour potential is reduced. This is achieved due to the fuzzy rule mechanism embedded in the developed fuzzy model using the Matlab Rule Viewer module. Such a mechanism allows identifying and quantifying the degree of influence of specific values of assessments of the roles of the psychological, technical, and organisational potential of the client on existing roles (positions) in an IT corporation.

Combining and transforming the function of belonging of input variables reflects the specifics of the relationship between such role assessments and the final level of competence of the applicant. In particular, the results of the study of the developed fuzzy model allow the authors to establish that the level of technical and psychological potential of the applicant has a more significant impact on the level of competence. This is conditioned by the high degree of mental and logical load when working in the field of modern information technologies, and the need for the employee to develop such psychological qualities: perseverance, concentration and the ability to abstract from external stimuli (triggers). The proposed model of fuzzy sets, by its logic, allows optimising the speed of decision-making of the efficiency of an IT company and at the same time ensure maximum accuracy.

Comparison of the results of fuzzy output of various values of input variables obtained on the basis of calculations, using the developed fuzzy model in Matlab, shows good consistency of the model and confirms its adequacy when evaluating the competencies of applicants for positions in an IT company. The developed fuzzy model for assessing the competence of applicants allows studying and analysing numerous relationships of uncertainty mechanisms in the interrelationships of the psychological, technical, and organisational potential of a candidate for a certain position in an IT company.

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Вітчизняний розвиток сьогодення в контексті удосконалення діяльності органів влади

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Анотація. Розвиток системи публічного управління в Україні відбувається в умовах динамічних змін. Разом з тим, швидкий темп інноваційних соціально-політичних змін, запропонованих потужними політичними гравцями сьогоденного світового простору, вітчизняними представниками влади на місцях, кидає виклик щодо здатності людини пристосовуватися до нових соціальних обставин. Враховуючи актуальність питань щодо підвищення якості державного управління, постає необхідність створення ефективної державної служби. У статті визначено теоретико-методологічні засади вітчизняного розвитку сьогодення в напрямі його удосконалення та функціонування органів державної влади. Метою цієї статті є обґрунтування сутності вітчизняного розвитку сьогодення, удосконалення функціонування органів державної влади, зумовленості суспільно-політичного, технологічного розвитку країни, ролі децентралізації в управлінні. У статті розглядаються питання, пов’язані з проблемами оновлення змісту діяльності публічного службовця в контексті взаємодії влади та суспільства. Завдання державної служби полягає в тому, щоб запроваджувати в життя цілеспрямовану державну політику. На жаль, в нинішню епоху сьогодення її реалізація на практиці може зіткнутися з певними складнощами. Проаналізовано сучасний стан модернізації суспільства, органів управління та розроблено рекомендації з удосконалення механізмів децентралізації владних повноважень персоналом державної служби. На основі проведеного аналізу було зроблено висновок про те, що актуальною проблемою вітчизняного сьогодення залишається удосконалення правового регулювання інституту державної служби в контексті того, що забюрократизованість професійної діяльності кадрів знижує якість управлінського процесу

Ключові слова: державна служба, місцеве самоврядування, реформи, правовий інститут

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Modern National Development Within the Context of Improving the Governance

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Abstract. The development of the public administration system in Ukraine is taking place in conditions of dynamic changes. Therewith, the rapid pace of innovative socio-political changes proposed by powerful political players in the modern world and domestic representatives of the local authorities, challenges the ability of people to adapt to new social circumstances. Given the urgency of improving the quality of public administration, there is a need to create an effective civil service. The study defines the theoretical and methodological principles of modern national development towards its improvement and the functioning of public authorities. The purpose of this study is to substantiate the essence of modern national development to improve the functioning of public authorities, the conditionality of socio-political, technological development of the country, the role of decentralisation in management. The study addresses issues related to the updating of the content of public service activities in the context of interaction between government and society. The task of the civil service is to implement a purposeful public policy. Unfortunately, in the current era, its implementation in practice may face certain difficulties. The study analyses the current state of modernisation of society and the governing bodies and provides recommendations for improving the mechanisms of decentralisation of power by civil service personnel. Based on the analysis, it was concluded that the relevant issue of the modern Ukraine lies with the improvement of the legal regulation of the civil service in the context that the bureaucratisation of professional activities reduces the quality of the management process

Keywords: civil service, local self-government, reforms, legal doctrine

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Introduction

Reasoning the national development of the present is based on the improvement of state authorities' functioning, the predetermination of socio-political, socio-technological progress of the country. On the one hand, there are rather complex socio-political processes, a negative economic growth, on the other – the organisation of the civil service system in Ukraine in accordance with European standards in the context of interaction between the government and society. At present, certain socio-political changes are taking place in Ukrainian society, and the mission of decentralisation in governance is being implemented. Notably, in a developed institutional system, individual public institutions complement each other, establishing a continuous orderly institutional space.

Almost all scientists agree that today the ability of Ukrainian society to make progressive changes based on European values is extremely important. This determines the need for timely and rapid renewal of the country's life within the framework of the purposeful implementation of public administration reforms [1-4]. Improving the governance in the context of European integration guidelines is confirmed by the strategy of the state personnel policy of Ukraine, which outlines the areas of personnel reforms in all spheres of public life [5]. A considerable place in the implementation of social transformations is given to the public administration, since the competitiveness of the state and sustainable socio-economic development depend on the professionalism of human resources, as noted in the annual address of the President of Ukraine to the Verkhovna Rada of Ukraine [6, p. 109].

As noted by the American researcher F. Fukuyama, the very innovation that increases productivity or gives rise to a new industry, undermines the existing human community, substantially weakening the stability of society due to radical methods of influence [7, p. 75]. The accelerated social transformation of the state apparatus and consequent feeling of disillusionment with the standard of living and uncertainty among many citizens have led to a situation where even in the countries of established democracies, the need to face the challenges and threats of the established order has increased. Despite the innate ability of people to restore social law and order, serious internal challenges even in the most developed societies have not been removed from the agenda. The existing public disappointments due to the inefficiency of decision-making and actions by the authorities, on which the individual's quality of life depends, have not been resolved. It is the government that acts as an effective locomotive of social development. However, disintegration in a stratified society under ineffective government is quite debilitating and causes challenges and threats to the development and preservation of the country's integrity.

There is a general scientific point of view that qualitative social changes are implemented when civil rights and freedoms correlate with the objectives of state policy [8-10]. For example, S. Teleshun considers issues of effective public administration amid internal and external threats and the ability of the national political and economic establishment to respond adequately to them [11, p. 28]. The theoretical understanding of national development in solving practical issues of our time, improving the institute of public administration is covered by representatives of national researchers: V.B. Averyanov [2], P. Bukovsky [8], V.Ya. Malinovsky [12], T.V. Motrenko [13], N.R. Nizhnik [14], O.Yu. Obolensky [15], V.P. Tymoshchuk [16], S.K. Khadzhiradeva [4], and others. Their substantial theoretical developments served as the basis for familiarisation with the specific features of national public service in the public administration system. These studies make a considerable contribution to the theory, methodology, and practice of studying social development.

Furthermore, providing civil service and local government with specialists is given particular attention among both Ukrainian and foreign researchers [17; 18]. In researchers' opinion, there is a need to develop a new institution of civil service, provide executive authorities with qualified personnel: competent, innovative thinking, capable of responsible decision-making. Their studies cover the correlation of national transformations and modernisation of society with the personnel support issues, the effectiveness of local self-government in the country [2-4; 19].

However, despite much attention to improving and reforming the activities of local self-government and the civil service, there are many debatable issues that require understanding the essence of the current public administration reforms. In 2019 (now former Deputy Ministry of Regional Development, Construction, Housing and Communal Services of Ukraine) V. Negoda noted that Ukraine, upon reforming local self-government, is trying to reach the European level of local democracy [6, p. 107]. In the context of administrative reform, democratic changes come to the fore, namely: updating the content of state authorities' activities, their maximum approximation to the public needs and requests with the main priority of democratising society and serving Ukrainians [4; 10; 11].

Features of Legal Regulation of Civil Service in Ukraine

Notably, according to the current law of Ukraine "On Civil Service" [20, p. 4] under public service, Ukrainian legislation defines professional activities to ensure the exercise of the authority of state bodies. As an organisational and managerial institution, the civil service is a professional activity for fulfilling and ensuring the purposes, objectives, and functions of the state, which acts as a social mechanism.

Civil service is a public, professional, and politically impartial activity aimed at the practical implementation of the state objectives and functions, in particular: analysis of state policy at the national, sectoral, and regional levels and preparation of proposals for its development, specifically the development and examination of draft programmes, concepts, strategies, etc. [15, p. 2]. As a professional institution, it provides for the fulfilment of the obligations by persons holding public positions and providing services to citizens.

Upon clarifying the essence of public servants' professional activity S. Khadzhiradeva notes that professional activity is included in the social division of labour and is historically determined as the concretisation of social and productive activities, namely concretisation of such activity, which, according to researchers, (E. Aksenova [21], T. Bazarov [21], V. Voropaev [22], E. Vykhodtsev [22], R. Shakurov [23], etc.) is a specific form of people's attitude to the outside world and themselves, expressed in appropriate changes, social transformations, changes in human consciousness. That is, activity is a process that includes purposes, means, and results [4, p. 256].

In Ukrainian legislative practice, an activity-based approach to the civil service is adopted, civil service is defined as the professional activity of state bodies and their apparatuses [3, p. 346-349]. The legislation of Ukraine defines the procedure for admission to the civil service and its specific features, passing a probationary period, the procedure for assigning ranks, and many other issues. To ensure the implementation of these reforms in Ukraine, it is planned to prepare concepts and programmes, laws of Ukraine. The legal basis of the administrative package of reforms is the Constitution [24] and the laws of Ukraine, which determine the status of central and local executive authorities, the system of administrative-territorial structure, and the organisation of local self-government. The main objectives of the state target programme for the civil service development are: improvement of its organisational bases, taking into account the competence approach provided for in the new law of Ukraine "On Civil Service", the introduction of a human resource management system in the civil service in the medium term; providing the civil service with qualified personnel and developing personnel policy in direct activities [5; 20].

Therewith, practice shows that the effectiveness of state (public) management is confirmed by the impact of managerial decision-making and state-management reforms. The level and pace of socio-political and technological development within the country are determined primarily by the existence of a public environment capable of reproduction based on human resources, the introduction and use of innovative technologies [4; 10]. It should be recognised that today socio-political changes require improving the activities of government bodies, which leads to the decentralisation of power structures. It is essential to transfer powers and budgets from state authorities to local self-government bodies so that bodies that are closer to people have the ability to exercise powers more successfully

The development and implementation of public-service relations are aimed at ensuring that people understand that the quality of life depends on their choice, for which it is necessary not only to improve the functioning of local authorities but also to reduce the bureaucratisation of the state machine. Nevertheless, the authors can state that the bureaucracy that remained under any government, by inertia today, is increasingly attempting to maintain its usual management mechanisms. Therefore, one of the key objectives of the government is to reform the civil service and improve the activities of government bodies to solve local issues as soon as possible. It is obvious that the state transfers a wide range of powers and resources to establish a capable community as well as to increase the responsibility of local government specialists and employees. Therewith, modern Ukraine is characterised by institutions inherited both from the Soviet era and new institutions established during the difficult period of independence [2; 3].

It is worth focusing on the fact that the civil service, as a legal institution, is regulated by both constitutional and general rules of law, in addition, the constitutional rights and freedoms of a person cannot be restricted, except in cases provided for by the Constitution of Ukraine. According to the legislation, the civil service is defined as the most important institution in the development of Ukrainian statehood, since the successful functioning of the entire socio-political system depends on an appropriate professional service corps [2; 8; 20]. Although a clear organisation model of the civil service according to constitutional provisions is not established, the Constitution of Ukraine highlights the general principles of establishment and development of civil service institution.

Thus, the main constitutional provisions directly related to the civil service and revealing its social essence include: article 38 (sec. II) the Constitution of Ukraine emphasises that "citizens enjoy an equal right to access public service, as well as to service in local self-government bodies"; article 8 (sec. I) determines that the Constitution of Ukraine has the highest legal force and the principle of the rule of law is applied in Ukraine [24, p. 12]. This principle ensures the unity, consistency, and stability of the entire legal system, its individual elements and institutions, in particular the public service institution [24, p. 12]. This principle also provides that: authorities, officials, and citizens must comply with the Constitution of Ukraine, laws of Ukraine, international standards; civil servants should perform functions only within their competence and the rights assigned by their position; all state bodies and officials must properly exercise their rights and duties; civil servants fairly, conscientiously, faithfully serve the state, which becomes the basis of citizens' confidence in their actions and improves their professional competence [24, p. 12].

Analysis of the Current State of the Civil Service Institution

Certainly, as a professional institution, the civil service provides for the fulfilment of the obligations by persons holding public positions and receiving monetary remuneration from the state budget for their work [6, p. 432]. In general, civil service is performed by civil servants in accordance with established law and standards that are regulated by the institution which represents the democratic essence of the state, supports the life of society, while the state apparatus serves the needs of social development both in the centre and at particular places [2; 6; 8]. The diverse influence of the state apparatus on public life, multi-vector purposes and functions in its activities indicate that at the present stage of democratisation, transformations in public administration and public service are correlated with the transformation in the local self-government and should be provided by the Coordination Council on Local Self-Government under the President of Ukraine [19, p. 7].

Therewith, it should be noted that at the present time, from year to year, there is a high turnover of both civil service personnel and local government officials in the country. Due to ill-conceived personnel policy, low material security, lack of demand from the authorities, the experienced, proficient employees are forced to leave the civil service, move to commercial and other structures [4; 9; 11]. Thus, modern reality insistently requires theoretical coverage of existing issues. Organisational bases of reform, structuring, and ordering of Ukrainian society are examined in the studies, which offer scientific approaches to analysing the “holistic picture” of public life, investigate the content, functional, and structural characteristics of the public administration's professional activity.

The general scientific point of view is that the main defeat today is the lack of structural reforms in Ukraine [4; 9; 11]. This is evidenced by the political analyst P. Bukovsky of the I. Kucheriv Democratic Initiatives Foundation: “Among the main defeats of the year in Ukrainian politics, the absolute majority of experts cite the absence of structural reforms and a real fight against corruption, as well as an adequate response to the hybrid-diffuse war in Donbas and the annexation of Crimea” [8, p. 1-2]. According to experts the key issues that Ukraine should solve include overcoming corruption, as well as judicial reform, the law enforcement system, strengthening the combat capability of the Ukrainian army, decentralisation, and administrative reform [4; 8; 11].

Taking into account the above, it is worth noting that the imperfection in the implementation of the state objectives and functions is a consequence of the state-service relations of officials, the issue of their power dominance or tyranny over society. The work of public officials is intellectual, mental, psychologically rich, responsible, mainly associated with the impact on people's consciousness [4; 6]. The issue of power dominance or tyranny over society was considered by K. Popper, who defined the imperfect management system as “the tyranny of a minor official”. Upon fulfilling the will of people who developed political and administrative bureaucracy, it preserves its foundation, that is, the tyranny of a minor official. In such cases, officials most often absolutise their corporate interests [17, p. 123-127]. According to H. Popper, the only guarantee against abuse of power is the establishment of democratic control over authorities [17, p. 127].

It is vital to recognise that the relevance of improving governance is growing due to the fact that the world is moving from the model of public service administration to the service state model. It focuses on the needs of a particular citizen instead of the administrative distribution of services and resources. An urgent issue today is the improvement of the legal regulation of civil service institution in the context of the fact that the bureaucratisation in personnel's professional activities reduces the management quality. According to V.B. Averyanov, acquiring government power has become end in itself, which inevitably and substantially distorts the consciousness of civil servants, the management apparatus representatives, forms their peculiar “functional” consciousness [2, p. 47]. The authors can state that in a country where democratic institutions are in a complex process of legal regulation, the increasing influence of bureaucracy hinders economic growth and social development.

Based on the above, it should be noted that the old economic clan-oligarchic model is being eliminated in Ukraine. For example, according to the American Constitution framers, the greatest threat to the democratic system is the ability of individual leaders and parties to manage public opinion, to aim it at serving political interests rather than achieving the common good [8, p. 3]. In this regard, it should be outlined: it is difficult to imagine a modern state without a developed system of bureaucracy. The governance model that leads the country to degradation should be changed as soon as possible. This will attract the investors who will believe in the reforms. Investment inflows are possible in the absence of criminality, corruption, where a person understands what the real rules of the game are.

Conclusions

To summarise the above, it is not the laws that are capable of solving specific issues, but people. Only rational democracy can be determined as the most important social invention of human civilisation. A considerable expansion of the functions of state authorities and local self-government bodies in most developed countries is accompanied by an increase in the role of the state apparatus in the comprehensive regulation of economic, political, social, legal, and other processes in order to ensure the stabilisation of public relations.

Considering the social development of today, there is a need to improve governance, its prompt response to the challenges and threats of society. Only provided the proper attention of the state to the role of a public servant, whose purpose is to ensure the implementation of the Constitutional provisions, legislative and other normative legal acts to serve the people and the state, the public service reform will bring the system of Ukrainian administration closer to European standards. Therefore, the primary objective for today is to preserve and strengthen the administrative apparatus capable of effective development, to maintain the socially-oriented bureaucracy capable of mandatory procedures for increasing the country's socio-economic prospects in the context of democratic progress on a generally Ukrainian scale.

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Декаплінг економічного зростання від екологічної шкоди: теоретичний аспект

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Анотація. Актуальність дослідження обумовлена необхідністю поглибленого вивчення декаплінгу, як індикатора ефективності реалізації державою концепції сталого розвитку, що в умовах сучасних тенденцій світової економіки є домінуючою серед держав світу. Метою дослідження є вдосконалення та конкретизація теоретичних основ декаплінгу економічного зростання від екологічної шкоди. Методологічну основу дослідження склали методи емпіричного аналізу, синтезу, індукції, порівняння, гіпотетично-дедуктивний метод, а також системний підхід до опрацювання наукових праць українських і зарубіжних вчених, стратегічних документів екологічного характеру авторитетних міжнародних організацій, присвячених темі декаплінгу. У статті визначено три контентних ознаки декаплінгу економічного зростання від екологічної шкоди, пов'язаних з економічним ростом економічної системи та екологічною шкодою, яку вона чинить, а також двома групами факторів екологічної шкоди: ресурсними та факторами впливу на навколишнє середовище. Автором було удосконалено визначення декаплінгу на основі аналізу існуючих дефініцій даного поняття, шляхом виокремлення у них спільних контентних ознак та їх синтезу в єдине ціле. Розглянуто види декаплінгу та підходи до класифікації його ступенів: за методикою Організації з економічного співробітництва та розвитку, а також авторською методикою П. Тапіо. З'ясовано, що абсолютний декаплінг є пріоритетним ступенем у контексті реалізації державою концепції сталого розвитку, так як відповідає визначеним у ході дослідження ознакам декаплінгу та базовим засадам сталого розвитку. Запропоновано шляхи ефективного розвитку та інтенсифікації декаплінг-процесів у рамках реалізації державою концепції сталого розвитку. Практична цінність отриманих результатів дослідження пов'язана із їхнім подальшим застосовуванням у процесах стратегічного планування на національному рівні, а також при розробці економічного механізму стимулювання декаплінгу економічного зростання від екологічної шкоди

Ключові слова: концепція сталого розвитку, ресурсний декаплінг, екологічна шкода, відносний декаплінг, абсолютний декаплінг, економічна система, екоінновації

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Decoupling Economic Growth from Environmental Damage: A Theoretical Aspect

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Abstract. The relevance of the study is conditioned by the need for an in-depth study of decoupling as an indicator of the state's implementation effectiveness of sustainable development, which is dominant among the states in the context of current trends in the world economy. The purpose of the study is to improve and specify the theoretical foundations of decoupling economic growth from environmental damage. The methodological basis of the research includes the empirical analysis, synthesis, induction, comparison, hypothetical-deductive methods, as well as a systems approach to processing the studies of Ukrainian and foreign researchers, strategic environmental documents of reputable international organisations devoted to decoupling. The author identifies three content features of decoupling economic growth from environmental damage related to the economic system growth and the environmental damage it causes, as well as two groups of environmental damage factors: resource and environmental impact factors. The author improved the definition of decoupling based on the analysis of existing definitions, by identifying common content features in them and synthesising them. The study considers decoupling types and approaches to the classification of its degrees: according to the methodology of the Organisation for Economic Co-operation and Development, as well as the methodology of P. Tapio. The research established that absolute decoupling is a priority step in the state's implementation of sustainable development, as it corresponds to the decoupling features defined in the course of the study and the basic principles of sustainable development. The study includes the effective development ways and intensification of decoupling within the framework of the state's implementation of sustainable development. The practical value of the research results is related to their further application in strategic planning at the national level, as well as in the development of an economic mechanism for stimulating the decoupling of economic growth from environmental damage

Keywords: sustainable development, resource decoupling, environmental damage, relative decoupling, absolute decoupling, economic system, eco-innovations

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Introduction

At present, sustainable development is on the agenda of the entire leading world community, since it is generally recognised, as declared in the final document of the UN Sustainable Development Summit, which was attended by 189 countries, within the framework of the 70th session of the UN General Assembly in New York in September 2015 "Transforming our World: The 2030 Agenda for Sustainable Development" [1], where 17 purposes and 169 tasks were approved upon implementation. Sustainable development is a scenario of safe human community development amid depletion of non-renewable natural resources, environmental pollution, the unlimited impact of anthropogenic factors on the ecosystem, and so on. It provides for a new model of the world order, which prioritises the harmonious coexistence of man and nature in an ecological economy, in order to preserve our planet for future generations and not economic growth by increasing the turnover of resources involved in production.

In such circumstances, special attention of the scientific community is paid to the peculiarities of the functioning of economic systems within the modern world economy, namely, ways to ensure their growth in conditions of limited resources and the effectiveness indicators of greening the economy. In the interaction of the economic system and the environment, according to sustainable development, decoupling of environmental damage from economic growth is provided, which implies a violation of the direct relationship between the economic system growth and its negative impact on the ecosystem. Eco-balanced sustainable development of states is ensured precisely through decoupling, improvement, and concretisation of the theoretical foundations within the subject of this study.

In English the word "decoupling" is used in various sciences, such as physics, mechanics, electronics, finance, economics, etc., denoting the gap in the relationship between processes and phenomena. In research on the economy of nature management and environmental protection, sustainable development, green or circular economy, this word is used in such phrases: "decoupling in the economy" [2; 3], "ecological decoupling" [4], "ecological and economic decoupling" [5; 6], "decoupling of economic growth and environmental impact" [7], "decoupling of economic growth and consumption" [8], and "decoupling of environmental pressure from economic growth" [9], etc. Such a variety of approaches to formulations necessitates clarification and improvement of the conceptual framework on decoupling issues within sustainable development.

The decoupling within sustainable development is covered in the studies of P. Tapio [10], M. Fisker-Kowalski [11], K.Y. Zeng and V.M. Wong [12], O.O. Veklich and B.M. Danylyshyn [13], O. Vatchenko, K. Svistun [2], O.M. Rook [14], A.V. Barzhina [15], I.M. Sotnik and L.A. Kulik [7] et al. Despite the interest of researchers in this subject, the author considers it appropriate to deepen research in this area in order to systematise theoretical material, concretise and improve definitions, as well as the essence of basic concepts in order to apply them in both in the theoretical and practical forms.

The purpose of the study is an improvement and concretisation of the theoretical foundations of decoupling economic growth from environmental damage. This scientific research is aimed at performing the following tasks: to improve the definition of decoupling of economic growth from environmental damage based on the analysis of existing definitions, by identifying common content features and their synthesis; to study the decoupling types and degrees; to determine the priority degree of decoupling, based on its compliance with the selected decoupling features and the basic principles of sustainable development; to suggest ways to effectively develop decoupling within the framework of the state's implementation of sustainable development.

Methodology

The methodological basis of the research of decoupling economic growth from environmental damage was a systems approach to examining Ukrainian and foreign studies, which highlight this issue, as well as strategic environmentally-themed documents of reputable international organisations, in particular the report of the Organisation for Economic Co-operation and Development "Indicators to Measure Decoupling of Environmental Pressure from Economic Growth" from 2002, the methodological report of the Eco-Innovation Observatory established by the European Commission "Europe in transition: Paving the way to a green economy through eco-innovation" from 2010, the final document research services of the European Parliament "Decoupling Economic Growth from Environmental Damage" from 2020, report of the International Resource Panel "Assessing Global Resource Use. A systems approach to resource efficiency and pollution reduction" under the auspices of the United Nations Environment Programme from 2017, which allowed studying the existing approaches to determining the essence of decoupling in the context of sustainable development, the types and degrees of decoupling, which served as the theoretical basis for scientific conclusions and proposals.

In the course of the study, such general scientific methods were used as: the empirical analysis, which studied the existing definitions of decoupling and identified common content features in them; the synthesis method, which allowed formulating the author's definition of decoupling of economic growth from environmental damage by integrating certain common content features; the induction method, based on which absolute decoupling was identified as a priority step in ensuring the effective implementation of sustainable development;

the comparison method – to determine the compliance of absolute decoupling with the basic principles of sustainable development; hypothetically-deductive method at the stage of establishing ways to effectively develop decoupling in the state.

The study was conducted in two stages. Firstly, the authors specified decoupling in the context of sustainable development. Secondly, the authors defined the priority degree of decoupling within ensuring the effective implementation of sustainable development based on the comparison of decoupling features identified in the analysis of existing definitions and the basic principles of sustainable development, the conceptual framework of which is defined by the resolution adopted by the UN General Assembly on September 25, 2015, "Transforming our World: The 2030 Agenda for Sustainable Development".

Results and Discussion

Decoupling in the context of sustainable development

Decoupling environmental pressures from economic growth is first considered by Organisation for Economic Cooperation and Development (OECD) in the report "Indicators to Measure Decoupling of Environmental Pressure from Economic Growth" from 2002 [9] (Fig. 1), in which the term "decoupling" is identified as a gap in the relationship between "environmental damage" and "economic gain", which became one of the main purposes of the OECD Environment Strategy for the first decade of the 21st century.

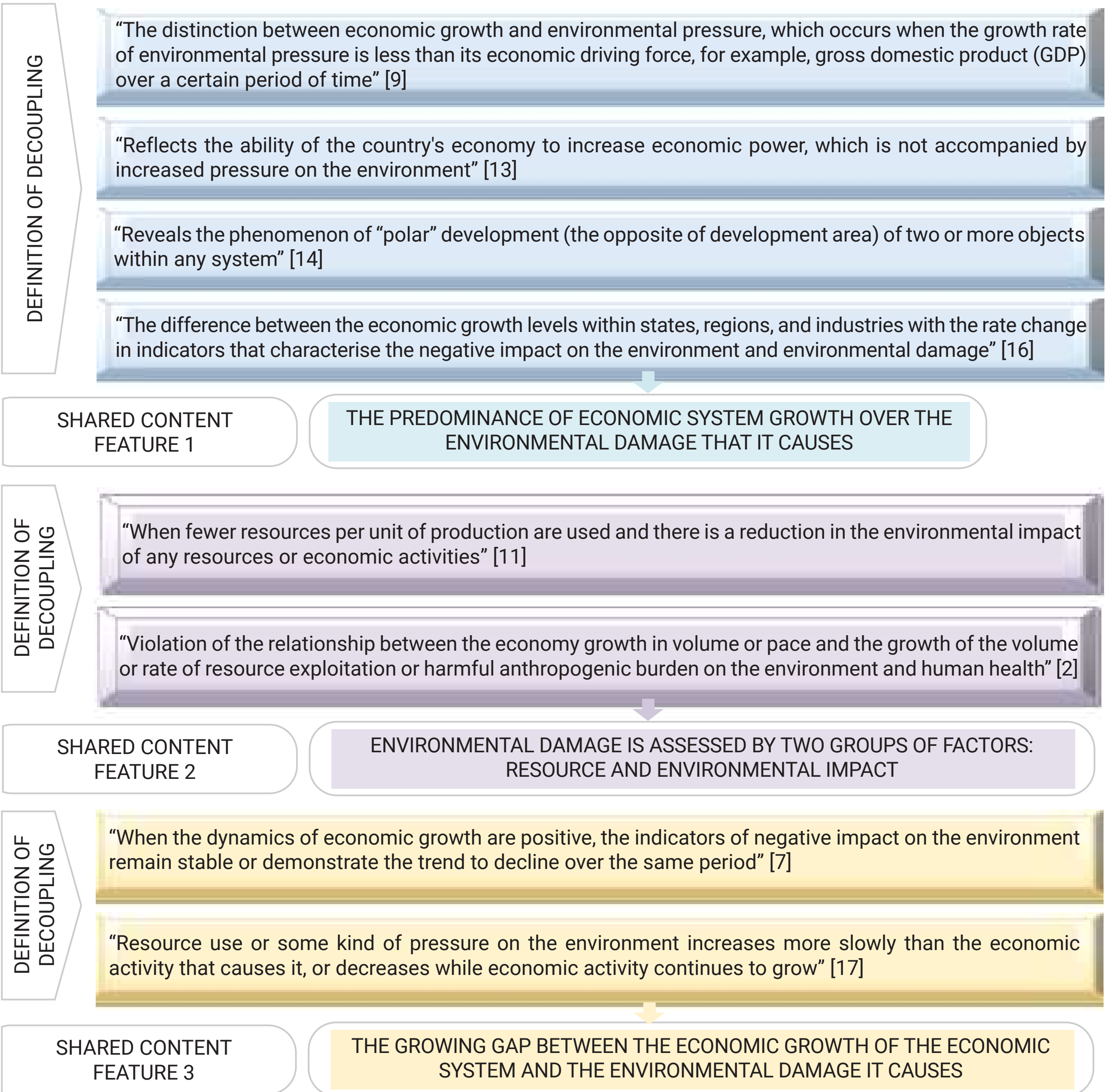

Figure 1. Analysis of existing definitions of decoupling in the context of sustainable development

At present, in the foreign and Ukrainian scientific literature, there are many definitions of this decoupling type, which are determined by researchers depending on the subject of their study. To define this concept in all possible parameters, the existing definitions of decoupling should be analysed, followed by identifying common content features between them, to then synthesise them into a single definition. The study order is demonstrated in Figure 1.

As the above analysis of the existing "decoupling" definitions presents, there are three content features in common:

1. The predominance of economic system growth over the environmental damage that it causes. Since decoupling is interpreted as a gap, there is a positive gap between the economic growth which is an objective of economic and environmental damage, as the price for such growth, i.e. decoupling occurs when the ratio of economic growth to environmental damage will have a value greater than unity.

2. Environmental damage is assessed by two groups of factors: resource factors and environmental impact. Environmental losses can occur both at the entrance to the economic system in the form of exhaustive raw materials and non-renewable energy resources used in production, and at the exit in the form of harmful emissions into the environment (greenhouse gases, industrial effluents into reservoirs, garbage, etc.).

3). The growing gap between economic system growth and the environmental damage it causes. Decoupling implies a steady extension of the gap between economic growth and environmental damage, which is assumed either by stopping maximising environmental losses from the economic system, or reducing them by introducing eco-innovations in production, expanding the use of alternative energy sources, recycling raw materials, garbage disposal without harm to the ecosystem, and so on.

For its part, the application of the synthesis method to the general content features defined above in the analysed definitions allows determining *decoupling* as a state of the economic system, in which its economic growth prevails over its environmental damage on the ecosystem through two groups of factors: resource and environmental impact factors with the prospect of increasing such a gap in the future.

Determining the priority degree of decoupling in ensuring the effective implementation of sustainable development

As evident from the definition, decoupling, depending on environmental damage type, is divided into two types: *decoupling non-renewable resources*, which implies a break the link between economic growth and the use of non-renewable resources in socio-production processes; *environmental impact decoupling*, which means the functioning of the economic system without releasing harmful products of its vital activity into the ecosystem.

Notably, both types of decoupling are equally important for the sustainable development of the world community, since resource decoupling is necessary to ensure the stable functioning of the economic system in conditions of lack of resources, especially further depletion of which can hinder the development of the world economy as a whole, for example, oil, rare minerals, fertile land, etc. For its part, environmental impact decoupling is a requirement of the current catastrophically polluted environment, when toxic emissions from human activities pose a direct threat to the ecosystem, as well as to human health and life.

Furthermore, there are many approaches to determining the degree of decoupling in the economic literature. In this case, focusing on the indicators for measuring the decoupling of environmental pressure from economic growth proposed by the Organisation for Economic Co-operation and Development (OECD), according to which [9]:

1) *relative decoupling*, in which environmental damage increases, but not as fast as economic growth occurs.

According to the author, this effect can be achieved due to ecological and economic incentives for the rational use of natural resources within the framework of the national strategy for Sustainable Development, which includes:

– environmental taxes, which are set depending on the amount of environmental damage that the enterprise causes to the environment;

– financial and credit mechanism, which provides for soft loans to enterprises in the case of rational use of natural resources and implementation of environmental protection activities;

– pricing policy with environmental priority, which is aimed at increasing the price of products that were manufactured in environmentally harmful production, and its possible withdrawal from sale in the future in the conditions of environmentally fair market development.

2) *absolute decoupling*, in which environmental damage does not increase or even decrease with economic growth.

To ensure absolute decoupling, along with environmental and economic incentives, it is necessary to introduce eco-innovations on the way to organising a circular and green economy. The European Commission, in its 2010 The Eco-innovation Action Plan, defined eco-innovations: "as any form of innovation that aims or results in considerable and demonstrated progress towards achieving the sustainable development goal by reducing environmental impact, increasing resilience to envi-ronmental stress, or achieving more efficient and responsible use of natural resources" [18].

It is eco-innovations that can provide the economic system with alternative raw materials (renewable), the maximum preservation of the product value within the production cycle, the transition from selling the product to the service model, when the service for using the product is sold, and not the product itself, waste recycling and recovery of raw materials with its reuse [19], the creation of treatment systems for industrial waste, etc.

1. *Coupling*, which means a parallel synchronous increase in environmental damage and economic growth.

2. *Negative decoupling*, which implies a situation in which environmental damage does not correlate with economic growth, that is, their development is not interrelated.

According to Petri Tapio's classification of decoupling degrees, "economic growth and environmental damage can be interrelated processes (*coupled*), delimited (*decoupled*), or negatively delineated (*negatively decoupled*). On the other hand, the growth of variables can be positive and negative, which is expressed by increasing the relationship between them (*expansive coupling*) or decreasing (*recessive coupling*)" [10]. This classification allows outlining a wide range of relationships between economic growth and environmental damage, as it has eight degrees of decoupling: *strong negative decoupling, weak negative decoupling, expansive negative decoupling, weak decoupling, strong decoupling, recessive decoupling, expansive coupling, recessive coupling* [10].

Comparing the methods for measuring the decoupling of economic growth from environmental damage according to the OECD and according to P. Tapio, the authors agree with the opinion of Yong Li, Hushenggao, Weisun, who prefer the Tapio approach, since it does not require binding to the base year, but focuses on changing data for different years, which allows adequately assessing the effectiveness of environmental policies implemented [20]. In addition, the Tapio method offers a wider range of assessments, which increases the objectivity of decoupling study results.

For this study, it is important to determine which degrees of decoupling from the proposed classifications fall under the previous definition based on common content features. Evidently, the desired and real goal of sustainable development implementation and therewith an effectiveness indicator of this process is to achieve absolute decoupling of economic growth from environmental damage, when the economic system becomes more closed and circular since it provides for the predominance of economic system growth over the environmental damage that it causes, as well as the growth of such a gap. According to the author, only complex constructive changes and effective state policy can lead to such a result, that is, absolute decoupling cannot be a random and spontaneous phenomenon, but a logical result of purposeful actions and, therefore, not a short-term and fragmentary, but a permanent and irreversible process.

The authors believe that the orientation of the state's sustainable development policy to absolute decoupling is appropriate since it will lead to positive changes for all components of sustainable development: economic, social, Innovative, environmental because this type of decoupling provides for the following:

o economic growth, which means that the development of the economic component of sustainable development is ensured;

o reducing environmental damage amid economic growth, which will have a positive impact on the environmental and social components;

o the existence and growth of a gap between economic growth and environmental damage, which is possible only through the introduction of innovations in economic processes and in production in particular, and thus ensures the innovative component of sustainable development.

Conclusions

Effective implementation of sustainable development and the introduction of a green economy in the state require powerful innovative development with an increased number of eco-innovations in production, broad promotion of healthy food among the population, saving resources and careful attitude to the environment, the establishment of an environmentally fair market, etc. It is a comprehensive innovative approach to the implementation of sustainable development that will ensure sustainable and irreversible absolute decoupling of economic growth from environmental damage, and ensure the prosperity of the economic system in harmony with the environment.

In addition, further research on this issue will lead to increased attention during the national socio-economic strategy development to the need to achieve absolute decoupling as a result of the implementation of such a strategy. Focusing on such results will allow avoiding formalisation within setting strategic goals and making decisions on effective innovative means to achieve them. Such an emphasis in implementing sustainable development will provoke the state to give a clear message to the innovation market about the demand for eco-innovations that can ensure absolute decoupling of economic growth from environmental damage, as well as launch a mechanism for stimulating scientific and technological development in the state as a whole.

Furthermore, an important aspect in this context is to ensure the harmony of all sustainable development components in the course of achieving the absolute decoupling of the economic system's growth from the environmental damage it causes. After all, the green economy introduction, for example, should not put a burden on eco-energy consumers with multiplied tariffs, if the population's living standard does not increase. In other words, decoupling should be accompanied by economic benefits for their deep and sustainable cultivation in a country that has embarked on the path of sustainable development.

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Аналіз системи державного управління у сфері фізичної культури і спорту в Україні

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Анотація. Актуальність проблеми функціонування сфери фізичної культури та спорту в умовах недостатнього охоплення молодих людей різноманітними спортивними заходами та погіршення стану здоров'я пересічного українця недостатньо досліджена. Зазначено, що метою дослідження є характеристика базових компонентів системи державного управління у сфері фізичної культури та спорту. Були використані наступні методи: пошуковий, аналіз наявної методичної та наукової літератури, класифікація, з'ясування причинно-наслідкових зв'язків, систематизація ключових моментів зазначеної вище проблематики. У процесі літературного огляду виявлено сучасний стан дослідження зазначеної проблематики, визначено її перспективність. Зазначено, що у наш час високих технологій і достатку продуктів харчування, відбувається зменшення фізичної активності населення. Вказано, що виникає нагальна потреба в актуалізації та популяризації розвитку масової фізичної культури і спорту. Охарактеризовано діючий стан регулювання державою сфери фізичної культури та спорту. Обумовлено, що невирішеність проблем окремих напрямів послабить динаміку розвитку сфери фізичної культури і спорту. Ефективний розвиток фізичної культури і масового спорту із боку держави та супроводжуючі його стійкі гуманітарні ефекти серед населення України можливі лише на основі комплексних науково-обґрунтованих інфраструктурних та організаційно-управлінських рішень за всіма відповідними напрямами. Вказано, що вирішити весь комплекс проблем, які наявні у сфері фізичної культури і спорту, неможливо за допомогою проведення окремих дій, які не пов'язані між собою. Підсумовано, що тісний взаємозв'язок процесів, які виникають у цій галузі, з процесами, що відбуваються у суспільстві, свідчать про необхідність використання програмно-цільового методу у цілях успішного вирішення завдань у сфері фізичної культури та спорту на державному рівні

Ключові слова: спортивні заходи, державна політика, суспільство, фізкультурно-спортивна політика, фінансове забезпечення

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Analysis of the System of Public Administration in the Field of Physical Culture and Sports in Ukraine

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Abstract. The relevance of the problem of functioning of physical culture and sports sphere in the context of insufficient coverage of young people with various sports events and the deterioration of the health status of ordinary Ukrainians is understudied. The purpose of the study is to characterise the basic components of the public administration system in the field of physical culture and sports. The following methods were used: searching, analysis of the available methodological and scientific literature, classification, clarification of cause-and-effect relationships, systematisation of the key points of the above problems. In the course of the literature review, the current state of research on this problem was covered, and its prospects were determined. Notably, in the time of high technologies and an abundance of food, there is a decrease in physical activity of the population. It is indicated that there is an urgent need to update and popularise the development of mass physical culture and sports. The paper describes the current state of regulation of the physical culture and sports sphere by state. It was stipulated that the unresolved problems of certain areas will weaken the dynamics of development of physical culture and sports sphere. Effective development of physical culture and mass sports on the part of the state and its accompanying sustainable humanitarian effects among the population of Ukraine are possible only with comprehensive scientifically based infrastructure and organisational and administrative decisions in all corresponding areas. It was mentioned that it is impossible to solve the whole complex of problems that exist in the field of physical culture and sports by conducting separate actions that are not related to each other. Summed up that the close relationship of the processes that arise in this area with the processes that occur in society indicates the need to use a programme directed method in order to successfully solve problems in the field of physical culture and sports at the state level

Keywords: sports events, national policy, society, physical culture and sports policy, financial support

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Introduction

Ensuring socialisation through sports is carried out through the involvement of young people in sports events, active influence on various aspects of the development of younger generation, which has a diverse reflection in different strata of society, but in general, the level of coverage of sports activities determines the effectiveness of the socialisation process. The modern development of Ukrainian society is characterised by the following trends: social instability, an increase in the number of conflicts in social relations, a decrease in the overall level of life quality. As a result of spontaneous reforms, the state lost its previous achievements in various spheres of public life. The reform process has led to the development of destructive trends in mass Ukrainian sports and a decrease in physical activity of the younger generation.

An increased attention to young people in these conditions is not accidental at all since it is this category that determines the future of the state. At the same time, the level of coverage of young people with physical culture and sports depends on the state of their physical and moral health, the level of working capacity in the future. Optimisation of the social structure, which extends to different strata of society, including mass sports, which, combined with the lack of a focused national policy in this area, led to the destruction of the system of mass sports, the removal of physical culture from the strategic guidelines of the population.

N.S. Sitnikova in her works analyses the foreign experience of financing professional sports and its state in Ukraine [1]. S.V. Nikitenko described the basic criteria of the field of "physical culture and sports" in Ukraine and reflected the positive and negative aspects of its development [2]. S. Zaporozhets outlines the key problems that harm the development of sports in Ukraine, the irrelevant administrative system, the constant lack of funding, and the initial state of the sports sector [3]. Among foreign researchers, it is worth highlighting J. Loy [4] and B. McPherson [5], who conducted a comprehensive study of the interaction of sports, culture, and society.

At the same time, there are almost no systematised scientific papers that would analyse the issues of public administration in the field of physical culture and sports and the problems of ensuring the functioning of the sphere of physical culture and sports in conditions of economic instability in Ukraine. Thus, the outlined problems are poorly developed and understudied at present.

The purpose of the study lies in analysing the key components of public administration in the field of physical culture and sports. To achieve this purpose, the following *tasks* must be performed: to characterise the components of state regulation of the functioning of physical culture and sports; to analyse the current regulatory documents in the field of physical culture and sports; to consider current problems and areas of optimising the functioning of the sphere of public administration in the field of physical culture and sports.

Materials and Methods

The methodological basis of this research is the use of the following methods: searching, analysis of available methodological and scientific literature, classification, clarification of cause-and-effect relationships, systematisation of key points of the above problems. At the same time, the research methodology is based on the accumulation of general scientific methods and techniques used in general by legal science. For a comprehensive analysis of the system of state administration of physical culture and sports, determining the main features of organisational aspects, functions, and methods, the relationship with its individual components, the specifics of introducing physical activity into the daily life of society, identifying the level of influence of the main factors on the development of culture and sports sphere, as well as the basic characteristics of the process for improving the field of physical culture and sports, several methods were used, in particular: quantitative, normative, dialectical, situational, structural and functional, system. The paper is based on the analysis of the laws of Ukraine, scientific and methodological literature, methodological manuals, scientific papers, periodicals and the best practices of modern and previous scientists in the field of law.

The key principle of the scientific paper is a system approach, which allowed considering physical culture as a system, the components of which were committees, sports facilities, specialists, etc. For its part, the ability to specify the functions, structure, and characteristics of this system was carried out using system analysis. The principle of historicism, which implies reliance on factual material in its true content, made it possible to analyse each phenomenon in its development, change, versatility, and inconsistency. The principle of objectivity made it possible to analyse the development of physical culture and sports as close to reality as possible, as well as to show the reliability of this process, based on a multi-faceted study of available information in unpublished and published sources.

Clarification of the need for state administration of physical culture and sports in Ukraine is carried out using the methods of formal logic. The identification of gaps and inefficiencies in the functioning of public administration in the above area was carried out using a problem analysis. The specifics of the system's interaction with the external and internal environment were studied using system analysis. A prognostic analysis was used on the further development of physical culture and sports. For a comprehensive analysis of the features of the research object, subject, tasks, and assessment of the existing state of the administrative system, the method of studying documents and legislative acts was used.

Results and Discussion

Now official documents stipulate that the mechanisms of public administration in the field of physical culture and sports used in recent years have proved to be ineffective. In this regard, to minimise the existing negative trends in the field of physical culture and sports in the context of financing reform due to the introduction of an economic national policy tool, it is advisable to use a programme directed method, which is a system of measures outlined before the planned implementation – systematised by content, time, and spatial characteristics, endowed with resources and aimed at optimising the system of physical culture and sports at the stage of development of a socially-oriented Ukrainian market economy.

Physical culture and sports are an organic component of universal culture, its unique complete area. At the same time, it is a unique process and result of human activity, a means and method of physical improvement of the individual. Physical culture influences key aspects of a person's life, obtained in the form of makings that are genetically determined and develop during life under the influence of upbringing, life activity, and the environment. It is aimed at meeting special needs in communication, games, entertainment, and certain manifestations of personal expression through social useful activity. Physical culture is a combination of material and spiritual values. The first group includes sports buildings, special equipment, sports equipment, and medical support. The second group includes information, works of art, sports, games, physical exercise systems, ethical and legal norms that determine human behaviour in the process of physical culture and sports activities.

Functioning of state regulation of the sphere of physical culture and sports

The process of state administration of physical culture and sports manifests itself in certain forms that are conditioned by unique tasks and regulatory functions and has a unique content. Under the conditions of analysing the functions of public administration in the field of physical culture and sports as the basic areas of purposeful influence on the objects of administration, the forms of public administration are the areas of a certain influence. Consequently, the forms of state regulation determine the area of administrative activities. The choice of effective forms of public administration should contribute to the effective implementation of administrative functions, and the achievement of the necessary purpose with minimal costs. First of all, the creation of a successful system of physical culture and sports administration is hindered by an imperfect system of legal regulation – in particular, ignoring legal regulation, insufficient information support for the functioning of this area.

The functioning and further development of physical culture and sports in a market economy is aimed at constantly identifying additional sources of financing, innovative tools for competitive struggle, and ensuring market communication. The key system tool is sponsorship. At the same time, part of the sponsorship contributions to the sports sector differs considerably and is largely due to the existing socio-economic conditions, the type of sport, its development and the level of the sports event held. The study of public administration mechanisms in the field of physical culture and sports should focus on the analysis of the basic components: the socio-economic state of functioning of the political system; the specifics of organisations that produce a certain national policy; the system of values, ideological beliefs of a group of people on whom the adoption of key political decisions depends.

The state apparatus should solve problems that have a rather contradictory content, form, ensure the implementation and control of the general policy of sectoral development as an integral system of physical culture and sports due to the concentration of various administrative tools in the hands of a single person. Given the limited resources, the state is forced to minimise budget burdens in terms of financial support for physical culture and sports. This formulation of the problem requires defining the key areas of public administration in the field of physical culture and sports, the financial support of which should be sufficient and stable.

At the same time, government agencies need to diversify their sources of financing in the main areas. First of all, this is the activation of service provision to consumers of various levels of sports requests of commercial and non-governmental non-profit structures. In addition, it is the delegation of administrative and support functions at the regional and local levels of administration, that is, diversification of administrative powers both within the state vertical: state – region – district – community, and in the area of the structure of the economic sector (subjects of the economic sphere). The non-state commercial sector comes into conflict with concentrated administration exclusively in state executive bodies. The sphere of physical culture and sports is a mandatory component of the economic system and, at the same time, an object of state regulation.

The concept of “good governance” is used by administrative institutions in the international and Ukrainian community. However, despite the popularisation and update of this concept, this category has not received a clear formulation, solid characteristics, boundaries, and purposes [6]. Effective administration is a clear conceptual system that determines the probability of achieving results in the current administrative system. The focus on the implementation of the principles of an effective administration in Ukrainian society guarantees certain values of awareness of the development prospects [7]. It is worth noting the circle of relevant power subjects (Fig. 1) and classify them taking into account the content and regulations of public administration, the development of concepts for analysing the overall level of public administrative influence, taking into account different levels.

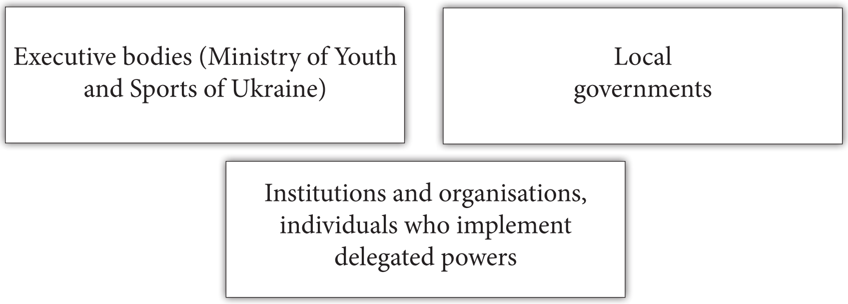

Figure 1. Multi-level government subjects responsible for public administration in the field of physical culture and sports in Ukraine

Among the identified subjects, it is worth noting:

– government institutions and organisations (National Anti-Doping Centre);

– non-governmental institutions and organisations (the National Olympic Committee of Ukraine is not only a public organisation of the sports area, but it also exercises certain administrative powers);

– private entities who are not employees of public authorities, but in certain cases acquire authority (for example, sports judges).

In modern Ukraine, the structure of the legal administrative system in the field of physical culture and sports includes:

– documents of international law, in particular, conventions, general principles and norms of international law, documents of international and interstate organisations. Special norms of international sports law are also presented in agreements regulating solely the implementation of sports activities. Among them, it is worth noting bilateral agreements, for example: Agreement on Cooperation between the Ministry of Defence of Ukraine and the Federal Department of Defence, Civil Protection and Sport of the Swiss Confederation [7] and multilateral agreements (or conventions): Agreement on Cooperation in the field of Physical Culture and Sports of the State Parties of the Commonwealth of Independent States [8], International Convention against Doping in Sport [9], International Convention Against Apartheid in Sports [10], European Convention on Spectator Violence and Misbehaviour at Sports Events and in particular at Football Matches [11], etc;

– national (intrastate) regulatory documents within the framework of Ukrainian legislation. Sources of sports law in Ukrainian legislation are the Constitution of Ukraine [12], The Laws of Ukraine "On Physical Culture and Sports" [13], "On anti-doping control in sports" [14], "On support for the Olympic, Paralympic Movement and high-performance sports in Ukraine" [15] and others. Sports law standards also regulate the list of subordinate legislation, international legal acts, decrees of the President of Ukraine, resolutions of the Cabinet of Ministers of Ukraine, etc.;

– laws and regulations of international non-governmental sports organisations, their agreements with interstate organisations, states and among them, political and advisory documents of global or regional international sports conferences;

– a system of documentary and corporate standards of public and other organisations in the field of physical culture and sports and their associations, in particular, codes, regulations, charters, rules;

– moral norms (for example, the Olympic Honour Code, etc.) [16].

Based on the analysis of the government's administrative powers in the field of physical culture and sports, a number of contradictory decisions have been identified, in particular regarding conditioned arguments aimed at awarding scholarships to athletes, coaches, and figures of physical culture and sports for considerable achievements. At the same time, athletes who took 1-6th places at the Olympic Games, and 1-3^{d} places at the Paralympic and Deaflympic games are considered considerable achievements within the rules for awarding scholarships. In the development of these criteria, the adjustments from the general legal principle of equality are assumed to be advisable.

The development of the central body for physical culture and sports was characterised by a noticeable dynamic of changes, which manifested itself both at the initial stage of state-forming measures and more than

30 years after. This, although it confirms the versatility of evolutionary changes (often does not allow achieving the necessary results), is characterised by a partial weight of the (scientifically reasoned) approach to determining the system of measures to optimise the public administration system and the field of physical culture and sports. However, the reorganisation of the central executive authority for physical culture and sports has changed meaningfully to a stable recovery process, which is always aimed at minimising administrative activities, the appearance of organisation-conditioned breaks, primarily the internal orientation of orders, the uncertainty of the professional position for personnel, which leads to a decrease in the level of activity.

Considering the above, it is noted that there is a negative attitude to continuous reform and a destructive desire to artificially reduce the number of employees in the reform process. There is a double influence of two basic provisions of the Ministry of Youth and Sports of Ukraine: approved by both the Decree of the President of Ukraine and the Resolution of the Cabinet of Ministers of Ukraine [17]. Due to the fact that, in Part 3 of Article 3 of the Law "On central executive bodies" [18], the regulations on ministries and other central executive bodies are approved by the government, it is the latter that provides orientation in the process of studying the activities of the ministry as a subject of public administration in the field of physical culture and sports.

Given that the President of Ukraine does not have the authority to approve status acts of central executive authorities, these provisions should be repealed. Maintaining the validity of regulatory documents is illegal and reflects a separate, generalised problem of legal regulation. Based on the conducted research of the system and powers of local self-government bodies regarding the administration of physical culture and sports, it was established that the implementation of delegated powers of executive bodies of local councils in the field of physical culture and sports is stipulated by the Law "On Local Self-Government in Ukraine" [19]. During the consistency of the outlined features of delegated powers that are not implemented, certain powers are stipulated without the free expression of the will of the subjects of delegation. If it is not considered that this refers to powers that are conventionally designated as "delegated" in regulations and in the doctrine, then it means that it is advisable to distinguish between the rights and obligations of a subject of state power stipulated by regulatory documents for an indefinite period in relation to the regulation of a certain list of public issues, that is, standard powers.

In this context, the question needs to be clarified: the reasons for the expediency of introducing and acquiring a considerable popularisation of the concept of delegation of powers "according to the law", which is not due to the basic understanding of delegation. The answer is conditioned by the content of the Ukrainian model of local self-government, which is capable of regulating issues of local importance. At the same time, local self-government in the context of decentralisation reform cannot be determined solely by local-territorial problems caused by the features of the life of a certain community, but it must also solve issues of state importance at the local level.

Consequently, delegated powers relating to state issues at the local level are transformed into their own powers. Vesting the public entities with the powers necessary to regulate public administration in this area, which corresponds to the decentralisation and European integration processes in the country. Involvement of members of the public in management in the field of physical culture and sports, coordination of administration mechanisms is a type of decentralisation (functional), which is due to positive consequences regarding the efficiency, expediency, professionalism, and effectiveness of legislative influence, proper guarantee of legal and public responsibility.

The orientation of strategic directions is aimed precisely at supporting "mass sports" and is an important step towards improving the physical culture and sports industry at the stage of development of a socially-oriented market economy in Ukraine [20]. The legal mechanism determines the procedure for the emergence, modification, and termination of legal relations between subjects and objects of the management system in the field of physical culture and sports and is aimed at implementing the tasks of the national policy for the development of education in the field of physical culture and sports [21]. The organisational mechanism of state administration in the field of physical culture and sports of Ukraine is aimed at state and local authorities in the field of physical culture and sports. The organisational mechanism for managing the development of education in the field of physical culture and sports determines the functioning of public organisations, for example: the National Olympic Committee and its divisions at the regional level; the Ukrainian Centre for physical health of the population "Sport for everyone" and its divisions; national sports federations and local sports federations in sports recognised in the state; the Ukrainian Centre for Physical Culture and sports of disabled people "Invasport" and its divisions.

Thus, in Ukraine there are a considerable number of state and public bodies for managing the development of education in the field of physical culture and sports, but their functioning does not meet the needs of the population.

Prospects for the development of physical culture and sports

The strategy for the development of physical culture and sports defines the priorities of national policy provided for by the Law of Ukraine "On the fundamentals of domestic and foreign policy", namely: creating conditions for the maximum fulfilment of the abilities of talented athletes, ensuring equal rights and opportunities to engage in physical culture and sports of all categories of the population of Ukraine, stimulating the creation of sports infrastructure, promoting the participation of Ukrainian athletes in international competitions, increasing the authority of the state in the world sports movement, improving national policy in the field of physical culture and sports, as well as promoting the popularisation and dissemination of a healthy lifestyle, organising meaningful leisure [22].

Systematisation of fundamental and applied research on public administration of the functioning and development of the sphere of physical culture and sports in modern scientific research allowed noting that the solution of an actual scientific problem with increasing the effectiveness of public administration is at the initial stage, and the main area of the outlined research is the development of an integral administrative system for the sphere of physical culture and sports. Today, public administration is being activated and the development of physical culture and sports is being optimised, organisational forms of cooperation between state bodies and business entities are being reformed, considerable changes are being made in the purposes, mechanisms, management apparatus, and the unity of state and market regulatory mechanisms. Thus, the organisational mechanism of state management of the sphere of physical culture and sports is characterised as a set of organisational methods, forms, tools, and legal canons implemented by the authorities.

Currently, it is quite important to identify the limits of state participation in the implementation of the process of popularised reproduction in the field of physical culture and sports. First of all, it provides for a qualitative change in the content of the economic activity of the central executive authority for physical culture and sports. It is advisable to deprive it of the function of current allocation of financial resources to ensure the maintenance of national teams in various sports, promote training meetings and other sports events. In contrast, it is an authorised state representative that ensures the implementation of the regulatory function of economic relations in the field of physical culture and sports. In order to implement it, it is necessary to learn the methods of strategic planning and forecasting, taking into account the identified priorities for the development of the sphere, the implementation of strategic projects, the development of optimal personnel policy, information and scientific and methodological support for the functioning of economic entities, and conducting comprehensive targeted research.

It was determined that the "strategy for the development of physical culture and sports" is a scientifically based system of strategic goals, a set of tasks, measures, methods, and means of their implementation aimed at achieving a sufficient qualitative and quantitative level of development and functioning of the sphere of physical culture and sports in the medium and long term [23]. The effectiveness of state management of the development of physical culture and sports is the targeted implementation of social, economic, organisational functions of the subject of management for the development of the industry using optimally sufficient material, technical, financial, labour resources and, as a result, obtaining a socially useful, positive effect that can meet the intellectual, spiritual, physical needs of the population in the field of physical culture and sports [24].

In the leading countries of the world, the administration of the industry is the prerogative of the state and is carried out by the relevant central state executive authorities. At the same time, the differences lie only in the degree of decentralisation and the focus of certain powers to manage the industry at the level of regional entities. But it is precisely these differences in development that are important: legislative acts are mainly aimed at regulating the activities of institutions, organisations, enterprises of physical culture and sports, their relations with the state, defining mechanisms for financial and other types of security, social and other guarantees in the field, combating violence in sports, countering the use of prohibited substances, gender equality issues, etc. Consequently, the effectiveness of the development of public physical culture administration largely depends on the balance, optimality, proper functionality, flexibility, economy, sustainability, and efficiency of the relevant organisational administrative structures.

The implementation of physical culture and sports policy measures is based on four main categories of the population: athletes, students, adults, and people with disabilities. At the same time, measures of a general nature for all these social groups nowadays are: development of technical regulations, national standards and rules for the design and construction of sports facilities, as well as certification of services and products. Other measures taken by the state in order to implement the physical culture and sports policy are aimed at the target audience.

At the same time, even measures proclaimed by the state in the field of special categories of the population (persons with disabilities and military personnel) in general are measures of other types of national policy, feeling the influence of both the specifics of the object of regulation and the actual needs of society in relation to the need to solve basic socio-political issues. Ensuring universal accessibility of sports infrastructure as a basic purpose of physical culture and sports policy occurs through the combined use of funds, conditionally divided into two categories. The first group of measures is designed to determine the real needs of the population for physical education and sports, including the development of professional services in this area. This category is exceptionally informational in nature, a permanent temporary basis since it provides both future measures to create sports infrastructure and current actions to maintain physical culture and sports facilities in proper condition.

The second group of events is directly related to the creation and operation of physical culture and sports facilities. However, not all of the measures used by the state in these two groups have been successfully formulated, and some of them have shortcomings in implementation. In particular, now the state should monitor the facts of the development of sports clubs at the place of citizens' residence or work, as well as the quality indicators of their activities. Thus, the problem of the possibility of developing sports clubs at the place of residence lies in the need to delegate administrative powers in this area to a special subject and society as a whole. Against this background, the general concept of forming the powers of bodies that directly implement physical culture and sports policy also needs to be modernised. This is explained by the fact that physical culture and sports policy, like other political trends, is affected by the transition period, as a result of which not all its conceptual principles are properly implemented. The general availability of physical culture and sports infrastructure now only forms the basis for implementation and requires the use of special funds on the part of entities that manage in this industry.

Some problems of the physical culture and sports sphere reflected in the official programme documents are not fully formulated. The reason for this is a partial replacement of concepts. Very often, problems are called only certain factors that contribute to their occurrence and development, and in some cases, its negative result is considered as a problem. Trying to cover the whole complex of negative phenomena of the physical culture and sports sphere in this way, the state faces the impossibility of solving them in determining the time frame. This creates dependent sentiments both in society and in sports, allowing blaming the state authorities for the poor organisation of the declared political course every time. Because of this circumstance, it is necessary to reconsider approaches to the formulation of issues that should be resolved at the state level. First of all, it is necessary to clarify a number of controversial provisions in the official programme documents of the state physical culture and sports policy (Fig. 2).

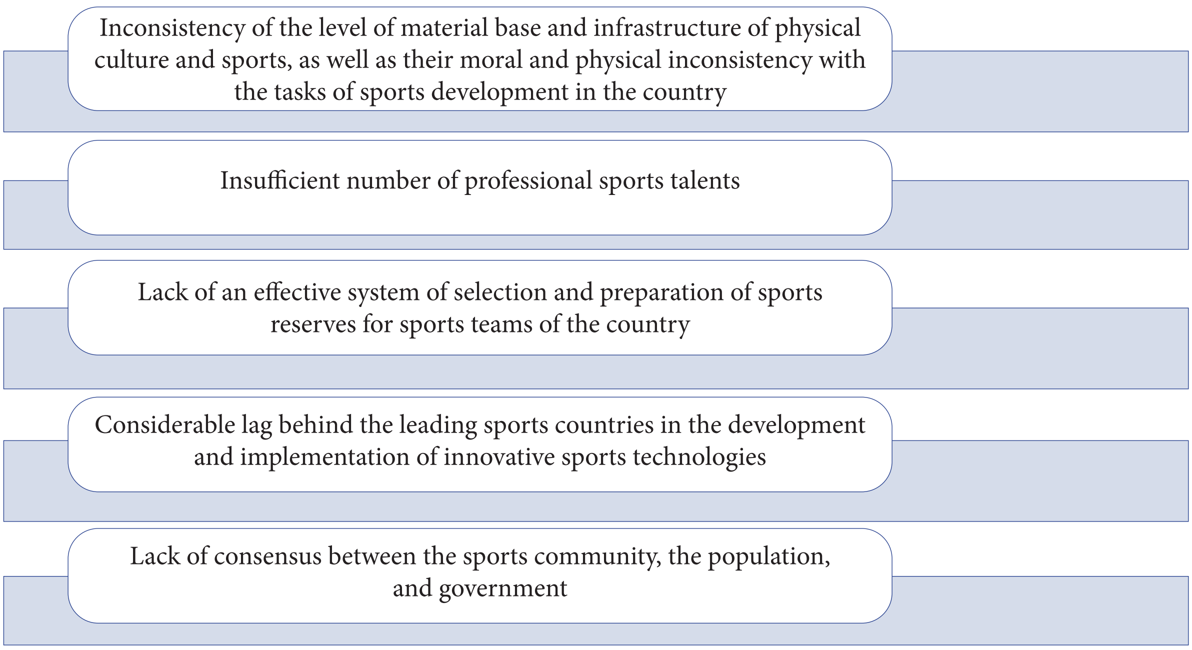

Figure 2. Modern problems of physical culture and sports policy

Solving the officially recognised problems shown in Figure 2 in this area will allow the state to optimise financial costs, achieve the effectiveness of its policy, and establish a constructive dialogue with representatives of the sports sector. The realities of the current economic situation of subjects in the field of physical culture and sports emphasise the inadmissibility of using the former financial mechanism for solving the problems of physical culture and sports policy, in which the main burden of maintaining industry expenditures is borne by the regional budget. Today, a segmental approach to financing should be used, in which funds are spent not only by the state, but also by other entities. The ability of regional leaders to involve various subjects, including the business community and foreign investors, in the implementation of national policy in the field of physical culture and sports is an effective measure. At the same time, not all regions of Ukraine are active in solving the problems of the physical culture and sports sphere.

In state entities where the political elite does not develop physical culture and sports well, there is a situation when the state centre does not show interest in such regions. Conversely, in regions where these issues are actively resolved at the initiative of the authorities themselves, the share of state participation increases, in particular through the financing of other entities. It is noteworthy that the problems of financing and distribution of ownership forms for infrastructure facilities are not the only ones in the regional physical culture and sports sphere, but in individual subjects, they now cannot be considered as decisive due to the favourable environment for investment.

There is an attempt to use an independent approach of individual regions to search for and solve problems of the physical culture and sports sphere. This explains the situation in which there is a positive trend in the development of the industry in state entities, thanks to the coordinated work of the administrative and state apparatus, the availability of socio-economic resources, and contacts with direct participants in the physical culture and sports system. Usually, in such regions, industry problems are solved in stages according to their importance and taking into account the actual state capabilities in accordance with the impact. Considering these features, a specific set of tools is also developed, which allows gradually minimising problem areas within the development of physical culture and sports. As a result, there is a segmental approach to assessing the general state of the physical culture and sports sphere at the regional level, which makes it possible to concentrate the resources of the state entity on a specific range of issues that require, depending on the degree of negativity, an operational or step-by-step solution.

Thus, a considerable part of organisational structures in the field of physical culture and sports in Ukraine and their administrative bodies are the reason for the low level of efficiency of the economic mechanism functioning of state management of education in the field of physical culture and sports, inappropriate use of necessary economic resources, financing of the inappropriate staff of the administrative apparatus. To solve this problem, it is necessary to implement legal and organisational reforms of the management system in the field of physical culture and sports, including targeted interaction with sports clubs that provide educational and sports services.

The development of education in the field of physical culture and sports in Ukraine can have a more effective continuation due to the optimisation of existing and reform of the latest administrative mechanisms, ensuring constructive interaction of administrative bodies of various levels and public institutions, in accordance with the current needs of state, regional and local levels in the process of providing targeted services in the field of physical culture and sports. Mechanisms of state administration of the development of physical culture and sports should be as appropriate as possible for the modern development of Ukraine, respond to possible internal and external current changes in Ukrainian society, and focus on the functional purpose of managing legal, organisational, and economic processes aimed at optimising the functioning of mechanisms of material and technical, financial, professional, and information support.

Conclusions

Thus, the development of physical culture and sports implies an increase in the number of people who consume the full range of services produced by such industries: health-improving sports, educational, recreational, rehabilitation. The strategic task of subjects in the field of physical culture and sports is the need for continuous and permanent improvement of the service quality, the internal quality management system. Quality management is one of the key priorities and activities of a modern physical culture and sports organisation. Improving the image of the state contributes to the successful performance of athletes in the international arena, in accordance with this, the development of high-performance sports is relevant. Furthermore, high-level athletes and sports broadcasts play an important role in popularising physical culture and sports, form a good example for the population, create shows and spectacles, thereby noting the role of entertainment for a wide range of viewers. Revision and improvement of the current system of public administration of the sphere of physical culture and sports in Ukraine in the current conditions is a defining necessity, which in the future should ensure high efficiency of the internal organisational system of physical culture and sports services sphere administration that meet international standards.

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Особливості формування та реалізації конкурентних переваг закладів ресторанного господарства в сучасних ринкових умовах

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Анотація. Актуальність дослідження питання формування конкурентних переваг пов'язана з необхідністю забезпечення конкурентоспроможності закладів ресторанного господарства, з огляду на сучасні ринкові умови. Мета статті полягає у дослідженні шляхів формування стратегії забезпечення та реалізації конкурентних переваг закладів ресторанного господарства. Теоретико-методологічною основою наукового дослідження стали: загальнонаукові методи (методи наукового узагальнення та порівняння), специфічні методи (методи аналізу та синтезу). У статті визначено, що для оцінки конкурентоспроможності використовуються непрямі критерії, які можна поділити на дві основні групи: споживчі та економічні критерії. Проаналізовано, що для різних категорій споживачів і груп товарів конкурентоспроможність забезпечується різними видами цін: закупівельними, реалізаційними і споживчими. Визначено джерела формування конкурентних переваг. Наведено конкурентні переваги закладів ресторанного господарства, що мають різні форми прояву. Проведено діагностику конкурентного середовища, яка вимагає не тільки аналізу стану різних методів конкуренції, але і дослідження іміджу товару, а також іміджу підприємства. Було розглянуто основні чинники конкурентної переваги закладів ресторанного господарства. Проаналізовано чинники конкурентної переваги організації, які поділяються на зовнішні і внутрішні. Визначено, що чинники формування споживчих переваг поділяються на чотири групи: психологічні, інформаційні, збутові та економічні. Встановлено, що для кожної групи властиві певні заходи, послідовне виконання яких, у підсумку, призводить або до формування, або до підтримки споживчих переваг

Ключові слова: конкурентоспроможність, споживчі переваги, психологічні чинники, збутові чинники, економічні чинники, інформаційні чинники

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Features of Development and Implementation of Competitive Advantages of the Dining Outlets in Modern Market Conditions

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Abstract. The relevance of the study of the development of the competitive advantages is related to the need to ensure the competitiveness of dining outlets, taking into account modern market conditions. The purpose of the paper is to study the ways of forming a strategy for ensuring and implementing competitive advantages of dining outlets. The theoretical and methodological basis of scientific research is general scientific methods (methods of scientific generalisation and comparison), specific methods (methods of analysis and synthesis). The paper establishes that indirect criteria are used to assess competitiveness, which can be divided into two main groups: consumer and economic criteria. It has been analysed that for different categories of consumers and groups of goods, competitiveness is ensured by different types of prices: purchasing, sales, and consumer. The sources of development of competitive advantages were determined. Competitive advantages of dining outlets that have various forms of manifestation are presented. Diagnostics of the competitive environment was carried out, which requires not only an analysis of the state of various competition methods, but also a study of the product image, as well as the image of the enterprise. The main factors of competitive advantage of dining outlets were considered. The factors of competitive advantage of the organisation, which are divided into external and internal, were analysed. It was determined that the factors of development of consumer preferences are divided into four groups: psychological, informational, sales, and economic. It was established that each group is characterised by certain measures, the consistent implementation of which, as a result, leads either to the development or maintenance of consumer preferences

Keywords: competitiveness, consumer preferences, psychological factors, sales factors, economic factors, information factors

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Introduction

Changing the forms of competition manifestation requires additional consideration of the theoretical foundations of building and forming competitive advantages, which are the main methods of winning the competition. The importance of competitive advantages that allow a firm to survive in competition has increased dramatically recently. This is due to the fact that new competitors are constantly appearing on the market. Any dining outlet in the context of fierce competition and a rapidly changing situation on the market of goods and services should not only focus on the internal state of affairs, but also develop a long-term strategy that would allow it to keep up with the changes taking place in the external environment.

The market for providing hospitality services is crowded with many dining outlets that have different pricing policies and individual cuisine areas. All this allows the consumer to choose what will meet their needs. This market is not yet fully formed. This is since every year new food outlets are opened, which have more interesting offers than competitors. That is why it is necessary for any dining outlet to have such competitive advantages that will allow it to differ from other outlets, which, in turn, will form the opportunity to take a leading place in the market of catering services. In a market economy, not only stable, uninterrupted performance and fulfilment of planned tasks are important for an enterprise, but also opportunities for development and improvement, characteristics of management flexibility and adaptability of all aspects of activity to changing consumer requirements, as well as a social activity – as a special challenge of our time.

Therefore, the relevance of the problem of forming competitive advantages and the analysis of the theoretical basis for studying the competitiveness of dining outlet determined the choice of the research topic. The scientific originality consists in the systematisation of theoretical knowledge about the competitiveness of the restaurant business and the development of competitive advantages. Based on this, practical lines for improving the development and strengthening of competitive advantages in dining outlets are designed.

The theoretical and methodological basis of the research was the works of V.V. Antoshchenkova [1], V.V. Dzhedzhula, I.Yu. Epifanova, V. Humenyuk [2], L.V. Ivanchenkova, K.V. Stasyukova [3], K.V. Kalenik [4], T. Kostyshyna, N. Kirnis [5], and many other authors.

In particular, V.V. Antoshchenkova analysed and evaluated the global competitiveness index as the basis for the efficiency of the national economy [1]. V.V. Dzhedzhula, I.Yu. Epifanova and V. Humenyuk systematised the main theoretical aspects of competition and competitiveness. Analysed the genesis of economic theories of competition. Studied modern definitions of enterprise competitiveness [2]. L.V. Ivanchenkova and K.V. Stasyukov proposed an approach based on the concept of forming a mechanism for increasing the level of competitiveness of enterprises, and also studied the functions that competition will perform at the enterprise and justified their relationship [3]. K.V. Kalenik presented an integrated structural model of the competitive potential of a restaurant enterprise, proposed a system of partial indicators for assessing local potentials, taking into account the industry specifics of restaurant enterprises, and developed a structural and logical scheme, substantiating a methodological approach to assessing the level of implementation of the competitive potential of restaurant enterprises [4]. T. Kostyshyna and N. Kirnis formed their own vision of the term "competitiveness of the restaurant industry enterprise", analysed the specific properties of service sector enterprises [5].

Although many scientific studies have been conducted on the problems of forming the competitiveness of the enterprise, the issues of a more detailed analysis of the competitive advantages of dining outlets remain relevant. This is due to the variability of business conditions, as well as the development of new areas of economic activity, so it requires constant scientifically based adaptation of existing mechanisms to the newly formed features of the restaurant business market. That is why there is a need for objective improvement of the mechanism for increasing the competitiveness of dining outlets, and insufficient research of scientific, theoretical, and practical issues in today's conditions has led to the choice of the research topic.

The purpose of the work is a study of means to form a strategy for ensuring competitive advantages of dining outlets. The research hypothesis is that in modern market conditions, competitive advantage is both the basis on which a successful business is built, and the main criterion for selecting projects by successful investors. The purpose of the work led to the formulation and solution of the following *tasks*: to study the theoretical aspects of the development of competitive advantages in dining outlets; to develop recommendations for strengthening the competitive advantages of food outlets.

Materials and Methods

The theoretical and methodological basis of the research on modern problems of forming competitiveness and competitive advantages of restaurant enterprises was made up of scientific works of Ukrainian and foreign authors. In the course of the research, materials of scientific and practical conferences, as well as materials of special, general economic scientific literature and periodicals were used. The information base included statistical data, marketing research results, scientific sources, information from periodicals, reference and information publications, and the results of surveys of restaurant business managers.

To achieve this purpose and solve the corresponding tasks the following arsenal of general scientific and special methods was used:

– *analysis and synthesis, comparison, induction and deduction* – to study the conceptual framework of competitive advantages, determine the criteria for the competitiveness of products and services, form factors of competitiveness of restaurant business enterprises, determine the forms of manifestation of competitive advantages;

– *resource approach* – to substantiate the relationship between the potential and resources of dining outlets, to determine the sources of development of competitive advantages;

– comparative analysis – to study the features of key opportunities and competitive advantages of modern enterprises, analyse the competitive environment of the restaurant business;

– *formal-logical* – to form the structure of the configuration of the potential of enterprises, the specifics of the restaurant business in competitive economic conditions;

– *hierarchy analysis method* – for assessing and diagnosing the level of development of key opportunities of enterprises, taking into account the development of competitive advantages of enterprises;

– *a system approach* – during the development of appropriate conceptual approaches to the design of competitive advantages;

– *modelling* – for the development and adaptation of factors of designing and development of competitive advantages of the enterprise;

– *graphical method* – for visual display of individual research results.

Results and Discussion

The competitiveness of dining outlets, as a generalised economic category, characterises the general economic situation that has developed, including the following aspects: design, production, distribution, and consumer. The phenomenon of competitiveness is inherent in all elements of the economic system and is a multi-faceted economic category. The levels of analysis and research of competitiveness include: competitiveness of goods or services, enterprises or the industry as a whole [1].

The competitiveness of products or services provided by dining outlets refers to a set of the following characteristics: consumer, price, and quality. These characteristics determine the success of the enterprise in the national and foreign markets. That is why indirect criteria are used to assess the competitiveness of dining outlets, which can be divided into two main groups: consumer and economic preferences (Fig. 1).

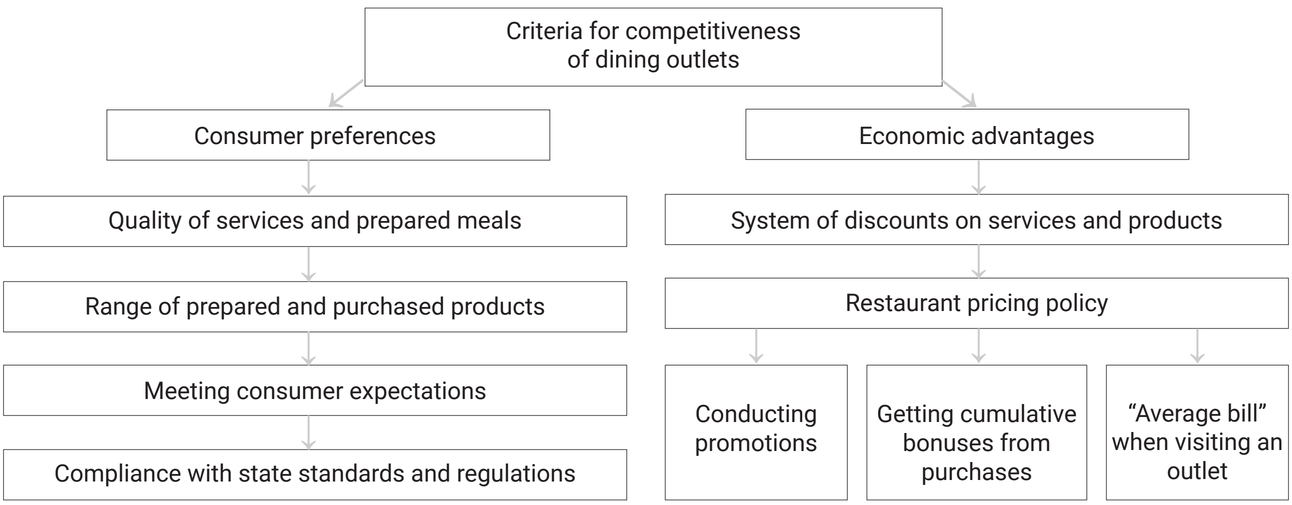

Figure 1. Classification of criteria for competitiveness of products and services of dining outlets
Source: developed by the authors based on the research of V.V. Atoshchenkova [1]

The use of various types of discounts will attract an additional segment of consumers to the restaurant business, which will also consolidate and increase the competitive advantages of the enterprise. Therefore, the use of a flexible system of discounts will ensure the competitiveness of products and services, as well as increase their sales. It is worth noting that consumers associate the price with the main characteristics of products or services and with their quality. The price of consumption is determined by the sales price and operating costs: transportation, storage, energy consumption, as well as paying taxes and fees, insurance [6]. The competitiveness of dining outlets that have a full production cycle can be defined as a relative characteristic that will show the difference in the development and preparation of dishes of one outlet from a competitor outlet [2]. Thus, competition in the restaurant services market can be interpreted as the process of managing a restaurant business enterprise with its existing competitive advantages or existing material and technical means to achieve their purposes and objectives [7]. No enterprise will achieve competitive advantages in all the qualitative and quantitative characteristics of services, as well as the means by which these services are promoted among consumers without a clearly defined strategy. Therefore, it is necessary to choose competitive strategies that can most closely correspond to the trends in the development of the restaurant business. In accordance with this, dining outlets should conduct research by using the SWOT analysis method, which can be used to identify the strengths of the restaurant business, as well as opportunities and advantages among competitors, taking into account their weaknesses.

Competitive advantages are closely related to competition in the service market since they arise precisely where such competition develops and where there are many food and beverage outlets that are similar in their field. The more dining outlets there are on the Ukrainian market, the more considerable competitive advantages are for commercial success since competition in the market is constantly growing [7]. Competitive advantages are formed due to the predominance of the strengths of products over their disadvantages (weaknesses). There are a large number of sources of competitive advantage development:

– offering and providing the highest quality services to consumers;

– minimisation of costs compared to a competitor (for developing services and preparing dishes from the restaurant's menu);

– convenient location of the dining outlet (in the city centre, in crowded places, with convenient access by public transport);

– cooking dishes from the menu better than competing outlets;

– providing more reliable and secure services (given the situation with the COVID-19 pandemic);

– providing consumers with more services and dishes from the menu for the same price [3].

All of the above means an attempt by a dining outlet to provide consumers with the products and services that they consider most satisfying their needs. If an enterprise has competitive advantages, then this is a good reason for the success of a food outlet [4].

The general principles that form the competitive advantages of dining outlets are:

1) directing the actions and motivation of employees of dining outlets to continue the business they have started;

2) bringing the food outlet closer to each consumer;

3) creating a favourable atmosphere at the enterprise;

4) increase labour productivity by using the skills and experience of employees;

5) continuous training of employees through advanced training at relevant trainings and seminars;

6) using the simplified HR management organisation system;

7) an ability of the head of a restaurant enterprise to keep the most important problems under control, clearly transfer tasks for further execution by subordinates.

In accordance with the practice of conducting a restaurant business, the use of the above principles will guarantee an increase in the competitiveness of enterprises [5]. Today, there is no unambiguous interpretation of the concept of competitive advantage. It all depends on what phenomenon or object it belongs to. In general, a competitive advantage is a set of characteristics that are properties of products or services that create certain advantages for a dining outlet over their competitors. These characteristics can be different and relate directly to the product and additional services [8].

Competitive advantages of dining outlets – the position of a dining outlet in the market, which includes the ability of a restaurant enterprise to overcome the forces of competition better than its competitors and perform work to attract consumers. Thus, a competitive advantage is the advantage of a dining outlet over its competitors, by offering consumers greater values. These values can be the sale of products and services at lower prices compared to competitors [9].

Competitive advantages of dining outlets are formed due to the activation of the strengths that the company has, those strategically important areas of service provision for this business that allow it to win the competition. Competitive advantages are fulfilled at the level of strategic business units and form a competitive business strategy, which, for its part, allows them to have various forms of manifestation (Fig. 2).

Of particular importance for the restaurant industry enterprise is the division of competitive advantages by sources of development, as well as the nature of development. The competitive advantages of the basic level are most accessible to enterprises. This can be: the use of cheaper labour force, for example, students as waiters, the availability of a wide range of products for preparing dishes from the menu (shops, supermarkets, wholesale markets). Such advantages are based on the cost of providing services and producing products, as well as the availability of various factors of production for the dining outlet, which, for its part, does not guarantee the food company a stable position in the service market.

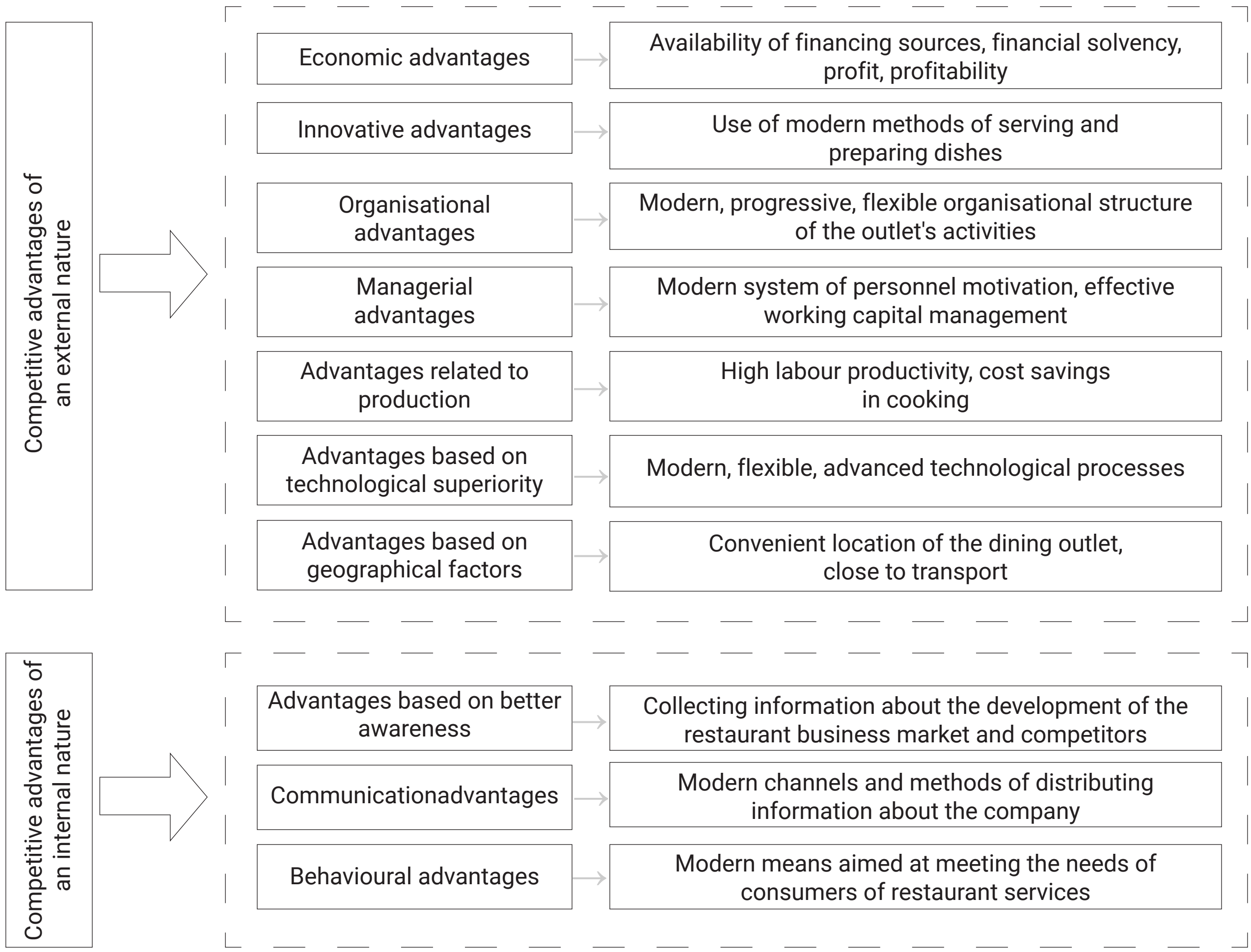

Figure 2. Competitive advantages of dining outlets

Source: developed by the author

Competitive advantages of the middle level are a consequence of the purposeful activity of the restaurant business enterprise, using various methods of competitiveness. This is all due to high costs for the implementation of services, the use of various additional methods of attracting consumers, and new technologies that competitors do not have [10].

Competitive advantages of the highest level imply constant modernisation of production and all areas of activity of the dining outlet. The use of competitive advantages of the middle and upper levels provides an opportunity for the restaurant business not only to increase its level of competition, but also to ensure the long-term preservation of the achieved competitive position in the food services market under study. It is worth noting that in addition to the nature of the sources of competitive advantage development, the number of such sources of development is of key importance for the restaurant business enterprise. The larger the set of sources and the more complex they are, the greater the advantage of the restaurant enterprise over competitors and the less likely it is to imitate the outlet by competitors [11]. At the same time, the constant modernisation of all spheres of activity of the enterprise plays a decisive role – from replenishing and improving the tools of marketing research of demand to the quality level of service provision and customer service.

Competitive advantage can pass to competitors if the outlet changes the qualitative or quantitative characteristics of production (choice of cheaper raw materials for cooking), use of cheaper labour (or even reduction of staff), delivery of products (additional payment for its transportation to the consumer), lack of marketing activities, outdated equipment of the dining outlet. Well-established management of food enterprises will gain competitive advantages if it meets the new conditions, while competitors who will rashly invest and act tactically will meet the old conditions.

The development of competitive advantages of restaurant business outlets will occur when there are changes in the existing segments of the market under study. That is why it will be possible not only to reach new potential consumers of restaurant services, but also to find a new, more efficient way to prepare certain types of dishes, depending on the purpose and concept of the food outlet. The existing leaders in the restaurant services market have already adapted to the current market conditions, and when the market situation suddenly changes, enterprises simply will not be able to resist and stay in the market under the same conditions [12].

Let us consider the main factors of competitive advantage of dining outlets, divided into external and internal. The manifestation of external factors depends to a lesser extent on the organisation, mainly they are formed on the level of competitiveness of the country. Factors achieved and implemented by personnel where managers play a special role are called internal factors. The higher the strength of competition in the industry, the lower the profitability and cost of goods will be, but the higher the intensity and quality of goods. External and internal factors of competitive advantage are the maximum possible for an abstract enterprise.

For a particular enterprise, there can be any number of competitive advantages. Competitiveness is a result that captures the presence of competitive advantages. However, the presence of individual competitive advantages does not mean an automatic consumer advantage of a particular hospitality enterprise [13]. Consumer preferences of some goods (services) to others create prerequisites for the emergence of competitive relations between them.

Any company that produces goods or provides services strives to create and maintain consumer preferences for its products and services. In this regard, it is important to know the factors that influence the development of consumer preferences (Figure 3).

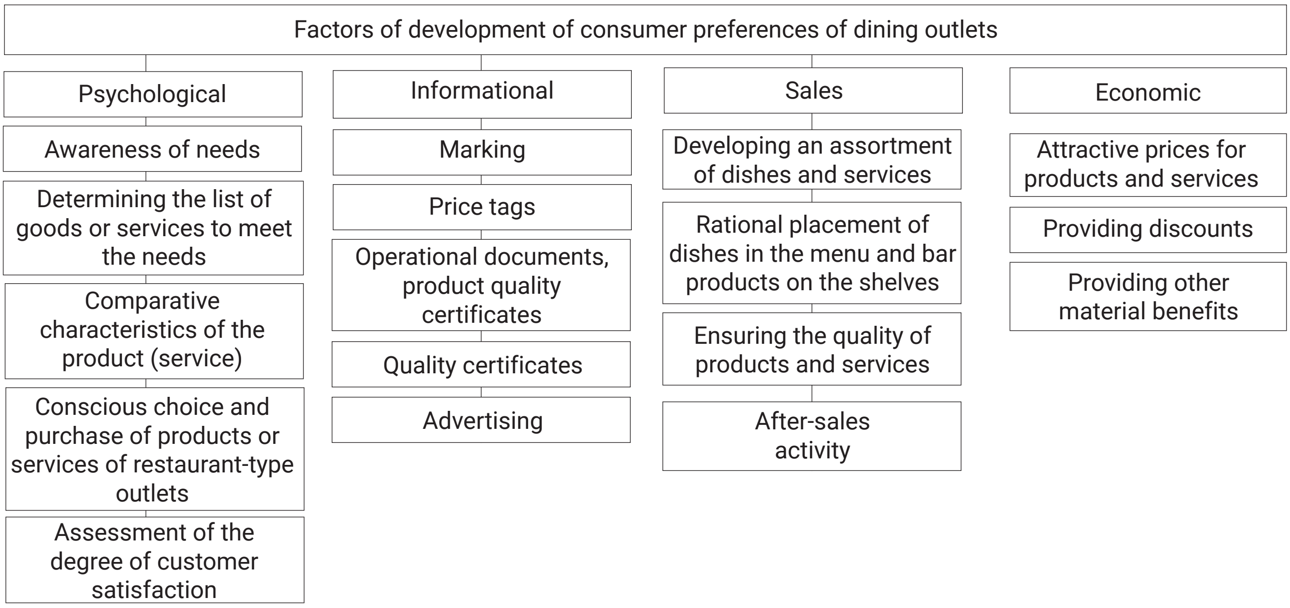

Figure 3. Classification of development factors of dining outlet consumers' preferences
Source: developed by the author based on the research by S. Cantele, F. Cassia [14]

Stable competitive advantages of dining outlets are the basis on which a successful restaurant business is built. Sustainable competitive advantages have the benefit of using a strategy that is not the same as other enterprises, which creates consumer value for the products and services of the restaurant enterprise, and also combines internal resources and capabilities of the outlet that competitors do not have. In accordance with this, competitive advantages will enable the restaurant business to maintain and improve its competitive position in the restaurant services market for quite a long time. Signs of stable competitive advantages are uniqueness, complexity of imitation, stability, superiority over competitors, universality [15]. It is worth focusing on the fact that stable competitive advantages are determined by a unique combination of abilities and resources of the enterprise (key competences of the enterprise), which create the consumer value of products and services and determine the uniqueness of the enterprise in a competitive environment.

Thus, the competitive advantages of a restaurant enterprise should be considered as the ability to create high consumer value in comparison with competitors, which arises due to the dynamics of key abilities of the enterprise, which is characterised by uniqueness in a competitive environment and leads to an increase in economic indicators. The competitive advantages of a restaurant enterprise are stable, unique, protected from imitation by competitors, and allow creating a high consumer value that is recognised by consumers, which, as a result, determines uniqueness.

Based on the analysis of the theoretical basis for studying the competitiveness of dining outlets, it is worth highlighting recommendations for strengthening the competitive advantages of food outlets:

1) often organise various events and receptions: official, dedicated to a particular event, receptions, meetings of famous people, etc.;

2) provision of services of VIP halls, gazebos, terraces, or other places separated from other consumers of a certain dining outlet;

3) access to WI-FI in the outlet;

4) possibility of on-site service (catering services);

5) availability of a children's playground, as well as a children's room in a dining outlet (with the possibility of additional babysitting services);

6) providing services of confectioners for birthday cakes and organising candy bars;

7) providing services of a holiday organiser, designer of festive halls of a catering company, presenter, florist, photo and video shooting, photo zone;

8) food delivery (free of charge);

9) availability of a children's menu in the outlet, organisation of children's parties with animators, entertainment programmes, special children's cooking classes.

Given these recommendations for strengthening competitive advantages, many dining outlets may start offering their customers a wide range of additional services in order to stand out from the competition. Furthermore, outlets can be combined with various special areas, that is, combine restaurants with coffee shops, pastry shops, hookah halls, summer terraces, and so on. Such events will provide an opportunity to hold their visitors longer, so that they can order more services and dishes. But at the same time, it is necessary to remember that all ideas in the outlet must correspond to the same concept and complement each other.

Conclusions

Based on the results of the study, it can be concluded that competitive advantages are not permanent since they remain only during the systematic improvement of all areas of activity of the dining outlets, which is quite a time-consuming and resource-intensive process. It is the competitive advantages formed by outlets that emphasise the uniqueness of a particular enterprise in a competitive environment, are the key to its competitiveness and obtaining maximum economic results. Modern experience in the activity and development of service sector enterprises allows stating that none of the enterprises can achieve an absolute advantage over competitors in all the characteristics of services provided without a clearly defined competitive strategy. The ways of forming a strategy for ensuring competitive advantages of dining outlets were studied. It was established that the more competitive advantages a dining outlet has, the higher its competitiveness, which in turn leads to the efficiency and prospects of the outlet.

The development of competitive advantages of dining outlets is the basis for ensuring the effectiveness of their activities, which are aimed at neutralising crises, in which, unfortunately, there are a considerable number of Ukrainian dining outlets, given the current situation with the COVID-19 coronavirus pandemic. At the same time, the solution of these problems should be considered from the point of view of improving the theory and methodology of forming competitive advantages in the context of using key methods of dining outlets. To do this, it is necessary to improve the scientific level of management, gain new competitive advantages, and look more boldly to the future. Prospects for further research in this area are to develop competitive strategies for the activities of dining outlets.

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Оцінка економічного ефекту від впровадження заходів з охорони праці на підприємствах

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Анотація. Охорона праці на підприємстві визначається більшістю економістів як система, яка значною мірою дозволяє розширити можливості підприємств із досягнення результатів операційної діяльності. Водночас роль охорони праці як чинника, що може посилити виробництво, визначається подібно лише у країнах із ринковою економікою. Актуальність дослідження визначається можливостями позиціонування охорони праці як чинника, що підвищує цінність продукції, яка виробляється зокрема й для країн із перехідною економікою. Мета дослідження полягає у необхідності розробки моделей, що дозволяють оцінити економічний ефект від впроваджуваних заходів на підприємствах як промислового, так і консалтингового сектору. Методами дослідження є аналітичні та методи моделювання економічних структур. У роботі визначено, що вартість виробничого травматизму та професійних захворювань заразом із економічною ефективністю заходів із охорони праці є важливим стимулом для роботодавців прийняти ці заходи. Виявлено, що вони особливо зацікавлені у тому, чи є інвестиції в програму економічно ефективними (ефект дає хорошу віддачу від вкладених грошей) або економічно вигідними (фінансові вигоди сприятливі). Авторами показано, що більшість опублікованих інтервенційних досліджень дотепер були зосереджені на ефективності інтервенцій, а не на їхній економічній ефективності. Виділення розробленої методичної структури дозволяє визначити вже за кількісними характеристиками можливості для структурування та досягнення цілей як встановлених для підприємства акціонерами, так і виробничими планами. У статті визначені межі використання інтересів охорони праці як соціальної структури в сукупності з використанням методів виробничого планування. Необхідні подальші високоякісні дослідження, що проводять повну економічну оцінку, щоб мати можливість зробити подальші висновки щодо економічної ефективності заходів із охорони праці з погляду роботодавця

Ключові слова: смодернізація виробництва, організація охорони праці, короткострокова економічна вигода, кадрові ресурси, збитки

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Assessment of the Economic Effect from the Introduction of Labour Safety Measures at Enterprises

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Abstract. Labour safety at the enterprise is defined by most economists as a system that allows considerably expanding the capabilities of enterprises to achieve operational results. Moreover, the role of labour safety as a factor that can intensify production is determined in this way only in countries with market economies. The relevance of this study is determined by the possibilities of positioning labour safety as a factor that increases the value of manufactured products, including for countries with economies in transition. The purpose of the study is determined by the need to develop models that allow assessing the economic effect of the implemented measures at enterprises of both the industrial and consulting sectors. The research methods are analytical and economic structure modelling methods. The paper determines that the cost of occupational injuries and occupational diseases, together with the economic efficiency of labour safety measures, are an important incentive for employers to take these measures. It is revealed that they are particularly interested in whether investments in the programme are cost-effective (the effect gives a good return on the money invested) or economically profitable (the financial benefits are favourable). The authors demonstrate that most of the published interventional studies have so far focused on the effectiveness of interventions, and not on their economic efficiency. The allocation of the developed methodological structure allows determining the possibilities for structuring and achieving the goals set for the enterprise by shareholders and production plans according to quantitative characteristics. The study defines the limits of using the interests of labour safety as a social structure in combination with the use of production planning methods. Further high-quality studies are required, which engage in a full economic assessment, to be able to draw further conclusions about the economic effectiveness of labour safety measures from the employer's standpoint

Keywords: modernisation of production, organisation of labour protection, short-term economic benefit, human resources, losses

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Introduction

Modern scientific developments, the introduction of technologies, as well as the modernisation of production cannot guarantee the avoidance of the impact of various risk factors, accidents, occupational diseases. The main purpose of labour safety is to determine the legal basis for the implementation of socio-economic, technical, and organisational measures and, consequently, to ensure the implementation, coordination, and control of the requirements established by law. Internal supervision of the working environment is quite restrictive, and its purpose is to identify risk factors existing in the working environment as early as possible and to prevent or reduce the impact of such factors on the safety and health of employees. In their working environment, employees are exposed to dangerous situations, hazardous effects of physical, ergonomic, chemical, and biological factors, and modern scientific developments do not guarantee the prevention of the impact of various risk factors, accidents, occupational diseases; therefore, a clear and effective labour safety system at both the state and business levels provides employees with safe and healthy working conditions.

The issue of the economic efficiency of labour safety measures has repeatedly been in the focus of attention of Ukrainian and foreign researchers. In particular, the assessment of the costs of an enterprise in case of an accident with an employee, depending on the severity of the damage to health, was considered by V.E. Gorshkova, Yu.V. Anishchenko, and M.A. Egorova [1]. T.M. Tairova, K.N. Tkachuk, A.A. Slipachuk [2] studied the legal framework for labour safety, the activities of relevant institutions, and reducing the level of industrial injuries. The definition of hazard factors and the impact of occupational injuries was covered by O.E. Kruzhilko, Ya.B. Storozh, I.M. Tkalich, O.I. Polukarov [3]. The assessment of the economic efficiency from the introduction of special measures for labour safety at production facilities was studied by the Ukrainian researcher O.M. Masyukevych [4]. Among foreign researchers, the labour safety system at the enterprise, the determination of factors affecting the financial component, and the reduction of labour safety costs were investigated by Yu. Kovalova, D. Atstāja [5]. The study of accidents at enterprises, the impact of economic incentives used in the labour safety system to reduce costs, was conducted by Polish researchers Z. Pawłowska and J. Rzepecki [6].

Despite the above, the present level of knowledge about the economic efficiency of labour safety measures remains unsatisfactory, since this subject area is understudied. To fill in the gaps and shortcomings identified in the scientific literature, *the purpose of this study* is to assess the economic efficiency of primary and secondary labour safety measures from the employer's standpoint. Primary preventive measures are proactive in nature and are aimed at preventing the occurrence of diseases among healthy people, while secondary measures are of a reclamation nature and are aimed at reducing the prevalence of the disease through early detection. Thus, both primary and secondary occupational safety measures

Materials and Methods

can contribute to the general prevention of disability or control over it before the disability becomes chronic or severe [7].

The study is based on a review of literature sources on improving the efficiency of labour safety management, based on the definition of hazards and assessment of the risks of occupational injuries. The obtained results were verified using factor analysis, which allowed determining the factors that cause additional costs and losses for labour protection, as well as a correlation analysis of economic efficiency. The use of the group statistical method is aimed at processing groups of accidents (direct and indirect).

The methodology of analysing labour protection costs was used to assess labour safety and determine the economic effect of the introduction of labour protection measures at enterprises. The economic method of research was used to determine the most correct indicator, which acted as an indicator of the quality of the chosen measurement method or economic solution. In addition, the economic method of research constitutes an attempt to recreate the economic model of factors influencing the working conditions to the efficiency of the enterprise, which also indirectly affects the overall rate of profit.

The methodological framework of this paper included the studies Ukrainian and foreign researchers in the field of economic efficiency management of labour safety, aimed at improving working conditions, reducing the risk of injuries. All the methods listed above are compensatory in nature and were used to develop a certain strategy that allowed calculating probabilistic losses from industrial accidents. The authors propose the use of a combined method that gives more accurate levels of forecasting.

Results and Discussion

A well-organised work environment can have a positive impact on the quality of products or services, customer satisfaction and the company's reputation, as well as contribute to faster achievement of business goals (Fig. 1).

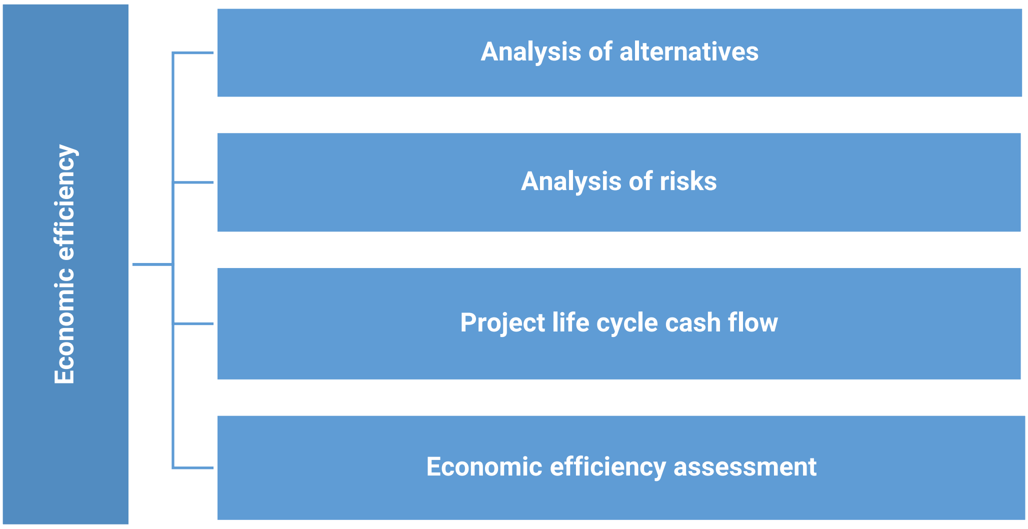

Figure 1. Correlation of economic efficiency

The calculation of costs and benefits can be expressed in simple mathematical terms according to the following equation (1):

$$V = \sum_{i=1}^{n} \sum_{i=1}^{n} \frac{B_{ij} - C_{ij}}{(1+r)^j} \tag{1}$$

where B_{ij} and C_{ij} are the j^{th} type of benefits and costs of the policy, respectively, in the i^{th} year after the introduction of the policy, and B and C are expressed in monetary units; r is the corresponding discount rate; V is the (discounted) present value of the labour safety policy.

For optimal selection, complete economic assessments are necessary, such as cost-effectiveness studies and cost-benefit analysis. Economic efficiency studies measure the result in "natural units" [8]. This type of analysis is best suited for results that are difficult to translate into monetary units, such as pain reduction. Cost-benefit analysis is rarely used in the context of workplaces. The costs that affect the price of a product or service belong to such categories as the cost of providing equipment and premises, personnel costs, the cost of purchasing production materials, etc., but, in addition, one group of economic costs is associated with ensuring labour safety at the enterprise [9].

When making a decision on the organisation of labour safety, it should be remembered that labour safety measures should be included in the planning of the enterprise's activities, since they are often associated with costs (for example, mandatory medical examinations, laboratory tests of the working environment, provision of personal protective equipment) or time that the employee will have to use not to perform their direct duties, but to implement labour safety measures (for example, training of personnel operating hazardous equipment). The structure of the company's costs for labour safety in the process of internal supervision of the production environment is as follows (Fig. 2):

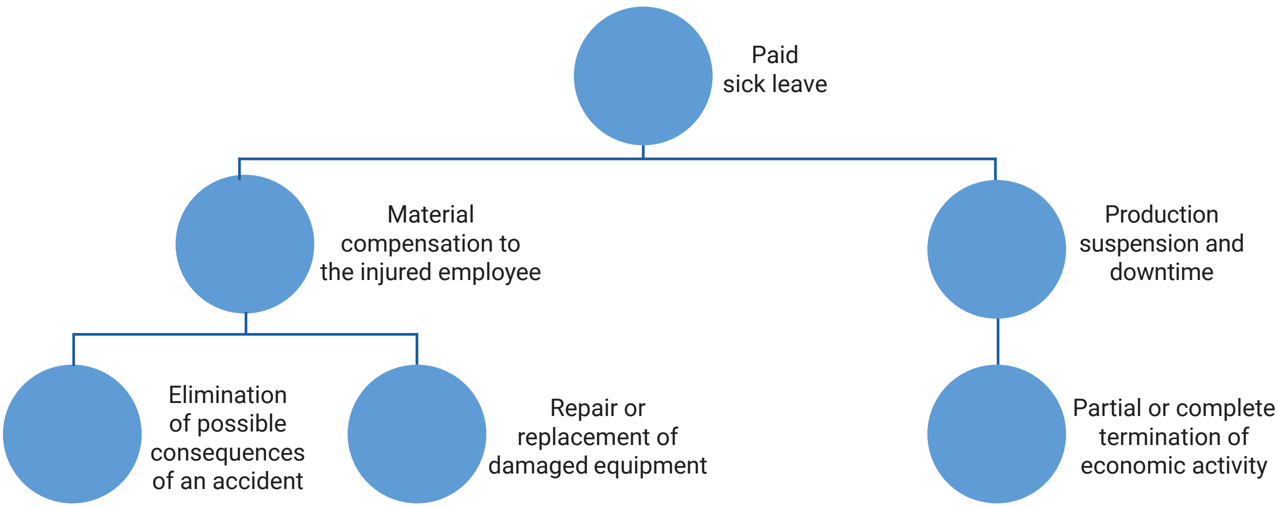

Figure 2. Consequences of accidents when attributed to costs

At enterprises, the costs of labour safety measures can be very high (especially at large enterprises), and this is one of the main factors that hinder the maintenance of an effective labour safety system. To reduce the total costs of the enterprise (and the costs of labour safety), it is necessary to pay attention to identifying factors that cause additional costs and losses. As foreign scientists S.G. Gendler, A.M. Grishina, E.A. Kochetkova point out, in 1920, the researcher H.V. Heinrich developed the so-called "Iceberg Theory", according to which he divided the business costs associated with workplace accidents into two categories: direct and indirect. In direct expenses, he included wages for the non-working period or medical expenses (for example, transportation of victims to the hospital, medical supplies, etc.). Indirect costs, according to him, are the costs of replacing employees, a drop in labour productivity, penalty costs, loss of the company's reputation, etc. [10].

H.V. Heinrich focused on the fact that indirect costs are hidden costs, and in the course of his research he calculated the correlation of direct and indirect costs: each euro of direct costs will lead to an additional 4 euros of indirect costs, which the company does not even know about [11]. This division, proposed by an American researcher, can be successfully used today. In their studies, foreign researchers K. Bhattacharyya and R.M. Gupta note that R. Brody found a ratio of 1:0.83 and came to the conclusion that the result of this ratio is influenced by the nature of the enterprise, the quality of the victims, the severity and consequences of injuries, cost definitions and the research methods used. Apart from the above-mentioned opinion of R. Brody, H.V. Heinrich also believes that the ratio of cost groups is not constant and changes depending on each particular situation [12]. The correlation proposed by H.V. Heinrich's study of the relationship between direct and indirect costs led to the general use of the iceberg metaphor. Only the tip of the iceberg, which is the direct costs, is visible. Everything else is indirect costs hidden underneath.

In the tradition of the researcher H.V. Heinrich, several authors have conducted studies to determine the ratio between direct and indirect costs. Numerous ratios were found, and most of them did not confirm the conclusions of H.V. Heinrich about the ratio of 1:4. It has been shown that the ratio between direct/insured and indirect/uninsured expenses differs considerably [13]. R. Brody found a ratio of 1:0.83 between insured and uninsured expenses [14]. The factors influencing this ratio, apparently, are the industry under study, the characteristics of the company, the victim, the severity of the consequences of injuries, the determination of the cost and the research methods used, as well as the structure of the restorative system of remuneration for health insurance workers.

Linear coefficients introduced by H.V. Heinrich cannot be maintained due to the low correlation between the frequency of accidents and the total cost of accidents. Insurance costs are determined by the cost of medical treatment and the degree of absence of the employee. Uninsured expenses are determined by the impact of the absence of staff on the rest of the organisation [13]. Instead, the authors propose a logarithmic dependence between uninsured and insured expenses. Many enterprises do not have the skills to harmonise safety issues and aspects of labour safety with the current legislation. This results in frequent situations where more attention is paid to short-term economic benefits, rather than long-term investments in the introduction of preventive measures and maintaining human resources to ensure a healthy working environment. Apart from its direct functions – production or provision of services – the company is forced to operate in an environment that affects its functioning and results in various ways [15].

Labour inspection and monitoring are the main elements of any institution and labour management system to ensure the sustainable implementation of labour policy, provide feedback and the possibility of adjusting this policy as necessary. Occupational health and safety is quite restrictive, and its purpose is to identify risk factors existing in the working environment as early as possible and to prevent or reduce the impact of such factors. The safety and health of employees can be jeopardised not only by risk factors present in the working environment, but also by working methods, labour organisation, professional training of employees and the interaction of the above factors.

The costs or losses that an enterprise may incur due to improper working conditions can be divided into two large groups: potential losses due to various accidents and incidents and potential losses due to improper labour organisation, inefficient equipment, insufficient training, workplace planning, etc. [16; 17]. They affect the employee and, consequently, the productivity of the entire enterprise. Apart from the annual costs of labour safety measures, which gradually increase every year as the enterprise grows, there are various other costs directly or indirectly relating to improper labour organisation [18; 19]. Small and medium-sized enterprises (SMEs) are a forgotten sector in research and practice in the field of labour safety, and there is no economic assessment of labour safety measures in this type of companies, despite the fact that they dominate in most economies. SMEs require special attention, since their knowledge and financial resources for conducting interventions are limited. Furthermore, it is difficult for SMEs to implement and adopt the strategies used by larger organisations [20].

Some economic estimates, for example, may not reflect additional economic efficiency and/or resource use (for example, staff working hours, materials used, depreciation, overhead costs, business trips), or they may not include a complete identification of all important and relevant costs (for example, indirect costs such as loss of productivity, absenteeism, presenteeism) [21; 22]. The costs may not have been measured properly using a valid instrument, or they may not include any type of sensitivity analysis to assess the reliability of the results. The lack of this economic information complicates drawing reliable conclusions [16]. The efficiency of the cost part of the enterprise for the prevention of labour violations and the implementation of the model for maintaining production indicators is calculated according to the average values of investments (2):

$$E_{ent} = \frac{S_{an}}{\sum_{k=1}^{i} B_k} \tag{2}$$

where: S_{an} is the annual savings from improving working conditions and labour safety at the enterprise (profit or loss reduction); $\sum_{k=1}^{i} B_k$ is the total costs of the enterprise for labour safety.

When implementing the received amount, the calculation of the total costs for the implementation of a set of measures to improve working conditions is already used (3):

$$C = C1 + C2 + C3 \tag{3}$$

where: $C1$ are the costs of labour safety measures at the expense of funding sources governed by state regulations; $C2$ are the costs of labour safety measures under collective agreements; $C3$ are the costs of labour safety measures from the enterprise's labour safety fund.

If there is a need to calculate the way to improve the efficiency of labour safety at production sites, then a generalised weighting factor (4) is used:

$$C_{ps} = \frac{C_{com} + C_s + C_{ppw}}{3} \tag{4}$$

where C_{com} is the coefficient of the level of compliance with the labour safety rules by employees; C_s – the safety factor of the equipment; C_{ppw} is the coefficient of performance of planned work on labour safety.

The most generalised indicator that describes injuries in a division is the coefficient of production losses (C_{pl}), which is defined as the product of the frequency coefficients (C_f) and the severity of injuries (C_{sev}) (5):

$$C_{pl} = C_f \times C_{sev} \tag{5}$$

However, this coefficient does not factor in the losses caused by fatal injuries. To account for the latter, they must somehow be led to losses from non-fatal injuries. For example, by establishing a certain equivalent of losses between fatal cases and cases of general injuries.

Conclusions

Difficulties in assessing the effectiveness of labour safety measures may affect the decision of employers to conduct them. Since economic incentives are important for employers to motivate them to take part in occupational safety measures, research is needed to assess the economic effectiveness of measures at the organisational level. Despite the fact that the workplace is a place that provides access to employees with work-related health issues, companies do not seem to take advantage of this by implementing activities at the organisational level. They tend to focus on interventions at the individual level.

Conducting a full economic assessment, which is the only type of economic analysis that provides reliable information about effectiveness, requires identification, measurement, and evaluation of costs and consequences, since it compares the effectiveness and benefits of two or more interventions. If it is necessary to draw conclusions about the economic efficiency of occupational safety and health, then only the results of complete economic assessments (such as the benefit-cost ratio, net benefits or savings, an incremental coefficient of economic efficiency) should be used.

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Оценка экономического эффекта от внедрения мероприятий по охране труда на предприятиях

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Аннотация. Охрана труда на предприятии определяется большинством экономистов как система, которая в значительной мере позволяет расширить возможности предприятий по достижению результатов операционной деятельности. Притом роль охраны труда как фактора, который может интенсифицировать производство, определяется подобным образом только в странах с рыночной экономикой. Актуальность исследования определяется возможностями позиционирования охраны труда как фактора, повышающего ценность производимой продукции в том числе и для стран с переходной экономикой. Цель исследования определятся необходимостью разработки моделей, которые позволяют оценить экономический эффект от внедряемых мероприятий на предприятиях как промышленного, так и консалтингового сектора. Методами исследования выступают аналитические и методы моделирования экономических структур. В работе определено, что стоимость производственного травматизма и профессиональных заболеваний вместе с экономической эффективностью мероприятий по охране труда являются важным стимулом для работодателей принять эти меры. Выявлено, что они особенно заинтересованы в том, являются ли инвестиции в программу экономически эффективными (эффект дает хорошую отдачу от вложенных денег) или экономически выгодными (финансовые выгоды благоприятны). Авторами показано, что большинство опубликованных интервенционных исследований до сих пор были сосредоточены на эффективности интервенций, а не на их экономической эффективности. Выделение разработанной методической структуры позволяет определить уже по количественным характеристикам возможности для структурирования и достижения целей как поставленных перед предприятием акционерами, так и производственными планами. В статье определены пределы использования интересов охраны труда как социальной структуры в совокупности с использованием методов производственного планирования. Необходимы дальнейшие высококачественные исследования, проводящие полную экономическую оценку, чтобы иметь возможность сделать дальнейшие выводы об экономической эффективности мероприятий по охране труда с точки зрения работодателя

Ключевые слова: модернизация производства, организация охраны труда, краткосрочная экономическая выгода, кадровые ресурсы, убытки

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Охорона праці як складова ефективного менеджменту сучасного підприємства

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Анотація. Питання охорони праці, особливо на великому підприємстві, є ключовими складовими соціально-трудової сфери, що значно впливають на роботу всього підприємства. У сучасних економічних умовах, де кожне підприємство націлене на випуск конкурентоздатної, високоякісної продукції та отримання прибутку, збереження здоров'я і працездатності кожного працівника знаходяться на пріоритетному місці. Будь-яке соціально орієнтоване підприємство зацікавлено, насамперед, у скороченні рівня аварійності, травматизму, виробничо-обумовленої та професійної захворюваності працівників. Метою дослідження стало визначення й оцінка ролі охорони праці та промислової безпеки у формуванні ефективної системи менеджменту та діяльності підприємств. У процесі дослідження було використано метод порівняння, аналогія, формалізація, структурний аналіз, діалектичний метод пізнання. У результаті дослідження було визначено, що сучасна організація охорони праці на виробництві має бути спрямована на ефективне управління промисловою безпекою всіх технологічних процесів і врахування міжнародних стандартів, зокрема OHSAS 18001, ISO 4501, ISO 9001, що є основою ефективного менеджменту підприємства загалом та сприяє виявленню й попередженню проявів несприятливих чинників та, як наслідок, мінімізує виникнення травм і професійних захворювань, втрати життя, здоров'я та працездатності загалом, виявляє та попереджає виникнення несприятливих чинників

Ключові слова: підприємство, виробництво, охорона праці, промислова безпека, ризик виникнення небезпеки для працівника, система управління охороною та безпекою праці

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Labour Protection as an Effective Management Component of a Modern Enterprise

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Abstract. Labour protection issues, especially in a large enterprise, are key components of the social and labour sphere, which significantly affect the performance of the entire enterprise. In modern economic conditions, where every enterprise is focused on producing competitive, high-quality goods and making a profit, maintaining the health and efficiency of each employee is a priority. Any socially oriented enterprise is primarily interested in reducing the level of accidents, injuries, industrial-related, and occupational diseases of employees. The purpose of the study is to determine and evaluate the role of labour protection and industrial safety within effective management system development and enterprise activities. In the course of the study, the method of comparison, analogy, formalisation, structural analysis, and dialectical method of cognition were used. As a result of the study, it was determined that the modern labour protection should be aimed at effective management of industrial safety of all technological processes and taking into account international standards, in particular OHSAS 18001, ISO 4501, ISO 9001, which is the basis of effective enterprise management as a whole and contributes to the identification and prevention of adverse factors and, as a result, minimises injuries and occupational diseases, loss of life, influences health and working capacity in general

Keywords: enterprise, production, labour protection, industrial safety, risk of danger to the employee, occupational health and safety management system

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Introduction

Labour protection and industrial safety form an integral part of an effective management system and modern enterprise management. The role of labour protection in the enterprise is as follows. First of all, it consists in validating the statement that human life and health are of the highest value. Management should not ignore labour safety, which is a priority in production. Most incidents and accidents in the workplace could have been avoided if employees had timely and fully obtained the necessary knowledge and skills to ensure safety and had been aware of labour protection principles. The main measures to organise safe working conditions even before the start of labour activity are: conducting briefings, training in safe techniques for performing professional duties. All employees, in particular heads of organisations, as well as employers-individual entrepreneurs, are required to undergo training on labour protection and test their knowledge of labour protection requirements. Organisation components of the labour protection system at the enterprise should primarily focus on the provisions of the Law of Ukraine "On Labour Protection" [1] and the Labour Code [2].

Furthermore, each person in the enterprise is valuable precisely as an employee who has certain knowledge and skills. In the conditions of properly organised labour safety provision, the discipline of employees at the enterprise and labour productivity significantly improves, the number of accidents, equipment failures, and other emergency situations decreases – all this has a positive impact on the enterprise productivity. Labour protection and industrial safety in the company's management system, along with the safety of employees in the performance of their official duties, also considers the prevention of occupational diseases, the organisation of proper nutrition and rest during breaks, providing employees with the necessary personal protective equipment, special clothing, sanitary and hygienic facilities, the implementation of certain social benefits and guarantees [3].

It is the standard-compliant approach to the organisation of labour protection, fair and effective use of material and non-material incentives that give employees a sense of stability, protection of their rights and interests, and demonstrate management's attention to their employees. Well-established labour protection reduces staff turnover, which, for its part, has a positive effect on enterprise stability. Certainly, there are other, less considerable forms of occupational safety and enterprise management system. However, the above is enough to realise the importance of quality support for occupational safety at the enterprise. The present forces recognising the issues of labour protection and industrial safety as more relevant than ever. After all, the emergency situations can permanently stop the production, cause not only emotional and physical stress in the work of the team, but also bring substantial financial costs for the manager. In this regard, timely recognition of hazards and solving existing and possible issues from the standpoint of labour protection, leading to injuries at the enterprise and occupational diseases become the priority. The labour protection and industrial safety issues, first of all, include untimely and poor-quality training of employees, lack of professional competence. Measures that prevent these difficulties include conducting briefings and training in safe methods of performing work. In some cases, the presentation of material should be changed: it may be advisable to add video and audio accompaniment to the text of training programmes, to create visual diagrams and models of situations, and to more actively use modern technologies in training and testing knowledge regarding labour protection. For all employees, including managers of economic activities and employers-individual entrepreneurs, the primary responsibility should be to complete training with subsequent knowledge testing on labour protection requirements as a part of successful enterprise management and its industrial safety.

Thus, *the purpose of the study* is to determine and assess the role of labour protection and industrial safety in the development of an effective management system and enterprise activities.

Literature Review

Research on aspects of labour protection and safety was conducted by such scientists as: M.P. Handziuk, E.P. Zhelibo, M.O. Halimovsky [4], Z.M. Yaremko, S.V. Timoshuk, O.I. Tretyak, R.M. Kovtun [5], A. Blackham [6], G. Gogitashvili [7], I.O. Shashkova-Zhuravel [8], M.I. Inshin [9]. The study of A.P. Bochkovsky [10] proposed priority areas for improving the Occupational Health and Safety Management System (OHSMS) in the industrial complex of Ukraine based on the analysis of the effectiveness of its functioning over the past five years. The analysis was carried out by studying the dynamics of changes in the main indicators that characterise the effectiveness of the OHSMS, namely occupational injuries and diseases, the condition of production equipment, buildings, and structures, as well as compensation for material damage to victims of accidents.

The study of V.B. Zagornyak, A.P. Kovalchuk and D.R. Kostinyuk is devoted to the development of a unified model of industrial labour safety management [11]. The need to apply professional standards in the development of the organisation's personnel policy and the establishment of a wage payment system is considered in the study of M. Chizhova and L. Khairullina [12]. The authors note that the professional standard can be used during employee certification. Professional standards also play a key role in the preparation of employment contracts.

It is also worth paying attention to the world scientific community opinions on the issue of labour protection and industrial safety during the population's labour activity. G. Janet's study focused on the analysis of occupational health and safety in medical institutions [13]. Although this is not an issue of industrial safety, it is still extremely relevant. The studies of G. Garnikaa and G. Barigaa [14], as well as P.A. Schulte et al. [15] cover the main obstacles to the implementation of occupational safety and health management systems within small businesses from the point of view of owners, managers, labour auditors, and occupational safety consultants, especially taking into account the OHSAS 18001 standard. K. Van, K. May, S. Liu, J.Zhang [16] determine their study as a mechanism to promote national and international occupational health and safety improvements for small and medium-sized enterprises (SMEs) in China within internal and external resources. Researchers L.-I. Choka and L. Ivask consider the IT components in the issue of ensuring labour protection and safety at European enterprises [17]. In addition, the study of Swedish researchers E. Hagquit, S. Winberg, S. Toivanen, and B.J. Landstad considers the role of labour protection inspectors in compliance with industrial safety and labour protection standards in Swedish enterprises [18].

Materials and Methods

The methodological basis of the study included the dialectical method of cognition, which allows studying the development issues of management and administration in labour protection and industrial safety, their interrelation and interdependence. The study was performed based on general scientific and special methods of cognition: comparison, analogy, formalisation, structural analysis, expert assessments and opinions, factor analysis, institutional analysis, as well as analysing the causes of occupational injuries and diseases. Upon research, it was predicted that the development of safe working conditions is influenced by a large number of factors: the type of work performed and working conditions, design and engineering solutions in the workplace and the enterprise as a whole, the quality of technologies used and technological discipline level, the overall organisation of the labour process, and others. The safety of technological, production, organisational and labour processes within enterprises is ensured by assessing the degree and type of the negative impact of dangerous and harmful production factors on employees' health [19]. The development and implementation of measures to reduce or prevent them is an effective mechanism for improving working conditions.

The initial information of the study is various guidance documents on labour protection: laws, codes, standards, provisions, lists and regulations, requirements and instructions, and so on. The existing level of ensuring labour protection of the enterprise can be determined by various assessments. The most common methods and means can be considered the following: preliminary analysis of hazards, analysis of hazards and employees' labour productivity, the use of checklists (surveys), the method of system risk analysis, analysis of errors/failures, analysis of the forms and consequences of failures, analysis of violations of labour protection regulations.

Results and Discussion

The emergence of the OHSAS-18000 standard “Occupational Health and Safety Management Systems” (hereinafter referred to as the occupational safety management system) was due to the need to implement measures to prevent major industrial accidents within the world community and ensure occupational health and industrial safety in general. The most successful development was the OHSAS 18000 series of standards by the British Standards Institute, which consisted of two standards – OHSAS 18001 and OHSAS 18002. OHSAS 18001 is the main standard. It contains requirements for creating, maintaining, and improving an occupational safety system. OHSAS 18002 completely repeats OHSAS 18001 in structure, however, unlike its “counterpart”, it does not contain requirements, but includes explanations and additional information on the implementation of certain provisions of OHSAS 18001 [20].

When referring to OHSAS 18001 standard, it is worth noting that it is built on such principles as: voluntariness and universality, which consist in the fact that it does not have to be applied at all enterprises, but if the management has decided to meet modern requirements in the field of security management, then this standard can be used and implemented in any organisations, regardless of the number of employees, the size of structural divisions, activity types, organisational structure, and ownership forms. In practice, the OHSAS 18001 standard is easily linked to other management systems of organisations, since some of its requirements repeat points from the quality management system, environmental management.

It should be understood that the implemented occupational safety management system has exclusively administrative requirements, which is expressed in the fact that the OHSAS 18001 standard sets only safety requirements, answering the question “What to do?”, but it does not define what actions and tools should be used to implement these requirements. The standard also does not replace or cancel other applicable regulatory requirements in the field of safety and labour protection. The requirements of the OHSAS 18001 standard can be used both to assess the compliance of the occupational safety management system by the enterprise or organisation (internal occupational safety audit) and by external parties (external occupational safety audit). At the enterprise, personnel safety and its health protection can also be organised through certification. In certification, dangerous and harmful production factors, production hazards, personnel health, the organisation itself, occupational safety and health protection can be the study subjects. These factors are evaluated for compliance with certain requirements of the OHSAS 18001: 2007 standard. Certification is usually carried out by an independent accredited body that issues a certificate of conformity to the enterprise – a document confirming that the organisation cares about the employees' safety and controls production risks. The certificate is valid for three years, subject to annual supervisory audits by the certification body.

Figure 1 presents the advantages of implementing a management system for industrial safety and labour protection of personnel at the enterprise. Table 1 provides criteria for modern industrial safety management.

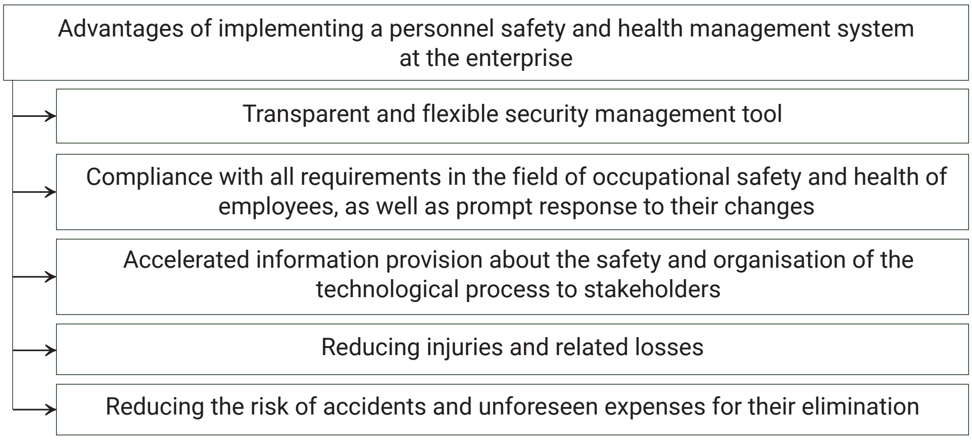

Figure 1. Advantages of implementing a personnel safety and health management system at the enterprise

Table 1. Criteria for modern industrial safety management

Criteria	Characteristics of criteria
Consistency	Consistency and timeliness of steps when building a security management system
Transparency of investments – labour protection expenses	Prevention costs and expenses that include direct material losses, i.e. expenses for the elimination, neutralisation, and compensation of already committed violations in the field of industrial safety and labour protection (post-expenses)
Adequacy	Search for the optimal ratio between probable losses and acceptable costs to prevent or minimise losses
High degree of fault tolerance	Minimising the human impact on the operation of the entire production safety system, flexibility during modernisation, functionality, and the possibility of integration regarding equipment and technological processes
Legality	Compliance of measures applied during the creation of the security management system with the current regulatory acts and legislation of Ukraine
Integration	Combining existing and newly implemented elements of security management into a single system and its harmonious integration into the enterprise's business activities

Security management is based on the principle of continuous improvement, which is described as Plan – Do – Check – Act, PDCA cycle [21]. The PDCA cycle makes it possible to:

- take into account the requirements of all stakeholders in developing and implementing the system;
- create and configure a management system for the needs of a specific company;
- promptly respond to any changes (new legislation, new internal standards, joining holdings, launching new equipment and products) and include them into the occupational safety management system.

Developing an industrial safety management system based on OHSAS 18000 standards is a long and complex process. According to statistics, approximately 50% of implemented projects end in failure, and many projects were not effective and did not give the results that they were originally designed for. It should be understood that OHSAS standards are aimed at establishing an industrial safety management system in an organisation or enterprise, which is quite difficult to do without special knowledge. Even if the implementation of such a system is carried out by third-party specialists, it will be necessary to maintain its working condition by the internal forces of the enterprise.

The implementation of OHSAS takes place in several stages, each of which requires using the knowledge obtained during training. In addition, when implementing the industrial safety management system of production, it is worth paying attention to the fact that along with the economic growth of the enterprise, methods and approaches to ensuring labour safety and personnel health should also be capable of dynamically and flexibly transforming since the modern industrial safety system becomes one of the components of business process management at the enterprise. Therewith, it should be taken into account that divisions of a large enterprise can be considered separate organisations, each of which can implement a labour safety management system.

Thus, a systematic approach to monitoring (analysis) and management of industrial safety will eliminate the randomness of taking measures to build an industrial safety and labour protection management system aimed at preserving the life and health of personnel. With regard to the safety of employees, it should be noted that an educated, professionally trained, economically interested employee a priori will not make mistakes that can lead to emergencies, fires, and consequences that arise from this. According to A. Fayol (a researcher who published fundamental issues on industrial safety in the 19th – early – 20th centuries), predictions, organisation, coordination, control, and orders regarding processes form the main content of administrative management [22]. The organisation of industrial safety management at the enterprise will have the following form (Table 2):

Table 2. The organisation processes of industrial safety management at the enterprise

Process	Process characteristics
Predictions	Forecasting (planning) emergency situations at each workplace and the enterprise as a whole, based on physicochemical and flammable properties of substances and materials used in the production scheme, and assessing the possibility of hazards to their sources. Planning can be long-term (with a deadline of more than one year), current (with a deadline of the current year); it can provide for two levels: planning at the enterprise in general (long-term and current planning); planning at the level of production structural divisions (workshops)
Organisation	Building a double (material and social) mechanism of the enterprise to prevent possible accidents. In addition, the establishment of work methods and techniques in accordance with the production technology; the provision of favourable working conditions; prompt elimination of identified shortcomings with an accurate indication of the completion deadline
Order	Organisational and administrative measures to force personnel to constantly and strictly comply with the safety rules and standards established at the enterprise
Coordination	Association, linking, harmonisation of all joint actions of the company's personnel to build a high-quality industrial safety system: training the employees in safety rules regarding the functioning features of the technological process in production (briefings, training, activities of labour protection commissions, etc.)
Control	Monitoring the security system of each workplace, site, workshop, and enterprise as a whole. The implementation of action plans for labour protection and industrial safety can be controlled by the labour protection service along with the trade union committee and labour protection commissions; in production structural divisions, services – by managers and specialists of these structural divisions. The implementation of measures can be periodically reviewed at security meetings. Reports on the implementation of action plans, treaties, and collective agreements are reviewed by managers during planned reports

Thus, the function of planning measures to ensure industrial safety management is to set requirements for the safety of equipment, workplace, technological process, to check the compliance with these requirements during installation and adjustment, to plan production control measures, preventive work to maintain the reliability and safety of the equipment. Planning should be accompanied by operational security management, which includes regulating the security level by taking various measures (for example, monitoring security parameters; comparing security parameters with acceptable values; evaluating the possibility of changing parameters to acceptable ones or changing trends; making a decision on security management and implementing the decision in practice) in accordance with the plans.

It is also necessary to note that accounting and analysis in the implementation of forecasting measures in the industrial safety management system provide for the accumulation of all data on the safety state, the results of measures performed, accidents, diseases, and funds spent on ensuring safety. Considering the accumulated data, a quantitative and qualitative analysis of the security status should be conducted periodically, the results of which allow clarifying and, if necessary, adjusting the security action plan.

Conclusions

Therefore, production safety management should be strategically focused on the development and preservation of the most important intangible resource – human capital, which in the modern world is becoming the main wealth of countries, corporations, and firms. To do this, employees – holders of human capital – need to create safe working conditions and maintain the necessary level of technical knowledge in them. Obviously, this is the main objective of enterprise security management in modern production conditions as a factor of the successful operation within an enterprise.

The role of labour protection and industrial safety is of great importance, disregard for the principles and rules of which often leads to unfavourable consequences. At present, the issues of occupational safety and health are important and relevant for any enterprise. Labour protection is one of the main elements in enterprise management. Therefore, the establishment and transformation of a high-quality occupational health and safety management system, within management and administration issues at the enterprise, which acts as a link between the various elements of the occupational health and safety system and its issues, should be one of the main priorities of social policy of any enterprise and the state in general.

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Проблеми розвитку медичної галузі в Україні в умовах впровадження реформи децентралізації

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Анотація. Актуальність дослідження полягає в тому, що реформування медичної галузі є важливою складовою децентралізації. Стара модель функціонування медичних закладів є неефективною, тому виникає потреба в реорганізації, що проводиться шляхом ухвалення відповідних рішень. Медична галузь одна з найпроблемніших в Україні, особливо це стосується організації медичної допомоги саме в територіальних громадах. Тому реформування в умовах децентралізації є достатньо складним процесом для вирішення і введення в дію. Реформування медичної галузі передбачає створення нової системи територіальної організації, розвиток місцевого самоврядування та удосконалення регіональної державної політики. Розвиток медичної галузі є одним з основних чинників досягнення добробуту населення та національної безпеки. Більшість медичних закладів – це малопотужні лікарні, які мають застаріле технічне оснащення та зношені основні фонди. Необхідно запровадити нові підходи до розв'язання проблем громадського здоров'я. Мета дослідження – визначити основні проблеми, які негативно впливають на розвиток медичної галузі в Україні в умовах впровадження реформи децентралізації. Децентралізація уособлює можливість громад розпоряджатися ресурсами та мати повноваження на їх реалізацію. Механізм реформи децентралізації передбачає перерозподіл фінансових ресурсів і владних повноважень від центральних органів державної влади до регіональних або органів місцевого самоврядування. Реформа медичної галузі передбачає конкретні кроки для підвищення якості життя та наданих послуг, вона має концептуальне наповнення та чіткі рамки. В процесі децентралізації реалізується широкий спектр реформ регіональної політики та місцевого самоврядування. Її досягненнями є зменшення рівня корупції, поліпшення структури управління та активізація громад. Однак, варто підкреслити, що водночас даний процес супроводжується чисельними проблемами, викликами та ризиками в медичній системі, які необхідно доопрацювати та врахувати для подальшої успішної реалізації. Практична значимість полягає у виявленні проблемних факторів розвитку медичної системи та встановленні взаємозв'язків, що пригнічують реформування охорони здоров'я

Ключові слова: децентралізація, реформа, інфраструктура, місцеве самоврядування, медичні послуги, територіальні органи, фінансове забезпечення

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Problems of Development of the Medical Industry in Ukraine in the Context of the Decentralisation Reform

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Abstract. The relevance of the study lies in the fact that the reform of the medical industry is an important component of decentralisation. The old model of functioning of medical institutions is inefficient, so there is a need for reorganisation, which is carried out by making appropriate decisions. The medical industry is one of the most problematic in Ukraine, especially with regard to the organisation of medical care in territorial communities. Therefore, reform in the context of decentralisation is quite a complex process to solve and implement. The reform of the medical industry provides for the creation of a new system of territorial organisation, the development of local self-government, and the improvement of regional state policy. The development of the medical industry is one of the main factors for achieving the well-being of the population and national security. Most medical institutions are low-duty hospitals that have outdated technical equipment and worn-out fixed assets. It is necessary to introduce new approaches to solving public health problems. The purpose of the study is to identify the main problems that negatively affect the development of the medical industry in Ukraine in the context of the implementation of the decentralisation reform. Decentralisation represents the ability of communities to manage resources and have the authority to implement them. The mechanism of decentralisation reform provides for the redistribution of financial resources and power from central state authorities to regional or local self-government bodies. The reform of the medical industry provides for concrete steps to improve the quality of life and services provided, it has a conceptual content and a clear framework. In the process of decentralisation, a wide range of regional policy and local government reforms is being implemented. Its achievements include reducing corruption, improving governance, and activisation of communities. However, it is worth emphasising that this process is accompanied by numerous problems, challenges, and risks in the medical system that need to be finalised and taken into account for further successful implementation. The practical importance lies in identifying problematic factors in the development of the medical system and establishing relationships that hinder health care reform

Keywords: decentralisation, reform, infrastructure, local self-government, medical services, territorial bodies, financial support

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Introduction

Decentralisation in the field of medicine is aimed at creating organisational, material, and financial conditions for providing territorial bodies with delegated and own powers. Local self-government bodies are tasked with implementing local programmes, providing high-quality public health services, and developing regional policies. For several years since the adoption of the laws, the process of creating communities in some regions of the country has not begun, which has led to a slowdown in the creation of a basic-level health network. Many radical changes have been made to the healthcare system of Ukraine, which are based on the latest model of focusing on the health of Ukrainian citizens. The application of reformed changes in the field of health care contributes to improving the health status of the population by selecting a medical worker and providing highly qualified personnel.

The main priority is the financial protection of the nation by providing high-quality and modern medical services according to equal and uniform rules for everyone. Medical reform should encourage efficient and equitable allocation of resources, focusing their costs on the provision of medical services, rather than the maintenance of medical institutions. The decentralisation reform seeks to ensure a high level of transparency by providing the necessary information about health care in full [1]. The system of medical care in Ukraine operates on the budget support of medical institutions. The lack of mechanisms for flexible distribution of services by level of medical care does not make it possible to effectively and efficiently organise high-quality medical care and optimally manage the budget. The modern industry of municipal and state healthcare institutions does not maintain the medical sector in a satisfactory condition for providing services and efficient operation. The main problems that slow down the effective functioning of the medical sector are considered to be: irrational distribution of finances, dominant hierarchy, not established information management system and personnel management system [2]. The possibility of implementing reforms depends on the implementation of changes at the legislative level. The main subject in the implementation of improvements in the medical industry is professional and moral readiness to implement changes. Their key task is to promote reforms productively. After all, political expediency often prevails over rational arguments, especially in such an area as healthcare. A number of obstacles hinder the implementation of medical policy. That is why it is necessary to popularise the importance of medicine in general and change the consciousness of the population, since distrust of the professionalism of doctors and medical institutions is a barrier to the adaptation of decentralisation [3-4].

The concept of development of the public health system in Ukraine lays the foundations for reorienting the medical system from the policy of treatment to the policy of preventing, strengthening, and preserving the health of the nation. One of the most important purposes of the international community is precisely to preserve and ensure the health and high-quality life of the population, which are reflected in the principles of European policy. This strategy is based on recognition of success at all levels if effective funding for health services is implemented to improve the quality of treatment, improve collective leadership and the quality of treatment for all segments of the population. According to the reform of the territorial organisation of power in Ukraine and local self-government, the responsibility for organising the implementation and provision of medical care is borne by communities that provide primary care services, disease prevention, and emergency medical care. Local self-government bodies are responsible for providing specialised medical services at the secondary level and forming a network of hospital districts [5-6].

The purpose of the study is to identify the main problems that negatively affect the development of the medical industry in Ukraine in the context of the implementation of the decentralisation reform.

Materials and Methods

A set of scientific methods and approaches was applied to work out the problems raised. The theoretical and methodological provisions are based on fundamental research of Ukrainian specialists and scientists in the field of development of state medical reform in Ukraine. The application of the regional approach as the basis for methodological support of reform problems is characterised by a discrepancy in demographic, economic, and political characteristics of different regions, which considerably affects the development of motivation of local government officials and administrative executive power involved in the decentralisation process. Using the search-problem method, a problem was found and recognised, which will be solved in the future by selecting the best option. Comparative legal and comparative functional approaches helped to establish the specifics of implementing medical reform in Ukraine in the context of decentralisation and analyse world experience in this matter.

The scientific approach was used in the analysis of legislation, which identified gaps in the legal regulation of the implementation of state medical reform. The results obtained identified the issues of ensuring strategies for reforming the medical industry based on the activities of organisational, technological, and economic systems. At the same time, the system of economic relations acts as the basis for reforming and moving to progressive models of organising medical services at all stages of its provision. Using a comparative methodology, organisational and legal aspects of solving the problems of healthcare institutions during the unification of territorial communities are analysed. And the approach of system analysis contributed to the comparison of diverse regulations that control relations of the organisational and legal aspect at the time of planning the territorial structure. To assess trends in the decentralisation of the healthcare system in Ukraine, which is an important element of adaptation and reform, the study uses the theoretical basis of the theory of public economic sector, its disadvantages and advantages in the functioning of various systems.

During the study, a questionnaire was used to identify the problems of territorial communities. This analysis is the result of collecting information obtained during group interviews. The procedure itself involved filling out a questionnaire form. The study was conducted in order to identify the main possible reasons related to the implementation of medical reform in the context of decentralisation and resistance on the part of various groups that somehow relate to the issue under consideration. The development of recommendations in the communication and information spheres for government agencies is the result of a survey. Other theoretical methods were also used: systematisation, comparison, synthesis, summary of empirical and generalisation of theoretical research results.

With the help of gradual distribution, the complex state of medical and preventive institutions was analysed, the basic principles of creating territorial communities and the stages of the process of implementing reforms in the context of decentralisation were described. It was determined that an effective way to optimise the networks of preventive and medical institutions is to form an integral space in the medical industry, which should be based on the integration of health care institutions owned by different territorial communities. Such a benchmark of reforms requires an effective management strategy in the medical system and political decentralisation in order to achieve affordable and high-quality healthcare. Having identified the main factors of the relevant strategy in the field of medicine and the level of funding organisation, it is possible to analyse typical development models in foreign countries with different dominant mechanisms.

Results and Discussion

At the present stage of development of Ukraine, the issue of effective implementation and fulfilment of medical reform by the state at all its stages, including regulation of the medical services market, has become particularly relevant. The lack of scientific research and the presence of imperfect management mechanisms for this industry are considerable reasons for the implementation of state medical reform in Ukraine. The state policy is aimed at effective and high-quality implementation of the reform, which is characterised by the introduction of reference prices for certain medicines and the further development of family medicine. Comprehensive renewal of the medical, humanitarian, and social spheres is one of the best ways to bring the industry out of a large-scale deep crisis. Indicators of public health act as an index of the development of an economic and social factor, as well as a generalising characteristic of the standard of living in general. The level of national security of the state is also directly related to the reform of healthcare [7-8].

The main areas of medical reform in Ukraine are polyclinic departments, primary care institutions, and medical workers. Every citizen of the state has the opportunity to choose a doctor. The patient signs a contract based on which specific medical services are provided to him. At the moment, there is a positive trend in the implementation of medical reform in Ukraine. The state partially meets specific expectations and citizens feel the productivity of the parties of the reform since a certain analysis of the reform of the medical industry has been carried out. The features of their implementation and the specific combinations of mechanisms that are successfully used to solve health issues always differ from each other in different countries of the world. Therefore, it is impossible to create a single concept of reform that could be used on the example of other countries. Such changes embody the differences between many economic and conceptual factors of development and the transition process [9].

In accordance with the international requirements of Ukraine and with the support of international organisations, the process of reforming the medical industry is being conducted. Within the framework of the association agreement between the European Union and Ukraine, the medical system is being implemented and strengthened through reforms. This makes it possible to provide society with the necessary and high-quality medicines, avoiding corruption. Attempts to discredit the reform programme and block a number of fundamental innovations by some political forces contributed to stagnation of work and put the transformation of the reform process at risk [10]. The rejection and distrust that have formed in the community threaten to the implementation of reforms. The main threats are: inadequate financial support for programmes in the local and state budgets, incomplete structural adjustment of the industry, changes in the political vector of state development. Prolonged depression has created distrust of the health care system.

Sociological studies show that the most tangible understanding and adoption of the reform is observed in those areas where the programmes are confirmed by practical implementation. With the introduction of health insurance and the emergence of a large number of private medical institutions, attention to the quality of services provided has increased and competition has emerged in the medical services market. One of the most important tasks of the management of healthcare institutions is to achieve competitiveness and innovation of management technologies. The ability to fully meet the needs of consumers by providing high-quality medical services, economic efficiency and safety are the main factors of competitiveness of a medical institution. The management system should be based on modern information technologies, which will be the basis for automating accounting for medical services and information [11].

The development of the medical industry in Ukraine is accompanied by considerable difficulties. The reform is carried out simultaneously with the transformation and restructuring of the state administrative apparatus. In these conditions, the health of society acts as a socio-economic value. Consequently, the activities and problems of the medical system, which are aimed at preserving the potential and increasing it, require constant attention and support from the state. Health care is considered as one of the priority and important areas of national security and state policy. Information materials of the system analysis of the Ministry of Health indicate that the level of public health at the present stage qualifies as unsatisfactory.

Over the past decade, Ukraine has seen an increase in the overall mortality rate of society, while in European economically developed countries it has decreased over the specified period of time. The main priorities of the state policy in the field of medicine should be to improve the efficiency of healthcare, ensure social justice, and improve the financing of the industry in order to use the resources provided to the full. Achieving the purpose is possible with the use of a set of national measures that provide for: creating conditions for improving the well-being of the population, organising effective environmental protection, carrying out economic reforms to form a complete state budget, ensuring labour protection and safety in all industries, updating demographic policy to increase the birth rate and reduce mortality in society [12-13].

The state policy of Ukraine in the field of healthcare is aimed at improving the quality of life, preserving the gene pool of the Ukrainian nation and improving the level of health. Ensuring its implementation should contribute to the introduction of new mechanisms for managing and financing the industry and qualified medical care for every citizen. The level of satisfaction of the needs of an individual and the whole society is an indicator of the effectiveness of the state policy of decentralisation in medicine. The ongoing reforms partially ensure the transition of the healthcare system from socially costly to socially investment, the prerequisites for which are the intensive development of the system as a whole.

Thus, optimisation of the public needs of the healthcare system of Ukraine requires the invention of new ways to implement and form the reform of medicine and the application of advanced foreign experience. The primary tasks of state policy are to recognise the right of every citizen to ensure protection, healthcare, and guarantee the exercise of their rights in this area. To fully ensure the functioning of an independent democratic state, it is necessary to introduce and approve relevant legislative acts regulating the legitimate activities of the public health sector. Evidently, the health system's efforts to solve problems are not enough. The interest of citizens in strengthening and maintaining health also forms social responsibility, contributes to the creation of a healthy environment and develops the medical industry in the area of innovative technological progress [14]. Given the need to introduce quarantine in Ukraine due to the spread of the coronavirus disease COVID-19, the issue of maintaining the constancy and quality of state bodies and medical institutions' functioning has become acute. To introduce the practice of remote work, changes were recorded to the standard rules of internal service regulations on civil service issues registered in the Ministry of Justice of Ukraine. Consequently, civil servants were given the opportunity to perform tasks outside the administrative building of a state body. Based on this, a survey was conducted, in which all interested civil servants of different levels of state bodies and different categories of positions were able to take part [15]. According to the results of the survey, it was determined that as of April 2020:

37.6% – work normally, perform their official duties within the administrative building of a state body;

31.3% – switched to remote work, so they work from home;

29% – work from home, and visit the workplace in accordance with the duty schedule;

2.1% – do not work, are on sick leave/on long-term leave (Figure 1).

The dynamics of growth in the percentage of civil servants who switched to remote work can be traced with the growth of the level of the state body. Accordingly, the higher the level of the state body, the more civil servants switched to remote work (Table 1).

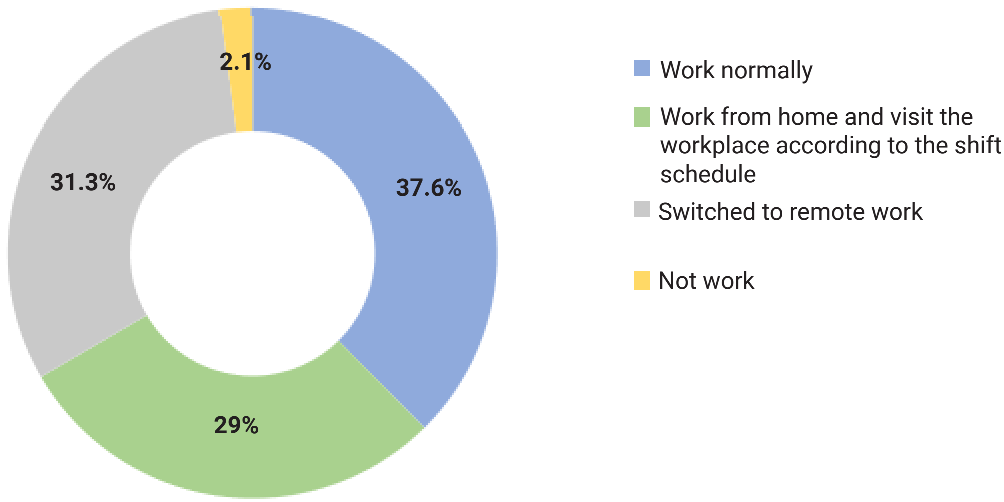

Figure 1. Working hours of civil servants as of April 2020

Table 1. Working hours of civil servants in state bodies of various levels

Working schedule	Level 1	Level 2	Level 3	Level 4	Level 5
In normal mode	18.2%	17.5%	30%	44.5%	55.2%
Remotely	40.9%	29.8%	28.8%	26.6%	30.1%
Remotely, and the workplace is vis-ited according to the duty schedule	40.9%	51.5%	37.5%	27.1%	11.7%
Do not work	0%	1.2%	3.8%	1.7%	3.1%

The dominant means of telecommunications interaction, both during the normal and remote mode, remain the telephone and work email. At the same time, the frequency of using personal email, Viber, and the electronic document management system for remote work is increasing. It is worth noting that the percentage of use of the electronic document management system (51.4%) remains quite low in remote work conditions. Percentages for the use of remote work organisation tools (Trello, Slack) and online meeting organisation (Skype, Zoom, Meet, Cisco Webex) are growing slightly, but remain critically low. A comparison was made based on the level of the state body regarding the use of telecommunications equipment by civil servants for interaction within their structural division (Table 2).

Table 2. Application of telecommunication means in the organisation of work and interaction within a structural division

Means of communications	Level 1	Level 2	Level 3	Level 4	Level 5
Email (working)	**86.4%**	**72.5%**	**65%**	**65.5%**	**61.3%**
Email (personal)	**72.7%**	**55%**	**56.3%**	**56.8%**	**34.4%**
Telegram	**68.2%**	29.8%	18.8%	7.9%	9.8%
Viber	40.9%	**66.7%**	**75%**	**79.5%**	**62.6%**
WhatsApp	40.9%	39.8%	21.3%	18.8%	11.7%
Slack	0%	3.5%	11.3%	0.4%	0.6%
Facebook	13.6%	16.4%	8.8%	19.2%	17.8%
Instagram	4.5%	1.8%	0%	1.3%	1.8%
Trello	0%	5.8%	5%	0.4%	0.6%

Table 2, Continued

Means of communications	Level 1	Level 2	Level 3	Level 4	Level 5
Skype	13.6%	14.6%	3.8%	6.6%	6.1%
Zoom	36.4%	28.7%	20%	20.5%	11.7%
Cisco Webex	4.5%	3.5%	3.8%	0.9%	1.2%
Meet	0%	3.5%	1.3%	0%	0%
Google Docs	**50%**	40.9%	28.8%	12.7%	6.7%
Electronic document management system	**50%**	**70.8%**	**52.5%**	**38.9%**	**16%**
Telephone	**77.3%**	**78.9%**	**75%**	**80.3%**	**73.6%**
Other means of communications	18.2%	12.3%	11.3%	6.1%	8.6%
Do not use any	0%	1.8%	2.5%	7%	14.7%

From the table above, it is evident that at all levels of government agencies, most employees use telephone, work email, and personal email (except for the fifth level) to interact within a structural division. Telegram is most in demand among representatives of the first level, and Viber is most in demand among representatives of other levels of government agencies. Among representatives of the first level of government agencies, 50% use Google Docs, while in other government agencies there is a downward trend in the use of this tool in accordance with the decrease in the level of jurisdiction. The electronic document management system is mainly used at the first and third levels of state bodies. This may be due to the lack of such a system in most government agencies of the fourth and fifth levels.

Based on the results of the analysis, it can be assumed that in quarantine conditions, when some civil servants work remotely, and some continue to work normally, there are certain difficulties and inconveniences regarding communication, interaction, and organisation of work. An important factor in productive interaction in remote work is the quality of communication. A significant percentage of civil servants noted that they are in constant contact with colleagues (77.6%) and receive feedback on the work done (61.6%). At the same time, some respondents feel some isolation from the team when working remotely. It was identified that men are less likely to receive feedback about work performed remotely than women. And category "B" employees are less likely to receive feedback than category "C" employees. A causal relationship has been established between public service experience, work experience in the position held, and receiving feedback: employees with more experience receive less feedback about work performed remotely. It was established that the bigger an employee has work experience in his position, the less he believes that he is in constant contact with colleagues of the structural division and the manager. There is a change in the level of employees' sense of constant contact with colleagues, receiving feedback, depending on the level of the state body: the higher the level of the state body, the higher these indicators are [16].

It was determined that the use of such methods as conducting online conferences, online meetings of working groups, exchanging electronic documents, working together on documents online, setting tasks, planning and monitoring, telephone communication, messaging, correspondence, affect whether an employee who is in constant contact with colleagues of his structural division and the manager feels that he always receives feedback about remotely performed work and believes that the level of work communication has remained unchanged. Using such a method as working together on documents online affects employees' assessment of remote work of colleagues. In other words, the less work is done together on documents online, the more employees believe that colleagues who have switched to remote work are not doing anything. The establishment of such a connection indicates that online collaboration can be used as a way of communication in order to establish interaction and accept changes in the working hours of employees, establish a favourable climate for remote work [17].

The majority of civil servants surveyed (68.1%) would like to combine remote work with full-time work in the future, 19.6% would not like to work remotely, and 12.3% would like to switch to remote work mode (Figure 2).

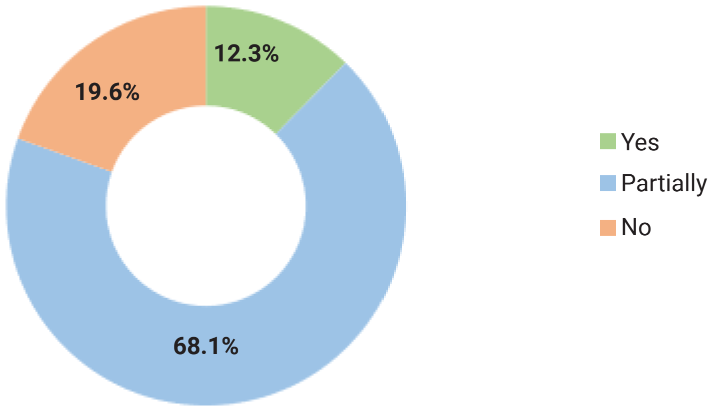

Figure 2. Would you like to continue working remotely in the future?

Correlations were established between how the respondent evaluates the effectiveness, quality, and performance discipline of a structural unit or state body and his desire to continue working remotely: the higher civil servants evaluate efficiency, quality, and performance discipline, the more they want to work remotely in the future. It was established that the more methods of organising remote work are used when working remotely, the more civil servants would like to continue working remotely in the future [18-19]. Civil servants tend to work more remotely if they use the following telecommunication tools: Telegram, WhatsApp, Slack, Trello, Skype, Zoom, Meet, Google Docs, electronic document management system, and telephone. Respondents noted that if the decision depended on them, 65.7% would allow employees of their structural division to switch to partially remote work (combine remote work with full-time), 20.8% would allow them to fully switch to remote work mode, and 13.5% would not allow [20].

Conclusions

Current challenges and changes require the implementation of policies to achieve and maintain health for the entire population through the implementation of appropriate national and regional policies. To implement the successful implementation of reforms in the healthcare system in Ukraine, a balanced programme is required that will form the areas of development, taking into account the necessary number of legislative acts, depending on the conditions of their existence. The latest models of reform management serve as an impetus for the transition of the healthcare system to modern mechanisms of functioning. The main priority area should be the theoretical basis for state executive authorities and local self-government bodies to create appropriate conditions for improving and preserving the health of the nation, activities in health management. The activities of medical institutions in modern conditions should take into account unpredictable challenges and strengthen control over their work.

Analysing the problems of functioning and development of the medical industry in the context of the implementation of the decentralisation reform, it is important to note that at the present stage the medical system is on the list of the most problematic areas that require effective and rational reform. This is especially true for the organisation of medical care in territorial communities. That is why the decentralisation reform is a complex process that should result in affordable and high-quality medical services for the entire population of Ukraine. The main characteristic of the transformation of the healthcare system is the vector of increasing the level of decentralisation while maintaining the principle of financial solidarity. Health protection and promotion should be one of the main priorities not only of local self-government bodies and state bodies, but also of society itself. The key task of the government of Ukraine is to further refine the medical reform, provide considerable financial support, and inform members of self-government communities about changes that are taking place in the process of providing medical services.

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Сучасні підходи до оцінювання ефективності державно-управлінських рішень

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Анотація. Актуальність теми дослідження полягає у тому, що ефективна державно-управлінська діяльність є одним із найважливіших чинників прогресуючого розвитку сучасної держави. Важливою умовою продуктивного функціонування органів державної влади є державне управління, що виступає цілісною науковою системою організації діяльності. Оцінка ефективності державно-управлінських рішень необхідна як для державних органів влади, так і для суспільства. Вона допомагає державним службовцям контролювати та вдосконалювати процес управління, а суспільству оцінювати якість діяльності державних інститутів. Відсутність об'єктивних загальноприйнятих показників оцінки соціально-економічних процесів, роботи органів та інститутів є однією із головних проблем, які перешкоджають підвищенню ефективності роботи державного механізму. На сучасному етапі відсутні усталено сформовані підходи до оцінювання ефективності державно-управлінських рішень. Вирішення даної проблеми полягає у більш детальному вивченні наукових знань про систему та механізми оцінювання. Мета дослідження – проаналізувати основні сучасні підходи та механізми оцінки ефективності державно-управлінських рішень. Поняття оцінки ефективності як комплексного процесу є на сьогодні найбільш переважаючим і вживаним у сучасних науковців. Забезпечення ефективності виступає складним завданням для державної управлінської діяльності. Різноплановість системи потребує використання раціональних підходів та створенню диференційованих критеріїв оцінювання. Складові системи оцінювання в умовах глобалізації впливають на результативність та ефективність і потребують безперервного вдосконалення розвитку. Застосування особливих інструментів і технологій забезпечують гнучкість державних рішень і внутрішню цілісність, що зумовлюють швидкі зміни в державі. Актуалізація підвищення ефективності та якості оцінювання державно-управлінських рішень безпосередньо впливає на соціально-економічний розвиток держави та покращення добробуту населення. Використання результатів оцінки дозволяє своєчасно виявити наявні проблеми, знайти шляхи їх розв'язання, удосконаливши управлінську діяльність шляхом підвищення ефективності державного управління на всіх його етапах. Практична значимість полягає у використанні результатів дослідження в діяльності окремих органів державного управління, що дасть змогу модернізувати ефективність оцінки державно-управлінських рішень та управлінської системи в цілому

Ключові слова: коефіцієнт ефективності, державно-управлінські рішення, сучасні підходи, органи державної влади, державне управління, система оцінювання, результативність

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Modern Approaches to Evaluating the Public Administration Performance

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Abstract. The relevance of the research subject lies in the fact that effective public administration is one of the key factors in the progressive development of the modern state. An important condition for the productive performance of state authorities is public administration, which acts as an integral scientific system for organising activities. Evaluation of the public administration performance is necessary for both state authorities and society. It helps civil servants to monitor, improve the administration and society to evaluate the quality of state institutions' activities. The lack of objective generally accepted indicators for evaluating socio-economic processes, the performance of bodies and institutions is one of the main issues that hinder improving the efficiency of the state mechanism. At the present stage, there are no well-established approaches to evaluating the effectiveness of public administration decisions. This issue can be solved through a more detailed investigation of studies regarding the evaluation system and mechanisms. The purpose of the study is to analyse the main modern approaches and mechanisms for evaluating public administration performance. The definition of performance evaluation as a complex process is by far the most predominant and used among modern researchers. Ensuring efficiency is a complex objective for public administration. The diversity of the system requires the use of rational approaches and the creation of differentiated evaluation criteria. The evaluation system components in the conditions of globalisation affect performance and effectiveness, hence, require continuous development improvement. The use of special tools and technologies ensures flexibility of state decisions and internal integrity, which leads to rapid changes in the state. The actualising the efficiency and quality improvement for evaluating public administration directly affects the socio-economic development of the state and enhances public well-being. The evaluation results allow timely identifying existing issues, find ways to solve them while enhancing the public administration performance at all its stages. The practical significance lies in the use of the study results in the activities of individual public administration bodies, which will make it possible to modernise the effectiveness of evaluating public administration decisions and the administrative system in general

Keywords: efficiency coefficient, public administration decisions, modern approaches, public authorities, public administration, evaluation system, performance

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Introduction

Each political system has its own hierarchy of values, which are determined by social interests and the peculiarities of the state. The value system within the state includes political principles and strategies fixed in the constitutional foundations, which are laid down in the criteria for the public administration performance. They are developed based on political course, which includes general national and state attitudes that change depending on the political environment and the existing regime. Collectively, they establish a mechanism for evaluating decisions that affect the internal and external environment and a system for controlling variable processes. Performance evaluation increases transparency, which is a valuable quality in administration. Due to its absence and the insularity of state authorities, bureaucracy develops, during which all processes are based on unproductive structuring and recommendations [1]. Therefore, certain performance and effectiveness indicators of public administration decisions can serve as an additional impetus for innovative technology introduction and increasing transparency.

Public administration processes are variable and diverse in their characteristics, so there is a need to structure results and resources. The performance evaluation system is associated with the planning stage in which the effectiveness and scope of public authorities' activities are achieved and evaluated. It defines the purposes that will be achieved during the time frame by the relevant authorities. The achievements of results are fixed in effectiveness indicators of public administration. The evaluation system is related to the implementation and achievement of operational and strategic purposes. When implementing a system for evaluating the public administration performance based on results, it is important to take into account limitations and risks It is necessary to evaluate the indicators in advance since establishing an unreliable and unbalanced system can lead to serious consequences. In general, evaluation as an integral part of improving public administration decisions should be strictly defined in terms of time, consequences, and procedure. Performance evaluation technology, as a full-fledged system, includes tools and procedures for activities, knowledge and information, resources, and a set of consequences that indirectly affect the decision-making environment. Evaluation of public authorities' activities is focused on the consequences of decisions made since the ultimate purpose is the ability to meet social interests. The main factors influencing the performance evaluation system are the needs of social development, the essence and content of administrative purposes, as well as methods and means of their implementation. The evaluation criteria are designed to restore the ability to provide the necessary regulatory social processes. The criteria can be used to analyse the functioning of state bodies or individual departments [2; 3].

To determine approaches to effective evaluation, it is necessary to define value aspects and project effectiveness on the results and scope of its activities. Value aspects determine the specific features of the evaluation and its content in the range of impact on society or the sphere of functional application. The complex of value orientations includes the following definitions: the level of quality analysis, indicators of performance regulation, the local aspect of a public administration decision, the time interval of evaluation, and targeted research. Performance criteria are quantifiable and make it possible to compare and evaluate indicators of the state. Performance indicators of public administration decisions that are used to solve certain issues and objectives differ in form and meaning. In order to make a rational and correct decision, there are not enough performance evaluation indicators. It is required to take into account certain rules that will allow choosing the best course of action. One of these rules is the performance criterion, which helps to choose from the suggested alternatives. This indicator creates conditions for the development of modern mechanisms for implementing administrative decisions in the public administration system. The performance criterion reflects subjective purposes and is based on the selected indicators. Its evaluation allows identifying the essence of a particular decision, in addition to showing the qualitative and quantitative levels of purpose achievement [4].

The purpose of the study is to analyse the main modern approaches and mechanisms for evaluating public administration performance.

Materials and Methods

The methodological and theoretical basis of the research is a set of applied and fundamental approaches within evaluating public administration decisions, concepts and theoretical provisions of administrative decisions, the studies of leading foreign and Ukrainian scientists in this area. Based on a systematic approach, the authors determined the essence of public administration decisions, performance evaluation, methodology for building mechanisms for their adoption and implementation, and the establishment of development areas in the public administration system. Information materials include studies, programme and planning documents, reporting materials on the results of state activities, resolutions of the Cabinet of Ministers of Ukraine, decrees of the president of Ukraine, and Ukrainian laws. The essence of the scientific and methodological approach is revealed in the provision of certain conditions to develop mechanisms for evaluating public administration performance, improving information and organisational support to ensure their quality. Due to this method, further development of modern evaluation modelling applies performance indicators and improves the decision-making level through complex stages of transition from a functional to an organisational and process mechanism. The general classification scheme for public administration decisions takes into account the possibility of applying its various forms at all stages of public administration: organisational and administrative, regulatory, program-targeted.

The institutional research method reflects the public administration theory within the transition from public administration to public management, which is characterised by an increase in the independence of the lower tiers of hierarchical state organisations and a shift in emphasis on the relationship of the external environment with state authorities, which significantly affects changes in the evaluation of public administration performance. At the present stage, this approach improves the perception of the influence that accumulated experience, scientific models, qualifications, and the leader's intuition have in administrative activities. The economic and mathematical method served as a tool for supporting modern approaches to evaluating public administration performance and contributed to the development of purposes and tools for identifying issues and performance indicators that are used in this case. The authors highlighted the main requirements for criteria that are used to evaluate alternative options for action.

The analysis of scientific approaches to evaluating the performance and modernising state work proved insufficient development of the methodological base and the lack of a unified evaluation approach. Many existing models do not have clearly defined criteria and methods for evaluating public administration decision-making and are fragmented and descriptive, do not provide an integral evaluation. The methodological framework requires clarification of issues and the development of a universal evaluation model. Upon summarising the works of leading researchers, the authors reasoned the feasibility of evaluating the decisions made due to the financial indicators for making a contribution and borrowing from foreign practice, taking into account current trends in discrepancies in theoretical provisions and practical results. The methodology review was considered in the context of comparative analysis and an analytical method for particular indicators to predict individual processes that were used to identify modern approaches and evaluate their implementation in the public administration through the prism of the results obtained. The authors applied the method of descriptive statistics to outline and explain the dynamics of the main indicators concerning the effectiveness of decisions that limit the potential features of their implementation based on the resources spent.

Results and Discussion

The efficiency should be compared with the achievement level of set objectives. Modern approaches of programmes are characterised by the ratio of the result obtained to the factors that affect the result obtained. Performance evaluation is possible only with the use of an index that reproduces the actually obtained level of the indicator analysed to the potential one. When determining it, an indicator of distributive efficiency is used, which is achieved when resources for obtaining a rational public administration decision are minimised. The use of this indicator in public administration activities arises difficulties related to the results of the decision obtained and the specific features of administrative activities. Performance evaluation allows studying the qualitative characteristics of both individual regulatory bodies that shape the state control system and individual control measures that directly affect decision-making. Therewith, most often efficiency is identified with the volume of detected violations when implementing administrative activities [5].

Modern approaches to the effectiveness of public administration decision-making are an active force that can influence the administration level, improve its quality and rationality. Evaluation of public authorities' activities is focused on arising consequences since the ultimate objective is considered to be the ability to meet the public interests. The essence and content of objectives act as the effectiveness factors within the functioning of the state apparatus. Political, economic, or social groups of criteria are used for evaluation. Economic criteria make it possible to evaluate and compare decisions in different countries, they can be quantified and are distinguished by the lack of a single universal indicator. Assessment of approaches to social and political status is based on appropriate criteria, which are manifested in reflecting satisfaction or dissatisfaction of social groups and are important for assessing the risks regarding public administration. The efficiency level of decision-making is determined by the following indicators: the stability of the monetary unit, the inflation level, and the economic growth rate. The main indicators should be supplemented by administrative regulation, the competence of public administration bodies, institutional stability, and transparency of legislation. One of the main modern scientific approaches is to ensure the orientation to the future of decisions made. This approach implementation encourages the transformation of scientific research into a necessary condition for effective practice. The public administration development is situational and dynamic, so the processes of society are based on the trend of acceleration and constantly need advanced administration [6]. Providing mechanisms and implementing decision-making, forecasting and developing appropriate areas are among the most important objectives of modern public administration. Issues in social systems arise when there is a need to change the set parameters and objectives of the decision. The crisis and development issues are due to discrepancies in the state environment and the result of a state administration decision. Thus, an important objective of a future-oriented approach is to advance the research of public administration and diagnose issues when developing an effective decision.

When developing modern approaches to evaluating the effectiveness of decisions made in public administration, the issue of using and improving general methods arises due to the need to reform the administration and society. The methodology of approaches refers mainly to poorly structured ones, the main feature of which is the description in a qualitative form. It does not belong to certain classes of administrative activity and is used as a generalising characteristic of all modern approaches to reasoning the effectiveness of public administration decisions. In this case, the greatest attention is paid to a wide range of factors and circumstances in order to identify the disadvantages and advantages of each indicator separately. When using the approaches, state programmes, regulations, political consequences of decisions made and their impact on the economy, society, and the environment are studied. The main problematic components are diagnostics and implementation of structuring, which provide for establishing the causes for situations and the consequences of their deployment [7; 8]. At the present stage, evaluating performance is a relevant and used concept in research. Since the basis for evaluating the effectiveness of decision-making is comparison, which represents a level of approximation or deviation from quality. Comparison takes place due to special techniques that are reduced to the appropriate administration decision-making process. Depending on the main characteristics of effectiveness, there are certain groups of criteria: pragmatic, rational-target, and rational-value. For each group, it is important to develop separate criteria, taking into account the time and target aspect of implementation dynamics. Based on this, the following approaches to evaluating the effectiveness of public administration decision-making are distinguished: multiple, behavioural, compositional, target, functional. The multiple approach characterises performance evaluation using generalised indicators that focus on several important aspects of decision-making in administrative activities. The behavioural approach is based on measuring the needs-satisfaction level among groups interested in the outcome of the decision [9; 10]. Its main feature is to achieve a balance of influential and concerned parties' interests in the activity results. The compositional approach is used to determine the influence level of state bodies on the results of public administration decisions. The target approach is based on achieving the set objectives in the most rational way. The functional approach determines the effectiveness of public administration from the standpoint of the administrative system functioning [10].

There are a number of social and political factors that influence performance evaluation transformations in the public administration system. The interrelation system within public administration is a unified stabilisation system, the processes in which are constantly repeated, are stable and necessary, which allows confirming the consistent pattern. The development of mechanisms and conditions for ensuring social stability is essential for organising the modern evaluation. Political factors are associated with certain platforms of the forces that came to power. Since administrative decision that does not correspond to their value programmes will not be supported. The relevant objectives are to consider and analyse the influence of the political factor on making public and administrative decisions. In addition, the need to implement modern quality standards, develop new approaches to evaluating effectiveness in state and local government bodies [11; 12].

Alternatively, approaches based on the criterion for evaluating the effectiveness of the relationship between subject and object are divided into external and internal. The external evaluation is carried out with the involvement of state commissions and independent experts. Internal ones are performed by the state authorities' own forces. In general, the method for evaluating the effectiveness of public administration decision-making is determined by the reliability, evaluation of information and the extent that characterises the issue. This information support serves as the basis for using one of the general areas of issues resolution in decision-making. In modern conditions, it is possible to combine the application of areas that require a scientific approach to solving problematic situations in public authorities. The efficiency ratio obtained through using modern methods is expressed as an indicator of purpose achievement level and decision implementation [13]. The methodology validity and compliance with the rationality parameters determine the quality and effectiveness of a public administration decision. The issue resolution should be focused on positive final results, taking into account the use of modern techniques. There is an interaction between society and the state, the level and quality of which is determined by indicators of public administration performance. Based on this, it is proposed to conduct an evaluation based on the characteristics that reflect the rationality of the organisational structure within the administration. Such a system provides a balanced expression of the purposes and functions of public administration, which lays the foundations for monitoring the effective activities of government institutions, in particular in making public administration decisions. The priority objective of using modern approaches to implementing performance evaluation is to provide the administration with reliable and complete information on the results of their activities to improve performance indicators and evaluate the decision-making quality assigned to these bodies. This methodology is implemented by comparing its value with the regulatory and previous-period indicators [14].

Effective interaction in the public administration system is extremely important since it affects the main characteristics of performance evaluation approaches, their stability and development possibility. Systematic evaluation requires identifying interaction indicators, which will be used to select an integral system of indicators that spot issues in using a particular method. The factors and circumstances that hinder coordinated interaction are identified and measures are developed to reduce or eliminate them. The evaluation of the public administration performance depends on the legal capacity of the society, the activity level of the state power system. A substantial methodological study is a certain regime fixation in which decisions of public administration bodies are implemented [15]. When considering modern approaches to evaluating the effectiveness of decision-making, it is worth paying attention to its division into preliminary, current, and final. The public administration activities and is used to select the most effective method and area from possible alternatives. It is carried out in the planning and development phase of the decision programme in order to collect basic information. The current evaluation takes place during the adoption process and directly affects the subsequent implementation stages through corrective means. It is designed to receive feedback to further improve the adopted decision aimed at evaluating the content and implementation of the integrated policy of the state body. This evaluation also examines the conditions under which public administration activities are carried out. The information obtained can be useful for interpreting the results of the final evaluation and reproducing successful elements of the policy system. The final evaluation is intended to clarify the consequences of the decision made by comparing the results obtained with the planned ones. It has an impact on the achievement of stated purposes and the relationship between their implementation and consequences [16; 17]. The diversity of influence that state bodies have on social life, the multi-vector functions of their activities, and the structure complexity cause certain difficulties in determining a rational approach to evaluating effectiveness in making public administration decisions. The difficulties are also conditioned by the fact that the public administration system does not consider the unity of administration object and subject, as the evaluation is carried out within the framework of administrative activities, which results in administrative influence, and not its consequence. Notably, the system of establishing and implementing decisions will further develop and improve standards and regulations for evaluating the performance and monitoring the activities. Thus, certain public administration evaluation areas can be replaced by systematically monitoring the effectiveness of implemented decisions.

To solve complex issues in public administration activities, the approach of expert performance evaluation is used. As the opinion of a group of experts is considered more reliable than the single expert's opinion. There are two main methods of expert evaluation. The first provides a sufficient amount of information that will allow correctly evaluating the effectiveness of decision-making. The second method is based on a lack of information, which causes uncertainty in the proposed hypotheses and leads to the high-quality processing of expert's evaluations. It is also necessary to consider the fact that the approach development is influenced by a large number of opportunistic circumstances of national policy. Theoretical aspects do not fully cover the performance evaluation between decision-making and its implementation. The main issue is the vagueness of the objectives set at all public administration stages. The implementation phase is a set of decisions made, during which the evaluation of their effectiveness takes place based on the use of various values and interests [18].

Indicators for evaluating the effectiveness of public administration decision-making by executive authorities correlate personnel, information, and financial resources with administration results. Resource efficiency reflects the ratio of the resource amounts spent on making a particular decision. It is characterised by using return indicators of various resource types to evaluate the results from the decision made. Evaluating the resource approach actually involves analysing the internal processes associated with obtaining a rational decision. Interpreting public administration bodies as socio-economic entities that perform a wide range of considerable functions allows stating that their administrative activities should be evaluated from all positions in a multi-level way for the sake of Integral efficiency. In improving the evaluation of public authorities' efficiency, performance indicators that meet the democracy standards and the requirements of openness and responsibility should be implemented on a regular basis [19].

Conclusions

For a public administration system, the criterion for evaluating the public administration performance should identify the productivity of administrative activities due to modern approaches that determine the quality and level of implementation of administrative decisions. The performance evaluation distinguishes administration criteria from other indicators that measure only quantitative figures of the corresponding manifestations and features. The modern approaches transform indicators through certain definitions and clarifications, reproducing the relationship between the results obtained and the ways to achieve them. The peculiarities of public administration decisions determine the variety of methods for evaluating administrative activities. The choice of the source, evaluation criteria, and method of their aggregation depends on evaluation purposes and the effectiveness of administrative objectives. The search for a universal approach that will allow evaluating and analysing the effectiveness of public administration bodies from the perspective of their success and ability to maximise public welfare continues. An approach is required that will allow comprehensively considering the diverse indicators of public administration and focus on an external evaluation of the public authorities' activities by the population. Therefore, the search for the most appropriate approach to improving the evaluation of the effectiveness of public administration decisions requires further study and development of practical problem-solving stages in modern conditions and principles for the state mechanism functioning.

Thus, evaluating the administrative decisions is a systematic analysis of achieving rationally set purposes and performing functional objectives to determine the results of the activities of state institutions and local self-government bodies in order to increase their effectiveness. There are quite a few methodological approaches to evaluating public administration. Regardless of this, it is necessary to note the incomplete development of the methodological base and the lack of a comprehensive methodology for evaluating public administration performance. The vagueness of certain criteria leads to fragmentary and descriptive administrative activities, so modern approaches require substantial refinement and a combining evaluation as a result of public authorities' activities. The evaluation of the effectiveness of administrative decisions is one of the most studied and relevant issues at the present research stage. The main feature of this issue is that public administration bodies are in conditions of constant rapid changes. In such conditions, it is almost impossible to correctly evaluate the performance criteria and the impact of decisions made on the effectiveness within their implementation.

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Концептуальні засади інноваційного розвитку національної економіки у контексті технологічних укладів та енергетичних інновацій

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Анотація. Актуальність дослідження зумовлена зміною підходів до розвитку національної економіки на основі енергетичного новаторства в контексті аспектів екологізації економіки, енергетичної незалежності, енергозбереження та синергії інновацій. Метою наукової роботи є формування концептуальної моделі інноваційного розвитку національної економіки в енергетичній сфері в умовах усталених трендів збільшення обсягів споживання енергетичних ресурсів. Дослідження проводилося у два етапи на основі системного підходу з використанням загальнонаукових теоретичних методів, а саме аналізу, синтезу, систематизації, узагальнення та структурного методу. У роботі обґрунтовано необхідність дослідження інноваційного національного економічного розвитку в межах енергетичної сфери на основі праць зарубіжних науковців. Розглянуто основні підходи до визначення поняття «інновація» в контексті економічного простору, серед яких процесно-орієнтований і функціонально-результативний. Встановлено взаємозв'язок між етапами життєвого циклу інновацій і рівнем розвитку національної економіки. Надано характеристику зміни технологічних укладів суспільно-економічних відносин у межах історичної ретроспективи. Визначено структурно-функціональні особливості категорії «розвиток» з метою дослідження концептуальних засад інноваційного розвитку національної економіки. Виокремлено основні моделі інноваційного розвитку у світовій практиці. З'ясовано особливості функціонування базових концепцій інноваційного розвитку національної економіки в енергетичній сфері, серед яких «кластерна концепція», «альтернативна енергетика», «Smart Grid», «концепція сталого розвитку», на основі чого було створено авторську концептуальну модель інноваційного економічного розвитку енергетичної сфери. Перспективи подальших досліджень вбачаються в практичному застосуванні створеної моделі інноваційного економічного розвитку енергетичної сфери

Ключові слова: енергетична сфера, концептуальна модель, економічний розвиток, інноваційна діяльність, кластерна концепція, альтернативна енергетика

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Conceptual Foundations of Innovative Development of the National Economy in the Context of Technological Structures and Energy Innovations

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Abstract. The relevance of the study is conditioned by changes in approaches to the development of the national economy based on energy innovation in the context of aspects of greening the economy, energy independence, energy saving, and innovation synergy. The purpose of the study is to form a conceptual model of innovative development of the national economy in the energy sector in the context of well-established trends in increasing the consumption of energy resources. The study was conducted in two stages based on a systematic approach using general scientific theoretical methods, namely: analysis, synthesis, systematisation, generalisation, and structural method. The paper substantiates the need to study innovative national economic development within the energy sector based on the research papers by foreign scientists. The main approaches to defining the concept of "innovation" in the context of the economic space, including process-oriented, functional and effective, are considered. The relationship between the stages of the innovation life cycle and the level of development of the national economy is established. This paper describes changes in technological patterns of socio-economic relations within the framework of a historical retrospective. Structural and functional features of the category "development" are determined in order to investigate the conceptual foundations of innovative development of the national economy. The main models of innovative development in the world practice are highlighted. The features of operation of the basic concepts of innovative development of the national economy in the energy sector are clarified, including "cluster concept", "alternative energy", "Smart Grid", "sustainable development", based on which the author's conceptual model of innovative economic development of the energy sector was created. Prospects for further study are seen in the practical application of the created model of innovative economic development of the energy sector

Keywords: energy sector, conceptual model, economic development, innovation, cluster concept, alternative energy

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Introduction

Growing globalisation challenges, digitalisation of the economy, total informatisation of relations, and continuous development of technological progress strengthen the transformational processes of socio-economic development of the state and society. This, for its part, aggravates the competition for resources between participants in socio-economic exchange and requires modernisation of established approaches to the organisation of effective operation of production and economic complexes based on the implementation of innovative development mechanisms, which will form prerequisites for ensuring the dynamic competitiveness of Ukrainian business entities of the national economy, both in national and foreign markets. The strategic basis for the effective implementation of such structural transformations is the innovative modernisation of the energy sector of the national economy, as a driving source of stimulating the socio-economic development of the state. Taking this into account, the expediency of forming theoretical, methodological, and applied aspects for the implementation of effective mechanisms for innovative development of the national economy in the energy sector is determined.

The need to substantiate the conceptual foundations of innovative development of the national economy in the field of energy is also increasing in the context of established trends of increasing consumption of energy resources due to the growth of the total world population; reduction of reserves of non-renewable energy sources (oil, natural gas, coal, etc.); increasing climate changes caused by global warming, increasing the volume of carbon dioxide emissions into the atmosphere and pollution of the environment and natural ecosystems; aggravation of the problem of physical and economic availability of energy resources for the population; deepening spatial and territorial imbalances in the development of energy infrastructure; systemic shifts in the segment of development of renewable energy sources, which forms a steady trend towards an increase in its share in the overall structure of energy consumption; strategic orientation towards achieving sustainable development priorities that provide for the balance of economic, social and environmental functional components. One way or another, Ukrainian and foreign researchers repeatedly turn to these aspects of the development of the national economy in the context of innovative improvement of the energy sector in their theoretical and empirical research. For example, D.I. Kurbatov and A.V. Prokopenko worked on creating an innovative mechanism for the growth of the national economy using alternative energy methods [1]. For her part, the researcher N.O. Ryazanova considered the problems of small alternative (non-traditional) energy within the framework of innovative economic development of the energy sector as a whole [2]. At the same time, the experience of foreign scientists is noteworthy. Thus, the German researchers F.V. Hackstein and R. Madlener in their study turned to the use of geothermal resources for electricity generation, which, in the future, contributes to the economically optimal operation of enterprises [3]. For their part, researchers from Chile, Colombia, Canada, and France conducted an online survey to determine the level of awareness and perception of the need for geothermal energy by representatives of the intellectual elite of five European and American countries (Canada, Colombia, Chile, Belgium, France), based on which the economic development of each specified individual country is formed [4]. Swedish researcher F. Libertson described the problem of lack of investment and innovation in some regions of Sweden to properly provide electricity, as a result of which the overall economic indicator of the country decreases [5]. At the same time, L. Friedstrom and V. Ostley conducted an empirical study aimed at estimating the ratio of CO_2 emissions from cars and vehicles with energy prices [6]. Finally, an unusual way to maintain eco-efficiency and a closed-loop economy was proposed by P.F. Borovsky [7]. The author suggests that at enterprises of various sectors of the economy, in particular energy, it is necessary to use the chemical and mechanical properties of bamboo [7]. However, it is worth noting that foreign scientists also trace a negative correlation between "green" innovations and the economy. Thus, Chinese researchers have proven that environmental regulations restrict the financial activities of companies [8]. The effect of income displacement caused by China's environmental regulations is greater than the effect of income compensation caused by stimulating technological innovation [8].

Returning to the European practices of sustainable development, it is advisable to pay attention to the UN global institutional programme "Agenda for Sustainable Development", which defines the development of affordable and safe energy for the period up to 2030 [9]. It is well known that the burning of fossil fuels is one of the main sources of emissions that cause climate warming, and so far, it is with the help of it that approximately 80% of the world's energy consumption needs are met. That is why one of the twelve Global Sustainable Development Goals until 2030, approved at the UN summit on sustainable development in 2015, is Goal 7 "affordable and clean energy" [9]. Achieving this goal by 2030 involves a number of tasks, in particular, increasing the share of energy from renewable sources in the global energy balance, intensifying international cooperation to facilitate access to research and technology in the field of clean energy, improving energy efficiency, innovative and environmental technologies for using fossil fuels, encouraging investment in energy infrastructure and clean energy technologies, etc. The issues of reducing energy intensity in industry are being updated in the context of the transformation of the national economy associated with the establishment of Industry 4.0. All this determines the relevance of the study of the conceptual foundations of innovative development of the national economy in the context of technological structures and energy innovations.

Consequently, *the purpose of the study* is to build a conceptual model of innovative development of the national economy in the energy sector.

Literature Review

It is worth starting with the fact that the study of innovative development of the national economy based on energy innovations provides for a clear definition of the concept of "innovation" directly, which has long remained the object of study by Ukrainian and foreign researchers. Thus, the term "innovation" is usually understood as the introduction of a qualitatively new idea in business practice based on the use of scientific and technological progress, which ensures an increase in the efficiency of the development of socio-economic processes between participants in public exchange. It is a well-known fact that for the first time the concept of "innovation" was introduced into scientific discourse by I. Schumpeter, by which he understood the historically irrevocable change in the ways of producing things [10]. The scientist made a significant contribution to the establishment of the modern scientific paradigm of innovative development, which includes substantiation of the theoretical and methodological basis for introducing innovations into business practice, systematisation of key stages of development of the innovation process, the study of the relationship between the effectiveness of innovation activity and the duration of economic cycles. I. Schumpeter in his study identified such types of basic structural changes as the introduction of new equipment and technology in the practice of management, the manufacturing of products with qualitatively new consumer properties, the involvement of new raw materials in the economic process, the modernisation of resources and facilities and production and technological process, the emergence of new markets [10]. Thus, the development of the national economy based on the implementation of systematic innovation activities provides prerequisites for the establishment of unique competitive advantages of production and economic complexes of the state, which allows maintaining their leading positions in world markets, both in spatial and temporal dimensions.

The works of the outstanding Ukrainian economist M. Tugan-Baranovsky are devoted to a comprehensive study of innovations [11]. The researcher was able to establish a clear relationship between the level of innovation activity and the pace of development of economic cycles of the socio-economic system. He argued that innovation is a powerful driving tool for implementing structural changes in the activities of economic entities, the consistent use of which ensures the effective development of the state economy and supports the processes of expanded reproduction [11]. The tangential scientific position on the existence of direct interdependence between innovations and the life cycle of the so-called "long economic waves" is justified by the outstanding Russian scientist M. Kondratiev, who considered the level of technical and technological equipment of production and economic complexes to be a strategic determinant of the efficiency of the state economy [12].

The American economist P. Drucker interpreted "innovation" from the standpoint of a specific means of entrepreneurs, the use of which forms prerequisites for the implementation of structural changes in the sphere of socio-economic development of the state and society. At the same time, innovation activity, according to the scientist, is not stochastic and random, but is marked by a systematic, consistent and rationally organised character [13, p. 20]. For his part, the Hungarian economist B. Santo defines innovation as an important functional component of the socio-economic process, which through the use of mechanisms for introducing new ideas, scientific and technical developments and technologies is transformed into an increase in labour productivity, the creation of new jobs, the intellectualisation of socio-economic relations, which together ensures the improvement of the well-being of the population and socio-economic progress of the state [14, p. 127]. In this context, innovations are assigned not only a purely economic role, but also a deep social significance in ensuring support for the processes of socio-cultural transformation of socio-economic relations. A related approach is taken by G. Barnet, which determines the strategic importance of the aspect of spiritual creativity and defines this concept as a new idea that is qualitatively differentiated from existing ones [15].

Turning to legislative documents, it is worth pointing out that Article 1 of the Law of Ukraine "On innovation activity" defines innovation as "newly created (applied) and (or) improved competitive technologies, products or services, as well as organisational and technical decisions of a production, administrative, commercial or other nature that significantly improve the structure and quality of production and (or) the social sphere" [16]. Having worked out the existing scientific views, two strategic approaches to the interpretation of the theoretical essence of the concept of "innovation" can be distinguished, among which: 1) process-oriented (based on the mobilisation of scientific and technical activities and resource capacities in the segment of project and experimental activities); 2) functional and effective (aimed at positioning innovations through the prism of a qualitatively new product, differentiating from existing ones, and can significantly improve the level of satisfaction of interests and needs of society). The interdisciplinary phenomenon of innovation is not limited exclusively to the economic sphere, but goes far beyond it and is extrapolated to almost all spheres of public life (social, cultural, political, spiritual, etc.), which a priori increases the strategic importance of this category in the development of socio-economic transformations and expanded reproduction of the state.

Materials and Methods

The study of the issue of innovative development of the national economy in the context of improving the energy sector was conducted in two stages. The first stage provided for the development of legislative, regulatory, scientific, and methodological literature to determine the general characteristics of the concept of "development" in the field of innovative economic activity in general and in the energy sector in particular. The essence of the second stage was to form a conceptual model of innovative development of the national economy in the energy sector based on the analysed papers, taking into account the basic concepts in world practice.

The study used general scientific theoretical research methods, including analysis, synthesis, systematisation, generalisation, and a structural method. Thus, the methods of analysis and synthesis were used in the processing of research papers by Ukrainian, Swedish, Chinese, Norwegian, and Polish researchers to determine the main approaches to the interpretation of the concept of "innovation"; characteristics of the main aspects of the development of the national economy in the context of innovative improvement of the energy sector; establishing the order of evolutionary changes in the development of technological ways of socio-economic relations with a focus on the features of the energy sector; highlighting the functional characteristics of the category "development", and describing the basic concepts of innovative development of the national economy in the context of technological ways and energy innovations. Methods of systematisation and generalisation were used to provide comprehensive definitions of the concepts of "innovation" and "development" in the context of economic activity; to reproduce the evolution of technological ways of socio-economic relations, and to create a conceptual model of National Economic Development based on the introduction of innovations in the field of energy activity. The structural method contributed to the reproduction of the relationship between the stages of the innovation life cycle and the level of development of the national economy. In addition, in the process of exploring the chosen issues, legislative and regulatory documents were used as a theoretical basis, such as the UN institutional programme "Agenda for Sustainable Development", which defines the development of affordable and safe energy for the period up to 2030 [9], and the law of Ukraine "on innovation activity" [16] to confirm the relevance of the introduction of an innovative approach in the energy sector and defining the concept of "innovation" within the economic space.

In general, the study of the conceptual foundations of innovative development of the national economy in the context of technological structures and energy innovations was conducted based on a systematic approach. It is this approach that allowed studying such aspects as "innovation", "development", "economic system", "energy sphere", and the basic concepts of innovative development of the national economy in the energy sector, including "cluster concept", "Smart Grid", "alternative energy", "concept of sustainable development", "concept of ensuring energy security", as a result of which the author's conceptual model of innovative development of the national economy in the energy sector was formed with the prospect of its further implementation in practice.

Results and Discussion

General characteristics of the category "development" in the field of innovation

Systematic development and implementation of innovations in the practice of management is transformed into a segment of innovative development of the national economy, which is formalised through the prism of such manifestations of a useful effect as constant technical and technological modernisation of production and economic complexes, increasing the dynamic competitiveness of sectors of the national economy, the establishment of preventive mechanisms to ensure the economic security of the state, improving the quality of life and well-being of the population, balancing the economic, social and environmental components in the context of ensuring sustainable development of the state.

The relationship between the innovation life cycle and the level of development of the national economy is shown in Figure 1. Structural and functional parameters of innovative development of the national economy determine the competitive position of the state in the system of the international division of labour and in strategic global consumer markets.

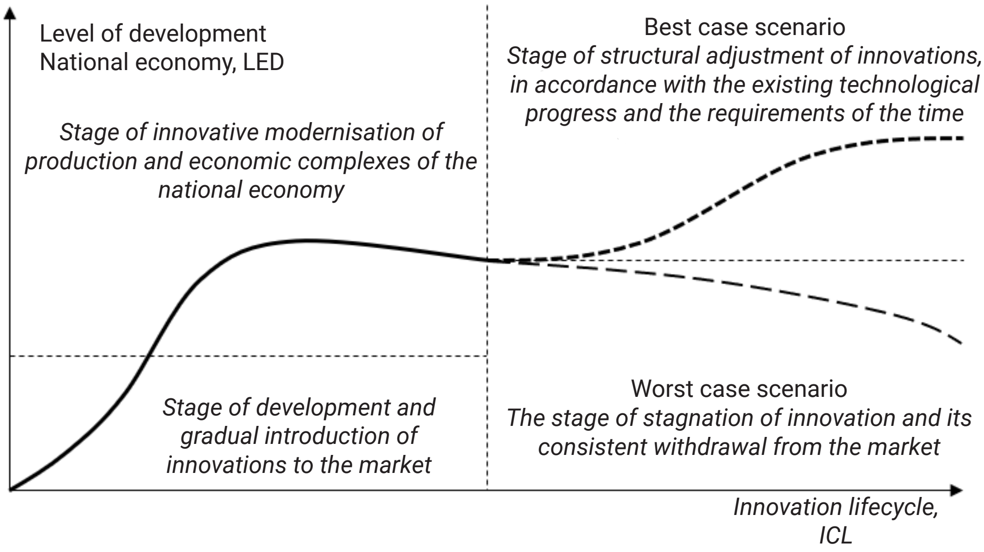

Figure 1. Relationship between the stages of the innovation life cycle and the level of development of the national economy

Source: compiled by the author

Structural and innovative restructuring of production and economic complexes of the national economy through the prism of the development of economic cycles is formalised in the technological ways of socio-economic relations. According to Yu. Bazhal, the concept of technological waves is based on the fact that the pace of technological progress and the introduction of innovations in business practice outstrip the pace of institutional development of the state, which leads to the implementation of structural changes in the management processes of the latter and, as a result, determines the innovative transformation of socio-economic relations, which is formalised in technological ways, the duration of which coincides with the theory of "long economic cycles" by M. Kondratiev [17]. Table 1 shows the evolutionary change in the development of technological systems socio-economic relations.

Table 1. Characteristics of changes in technological structures

Technological structures	Key innovations	Characteristics of the development of the technological way of life
The 1st technological wave (1770-1830)	Water engine, textile machines	Textile industry, pig iron smelting, mill construction, factory production, labour mechanisation
The 2nd technological wave (1830-1880)	Steam engine, machine tools, transport, railway, metallurgy, coal industry	Deepening of labour specialisation, development of transport infrastructure, development of horizontal and vertical economic relations, development of sea and railway communication
The 3rd technological wave (1880-1930)	Electric motor, rolled steel, heavy machine building, inorganic chemistry	Development of the electric power industry, electric networks, military-industrial complex, automotive and aircraft construction
The 4th technological wave (1930-1970)	Internal combustion engine, organic chemistry	Development of the oil refining industry, mass production of cars and aircraft, development of transport infrastructure
The 5th technological wave (1970-2010)	Microelectronics, information technologies, telecommunications, biotechnologies	Adaptation of military technologies to use in civilian life, informatisation of society, development of the Internet, computerisation, development of space technologies
The 6th technological wave (2010 and continues to this day)	Nanotechnology, genetic engineering, robotics, artificial intelligence, alternative energy	Total automation of human labour, development of hydro-, bio-, wind - and solar energy, globalisation of socio-economic relations, development of neural networks, social media

Source: developed based on [17-22]

In the cross-section of each technological wave, specific features of the development of the energy sector are characteristic, the evolutionary transformation of which, on the one hand, supported the structural innovative modernisation of production and economic capacities, and on the other – progressive scientific progress provided an impetus to the search for new sources and technologies for obtaining energy resources. Today, the development of the energy sector within the current 6th technological wave is marked by such specific features as: reduction of the share of non-renewable energy sources in the overall structure of its consumption; development of green energy and the establishment of the principles of rational use of energy resources of natural ecosystems; strategic focus on improving the efficiency of green energy technologies; reduction of the level of harmful material emissions into natural ecosystems from the operation of the network of energy infrastructure facilities; development of bioenergy capacities and establishment of a closed cycle of waste processing from production and economic activities for energy needs; reduction of the anthropogenic load in the process of management and using the natural resource potential of ecosystems; development and implementation of energy-saving production and processing technologies in the process of creating added value.

It is advisable to study the conceptual foundations of innovative development of the national economy in the energy sector through the prism of identifying structural and functional characteristics directly of the category "development". Researchers D. Joy-Matthews, D. Megginson, M. Surte interpret the concept of "development" as a process of improving the organisational component of an object based on consistent movement to its more complex state, taking into account the possibility of implementing potential opportunities [23, p. 20]. R. Chambers associates development with the process of moving forward in the space-time dimension [24]. For his part, L. Melnik identifies such specific characteristics of the category "development" as orderliness (despite constant changes, development is the antipode of the processes of destruction, since the introduction of these changes is marked by a logical sequential order); stochasticity (basic changes in the development process occur in conditions of environmental uncertainty and under the influence of poorly controlled factors of internal and external nature); self-organisation (changing the parameters of an object based on the use of its internal resource capacities). Thus, development is an irreversible, purposeful change in the socio-economic system (object) based on the implementation of its internal mechanisms of self-organisation [25, p. 12-14].

Development is uniquely characterised by the dynamic nature of changes in the structural and functional characteristics of the target object (system). On the one hand, development is the result of using the resource capacities of the socio-economic system, and on the other hand, it directly determines the improvement of the resource potential of this system. At the same time, development can be accompanied not only by purely positive changes, but also have a negative stagnation character for the operation of the system in cases of managerial miscalculations and mistakes. Thus, it is advisable to interpret development from the standpoint of evolutionary or revolutionary changes in the operation of the socio-economic system (object) in the space-time dimension based on the use of its existing resource and functional apparatus.

It is quite natural to extrapolate the specific characteristics of the category "development" to the sphere of innovation activity. According to Y. Morozov, innovative development balances between uncertainty and risks, on the one hand, and the advantages and benefits of innovation, on the other. Such symbiosis is an internal source of innovative transformations in the context of dynamic changes in the economic environment of development. Innovative development is a qualitative leap through the implementation of means of structural changes in the economic system, which leads to an increase in the efficiency of its operation based on improving technology, technological base, labour organisation, improving product quality [26, p. 126]. Researchers M. Rogoza and K. Vergal structure the properties of innovative development through the prism of: 1) purposeful process, which is marked by a motivated orientation, irreversibility of changes, and reorganisation of operation; 2) driving source of transformational transformations, which are accompanied by parameters of uncertainty, risk, and dynamism; 3) implementation of quantitative and qualitative changes, which are characterised by regularity, adaptability, and cyclicity; 4) implementation of changes in the time dimension, which are determined by unevenness, discreteness, and frequency [27, p. 11]. Admittedly, such a complex nature, on the one hand, formalises the multi-functionality of innovative development, and on the other, complicates the substantiation of theoretical, methodological, and applied foundations for building effective mechanisms for purposeful management of this development. Innovative development is a complex process of structural adjustment of the national economy, which is achieved through the practical use of new knowledge to increase the volume of gross production, improve the quality of the social product, improve the competitiveness of the national economy, and accelerate socio-economic progress in society.

Innovative development is a continuous process of implementing structural changes in the production and social sphere based on the development, use and dissemination of new knowledge, machines, technologies, materials, types of energy, methods of organisation and management, improving the level of education and professional qualifications of employees, carried out to increase the level of economic efficiency of the operation of socio-economic production systems and improving the quality of life of the population in the process of socio-innovative transformations. The Great Depression, which took place in the history of the United States of America in 1929-1933, played a significant role in the establishment and approval of the model of innovative development of the national economy. Overcoming deep stagnation processes objectively required the implementation of strategic management decisions in the field of innovative modernisation of US production and economic complexes, structural adjustment of the latter and the introduction of scientific and technical developments in business practice. It is quite logical that ensuring an appropriate level of efficiency of innovative development of the national economy requires the establishment of adequate organisational and managerial support. In this context, the opinion of L. Fedulova regarding the fact that the complex interaction of innovative resources and institutions in the management system of innovative development of the state is formalised through organisational innovations and positioned as the final result of the processes of development and implementation of innovations, and institutions, for their part, manifest as established norms and forms of innovative interactions aimed at implementing innovative solutions in the field of socio-economic exchange, which together ensures the transition of the state to the highest technological level of development of its national economy [28, p. 31-32]. Thus, ensuring the effective innovative development of the national economy requires the presence of the following basic institutional prerequisites: 1) the absence of institutional contradictions in the development of scientific and technical activities, support for innovations and conduct experimental research; 2) ensuring the financing of the scientific and educational sphere at the level of not less than 5% of the GDP of the state; 3) approval of the intellectual component of the establishment and development of the state's personnel potential in the process of socio-economic exchange; 4) the presence of a favourable investment environment for the development of innovation activities; 5) developed regional network of infrastructure facilities for innovation activities.

The conditions of global transformation and the establishment of a post-industrial information society strengthen the strategic importance of establishing systematic interaction between innovators, innovation institutions, the state, and the consumer market. At the same time, people remain the main source of innovation development. For their part, innovation institutions create conditions for establishing effective innovation activities and implementing their results. While the market provides social selection and commercialisation of innovations, transforming them into a factor of economic development [29]. Such an institutional balance of state management of innovative development ensures the implementation of the basic function of innovation, which is to obtain a strategic competitive advantage of the national economy in the context of globalisation of trade and economic relations and the aggravation of competition for resources.

Researcher L. Marchuk in her studies identifies the following main models of innovative development in world practice: 1) the American model of technological leadership, characterised by limited state intervention in the processes of innovative development, the strategic importance of private capital in the processes of implementing innovative projects, developed vertically integrated relationships between educational institutions, research institutions, and business structures, support for the development of innovative infrastructure; 2) the European model of innovative development, marked by active state intervention in innovation processes, systematic institutional support for innovation activities, powerful budget allocations for innovative development, the use of indirect methods of financing innovation activities (concessional lending, accelerated depreciation policy, tax incentives), the active use of opportunities for international cooperation and the organisation of joint research within the relevant scientific and technical programmes; 3) the Asian model of innovative development, which is characterised by the evolutionary foundations of innovative transformations, strict state regulation of the innovation sphere, the widespread practice of importing promising innovative developments [30, p. 201-203]. It is obvious that the optimal model of innovative development of a particular national economy is formalised under the influence of a number of factors, including the existing natural resource potential of the state, the monetary and budgetary ability of the country to finance innovative projects, the capabilities of the research network and innovation infrastructure, the parameters of the intellectual component of human capital, the perception of innovations by the population and the readiness of society for change.

Innovative economic development of the energy sector: Basic concept

Innovative development of the national economy is a priori impossible without a comprehensive implementation of an innovative management model in the energy sector. Researchers O. Vlasyuk and D. Preiger note that the state of civilisation is determined by the development parameters of many problems, however, solving any of them, humanity faces the problem of forming energy supply, which makes it a fundamental basis in maintaining the viability of socio-economic development processes [31, p. 89]. The strategic importance of ensuring the innovative component of the development of the energy sector is enhanced in the conditions of total deterioration and obsolescence of technical and technological capacities of production and economic complexes of the national economy, which increases the need for consumption of energy resources and, a priori, causes an increase in the cost of production of a unit of production; objective expediency of introducing energy-saving technologies for the development of the national economy in the context of implementing the principles of sustainable development, rational use of natural resources and reproduction of the resource potential of natural ecosystems; improving the physical and economic availability of energy resources for subjects of the national economy and households; phased implementation of the strategy of transformation of energy resources areas in the priority segment for the use of renewable energy sources.

Growing global challenges in the energy sector formalise the strategic vectors of the conceptual foundations of its innovative development. For their part, these vectors depend on the complex action of a number of parameters, including the available supply of energy resources on the market, the network of energy infrastructure facilities, logistics of energy resources supplies, the established demand for energy carriers, and the volume of available proven reserves of non-renewable energy resources. Innovative development in the energy sector is based on the following two aspects: 1) development and implementation of its own high-tech products and technologies created based on the resource capacities of the Ukrainian scientific and technical potential; 2) attraction and use of existing innovative developments abroad [32, p. 16]. The fundamental principles of transformation of the energy sector of Ukraine are enshrined in the energy strategy of Ukraine for the period up to 2035 “Safety, energy efficiency, competitiveness”, the implementation of which was approved by the Order of the Cabinet of Ministers of Ukraine No. 605-R of August 18, 2017 [33]. The main goal of the strategy is to ensure energy security and energy efficiency based on innovative renewal of the energy sector and activate the processes of its integration into the energy sector of the EU countries. To achieve this goal, at each stage of the strategy implementation, basic priorities were defined, the main of which are: 1) priorities of the first stage (implemented until 2020) – institutional integration of Ukraine into ENTSO-G (European Network of Transmission System Operators for Gas), increasing the volume of own gas production, reducing the energy intensity of the national economy, compliance with high environmental standards in the energy sector, increasing the share of renewable energy sources to 11%. 2) priorities of the second stage (optimisation and innovative development until 2025) – improving accounting and attracting consumers to manage their own demand for energy resources, meeting domestic demand for natural gas through own production, attracting investment in renewable energy, infrastructure development for electric transport. 3) priorities of the third stage (ensuring sustainable energy development until 2035) – systematic implementation of innovations in the energy sector, reduction of emissions into natural ecosystems, modernisation of thermal power plants, adaptation of capacities of gas transport systems to the requirements of EU member states, attracting innovative gas production technologies (shale gas, offshore production, etc.), increasing the share of renewable energy up to 25% [33]. Admittedly, the institutional basis for regulating the energy sector is formed through the prism of changes in technological ways and scientific and technological progress, which together determine the system of views on the problems of transformation of the energy sector and formalise the corresponding concepts of its innovative development.

One of the basic concepts of innovative development of the national economy in the energy sector is the *cluster concept*, which provides for ensuring a strategic focus on resource mobilisation, activating horizontal-vertical cooperation and establishing systematic interaction between interested stakeholders in the context of strengthening the competitive advantages of the energy sector. The idea of the cluster concept of innovative development of the energy sector is presented in the scientific works of such scientists as M. Voynarenko [34], A. Polishchuk [35], L. Ptashchenko [36]. The establishment of an innovation cluster creates prerequisites for building stable relationships between the transformation of inventions into innovations and consequently – into competitive advantages. For its part, the innovative structure of the cluster forms the basis for minimising the gross costs of developing innovations with their subsequent commercialisation through the use of the capacity of the production and technological structure of the cluster [37, p. 227]. The cluster concept of innovative development of the energy sector, on the one hand, requires the creation of a favourable institutional environment for establishing cooperation between the participants of the cluster association, and on the other – the implementation of structural changes in the energy sector obtained based on the cluster approach, forms a multiplier effect of structural modernisation of sectors of the national economy and qualitative transformation of the institutional model of the state.

The development of IT has predetermined the prerequisites for the establishment of the concept *Smart*

Grid in the energy sector, which provides for improving the efficiency and economy of the use of energy resources based on the introduction of computer-intelligent systems for controlling energy consumption processes. The strategic role of the Smart Grid concept is strengthened in the context of the expediency of forming rational approaches to energy consumption, taking into account the established trend of increasing the cost of energy resources, the growing threat of climate change and the urgent need to reduce the volume of emissions of harmful substances into natural ecosystems, the need to optimise energy consumption in the global dimension and minimise the risks of emergency disconnections from power supply systems. The structural and functional parameters of the Smart Grid concept forms effective mechanisms and tools for timely response to the above-mentioned challenges based on the introduction of automated intelligent control systems for the generation and consumption of energy resources.

The gradual depletion of reserves of traditional energy sources objectively led to the formation of the concept of *alternative energy* development, the relevance of which has increased in the context of worsening environmental imbalances in the process of socio-economic exchange. Among the proponents of this concept, it is advisable to single out such researchers as J. Goldemberg [38], O. Voloshin [39] et al. The fundamental principles of the concept of alternative energy development are based on a gradual increase in the share of renewable energy sources (wind-, hydro-, bioenergy, solar energy, etc.) in their overall structure with a gradual rejection of traditional energy capacities (coal-fired thermal power plants, nuclear power, etc.). For its part, this requires significant investment in the development of innovative energy projects and the implementation of mechanisms for state support for the development of alternative energy. Given this, the effective implementation of this concept is a priority, first of all, for rich, highly technologically developed countries that have powerful budgetary and financial resources to abandon traditional energy carriers, which, quite naturally, are cheaper than alternative energy sources. Usually, one of the basic tools for supporting the development of alternative energy is the so-called "green" tariff (institutionally approved higher cost of consumed unit of energy obtained from alternative sources), which, on the one hand, forms prerequisites for increasing investment and innovation activity in the field of alternative energy, and on the other, increases corruption risks in the process of concluding contractual transactions for the supply of energy resources.

The strengthening of international geopolitical confrontation and systemic manifestations of hybrid aggression between states have led to the establishment of the foundations of the concept of energy security, within which ensuring access to energy resources becomes a priority weapon in the process of allocating strategic spheres of influence and interests on a global scale. The concept of energy security is formalised through the prism of the creation of monitoring system for identifying challenges and threats in the energy sector, the development of a set of indicators and methods for assessing the level of energy security (both in quantitative and qualitative dimensions), the development of institutional infrastructure for ensuring energy security, the development of organisational and managerial impacts of a complex transformation of the energy sector on innovative principles in the context of strengthening its competitive advantages in the market.

The *concept of sustainable development* of the energy sector is fundamental. This concept is based on ensuring the physical and economic accessibility of energy resources for all participants in economic relations in the context of balancing the energy aspects of the economic, social, and environmental spheres of public life. The concept of sustainable development of the energy sector is aimed at innovative modernisation of energy capacities of the national economy, establishing the principles of rational use of energy resources, development of a closed cycle of processing industrial waste for energy needs, diversification of sources of energy resources, by balancing the ratio of volumes of non-renewable and renewable energy in its overall consumption structure, reducing the anthropogenic load on natural ecosystems in the process of energy consumption, improving the efficiency of developing energy resources based on the introduction of energy-saving technologies. The concept of sustainable development of the energy sector is the most comprehensive and rational to use because it maximally aggregates the structural and functional components of the previously mentioned concepts and is focused on innovative modernisation of the energy sector. Figure 2 shows a conceptual model of innovative development of the national economy in the energy sector.

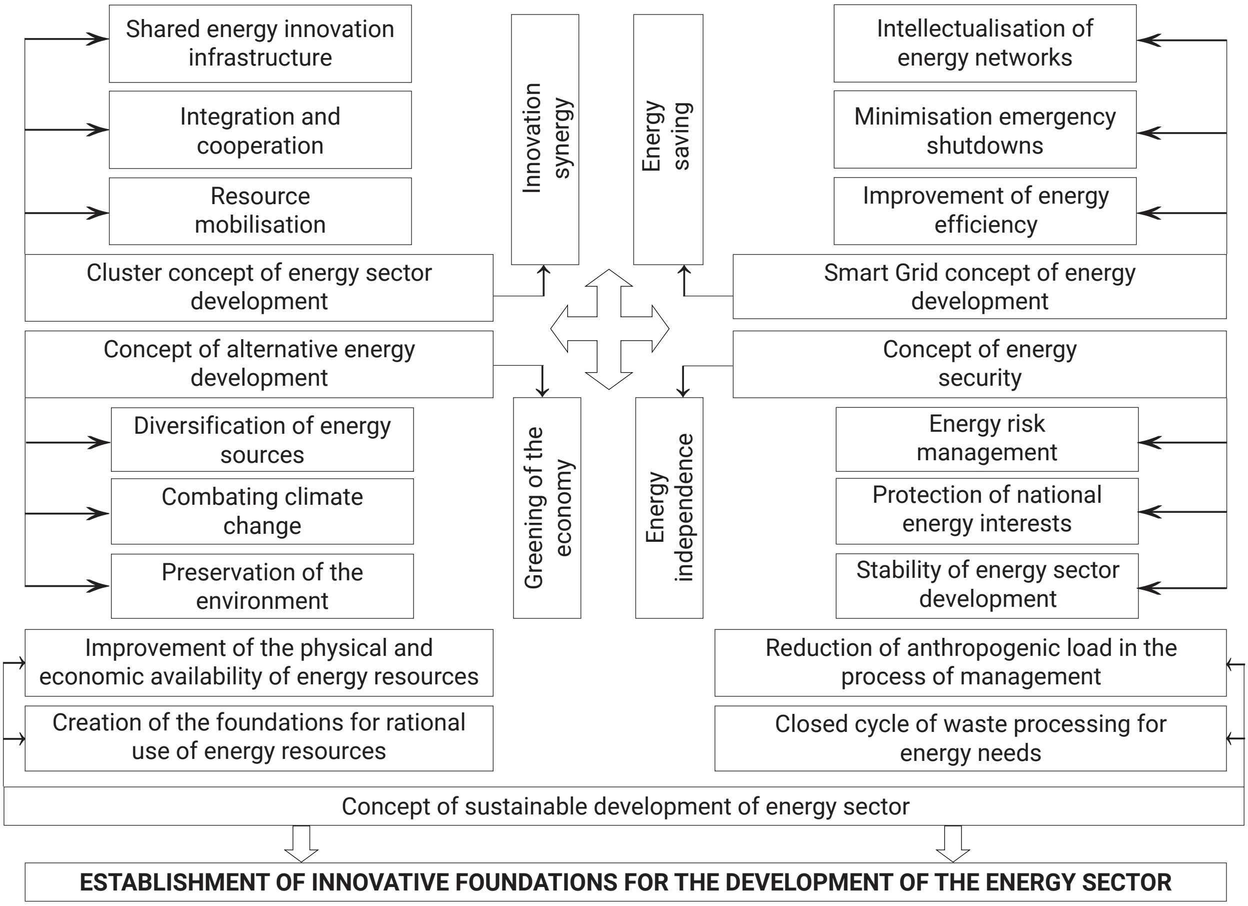

Figure 2. Conceptual model of innovative development of the national economy in the energy sector
Source: compiled by the author

Solving the problem of ensuring the innovative orientation of the development of the Ukrainian energy sector is a strategic task of strengthening not only the economic, but also the national security of the state. The implementation of innovative projects in the energy sector is a significant unused resource reserve for improving the efficiency of the operation of production and economic complexes of the national economy, reducing energy costs, and minimising the cost of production per unit of production, greening production and economic processes, improving the environment in the context of establishing the foundations of rational management and sustainable development of the state. Given the above, the innovative development of the national economy in the energy sector is advisable to position through the prism of: 1) generation, development, and implementation of new ideas in the management practice, which forms the prerequisites for creating a qualitatively new approach to the organisation of the development of energy business processes; 2) establishment of organisational and economic tools for activating the processes of transformation of socio-economic relations and accelerating the pace of transition from one technological way to another; 3) means of structural adjustment of technical and technological capacities of production and economic complexes of the national economy in the conditions of aggravation of global competition for energy resources; 4) resource and functional apparatus for diversifying the risks of the national security of the state and protecting the interests of the latter in the context of increasing manifestations of threats of hybrid aggression in geopolitical confrontation; 5) systems for managing the efficiency of the national economy and strengthening its competitive position in the global market. Therefore, the innovative development of the energy sector is a significant unused resource reserve for increasing the efficiency and scale of functioning of production and economic complexes of the national economy, the provision of which requires further formalisation of the theoretical, methodological, structural and analytical, and instrumental and applied basis for organising scientific research.

Conclusions

Innovative development of the national economy in the energy sector is a strategic basis for ensuring the dynamic competitiveness of the state in the context of escalating geopolitical confrontations and manifestations of hybrid aggression in the world. The growth of energy consumption, the reduction of reserves of non-renewable energy sources, and the deepening of natural and climatic imbalances make it advisable to restructure existing approaches to substantiate the conceptual foundations of innovative development of the energy sector. Energy innovations provide a structural boost in the context of the transition from one phase of the economic cycle to another in the context of existing technological structures. The conceptual foundations of innovation in the energy sector are formed from such concepts as the cluster concept of energy development (cooperation and mobilisation of resource capacities in the process of creating innovations), the concept of Smart Grid (intellectualisation of energy resource consumption processes), the concept of alternative energy development (greening of energy capacities), the concept of energy security (ensuring the energy independence of the national economy), and the concept of sustainable development of the energy sector, which is aggregating and provides for improving the physical and economic availability of energy resources in the context of the rational use of natural resources in the energy sector. Thus, the study proposed a scientific approach to the substantiation of the conceptual foundations of innovative development of the national economy in the energy sector, which, unlike others, provides for a complex aggregation of structural and functional components of basic concepts.

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Специфіка функціонування фіскального механізму на українських землях за козацьких часів

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Анотація. Вивчення джерел наповнення і напрямів використання державної скарбниці за козацьких часів набуває особливої актуальності, адже дозволяє з'ясувати, чи здійснювався цей процес на українських землях хаотично, або ж мав виразну упорядкованість. Мета дослідження полягає у розгляді особливостей формування та функціонування фіскального механізму на українській території у козацьку добу (XVI–XVIII ст.). Специфіка наукових завдань, що становлять предмет дослідження, вимагала використання комплексу спеціальних методів (філософських, загальнонаукових, конкретно-наукових), застосування яких допомогло проаналізувати історичні аспекти розвитку фіскального механізму у період існування Запорізької Січі та Гетьманської держави. Під час дослідження з'ясовано специфіку функціонування складових фіскального механізму, зокрема доходів і видатків козацьких держав. Встановлено, що за козацьких часів доходи державної скарбниці здебільшого формувались із податкових джерел, а також надходили від господарської, судової, військової та торговельної діяльності держави. Існували і специфічні доходні інструменти фіскального механізму, зокрема «ралець». У Запорізькій Січі до доходів державного скарбу належало грошове і матеріальне утримання від інших держав, а у Гетьманщині частина державних потреб задовольнялась за рахунок державних повинностей. Крім того, у Гетьманській державі були встановлені окремі податки на утримання церкви та духовенства. Виявлено, що у козацьку добу видатки державної скарбниці зазвичай спрямовувались на утримання козацької (гетьманської) адміністрації, забезпечення військових потреб та фінансування церкви. Із посиленням військово-політичного тиску сусідніх польської та російської держав, фіскальний механізм козацьких держав втрачав свою незалежність і набував характеристик держав-загарбників. Практична цінність дослідження полягає у тому, що проведений історичний аналіз дозволив з'ясувати основні засади функціонування фіскального механізму за козацьких часів, елементи якого можуть бути запроваджені і в сучасних умовах

Ключові слова: фіск, фіскальні інструменти, державна скарбниця, доходи скарбниці, видатки скарбниці

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Specifics of the Functioning of the Fiscal Mechanism on Ukrainian Lands in Cossack Times

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Abstract. The study of the sources of filling and areas of using the state treasury in Cossack times becomes particularly relevant, because it can show whether this process was carried out chaotically on Ukrainian lands, or had a clear order. The purpose of the study is to investigate the peculiarities of the establishment and functioning of the fiscal mechanism on Ukrainian territory in the Cossack era (16^{th}–17^{th} centuries). The specifics of the scientific tasks that make up the subject of research require the use of a set of special methods (philosophical, general scientific, specific scientific), the use of which helped to analyse the historical aspects of the development of the fiscal mechanism during the existence of the Zaporozhian Sich and the Cossack Hetmanate. During the study, the specifics of the operation of the components of the fiscal mechanism, in particular the income and expenses of the Cossack states, were clarified. It is established that in the Cossack times, state treasury revenues were mainly formed from tax sources and came from economic, judicial, military, and commercial activities of the state. There were also specific revenue tools of the fiscal mechanism, in particular "ralets". In the Zaporozhian Sich, the income of the state treasure included monetary and material maintenance from other states, and in the Hetmanate, part of the state needs was met at the expense of state duties. In addition, the Hetmanate established separate taxes on the maintenance of the church and clergy. It is revealed that in the Cossack era, state treasury expenditures were usually directed to the maintenance of the Cossack (Hetman's) administration, providing for military needs and financing the church. With the increasing military and political pressure of neighbouring Polish and Russian states, the fiscal mechanism of the Cossack states lost its independence and acquired the characteristics of the invading states. The practical value of the study lies in the fact that the historical analysis allowed finding the basic principles of the functioning of the fiscal mechanism in Cossack times, elements of which can be introduced in modern conditions

Keywords: fisc, fiscal instruments, state treasury, treasury revenues, treasury expenditures

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Introduction

The Cossack era is one of the most complex and important pages of Ukrainian history. It is no exaggeration to say that it was the times of the national liberation struggle that influenced the future fate of Ukrainian statehood, the evolution of the Ukrainian ethnic group, the implementation of nation-forming processes in Ukrainian society, and the establishment of the fiscal mechanism. The emergence of both Zaporozhian Sich and Hetmanate as a new democratic type of military-political systems on the territory of Ukraine created the grounds and opportunities for the development of fiscal relations. Moreover, the fiscal mechanism in the Cossack era acquired specific features: on the one hand, it was formed based on the fiscal traditions of Kyivan Rus, the Grand Duchy of Lithuania, the Kingdom of Poland, the Tsardom of Muscovy, etc.; on the other hand, it absorbed the mentality of the Ukrainian Cossacks despite the constant fiscal pressure of the newly created Polish-Lithuanian Commonwealth and the Russian Empire. In modern conditions, the study of the features of the functioning of the fiscal mechanism in the Cossack era is of great relevance, because the existence of Cossack statehood facilitated the continuation of national fiscal traditions that are still relevant in our time.

The issue of the fisc in the Zaporozhian Sich and Hetmanate was studied by many Ukrainian and foreign researchers. Thus, the general principles of operation of the Lower Dnipro Zaporozhian Cossack Host were studied by V. Milchev and D. Sen [1], and the organisation of its fiscal mechanism was considered by D. Yavornitsky [2] and V. Andrushchenko and V. Fedosov [3]. The financial economy of the Zaporozhian Sich and its revenues to the treasury was described by B. Lanovyk, Z. Matisyakevich, R. Mateyko [4] and F. Yaroshenko, V.V. Pavlenko and V.P. Pavlenko [5]. D. Yavornitsky [2] and P. Tsymbal [6] focused their attention on indirect and direct taxes as the main income of the treasury. Non-tax revenues of the treasury of the Lower Cosack Host were studied by P. Petrashko, O. Chechulina, V. Alexandrov, S. Bulgakova, K. Ogdansky, O. Nazarchuk, N. Sushko [7]. Specific revenue instruments of the fiscal mechanism of the Zaporozhian Sich were the subject of research by D. Yavornytsky [2], M. Kostomarov [8], L. Ivannikova [9], O. Rigelman [10]. Expenses of the Sich treasury were considered by D. Yavornitsky [2]. The foundations of the functioning of the Hetmanate were described by A. Kappeler [11], and the construction of its fiscal mechanism was studied by T. Staverskay and O. Ivanyuta [12] and V. Smoliy and V. Stepankov [13]. S. Golubka [14], A. Morozov [15], V. Orlyk [16], N. Zhelikhovskaya [17], V. Myakotin [18], V. Rudnev [19], A. Baik [20] drew their attention to indirect and direct taxes as revenue sources of the Hetmanate treasury. State duties as elements of the fiscal mechanism in the Zaporozhian Sich were considered by O. Gurzhiy [21], M. Sheverdin [22], V. Utvenko [23] and V. Horobets [24]. Specific taxes on the maintenance of the church were described by P. Znamensky [25] and, V. Barvinsky [26]. Despite a large number of scientific studies, scientists failed to form a comprehensive approach to the functioning of the fiscal mechanism in the Cossack era, which determined the relevance and purpose of the study.

The purpose of the study consists in considering the historical foundations of the functioning of the fiscal mechanism in the Cossack era (16^{th}-17^{th} centuries). For the furtherance of this goal, it is necessary to complete the following tasks: to study the components of the fiscal mechanism of the Zaporozhian Sich; to study the elements of the fiscal mechanism of the Hetmanate; to determine the specifics of the development of the fiscal mechanism of the Cossack era and its role in the process of the Ukrainian state formation.

Methodology

The research materials are historical scientific literature and studies by contemporary researchers, which contain data that characterise the development of the fiscal mechanism in the Zaporozhian Sich and Hetmanate, and serve as a way to create initial ideas and an initial concept about the functioning of the fiscal mechanism in Cossack times. Methods of study of the fiscal mechanism concerns the practical knowledge of the processes of establishment, distribution, and use of financial resources in order to implement the fiscal policy of the Hetmanate. These methods include philosophical, general and specific scientific methods. Philosophical methods cover a set of approaches that are universal in nature. The most ancient philosophical method is the dialectical one, which allowed studying the fiscal mechanism in all its versatility from the standpoint of development, the transition from the anachronistic, obsolete to the new, modern.

General scientific methods include approaches that ensure the connection and optimal interaction of philosophy with special scientific knowledge. Among such research methods, it is worth highlighting: methods of abstraction and concretisation, which allowed identifying the essential characteristics and forming a general idea of the fiscal mechanism of the Zaporozhian Sich and Hetmanate; the method of induction, due to which the fiscal mechanism in Cossack times was studied based on the consideration of its components and specific phenomena and processes that accompanied its development; the method of deduction, which considered each component of the fiscal mechanism based on the knowledge of the general laws of the evolution of finance in the Cossack era; an empirical and historical method, which allowed using historical facts to substantiate trends and patterns of establishment and development fiscal mechanism of Cossack state entities; a functional and comparative method that contributed to determining the main factors of development of fiscal instruments in Cossack times and their influence on the nature of causal relationships in the fiscal mechanism of the Cossack era; a method of analysis and synthesis, the use of which allowed an study in-depth study of the conditions and features of the development of the fiscal mechanism of the Zaporozhian Sich and the Cossack Hetmanate.

Specific scientific methods are determined primarily by the specific nature of financial science in general and the fiscal mechanism in particular, which determine the use of specific methods in research activity. In particular, among the methods of financial science in the study of the fiscal mechanism, it is necessary to single out the following: esoteric (essential) method, which reveals the content features of the fiscal mechanism in the Cossack era; exoteric (phenomenal) method, which reveals the specifics of the functioning of the fiscal mechanism in the Cossack era; integral (essence-phenomenal) method, which allows justifying the provision of Cossack statehood by means of the fiscal mechanism.

Results and Discussion

Fiscal mechanism of the Zaporozhian Sich

Cossack statehood in the scientific literature is analysed in two forms – the Zaporozhian Sich and the Cossack Hetmanate, which existed in the 16th-17th centuries. The Zaporozhian Sich or the Lower Cossack Host as a fortified centre of the unregistered Cossacks, which was located beyond the Rapids of the Dnipro, was a unique phenomenon not just in Ukrainian history but also an unprecedented fact in World military practice. This state entity existed from the middle of the 16th century to 1775 [1, p. 396]. For various reasons, the Lower Cossack Host has repeatedly changed its location. The latter was mostly located in the Velykyi Luh – an area covered with forests and swamps with many river channels, lakes and swamps. The Zaporozhian Sich is considered a specific state entity that emerged on a moral and psychological basis and was supported by intensive military development in the conditions of a primitively functioning fiscal mechanism.

According to D.I. Yavornytsky, the fiscal mechanism in the Zaporozhian Sich is associated with the existence of the treasury and the established description of income and expenses, which were called “special military treasury and war equipment table” [2, p. 441]. The treasury existed in the form of a special “fixed” chest at the Sich Church in the hands of a military judge. Like the treasury of the Grand Duchy of Lithuania, in the Zaporozhian Sich, the treasury contained not only money but also valuables that were at the disposal of the army. As noted by V.L. Andrushchenko and V.M. Fedosov, the treasury also served as an archive and warehouse for Hetman regalia and jewellery, served as an arsenal where military supplies and weapons were stored [3, p. 99-100]. The treasury of the Lower Cossack Host contained revenues from various sources, among which the leading role belonged to taxes.

One of the first sources of income for the Treasury of the Zaporozhian Sich was military loot, the so-called “Cossack bread”, which was obtained as a result of attacks on Turks, Tatars. and Poles. Moreover, according to D.I. Yavornytsky, such production was distributed in certain areas: part was directed to the maintenance of the church, part – to the general needs, part – to the personal needs of the Cossacks [2, p. 428]. Towards the end of the 17th century, the importance of military production gradually decreased, which was due not so much to military-political, but to cultural and economic factors. As noted by B.D. Lanovyk, Z.M. Matysyakevich, R.M. Mateyko, the influx of captured money and material values to the Zaporozhian Sich did not meet the financial needs of the Cossack state, so there was a gradual transition from deforcement to economically profitable peaceful management [4, p. 459].

Significant revenues to the Sich treasury were provided by demesnial management, that is, commercial operation of agricultural land (logging, hayfields, pastures, salt mines), animal husbandry, and fishing. With the decline of subsistence farming and the development of economic relations the Sich demesne gradually transformed into regalia – monopoly right of the Hetmanate to receive income from certain types of activities and to exploit water, earth’s interior and forests. F.O. Yaroshenko, V.V. Pavlenko and V.P. Pavlenko refer ham, mill, glass, tobacco, tar, saltpetre, ore monopoly, the so-called lease to the Sich regalia [5, p. 102]. Gradually, the vast majority of the treasury revenues of the Zaporozhian Sich began to generate relying on taxes, primarily indirect ones, in particular duties. The latter were divided into internal and external ones.

External duties included import and export duties that were paid during trade operations with other countries. Such duties were collected in kind and in cash and were used for the maintenance of Cossack elders. Internal duties covered transportation and trade duties. D.I. Yavornitsky refers the so-called “mostove” to transportation duties (for transporting travelling merchants, industrialists, and chumaks across rivers by military boats, and for ensuring safety on the road and providing a convoy) [2, p. 429-430]. Trade duty, as described by P.V. Cymbal, was collected in cash and in kind from all tradesmen, industrialists and merchants who traded at fairs in settlements, villages, and wintering grounds [6, p. 104].

Significant revenues to the Sich treasury came from the trade duty for the right to buy/sell alcoholic beverages. Thus, the "pokukhovne" was collected from each barrel (kufa) of alcoholic beverages imported from abroad for one quart (about 1 litre) or its value in money, which was used for the maintenance of the church and the Cossack officers. In addition to the latter, the so-called "supply wine" was dispatched in the amount of one bucket of imported alcoholic beverages from the one who bought such alcohol or from the one who sold it, which also provided the maintenance of the church and the Cossack officers [2, p. 429].

Revenues to the Sich treasure from direct taxes were insignificant, because the vast majority of residents of the Lower Cossack Host, that is, the Cossacks, were exempt from taxation for military service. The main direct tax was the "military tax", which was levied from the Polish-Lithuanian Commonwealth, that is, peasants, burghers, neighbours and other social strata and groups of the population in monetary form [5, p. 102]. In addition, there was "dymove", which was paid by the so-called "sydni" or "zymovchaky" (married Cossacks) who lived in the palanka around the Zaporozhian Sich. In addition to the "dymove" from married Cossacks who lived in palanka, from time to time an emergency monetary tax was levied, if necessary, to finance military campaigns against Turks, Tatars, and Poles, and to equip delegations to foreign states [2, p. 431].

The treasury of the Zaporozhian Sich also had non-tax revenues. Among them, D.I. Yavornitsky highlights court fines that were collected in cash or in kind for any offense from the perpetrators and were directed either to the needs of the entire army, or one kuren, or a military foreman. For the most serious crimes, the Cossacks were executed, and their property was taken away for the army needs. However, there were cases when for certain crimes (in particular theft), military officers could take all the property from the culprit and send it to their own needs, and not to general military ones [2, p. 431]. Non-tax receipts of the Sich treasury also included ownerless, extortionate, confiscated property and ransom for prisoners and convicts [7, p. 19].

The specific income of the treasury of the Lower Cossack Host was monetary and grain allowance, which came first from the Polish, and then from the Russian state [2, p. 431]. Until 1764, the monetary support of the Cossacks was carried out in gold and silver coins, but after 1764 – only in copper coins. Grain allowance provided for providing the Cossacks with flour, cereals, and other food supplies, as well as cloth, furs, lead, gunpowder, sometimes wood, resin, ropes, and anchors. Until 1751, the Cossacks independently went to the Russian rulers for monetary and grain support, but after 1751, the latter was received by the Cossacks from the nearest provinces, accompanied by bureaucratic red tape and formalism, and depended on the personal attitude of Russian local officials. D.I. Yavornitsky notes the small amount of money and grain allowance provided by the Russian state and the constant requests of the Cossacks to increase it. However, the Russian rulers did not grant such requests or made separate allowances in the form of temporary assistance for special merits [2, p. 441].

A special way to fill the treasury of the Zaporozhian Sich was "ralets". M.I. Kostomarov defines the latter as "a traditional gift to the Koshevoi hetman and military judge on Christmas and Easter from innkeepers, merchants, and artisans" [8, p. 429]. L. Ivannikova describes "ralets" in general as a ritual that covered several stages: congratulations and gifts to the officers by various groups of artisans and separately by Cossacks; a ritual feast, continuous firing from cannons, giving the ralets from the highest authorities to the lowest [9, p. 11]. Later, "ralets" began to be given to military judges for resolving the case in someone's favour. O.I. Rigelman notes that merchants and tradesmen gave military officers ralets for non-interference in their trade affairs [10, p. 727]. Gradually, the "ralets" turned from a gift for the holidays into a blatant bribe, which was given at every necessary opportunity and became a way of additional earnings for the Cossack officers, who at that time were completely corrupt. Thus, the income instruments of the fiscal mechanism of the Zaporozhian Sich covered primitive income (from military loot, demesnes, and regalia), traditional income (from tax and non-tax sources), and specific income (in the form of monetary and material transfers from other states and gifts to civil servants).

The expenditure tools of the fiscal mechanism of the Lower Cossack Host were not very diverse, because the Hetmanate was focused on conducting military operations. Therefore, almost all the income that went to the Sich treasury was directed to military needs – the purchase of military supplies and edible food, the construction of fortifications and military boats, and then to the maintenance of the entire prosperous class of Cossacks. In addition, an important expense item was the maintenance of the church and clergy. D.I. Yavornytsky noted that part of the state treasury receipts also went to the hands of individuals: considering all land and all income to be the property of Kosh, the Zaporozhian army did not exclude private property. Thus, the horse, weapons, money earned by economic or commercial activities, part of the spoils of war, monetary and grain allowance, were the personal property of each Cossack [2, p. 447-448].

Fiscal mechanism of the Hetmanate

The Hetmanate or Zaporozhian Army was formed in the middle of the 17th century, when as a result of the National Liberation War of 1648-1657, the Ukrainian

Cossack Hetmanate appeared as a result of the development of the national state forming idea. The existence of the Hetmanate was accompanied by an internal national confrontation, which led to the fact that during the second half of the 17th – beginning of the 18th centuries, there was a territorial and power split [11, p. 113]. Thus, in 1660, the lands of the Hetmanate were divided into the Right Bank, which was under the protectorate of the Polish-Lithuanian Commonwealth, and the Left Bank, which passed under the protectorate of the Tsardom of Muscovy. In 1668-1669, the Hetmanate was temporarily united, which in 1669 again broke up into Right-Bank Ukraine, which was under the protectorate of the Polish-Lithuanian Commonwealth and the Ottoman Empire, and Left-Bank Ukraine, which was under the protectorate of the Tsardom of Muscovy (since 1721 – the Russian Empire) and the Kingdom of Sweden. In 1742 the Hetmanate ceased its activities on the Right Bank, and in 1764 – on the Left Bank.

The study agrees with a number of Ukrainian researchers who claim that the fiscal mechanism of the Zaporozhian Army was quite complex. Thus, as noted by T.O. Staverska and O.M. Ivanyuta, during the rule of individual hetmans, in particular B. Khmelnytskyi, I. Samoilovich, Y. Khmelnytskyi, I. Mazepa, the private treasury of the Hetman was united with the treasury of the Hetmanate. Hetman I. Bryukhovetsky made an unsuccessful attempt to allocate the state treasury and transfer it to the state treasury of the Moscow Tsardom. During the reign of the Little Russian collegiums (1722-1727), the treasury of the Hetmanate was under the control of the Russian Empire. Although hetmans D. Apostol and K. Razumovsky tried to restore the independence of the treasury of the Zaporozhian Army, however, with the abolition of the Hetmanate in the Ukrainian Left-Bank lands, the treasury of the Hetmanate was united with the treasury of the Russian Empire [12, p. 35-36]. On the Right-Bank Ukraine in the second half of the 17th century, according to V.A. Smoliy and V.S. Stepankov, the pre-revolutionary fiscal mechanism was revived, so the treasury of the Hetmanate lost its independence and was combined with the treasury of the Polish-Lithuanian Commonwealth. Hetman P. Doroshenko made an attempt to negotiate with the rulers of the Polish state on the allocation of the treasure of the Zaporozhian Army, but it was unsuccessful. Therefore, the hetmans of the Right Bank were later forced to spend their own financial resources on state affairs [13, p. 444].

With the creation of the Hetmanate, significant revenues to the treasury were provided by the state domain. As noted by V.L. Staverska and O.M. Ivanyuta, Polish land holdings – former estates of magnates, gentry and catholic clergy, became the property of the Zaporozhian Army and were partially occupied by peasants and Cossacks [12, p. 34]. The hetmans sold some of the land, and sent the proceeds to the state treasury. Subsequently, the state domain turned into regalia – a form of generating income from those branches of economic activity of the state that are in a monopoly position with the complete or partial elimination of private competition. In the Hetmanate, there was a monopoly right of the state to sell vodka, tobacco, and tar. Persons wishing to sell these goods at retail had to pay a rental fee to the state treasury. Tenants were burghers, officers, town halls and magistrates of cities, monasteries [13, p. 443]. At first, rental fees in the Hetmanate were an isolated phenomenon. However, in the conditions of the creation of a mercenary army, it became necessary to collect significant income for its maintenance, so regalia in the form of rent fees turned into taxes on crafts, which became particularly widespread in the Left-Bank Ukraine. Among such taxes, S.M. Golubka identifies the following [14, p. 188-190]:

– "pokazanschina" (for the production of vodka products);
– "skapschina" (for the production of beer);
– "tar tax" (for the production of tar);
– "tobacco tithe" (for growing tobacco);
– "honey tithe" (for making honey);
– "potash tithe" (for the production of potash);
– "fish tithe" (for catching fish);
– "military tax" (from the profit of mill owners);
– "pokabanschina" and "pokolyushchina" (from the profit of peasant millers who worked for hire on the mill).

The largest revenues to the treasury of the Hetmanate were provided by duties, which were divided into external and internal.

According to O. Morozov, external duties included "evecta" (from the export of goods) and "inducta" (from the import of goods), the size of which was on average equal to 2% of the selling price of goods. Revenues from these duties were directed to the maintenance of the army and the Hetman's administration [15, p. 208]. The general, regimental, centenary foreman, monasteries, churches, military comrades, and wealthy Cossacks were exempted from paying "inducta" and "evecta". In 1754, the Russian empress Elizabeth Petrovna abolished external duties in force on the territory of the Hetmanate, which was under the protectorate of the Russian Empire, and established a single import and export duty at a rate of 13% of the price of goods, which was charged in addition to tariff rates [15, p. 226].

Internal duties included travel and trade duties. Travel duties covered "perevozove" (from transportations), "mostove" and "pogrebelne" taxes (from bridges and dams) from passing merchants. For the unit of taxation of such duties, the wagon and the unit of goods (cattle) were taken, but it was taken into account whether it was a light or a heavy wagon, foreign or local [15, p. 209]. As noted by V.L. Orlyk and N.M. Zhelikhivska, trade duties were imposed during sales at auctions and fairs, namely: "vagove" (from goods sold for poods), "krugove" (from a sold barrel of salt or fish), "povidne" (from cattle sold for sale), "skatne" (from vodka and tar sold in bulk), "pokukhovne" (from vodka and tar exported for sale), "pokovsheve" (from grain sold), "poviderkove" (from a bucket sold vodka or tar), "yarmarkove" (from merchants) [16, p. 44; 17, p. 17].

Among the direct taxes received by the Treasury of the Hetmanate, it is worth highlighting the usual tax "podymne", the rates of which for the rural and urban population were differentiated depending on the category of dym, which was the household of a wide undivided or separate small family, which covered the yard, house, outbuildings, and arable lands. In addition, peasants and burghers paid an extraordinary tax on the maintenance of the Hetman and the hired army – "statsia", the rates of which also depended on the category of dym. Unlike the "dym", the "statsia" was paid for by the entire population of the Hetmanate [14, p. 184].

V.O. Myakotin notes that during the reign of Hetman D. Mnogogrishnyi, it was also planned to introduce a specific military tax on the maintenance of the 30-thousandth Cossack Host, the obligation to pay which fell on the Polish-Lithuanian Commonwealth (peasants, burghers, and other social strata and groups), with the exception of subjects of orthodox monasteries. However, it was never introduced [18, p. 110-111]. In addition to the above, V. Rudniv also mentions other direct taxes paid by the Polish-Lithuanian Commonwealth, in particular "rokovyi" (set in cash from a horse or ox, from rich people depending on their property status, from poor people in a fixed amount), "mazepshchyna" (set in cash from poor and rich people in a fixed amount, and from owners of a horse or ox – depending on their property status), "svyatochnyi" (set in cash in a fixed amount) [19, p. 137-138]. With the increasing influence of the Russian Empire in 1765, the poll tax was extended to Sloboda Ukraine, and in 1783 – to the entire Left-Bank Ukraine [12, p. 36].

Notably, during the time of Hetman I. Samoilovich, wives of Cossacks who were left without a husband were exempt from paying direct taxes. Under the hetmanate of P. Orlik, widows of dead Cossacks and their orphaned children, farmsteads left after the death of the Cossacks, women whose husbands were involved in military campaigns or in military service were also not taxed [20, p. 98].

On the Left-Bank Ukraine, according to O.I. Hurzhii there were also specific taxes – "portia" and "ratia", which were levied in favour of the treasury of the Russian Empire and were directed to the maintenance of the Russian army ("donation on consistents"). Such taxes were collected in the form of provisions for soldiers and fodder for horses, or in cash. Their volumes were not officially established for a long time, and therefore depended on local conditions and the needs of the Russian army. During the years of crop failures and natural disasters, "portias" and "ratias" were not collected [21, p. 433]. In addition, the Polish-Lithuanian Commonwealth had to perform duties in favour of the Russian Empire, in particular, provide wagons, horses, oxen, and drivers for the Russian army, transport food, mail, officials [12, p. 36].

As noted by M.M. Sheverdin, subjects of secular and spiritual landowners, with the support of the latter, performed a number of duties on a much smaller scale or simply were exempt from them. However, the obligation to provide carts for governmental needs, maintenance of hired troops, repair and construction work extended to all categories of the rural population, while only individual villages were involved in the maintenance of artillery [22, p. 62].

The Cossacks performed military service, which granted them a number of rights and privileges: exemption from the bulk of state taxes and duties, the right of private ownership of land and other property, their own legal proceedings, etc. [23, p. 12]. However, according to V. Horobets, the Cossacks performed "voluntary" work on the farms of colonels. Usually, the Cossacks and free pospolites were involved in such work during the seasons of sowing or harvesting, as well as during the harvesting of hay, firewood, repairing the colonel's house or some outbuildings [24, p. 88]. In the Left-Bank Ukraine, which was under the protectorate of the Russian Empire, the Cossacks were sent to build channels between the Volga and the Don, around Lake Ladoga, and to build lines of fortifications, fortresses, dams, paths, bridges [12, p. 36].

In the Hetmanate, the "ralets" was also collected, which in the first half of the 17th century became a real problem. If in relation to the Cossacks O.I. Rigelman only hinted that a person who had a certain problem or complaint and wanted a positive solution brought "ralets" to the foreman. Later, in the Hetmanate, "ralets" was transformed into a real bribe, which was given not just on big holidays, but also on every appropriate occasion. According to L.M. Ivannikov, ralets turned into a way of additional profit for officers, who were completely corrupt in the Cossack era [9, p. 12]. The foreman often demanded the same duties from sotnia/regimental Cossacks. It is no coincidence that in the Cossack environment there was a practice of gifts to the foreman, timed to coincide with the holidays, which eventually turned into a mandatory cash collection. At the beginning of its existence, "ralets" as an ancient custom did not cause resistance from the hetmans. However, the violence that was committed during its collection forced the latter to reconsider this process. In 1722, hetman I. Skoropadsky forbade taking "ralets" [9, p. 14].

During the Hetmanate, court fines were also collected, the so-called "economic guilt". However, unlike the Zaporozhian Sich, in which such non-tax revenues were mainly directed to state needs, in the Cossack Host, court fines were in favour of government representatives. According to V. Horobets, recipients of recovered funds and material values from among the persons who did not suffer from the criminal, but received "economic guilt" only by their belonging to the authorities, could be the hetman, colonel, judges, the city government [24, p. 89].

A special feature of the fiscal mechanism of the Zaporozhian Army was the presence of targeted taxes in favour of the church. Thus, for the maintenance of the church in Right-Bank Ukraine, a monetary tax "tithe" was paid, and in Left-Bank Ukraine, a natural tax "rokovschina", in the form of bread or sheaves. For the performance of church duties, the clergy were paid a tax "ruga" from each dym [25, p. 716].

Therefore, the revenue instruments of the fiscal mechanism of the Hetmanate covered a variety of tax and non-tax revenues, which, according to V.A. Barvinsky, were sent to the private treasury of the Hetman, the state treasury of the Hetmanate, the town hall or church treasury [26, p. 11]. Expenditure instruments of the fiscal mechanism of the Zaporozhian Army in conditions of limited financial resources were associated with the maintenance of the military officers and the hetman's administration, maintenance of foreign ambassadors, and financing the military needs of the Hetmanate.

Conclusions

With the beginning of the liberation war in the Ukrainian lands, the Polish – Lithuanian Commonwealth lost control over a significant part of the Ukrainian ethnic lands, based on which Cossack statehood appeared in two forms – the Zaporozhian Sich and the Hetmanate. At the same time, the fiscal mechanism of these state entities was being formed, which was inextricably linked with their state treasury. The fiscal mechanism covered revenue and expenditure instruments. Income was formed at the expense of economic and military activities of the Cossack states, as well as the simplest forms of direct and indirect taxes, which did not require a complex system of calculation and accounting.

Since the Cossacks were exempt from paying taxes for performing military service, the main burden of taxation was borne by peasants and burghers. The fiscal mechanism of the Cossack era was based on indirect taxes, in particular customs payments, which indicates a weak level of industrial development and a lack of national capital to create industrial production. Expenditures of the state treasury in Cossack times were mainly directed to the maintenance of the state apparatus, the conduct of military operations and the maintenance of the church. In the face of the constant threat of loss of sovereignty, it was impractical to finance other state functions other than administrative and defence, in particular social and investment. Thus, the national liberation war led to the establishment of unique Cossack states, which formed a specific fiscal mechanism that corresponded to the economic conditions of the time and reflected the fiscal traditions of not just the invading peoples, but also the fiscal mentality of the Ukrainian nation.

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Менеджмент митної справи: збереження міжнародних ланцюгів постачань та реалізація митної політики щодо протидії кризі COVID-19

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Анотація. Стаття присвячена вивченню необхідності змін у роботі митних адміністрацій, що викликано пандемією, що зруйнувала або значно пошкодила наявні ланцюги постачання у всьому світі. Для протидії цьому митні адміністрації повинні реалізовувати скоординований та проактивний підхід з усіма зацікавленими відомствами для сприяння міжнародній торгівлі. Основною метою статті є дослідження трансформації здійснення державної митної справи в контексті антикризового реагування на умови пандемії COVID-19. Методологія дослідження базується на таких загальнонаукових методах дослідження як: аналіз і синтез, систематизація та узагальнення. Визначено основні напрями реінжинірингу роботи митних органів, які мають безперервно працювати й в умовах часових обмежень; організаційний дизайн реагування; протиепідемічний захист посадових осіб; цифровізацію здійснення митних процедур; митне регулювання; заходи сприяння торгівлі. Зокрема, відзначено, що в кризових умовах актуальним завданням є формування оперативних груп антикризового реагування, як це було запроваджено Китаєм. У статті наведені основні обов'язки таких оперативних груп та акцентовано увагу на необхідності швидкого внесення змін у законодавство та проведення консультацій із зацікавленими особами. Визначені основні заходи щодо забезпечення безпеки персоналу, які мають бути сформовано митними адміністраціями у тісній співпраці з органами охорони здоров'я та іншими зацікавленими сторонами. Також визначено заходи сприяння торгівлі, зокрема шляхом збору даних та їх представлення у репозитарії Світової організації торгівлі. Результати дослідження можуть бути використані з метою вивчення та удосконалення напрямів реформування митної системи України

Ключові слова: реінжиніринг, ланцюги постачання, митні процедури, митна політика, митна система, митне регулювання, антикризовий менеджмент

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Customs Management: Preserving International Supply Chains and Implementing Customs Policies to Counter the COVID-19 Crisis

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Abstract. This study investigates the need for changes in the work of customs administrations, which is conditioned by a pandemic that has destroyed or significantly damaged existing supply chains around the world. To counteract this, customs administrations should implement a coordinated and proactive approach with all interested agencies to promote international trade. The main purpose of the study is to investigate the transformation of the implementation of state customs affairs in the context of anti-crisis response to the COVID-19 pandemic. The research is based on the following general scientific methods: analysis and synthesis, systematisation, and generalisation. This paper defines the main approaches to reengineering the work of customs authorities, which should work continuously and in conditions of time constraints; organisational response design; anti-epidemic protection of officials; digitalisation of customs procedures; customs regulation; trade promotion measures. In particular, it was noted that in crisis conditions, the urgent task is to form operational groups of anti-crisis response, as it was introduced by China. The study describes the main responsibilities of such operational groups and focuses on the need for rapid changes in legislation and consultations with interested parties. The main measures to ensure the safety of personnel are identified, which should be formed by customs administrations in close cooperation with health authorities and other interested parties. Trade facilitation measures have also been identified, in particular by collecting data and submitting it to the World Trade Organization repository. The findings can be used to study and improve the directions for reforming the customs system of Ukraine

Keywords: reengineering, supply chains, customs procedures, customs policy, customs system, customs regulation, crisis management

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Introduction

The constant struggle for resources and access to them, which was observed in recent years, only increases during global challenges. The relevance of this is confirmed in the context of the threat of the global economic crisis of 2020 and the spread of COVID-19 infection, when protecting the national interests of the state and/or interstate associations quickly make the necessary decisions, and various supranational associations strengthen cooperation and jointly produce intentions and decisions. The spread of the COVID-19 has caused disruption of global supply chains, instability in financial markets, which has negatively affected key sectors of the economy. The development of the economic situation associated with the pandemic is characterised by the fact that in 2020 international trade decreased by 9%; trade in goods decreased by 6% and trade in services decreased by 16.5% [1] Regarding the sphere of trade between countries, it is worth noting that due to the increase in demand for medical products, the volume of movement of counterfeit products between states, in particular medical, pharmaceutical and sanitary products, has recently significantly increased.

The emergency situation of a pandemic, simultaneously destroys the national economy of states, existing foreign trade relations, negatively affects society, requires an appropriate response of states to the need to mobilise revenues, simplify trade, and ensure the security of state borders. As a result of the crisis created by the COVID-19 pandemic, questions have also arisen regarding the application of customs provisions related to the process of making customs decisions, implementing customs procedures and customs formalities.

On January 30, 2020, the World Health Organization (WHO) declared that the outbreak of the novel coronavirus (2019-nCoV) is an emergency related to international health concerns [2]. March 11, 2020 WHO has described the novel coronavirus disease (COVID-19) as a pandemic [3]. Anticipating a sharp increase in the cross-border movement of aid goods (supplies, medicines, and medical equipment), on March 17, the World Trade Organization (WTO), together with the World Customs Organization (WCO), called for sharing the best practices of customs administrations of member countries in preventing and/or combating the spread of the disease [4]. Notably, the experience of customs administrations in responding to the COVID-19 pandemic is quite diverse and depends on the state of economic development. In particular, on the WCO website, as of May 15, 2021, among the practices of the customs administrations of member countries to prevent and combat the spread of COVID-19, there is still no information about such measures in Ukraine. Among the countries, the experience of 117 countries of the world is already presented [5].

It is extremely important for customs administrations to continue to facilitate the cross-border movement of not only necessary, critical goods, but also goods in general, in order to minimise the overall impact of the COVID-19 pandemic on the economy and society. The disruption of supply chains by the pandemic is noted in many studies, in particular [6-8] show the application of the gravity model of international trade, that the emergency situation negatively affected simultaneously all the factors by which international trade is estimated (trade between two countries is directly proportional to the production capacity of the exporting country and the size of the market of the importing country, and inversely proportional to the trade costs required to move goods between countries). National governments and global organisations are now determining ways to address the issues of recovery from the pandemic, after the collapse of the global economy and trade. As part of this recovery, it is possible to reform customs and trade agreements in such a way as to ensure economic growth in accordance with the UN Sustainable Development Agenda until 2030 [9].

The impact of the pandemic on customs affairs in 2019-2020 was almost not studied. There are only a few studies on the actions of the WCO, the EU, and the WTO in such emergency conditions so that governments can update customs regulations. Such emergency measures were summarised in the materials of the European Commission, KPMG, and Ernst & Young Global Limited [10-13]. The World Bank report "COVID-19 Revenue Administration Implications: Potential Tax Administration and Customs Measures to Respond to the Crisis" [14] distinguishes between three stages of response (containment, recovery, and stabilisation) of the customs administration to the COVID-19 crisis, and provides potential measures for each of them.

R. Brennan, in the study of quarantine measures in countries of the Pacific region, elaborates on measures of customs control of ships entering the country and cargo management in accordance with national health principles [15]. The author emphasises the need for cooperation between customs authorities to ensure the security of the trade regime and the return of citizens. Thus, for the first time, the specifics of the implementation of state customs affairs in the context of a pandemic in Ukraine are noted by L. Prus [16]. The main measures by WCO for the customs administrations of the world are systematised by I. Nestoryshen and V. Turzhansky in [17]. T. Karavaev and N. Kaluga [18] supplemented these developments with a study of the impact of the pandemic and the imposed quarantine measures on the volume of foreign trade in Ukraine, indicators of the performance of the State Customs Service. O. Nagorichna in [19] notes the rather belated response of Ukraine to the challenges of the pandemic, including in the sphere of state customs affairs. The study by O.B. Girna [20] is devoted to the development of the logistics concept in the conditions of the COVID-19 pandemic and the main aspects of the restoration of supply chains taking into account the pandemic. Some priority measures for reforming the customs sphere, including in the context of a pandemic, are presented in the collective developments of the Research Institute of Fiscal Policy of the University of the State Fiscal Service of Ukraine [21]. However, these isolated developments require systematisation, updating and do not allow forming a clear understanding of what customs should change and how to function in such emergency conditions. For Ukraine, this experience should become the basis for implementing customs reform in the state.

The purpose of the study is to investigate of the transformation of the implementation of state customs affairs in the context of anti-crisis response to the conditions of the COVID-19 pandemic. The defined goal determined the following research objectives: to study the need for changes in the work of customs administrations as a result of the pandemic; to search for a successful experience and generalise international principles for regulating the work of customs administrations in emergency conditions of the pandemic; to form recommendations for the development of the customs system in the context of the existence of a crisis caused by the pandemic.

Materials and Methods

The methodological basis is an *interdisciplinary approach* where the basis of the theoretical and methodological component is the fundamental provisions of the theory of public administration in the field of development and implementation of state customs policy. Objective analysis of the subject matter became possible with the use of a set of methods of general and special scientific cognition. *Dialectical method* allowed finding out the theoretical features of public Administration in the field of customs policy and substantiation of the main directions used to reform customs affairs in the context of a pandemic. The *method of analytical abstraction was used to understand the essence of the mechanism of public administration in the field of customs policy*. General scientific research methods were used to solve the tasks defined by the study, in particular: *theoretical generalisation, induction and deduction* (in the process of disclosing the content of customs reengineering and forming conclusions); *synthesis and analysis* (for systematisation and generalisation of the directions of work of customs administrations in the context of a pandemic (emergency situations)).

Formal and dogmatic method was used in the analysis of regulatory requirements for the implementation of customs procedures, which are consolidated in international regulations of the WCO. *System and structural method* allowed identifying international organisations that provide international regulation of world trade, and their best practices in the field under study. *Logical and legal method* allowed identifying the state of customs affairs in the context of the pandemic in Ukraine. *Descriptive analytical method* was used to study social processes (in this case, public administration in the field of customs policy) and their current trends or new phenomena, selecting information about the current situation to obtain a comprehensive understanding of the analysed phenomenon.

The theoretical and methodological basis of the study of the problem under consideration were the fundamental and applied provisions of the implementation of state customs affairs, papers of foreign and Ukrainian researchers, reports of international institutions and the best practices of the WCO and the European Commission on the problem under study. During the analysis of measures recommended by customs administrations, the websites of the WCO, WTO, and OECD were analysed. In particular, the WCO, on the special web page "COVID-19 – WCO updates" [22], systematises information about tools, initiatives, and databases that can be used to solve various customs problems related to COVID-19 that member countries face. The WCO also defined lists of essential goods during the disaster [23]. Similar information is provided by the European Commission ("Guidance on Customs issues related to the COVID-19 emergency") [24].

Results and Discussion

Pandemic as a factor of customs system reform

The COVID-19 pandemic has shown the importance of both the Revised Kyoto Convention (RKC) [25] and the WTO Trade Facilitation Agreement (TFA) [26], including the main concepts supported by these documents: the digital registration process and effective risk management. The introduction of modern customs processes based on risk assessment, which balance the need to comply with the trade facilitation regime, would help to ensure the timely arrival of basic goods to their destination, maintain compliance and manage the customs clearance process remotely and digitally, which is positive for the health of customs officials and importers/exporters who need to be protected.

If the global economy is to recover as soon as possible, it is important that countries implement both the RKC and TFA to create a clear framework for customs. Moreover, if all countries act now and implement the most basic recommendations of the RKC and TFA, they would be able to take advantage of the necessary changes in supply chains that will come after the COVID-19 pandemic. Countries must act in the interests of sustainable economic growth, maintaining an appropriate balance between compliance and trade facilitation. Indeed, processes should be transparent and consistent in execution. Using the WTO's international expertise, customs administrations and the private sector should interact with each other to gain a clear understanding of the challenges they face, thereby enabling customs authorities to develop policies and processes that meet a specific goal.

Therefore, the key is the need to develop effective continuity plans that will allow customs and other border agencies to operate outside their normal environment and be able to adapt quickly to emergency conditions. Under such conditions, customs administrations should transform their configuration, working conditions and change the design of customs procedures. This refers to the fact that the customs administration in an emergency situation will not be able to repeat its outdated paper processes, because the pandemic, changes in the global supply chain necessitate the adoption of such an effective management tool as reengineering.

Supranational principles of the customs administration's response to the pandemic

In the context of a pandemic, it is necessary to focus on the following areas of reengineering of the work of customs authorities:

– organisational response design;

– anti-epidemic measures to protect customs officials, including to ensure social distancing;

– automation/digitalisation/of customs procedures (formalities);

– customs regulation (especially in relation to the import and export of goods of critical import, food security);

– trade facilitation measures (in particular, programmes of an authorised economic operator, joint transit, transit of international state transportation (TIR, Carnet TIR), ATA (Admission temporaire – Temporary admission during temporary import-export, Carnet ATA), preliminary information, etc.).

Thus, the WCO recommends that, in order to ensure the smooth operation of vital international supply chains, customs services continue to perform key functions when the number of their personnel may be significantly reduced. Therefore, the WCO focuses on the following:

1) distribution of leadership functions, establishment of an ascending and descending accountability order;

2) defining, classifying, and prioritising work processes.

The pandemic requires accelerated decision-making, particularly governmental ones, and maintaining a balance between proper parliamentary oversight and surveillance, allowing for faster temporary legal changes, including, for example, delegating some policy decisions to tax administrations, which currently vary significantly between jurisdictions. Under normal circumstances, significant consultations are often held with stakeholders on significant changes in tax/customs legislation requirements that have a significant impact on the way taxes are administered (as opposed to changes in rates). This is not possible in times of crisis, and therefore administrations must establish how such consultations can be held in a short time in order to quickly identify administrative issues and allow them to consider possible alternative implementation options. In addition, tax/customs administrations should be able to review their existing processes of interaction with other government agencies and how they can best collaborate to improve services for citizens, increase sustainability and flexibility.

Customs services should take measures to ensure the safety of personnel in close cooperation with health authorities and other stakeholders. Such measures will help to increase the detection of the disease at an early stage and, if the disease is suspected, quickly take counteraction measures. Preventive measures and precautions include:

– prohibition or restriction of entry to customs facilities of traders and visitors through strict checks at the entrance/exit, medical control and recording of the name and time of visit of each visitor;

– introduction of work shifts (division of staff into shifts to reduce the number of people who are in customs offices/premises at the same time, thus reducing the risk of infection);

– implementation of the maximum possible physical distancing;

– ensuring that personnel wear the necessary protective equipment provided by the state;

– provision of protective equipment when personal contacts are needed;

– maintenance of daily reports on absence from the workplace, the health status of staff and their families, logs of working hours (shift working hours, shift composition, location, used premises/equipment, details of working from home, etc.).

Electronic transmission of customs declarations and related documents is important to maintain social distance. While fulfilling various new responsibilities, some customs administrations have begun to rapidly develop new digital services and tools. This allows administrations to review how they approach digital development in general, and whether different and more flexible methods can be applied more broadly than previously possible. In addition, it would be useful to reflect the experience of the crisis in the future development of electronic administration systems, in particular, whether they are reliable enough to support both business operations and rapid changes in public policy, including the provision of financial and other support. The main consideration here is the resilience of electronic administration systems themselves to cybersecurity attacks and system failures.

Care should be taken to ensure that the movement towards digitalisation does not repeat the old paper manual processes. The transition to digitalisation should result in a complete paperless transaction without the need to print copies of electronic declarations manually instead of digital signatures, date stamps, and personal approvals, which are applied instead of email or electronic approvals through the customs clearance system.

Abandoning manual processes not only leads to significant delays and costs, but in the current crisis, COVID-19 has a risk for both customs officers and importers/exporters, which arises from the need for unnecessary physical contact. For those procedures that are not important and are not considered critical for safety, health and well-being, it is also necessary to extend the delivery time. For example, this includes processing permits, paying fees, and other reports and processes that are not directly related to shipment processing.

The revision of customs regulation provides for the adoption of a simplified and, if possible, preferential tax regime for essential goods and imported goods related to the treatment of COVID-19. Essential goods must:

1) be processed in an expedited manner due to the application of simplified customs clearance procedures, which may be similar to those applied in relation to perishable goods, and involve immediate customs release;

2) be marked using the code classifier of the Harmonised System (HS) and entered in the list of goods exempt from customs clearance approved by the law enforcement agency in case of exemption from customs clearance, before customs apply the procedure of exemption from duties/taxes;

3) generate data that is collected and recorded on a daily basis.

To implement these measures, customs, together with health authorities, must determine the list of basic medicines and medical equipment needed to combat the pandemic. They should also identify legal importers and work closely with them to facilitate the import of these goods without loosening proper controls. The tariff table in the customs IT system should be updated in a timely manner, and written notifications should be distributed to the relevant officials. Reference can be made to the Harmonised System code reference classifier for health products as recommended by the WMO [27].

Deferral of customs payments and agreements on this can also be an important tool to support exporting enterprises in maintaining sustainability in difficult economic times and their participation in global value chains. The accrual of penalties may be suspended or reduced, and would also require a review of the institution of liability for violations due to delays, in particular the submission of declarations, since this direction is associated with the impact of the COVID-19 pandemic. Finally, standards should be clearly defined with a gradual implementation period for any export/import restrictions. Training should also be consistent with changes in customs, so that customs officers take the necessary actions in accordance with the current legislation, and not try to apply something without a clear understanding of what needs to be done. It is appropriate to conduct diagnostics of the procedures used in the customs clearance of humanitarian aid in emergency situations, and their capabilities for the practical application of such procedures in the event of a natural disaster, and training to test their own level of readiness and ability to manage in emergency situations and, possibly, to check the quality of national emergency action plans.

Due to the ongoing outbreak of the COVID-19 pandemic, which has had a major impact on economic activity and caused major supply chain disruptions, countries around the world are taking a number of measures to prevent its spread across borders. Given that trade facilitation is a key policy tool that can help countries mitigate some of the effects of the COVID-19 pandemic, WCO is working with the WTO, the United Nations Conference on Trade and Development (UNCTAD), the Commonwealth Small States Office (CSSO), the Global Trade Facilitation Alliance (GTFA), the International Air Transport Association (IATA) and the International Trade Centre (ITC) to develop a single COVID-19 trade facilitation database in which all these actions are consolidated.

Unified database (*new online tool*) acts as a platform that brings together trade facilitation initiatives adopted by organisations and stakeholders to ensure access to these resources within a single and user-friendly database. As the situation evolves, the platform will be expanded to include other key actors working in the field of trade facilitation. This initiative will ensure a smooth flow of safe cross-border trade, especially with regard to essential goods, which are crucial for combating the COVID-19 pandemic [23; 28].

Thus, the COVID-19 Trade Facilitation Repository is a joint platform of action and initiatives taken by organisations aimed at consolidating this information about trade facilitation measures taken by key stakeholders, which aims to facilitate access to this information by making it convenient, easily accessible to users, the ability to search and merge in one database (avoiding multiple searches in different engines and platforms). It contains a useful list of all such initiatives and is broken down by organisations, event types, and topics. In order to facilitate trade, the customs administration must:

1) create a help desk to solve problems faced by importers/exporters;

2) maintain supply chain integrity;

3) apply a risk management system to minimise physical inspections and speed up customs clearance;

4) optimise hardware usage;

5) identify priority cargo transportation lanes and introduce measures that guarantee the continuity of the supply chain;

6) help speed up the movement of road transport, in particular for transit cargo, in cases where the driver of the vehicle has symptoms of COVID-19. Remove container restrictions;

7) introduce tax relief measures, such as extending the fee, paying the fee in instalments, and returning the fee;

8) provide flexibility when expanding authorised economic operators (AEO) certifications during a pandemic, while maintaining an appropriate monitoring mechanism;

9) waive penalties for delays caused by late receipt of commercial documents from exporting countries;

10) introduce measures to facilitate the requirements for submitting or printing certain documents;

11) provide greater opportunities for ATA book holders when temporarily imported goods cannot be re-exported due to a state of emergency [29].

Risk management systems and pre-arrival procedures should also be encouraged to speed up the release of low-risk goods on arrival and minimise personal contacts that will protect both customs officers and importers/exporters. Recognition and preferential treatment of AEO should be part of the risk profiling process.

To make better use of limited inspection resources, customs authorities should reduce non-essential or short-term physical inspections and administrative inspections, and instead focus on critical formalities and high-risk shipments. This should be facilitated by the construction of "digital customs" based on the use of *Strategic leadership in information technology*, which was analysed by O.A. Fradinsky [30], however, the author did not specify its use in extreme conditions. Notably, Ukraine has introduced measures similar to the methods of EU customs regulation. However, the level of digitalisation is quite low, including in the State Customs Service of Ukraine, the use of financial incentives for legal entities introduced by the community and member states and measures to support the national economy in Ukraine is not possible yet. This prevents quick reactions as in the developed countries of the world.

Anti-crisis management of customs affairs

Anti-crisis management suggests that it is mandatory to form operational response teams (Fig. 1), considering the positive experience of the Chinese customs administration.

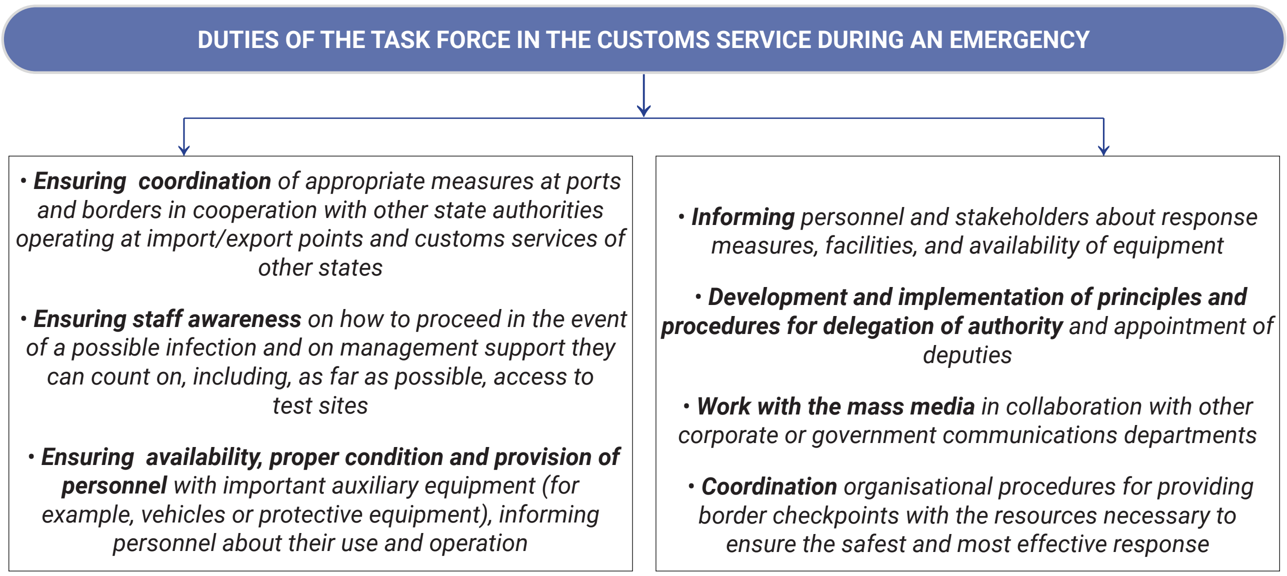

Figure 1. Prompt response to a crisis situation

Source: compiled by the author based on [12]

In response to the COVID-19 outbreak, the General Administration of Customs of China (GACC) has created a special working structure and mechanisms, adopted evidence-based border protection and quarantine measures to protect public health safety, and adjusted customs clearance formalities to promote security and facilitate trade [31-32]. After the outbreak, the Chinese customs service established a command centre headed by the GACC minister, and all his deputies were also deputies in it and a working group. Under the leadership of the deputy minister, who was responsible for border protection and quarantine, the working group sent customs services across the country to fight the epidemic in accordance with the policy of a joint prevention and control mechanism headed by the State Council. The working group developed anti-epidemic plans and measures, coordinated border efforts, supervised the implementation of anti-epidemic measures, and addressed emergency issues. The Chinese Customs Service has strengthened cooperation in the field of border protection and quarantine with its colleagues in other countries and regions. Contact points were assigned to communicate and coordinate anti-epidemic efforts [31].

Thus, the Chinese Customs Service closely monitored the spread of the disease both inside and abroad and collected information through many sources. As the disease progresses, experts from a wide range of industries and various departments gather to assess risks and provide guidance on targeted measures at border crossing points across the country. Mandatory health declaration. All passengers crossing the border are required to report their health status to customs, especially pneumonia-like symptoms and travel and exposure history in the last 14 days. The health declaration form (which can be found in the mobile app) has been translated into more than 10 languages [31]. An electronic declaration is also available on a mobile phone – passengers can submit a declaration and scan the generated QR code while passing through customs. All cross-border passengers are subject to three-stage control at border crossings. 1. Passengers are required to report their health status, take their temperature, and take an initial health assessment. 2. Those who are identified at the first stage with symptoms related to COVID-19 or from the most affected countries or regions that have been confirmed cases will be further tested through epidemiological investigation, medical examination and laboratory tests. 3. Those who are recognised as confirmed, suspected, or close contacts at the second stage, or have relevant symptoms, will be quarantined for further treatment or medical supervision in accordance with the requirements of the joint prevention and control mechanism [33-34]. The three-step approach enables early detection, early notification, early quarantine, and treatment. Other major infectious diseases, such as Ebola and Lassa fever, have also been closely monitored among arriving passengers to prevent other outbreaks [31].

For Ukraine and other states, the COVID-19 pandemic has also become a real challenge, requiring a timely and adequate response by introducing appropriate models of legal relations. The fight against COVID-19 has led to the need for temporary changes in the national customs regulation, in accordance with this, and amendments to the customs and tax codes of Ukraine. Thus, by analogy with the actions of the EU, importers who import medicines, medical devices and medical equipment intended for anti-epidemic measures to Ukraine were exempt from paying duties and VAT. However, it took the government a month to form appropriate measures, the main difficulty of customs clearance was the need to certify the purpose of importing medical devices and medical equipment, since only those organisations that provide assistance to patients with COVID-19 have the right to import without duty and VAT, and this required appropriate confirmation from the Ministry of Health. In this regard, appropriate amendments were made to the tax code of Ukraine, but it was delayed. Similarly, the list of medicines, medical devices, and medical equipment intended to combat the COVID-19 coronavirus, which will be imported to Ukraine without duties and VAT, was formed and constantly updated.

While more and more countries have agreed that it is inappropriate to restrict the movement of goods, including food, during a pandemic, the crisis has forced governments to build up their domestic food supplies. Ukraine is no exception, which temporarily banned the export of buckwheat until July 1, 2020, as Belarus, Russia and Kazakhstan did earlier to protect the domestic market. The pandemic determines the need to introduce new principles, methods and tools of work, and significantly accelerates the practices of customs administrations. Only developed countries with their electronic governance were ready for this, but not Ukraine. Emergencies usually encourage a review of existing norms and rules of operation. In particular, this may be the digitalisation of customs services in the medium term and significant acceleration in the use of digital and virtual technologies. After all, R. Felix notes that the introduction of new or increased existing import tariffs, restrictions on access to markets, difficulties in conducting new negotiations, will encourage business entities to search for new supply and sales chains, which will significantly update value-added chains [35].

Thus, the main lesson should be the well-coordinated work of all services and departments based on digitalisation. In particular, customs authorities in the context of COVID-19 should ensure, on the one hand, the speed of customs clearance and control, and on the other, be on the lookout for the economic interests of the state. The disruption of supply chains and changes in international trade routes were temporary, but it was necessary to make quick and effective decisions in the face of a pandemic. Streamlining customs procedures, revising the country's customs system, customs regulation and extending regulatory deadlines have come out on top in the implementation of state customs affairs. In particular, the establishment of lists of essential goods is the basis for revising taxation and applying non-tariff regulation. For its part, this is possible only in cooperation with departments, in particular those responsible for healthcare, finance, volunteers and public organisations. Institutional and methodological support for international organisations, in particular, the WTO and WCO, remains important. The concept of integrated border management in the context of a pandemic has also acquired a new meaning and has become an important tool for the coordinated work of all departments at the border. Thus, according to L. Marin, despite the EU's interstate solidarity, which is a generally recognised value of European integration, the COVID-19 crisis has once again shown the difficulty of achieving transnational forms of interaction: understanding in triangular relations between the EU, member states and third-country citizens [36].

Now, in the new economic conditions, Ukraine must decide on the necessary measures for integration, economic recovery. In particular, negative trends in the Ukrainian economy can be compensated for by expanding mutual trade, building up economic cooperation with countries, subject to the creation of a common economic space between the EU and the six countries of the Eastern Partnership, which includes Ukraine [37], by activating China's project “One Belt, One Road” [38].

It is also advisable, despite the negative experience of implementation in Ukraine, to turn to the successful experience of the operation of free customs zones in order to create conditions for stimulating the development of regions by introducing an additional incentive to attract investment, because in neighbouring countries, which according to investors are more attractive for investment, free customs zones (not only commercial but also Service and, especially, industrial types) are widely used and often this becomes the main factor for making investments in those countries, and not in our state [39-40].

The second point is that in the context of customs affairs, since the resumption of work at the end of 2019, there is no strategy of the State Customs Service of Ukraine. This is evidence not only of the need to activate the work of the Customs Service in the context of a pandemic, but also of the need to streamline its activities in general. Only an action plan for reforming and developing the system of bodies implementing customs policy has been developed, approved by Order No. 569-R of the Cabinet of Ministers of Ukraine dated May 13, 2020, and the state Customs Service is planned to operate annually for one year [41]. This does not allow Ukraine to approach the high customs standards of the EU and become part of the European community and ensure a rapid response in emergency situations.

Conclusions

The COVID-19 pandemic has actualised the issue of digitalisation of customs administrations and the implementation of state customs affairs, since neither the governments of countries nor their customs administrations were ready to work in such emergency conditions. Thus, developed countries, thanks to the high level of digitalisation, quickly responded to supply chain disruptions and provided not only health protection for their own citizens, but also supply and customs security components. Issues related to emergencies are not sufficiently or at all reflected in international documents, and therefore this issue needed to be resolved immediately.

The challenges faced by customs administrations during the COVID-19 crisis and their responses provide an opportunity to review both operational resilience to possible future crises (including possible further waves of COVID-19) and to improve the day-to-day operation of the customs administration, including reduction of the administrative burden. Therefore, the author believes that in Ukraine it is advisable to act on the principles of anti-crisis management, which provide for: the development of a national strategy of public administration in the context of a pandemic; the creation of an anti-crisis team; revision of the implementation of customs policy and the operation of the customs system. The result of such activities should be the development of a strategy for the implementation of state customs affairs, which is formalised in the relevant manual.

Thus, the development of the national manual on customs affairs related to the emergency situation, as the basis of actions for the customs administration, in particular, for Ukraine, requires the establishment of a number of provisions that will provide reasonable decisions in such exceptional circumstances (issues of e-commerce, customs decisions, customs payments and guarantees, import of goods (list of goods required in an emergency, presentation of evidence of preferential origin for determining the origin of goods, decisions on customs clearance if it is impossible to comply with the deadlines established by law and physical contact, determine the specifics of certain customs procedures).

Further studies should concern the fight of customs administrations against new manifestations of crime that have become relevant in the context of the pandemic – new methods and tools for smuggling and violating intellectual property rights, combating counterfeit goods, and balancing customs regulation in the context of economic and social crises and protecting the national economy, including in Ukraine.

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Економіко-математичне моделювання ефективності національної системи протидії кібершахрайствам та легалізації кримінальних доходів на основі методів аналізу виживання

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Анотація. У сучасному світі цифровізація фінансових відносин, розвиток інноваційних технологій, поява та використання криптовалют для розрахунків зумовлюють зростання кількості кібершахрайств у фінансовій сфері та їх інтелектуалізації, збільшення нелегального відтоку коштів за кордон. Неефективні рішення та бездіяльність у протидії даним загрозам призводить до масштабних негативних наслідків як фінансового, так і суспільного характеру. Метою даного дослідження є реалізація економіко-математичного моделювання ефективності національної системи протидії кібершахрайствам і легалізації кримінальних доходів, в основі якого лежить використання методів аналізу виживання. У статті проведено бібліометричний аналіз публікацій, присвячених проблемі ефективності кібершахрайств та протидії легалізації незаконних коштів, за допомогою побудови бібліометричної карти ключових слів, з використанням програмного забезпечення VOSviewer. Це дозволило виділити 7 кластерів основоположних категорій аналізу кібершахрайств. А зміни векторів досліджень науковців показала візуалізаційна карта контекстуально-часового виміру досліджень ефективності кібершахрайств у виданнях бази даних Scopus. У роботі досліджено ефективність національної системи протидії кібершахрайствам та легалізації кримінальних доходів на основі таблиць виживання. У результаті дослідження було здійснено аналіз ефективності національної системи протидії кібершахрайствам та легалізації кримінальних доходів на основі методу Каплана-Мейєра. Виявлено залежності ефективності національної системи протидії кібершахрайствам та легалізації кримінальних доходів від часового інтервалу після виявлення фактів порушення. Практична цінність застосування розробленої моделі полягає у формуванні аналітичного підґрунтя щодо подальшого прийняття управлінських рішень Національним банком України, Державною службою фінансового моніторингу, Службою безпеки України в розрізі ефективності національної системи протидії кібершахрайствам та легалізації кримінальних доходів та необхідності її коригування

Ключові слова: банки, кібершахрайство, легалізація кримінальних доходів, метод Каплана-Мейєра, національна система протидії відмиванню коштів

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Economic and Mathematical Modelling of the Effectiveness of the National System for Countering Cyber Fraud and Criminal Proceeds Legalisation Based on Survival Analysis Methods

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Abstract. In the modern world, the digitalisation of financial relations, the development of innovative technologies, the emergence and use of cryptocurrencies for payments lead to an increase in the number of cyber fraud in the financial sector and their intellectualisation, an increase in the illegal outflow of funds abroad. Ineffective decisions and inaction in countering these threats lead to large-scale negative consequences, both financial and public. The purpose of this study is to carry out economic and mathematical modelling of the effectiveness of the national system for countering cyber fraud and criminal proceeds legalisation, which is based on the use of survival analysis methods. This study provides a bibliometric analysis of research papers devoted to the problem of cyber fraud efficiency and countering the legalisation of illegal funds by building a bibliometric keyword map using VOSviewer software. This allowed identifying 7 clusters of fundamental categories of cyber fraud analysis. And changes in the research vectors of researchers were shown by the visualisation map of the contextual and temporal dimension of papers on the cyber fraud efficiency in publications of the Scopus database. The study examines the effectiveness of the national system for countering cyber fraud and criminal proceeds legalisation based on survival tables. As a result of the study, the effectiveness of the national system for countering cyber fraud and criminal proceeds legalisation was analysed based on the Kaplan-Meyer method. The effectiveness of the national system for countering cyber fraud and criminal proceeds legalisation depends on the time interval after the detection of violations. The practical significance of applying the developed model is to form an analytical basis for further management decision-making by the National Bank of Ukraine, the State Financial Monitoring Service, and the Security Service of Ukraine in the context of the effectiveness of the national system for countering cyber fraud and criminal proceeds legalisation and the need to adjust it

Keywords: banks, cyber fraud, money laundering, Kaplan-Meyer method, national anti-money laundering system

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Introduction

Cyber fraud and the legalisation of proceeds from crime pose a threat to the economic security of any country, and it becomes global in nature, since various money laundering schemes are essentially international and contain a link with organised crime. That is why the development of modern economic science is impossible within the isolated territory of a particular country. An analytical understanding of the current state and effectiveness of ensuring the national anti-money laundering system is important. Such information is necessary for political figures, state regulatory and law enforcement agencies, economic agents, financial institutions and organisations, business entities, individuals to determine the priority of problems in this area and make a decision on the appropriate adoption of adequate measures to resolve important aspects of countering the illegal circulation of funds [1; 2].

For its part, shortcomings in the legislation on the legalisation of criminal proceeds, lack of targeted attention to the legality of assets, insufficient experience in financial and economic investigations of fraudulent money laundering, imperfect and incomplete reporting structure in the direction of the legality of funds rotation, strengthen the relevance of the issue of eliminating key gaps in the national system of countering cyber fraud and money laundering, by combining existing mechanisms with specialised methods of data analysis on the risks and consequences of fraudulent money laundering [3]. Thus, knowledge and awareness of the specifics and forecasts in the direction of countering money laundering based on specific modelling methods would make a significant contribution to preventing the legalisation of illegal income both at the national and international levels.

At the same time, special attention should be paid to modelling based on methods of survival analysis, which is a type of statistical modelling that allows assessing and analysing the probability of occurrence of certain consequences over time. Data modelled by this method must be prepared in a certain way for analysis in a censored (incomplete) form, that is, the desired dependent variable characterises the occurrence of a probable consequence in time, provided that the time lag is limited.

The purpose of the study consists in developing a structural and logical model for evaluating the effectiveness of the national system for countering cyber fraud and legalising criminal proceeds.

Research objectives are: to conduct a bibliometric analysis of research papers related to the concept of cyber fraud effectiveness and countering the legalisation of funds obtained by criminal means, using the construction of a bibliometric map of keywords; to analyse the effectiveness of the national system for countering cyber fraud and criminal proceeds legalisation based on the Kaplan-Meyer method; to identify the dependence of the effectiveness of the national system for countering cyber fraud and criminal proceeds legalisation on the time interval after the detection of violations.

Literature Review

Taking into account the literature sources, it is worth noting that general theoretical and practical issues of countering the legalisation of criminal proceeds obtained illegally are revealed by many Ukrainian and foreign scientists. Thus, L. De Koker, T.T.H. Tran [1] describe the opposition to the legalisation of illegal income in Vietnam through the improvement of the legal framework for the confiscation of proceeds from crime. O. Lebid, O. Veits [2] search for statistically approved criteria and attributes to identify the risk of illegal money laundering. M. Levi [3] assesses control over money laundering; V. Vovk, Yu. Zhezherun, O. Bilovodska, V. Babenko, A. Biriukova [4] reveal the managerial and legal aspects of financial monitoring in the bank as a market instrument in the context of innovative development and digitalisation of the economy. For its part, the problem of countering cyber fraud is addressed in the treatises of modern researchers, including Chen, Y. Yuan, H. (Robert) Luo, J. Jian, Y. Wang [5] regarding the identification of group transnational assets of cyber fraud. I. Kara, M. Aydos [6] investigate cyber fraud through the detection and analysis of cryptocurrency software. S. Kemp, F. Miro-Llinares, A. Moneva [7] study the growth of cyber fraud in Europe. L.M. Lux, G.O. Calderon [8] define and differentiate types of cyber fraud.

It is worth noting that modelling of existing and projected systems and processes is widely used to analyse various issues in all sectors of the world and national economy today. For example, the gravitational model is used by J. Ferwerda, A. van Saase, B. Unger, M. Getzner [9] for estimating money laundering flows; probabilistic approach – T.I. Safronova, S.A. Vladimirov, I.A. Prikhodko [10], offer mathematical modelling of technological processes of optimisation of the use of resources; factor financial analysis – A. Borodin, I. Mityushina, E. Streltsova, A. Kulikov, I. Yakovenko and A. Namitulina [11] which is used to model the prospects for the development of an enterprise; Matrix modelling is described by Wubneh, F.M. Desta, H.A. Kahsay [12]; other models. Among such models, a specific method of economic and mathematical modelling is the modelling based on methods of survival analysis, which is covered by the following specialists: Shoaee, E. Khorram [13] – general theoretical features are investigated; K. Platero, M.S. Tobar [14] and N. Stevens, M. Lydon, A.H. Marshall, S. Taylor [15] – practical application in the field of Medicine and healthcare is described. Although a fairly significant circle of modern researchers around the world is studying the effectiveness of the national system for countering the legalisation of criminal proceeds, as well as combating cyber fraud, this issue remains open and requires significantly more new developments and acquisitions.

Materials and Methods

Initially, a bibliometric analysis of research papers for 2010-2020 was carried out. A map of the relationship between the concept of "cyber fraud efficiency" and other scientific categories was formed. VOSviewer was the tool for implementing this map. Direct economic and mathematical modelling of the effectiveness of the national system for countering cyber fraud and money laundering was carried out through a number of stages, each of which used appropriate methodological tools.

Stage 1 – ***Establishment of the input data base of the study***. For the implementation of the study, 70 Ukrainian banks were selected for 2019, which were declared insolvent by the National Bank of Ukraine with further dissolution. The corresponding dates in the format: month, date, year are shown in columns 1-6 of Table 1. To characterise the national system of countering cyber fraud and criminal proceeds legalisation, 9 indicators were selected in the context of the 70 banks of Ukraine (columns 7-11 of Table 1): *K1* – share of financial transactions registered based on the internal financial monitoring; *K2* – the ratio of the amount of commission income from cash settlement services to the total number of bank customers; *K3* – violation of the NBU state of emergency; *K4* – violation of the Law of Ukraine "on legalisation"; *K5* – violation of the Law of Ukraine "on banks"; *K6* – the ratio of the number of clients who did not perform financial transactions to the total number of clients; *K7* – share of cash receipts from the total amount of receipts; *K8* – share of non-cash receipts from the total amount of receipts; K9 – share of cash expenditures from the total amount of expenditures. In addition, the availability of complete information about the considered set of banks is important for assessing the effectiveness of the national system for countering cyber fraud and criminal proceeds legalisation based on survival analysis methods. Thus, in the column *Censored* two possible values are defined: *completed* if complete information is available and *Censored* if there is no data about the occurrence of the event of interest.

Table 1. Input data base of the study

Bank name	Month_1	Day_1	Year_1	Month_2	Day_2	Year_2	*K1*	*K2*	...	*K8*	*K9*	Censored
A	1	2	3	4	5	6	7	8	9	10	11	12
VAT BANK FINANSY TA KREDYT	9	17	15	12	17	15	0.11	0.08		0.28	0.99	completed
AT BROKBUSINESSBANK	2	28	14	6	10	14	0.74	0.10		0.24	0.52	censored
VAT VTB BANK	11	27	18	12	18	18	0.12	0.13		0.20	0.54	completed
VAT KB NADRA	2	5	15	6	4	15	0.45	0.03		0.37	0.31	completed
AKB FORUM	3	13	14	6	13	14	0.34	0.09		0.15	1.15	completed
AKB IMEXBANK	1	26	15	5	21	15	0.19	0.03		0.36	0.50	completed
TOV KB DELTA	3	2	15	10	2	15	0.00	0.00		0.26	1.56	completed
PAT KB KHRESHCHATYK	4	5	16	6	2	16	0.01	0.08		0.25	0.59	completed
VAT RODOVID BANK	2	25	16	12	19	17	0.06	0.01		0.33	1.49	censored
PAT FINANSOVA INIT-SIATYVA	6	23	15	5	21	19	0.04	0.19		0.21	0.84	completed
...	...	...	...	...	...	...	...	...	...	...	...	...
AB UKOOPSPILKA	1	22	15	4	22	15	0.54	0.06		0.05	0.55	completed
TOV FORTUNA-BANK	1	26	17	2	21	17	0.03	0.60		0.35	1.16	completed
AKB TK KREDYT	2	9	16	4	7	16	0.22	0.69		0.73	1.56	completed
AKB INTEGRAL-BANK	9	15	15	11	25	15	0.64	0.50		0.56	1.68	censored
AKB NATSIONALNYY KREDYT	6	5	15	8	28	15	0.17	0.03		0.17	0.93	completed
VAT AB UKRGAZPROM-BANK	4	7	15	9	14	15	0.30	0.14		0.48	0.42	completed
VAT BANK TRAST	12	6	16	12	29	16	0.00	0.51		0.03	0.18	completed
PAT PtB	1	10	17	2	23	17	0.02	2.03		0.62	1.23	completed
VAT AKTABANK	9	16	14	1	15	15	0.04	1.35		0.37	1.92	completed
VAT ZLATOBANK	2	13	15	5	12	15	0.00	1.91		0.50	0.79	completed

Source: compiled by the authors

Stage 2 – ***Study of the effectiveness of the national system for countering cyber fraud and criminal proceeds legalisation based on survival tables***. The technique of constructing survival tables is one of the methods for analysing survival data, which is based on a table of frequencies of possible occurrence of critical events in accordance with a certain selected number of intervals. In the context of the effectiveness of the national system for countering cyber fraud and money laundering, the approach based on survival tables allows building tables of the frequency of possible decision of the NBU to declare a bank insolvent or the NBU's decision to dissolve the bank as a result of monitoring activities and compliance with legislative standards. The Statistica software package was used to implement this stage. For this purpose, the following command was executed: Statistics / Linear / Nonlinear Models / Survival Analysis / Life labels and Distributions, that is, by selecting the command of the lifetime and distribution tables.

Stage 3 – ***Study of the effectiveness of the national system for countering cyber fraud and criminal proceeds legalisation based on the Kaplan-Meyer method***. The advantage of using the Kaplan-Meier method in comparison with the life tables method described in the second stage is the fact that in this approach, performance estimates do not depend on grouping the observation interval into intervals. The Kaplan-Meier method involves evaluating survival function as follows:

$$KM(t) = \prod_{i=1}^{t} \left[\frac{n-i}{n-i+1}\right]^{\beta i} \tag{1}$$

where $KM(t)$ – survival function score; n – total number of observation objects (banks) of the studied sample; $\prod^{t}_{(i=1)}$ – the product (geometric sum) in the context of all observation objects (banks), the study of which was completed by the time t; βi – takes a single value if the observation in the context of the bank under study is not censored (completed), and a zero value if the observation in the context of the bank under study is censored (not completed, connection is lost); i – the observation number is not in the context of the bank under study in the source file, but the observation number in the new file, ordered by the number of days of "life" of banks.

The Statistica software package was used to implement this stage. The following command was executed: Statistics / Linear / Nonlinear Models / Survival Analysis / Kaplan and Meier product-limit method, that is, by selecting the Kaplan and Meyer product-limit method command.

Results and Discussion

Considering the results of the bibliometric analysis of papers for 2010-2020, a map of the relationship between the concept of "cyber fraud efficiency" and other scientific categories was formed. VOSviewer was the tool for implementing this map. This allowed selecting 7 clusters, which in Figure 1 are displayed as red, blue, green, blue, purple, yellow, and orange. It is worth noting that the larger size of the rectangle corresponds to a higher frequency of mentioning the category that is indicated in it as a key concept in relation to the category "cyber fraud efficiency".

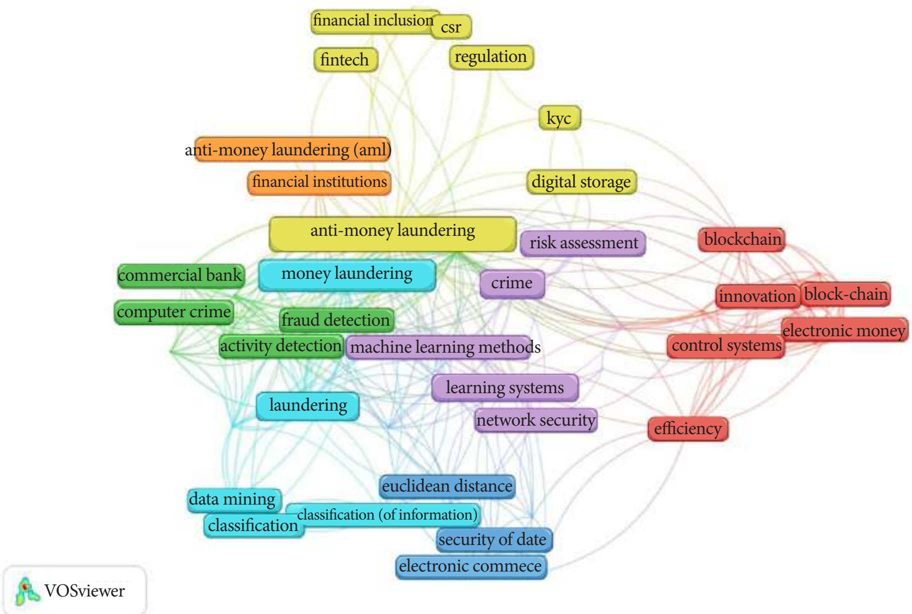

Figure 1. Scientific bibliography of the concept of "cyber fraud efficiency" using the VOSviewer 1.6.15 for the period from 2010 to 2020

Source: compiled by the authors

Analysing the results of the content and contextual block of bibliometric analysis, it is noted that the main array of research is focused on identifying the relationships between the efficiency of cyber fraud and countering money laundering obtained by criminal means (yellow cluster), crime and risk assessment (purple cluster), funds obtained by criminal means (blue cluster), blockchain and management system (red cluster), computer crime (green cluster), financial institutions (orange cluster), and data security (blue cluster). Thus, the fundamental categories in the study of the efficiency of cyber fraud are such categories as "countering money laundering", "funds obtained by criminal means", "crime" and the like. This is also proved by the data presented in Figure 2. Next, the study will analyse the contextual and temporal block of bibliometric analysis (Figure 2). The colour saturation in Figure 2 varies from dark purple (early publications) to yellow (modern publications).

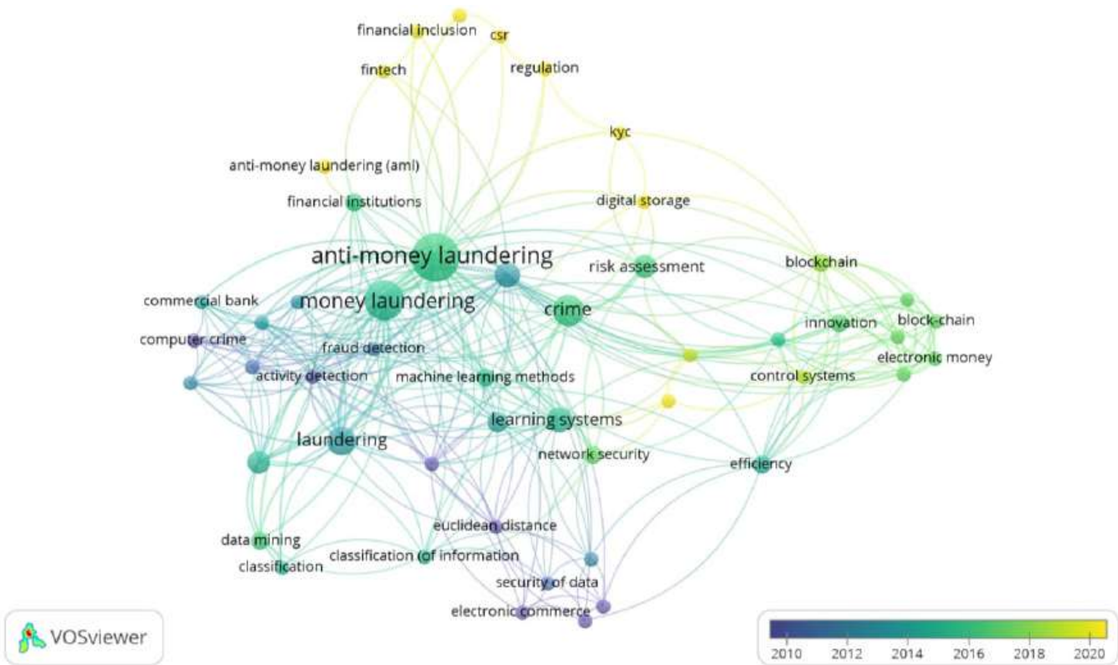

Figure 2. Visualisation map of the contextual and temporal dimension of research on the effectiveness of cyber fraud for 2010-2020 in publications of the Scopus database

Source: compiled by the authors

Thus, based on the results of contextual and temporal analysis on cyber fraud efficiency, three stages of changing research vectors were established, in particular: in 2010-2013, researchers tried to clearly understand and define how to interpret the concept of "cyber fraud", its types. During 2014-2018, researchers were concerned with countering cyber fraud, assessing the risks of its occurrence and establishing control over financial institutions as part of countering the legalisation of funds obtained by criminal means. In 2019-2020, with the development of electronic funds and blockchain, the main focus began to be on financial technologies and countering cyber fraud in modern realities.

At each of the conducted stages of implementation of economic and mathematical modelling of the effectiveness of the national system for countering cyber fraud and criminal proceeds legalisation, the corresponding results of the study were formed. At the stage of studying the effectiveness of the national system for countering cyber fraud, a table of NBU decision-making frequencies on declaring banks insolvent or dissolution of banks is constructed based on survival tables (Table 1).

Table 1. NBU decision-making frequencies on declaring banks insolvent or their dissolution

	Life Table (Spreadsheet1.sta) Log-Likelihood for data: -43,6918																
Interval	Interval Start	Mid Point	Interval Width	Number Entering	Number Withdrwn	Number Exposed	Number Dying	Proportn Dead	Proportn Survivng	Cum. Prop Surviving	Problty Density	Hazard Rate	Std.Err. Cum. Surv	Std.Err. Prob. Den	Std.Err. Haz.Rate	Median Life Exp	Std.Err. Life Exp
Intno.1	0,00	64,91	129,82	70	23	58,5	42	0,718	0,282	1,000	0,006	0,009	0,000	0,000	0,001	90,409	11,820
Intno.2	129,82	194,73	129,82	5	1	4,5	2	0,444	0,556	0,282	0,001	0,004	0,059	0,001	0,003	181,745	220,309
Intno.3	259,64	324,55	129,82	2	0	2,0	0	0,250	0,750	0,157	0,000	0,002	0,074	0,000	0,003	317,333	326,383
Intno.4	389,45	454,36	129,82	2	0	2,0	0	0,250	0,750	0,118	0,000	0,002	0,073	0,000	0,003	302,909	244,787
Intno.5	519,27	584,18	129,82	2	0	2,0	0	0,250	0,750	0,088	0,000	0,002	0,066	0,000	0,003	259,636	183,591
Intno.6	649,09	714,00	129,82	2	1	1,5	0	0,333	0,667	0,066	0,000	0,003	0,056	0,000	0,004	194,727	158,994
Intno.7	778,91	843,82	129,82	1	0	1,0	0	0,500	0,500	0,044	0,000	0,005	0,045	0,000	0,007	129,818	259,636
Intno.8	908,73	973,64	129,82	1	0	1,0	0	0,500	0,500	0,022	0,000	0,005	0,032	0,000	0,007	129,818	259,636
Intno.9	1038,55	103,45	129,82	1	0	1,0	0	0,500	0,500	0,011	0,000	0,005	0,019	0,000	0,007	129,818	259,636
Intno.10	1168,36	233,27	129,82	1	0	1,0	0	0,500	0,500	0,006	0,000	0,005	0,011	0,000	0,007	129,818	259,636
Intno.11	1298,18	363,09	129,82	1	0	1,0	0	0,500	0,500	0,003	0,000	0,005	0,006	0,000	0,007	64,909	129,818
Intno.12	1428,00			1	0	1,0	1	0,500	0,500	0,001			0,003				

Source: compiled by the authors

Based on the data in Table 1, it can be concluded that for the selected set of Ukrainian banks, their activities are constantly monitored in the context of countering cyber fraud and criminal proceeds legalisation, and on average, in cases of violations within 1,428 days (i.e., 3.9 years), the relevant banks are given the opportunity to liquidate them or an appropriate management decision is made to declare banks insolvent, which acts as a quantitative characteristic of the effectiveness of the national system. Thus, during the first 129 days after the discovery of the facts of using banks to conduct cyber fraud among 70 banks considered in the sample (column *Number Entering*) the number of banks that were subject to verification and were not dissolved is 58 (column *Number Exposed*). During this time interval, the share of banks that have stepped up their activities in the context of countering cyber fraud is 28.2% (column *Proportion Surviving*), while the share of dissolved banks within 129 days after the NBU's decision to declare the bank insolvent is 71.8%. Moving to a different time interval – the next 129 days after the discovery of the facts of cyber fraud, the share of liquidated banks decreases to 44.4%, and the share of banks that have taken measures to counteract the existing offenses increases to 55.6 %. It is the indicator of the survival rate (graph Proportion Surviving) indicates the effectiveness of the national system for countering cyber fraud, which is constantly growing during the first three-time intervals (387 days) after the discovery of violations or the decision on the insolvency of banks from 0,282 shares of a unit to 0,750 shares of a unit. 3rd, 4th, and 5th time intervals of 129 days (i.e., from 387 to 645 days) remain constant at 0.750 fractions of a unit, which indicates a high level of efficiency. Further, starting from the 6th interval (774 days or 2.1 years) after identifying the facts of offenses or making a decision on the insolvency of banks, this efficiency begins to fall to 0.500 units.

The next interesting indicator from the standpoint of analysis is such an indicator as the probability density (graph Probability Density), that is, an assessment of the probability of making a decision to liquidate the bank in the appropriate time interval:

$$p_{li} = \frac{K_i - K_{i+1}}{w_i} \qquad (2)$$

where p_{li} – estimation of the probability density of bank liquidation in the context of the *i*-th interval; K_i, $K_{(i+1)}$ – cumulative shares (survival functions) of banks that were not liquidated before the start of the *i*-th and *i+1*-th intervals; w_i – width of the *i*-th interval.

Based on the data obtained in Table 1 in terms of probability density, it can be concluded that the probability of dissolution of banks declared insolvent within the first 129 days is the highest and amounts to 0,006 parts of one. Over the next 129 days, this indicator decreases to 0,001 fractions of a unit.

An important factor in the context of this stage is the analysis of the indicator of the failure rate function or the instantaneous risk function (graph *Hazard rate* Table 1), which is defined as an estimate of the probability that a bank that survived (was not liquidated) before the start of the corresponding time interval will be liquidated within a given interval (the next 129 days for a given case). Analysis of this indicator shows the value of the instantaneous risk function at the level of 0,009 shares of one for the first time interval, that is, among 58 banks that were not liquidated after the decision on their insolvency was made, the instantaneous risk of making a decision on their liquidation is 0,009 shares of one. This risk gradually decreases to 0,002 fractions of a unit over 3rd, 4th, and 5th intervals (i.e., from 387 to 645 days), and then increases to 0,005 fractions of a unit at the end of the studied time period.

The results of the stage of research on the effectiveness of the national system for countering cyber fraud and criminal proceeds legalisation based on the Kaplan-Meyer method are presented in the form of an analysis fragment (Table 2).

Table 2. Results of the analysis of the effectiveness of the national system for countering cyber fraud and criminal proceeds legalisation based on the Kaplan-Meyer method (fragment)

	Kaplan-Meier (Product-limit) analysis (Spreadsheet1.sta Note: Censored cases are marked with +		
Case Number	Time	Cumulatv Survival	Standard Error
32+	20,000		
3	21,000	0,985507	0,014387
67	23,000	0,971015	0,020197
44+	24,000		
62	26,000	0,956302	0,024674
34+	27,000		
56+	30,000		
58+	30,000		
47	35,000	0,940878	0,028695
36+	43,000		
68	44,000	0,925197	0,032218
55+	44,000		
60+	47,000		

Source: compiled by the authors

Analysing the effectiveness of the national system for countering cyber fraud based on the Kaplan-Meier method based on the data in Table 2, censored banks (with incomplete data) are marked with a + sign. In Table 2, all the banks studied are grouped by the number of days (graph *Time*), during which the bank performed its activities in the context of countering cyber fraud and criminal proceeds legalisation after the revealed facts of violations and the NBU's decision on insolvency. Graph *Cumulative Survival* in Table 2 indicates the probability that the relevant bank will "survive" (will not be liquidated for violations in the context of cyber fraud and legalisation of criminal proceeds) and implement counteraction measures. Consequently, the effectiveness of the national system for countering cyber fraud and criminal proceeds legalisation is the highest at the level of at least 95% in the first 26 days after the detection of offenses. This indicator decreases to 90% in the interval of up to 55 days (approximately two months); to 80% in the interval of up to 75 days (two and a half months), to 50% in the interval of up to 93 days (three months), that is, the effectiveness of measures to counter cyber fraud will rapidly decrease with increasing time that has passed since the discovery of offenses. Figure 3 graphically presents the detected dependency.

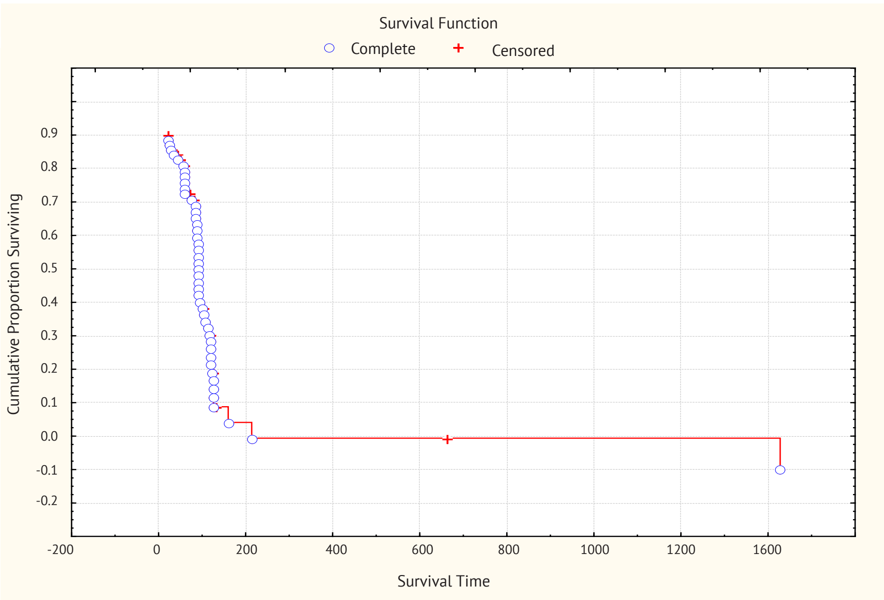

Figure 3. Visualisation of the dependence of the effectiveness of the national system for countering cyber fraud and criminal proceeds legalisation (based on the Kaplan-Meier method) on the time interval after the detection of violations

Source: compiled by the authors

The graph in Figure 3 shows that the value of the survival function drops sharply in the first 93 days after the detection of violations. For ease of interpretation of the results, complete observations are marked with dots, and incomplete observations are marked with crosses.

In order to reflect the nature of the distribution of the effectiveness of the national system of countering cyber fraud, presented in Figure 3, Table 3 is constructed. It presents the percentage ratio: 25% (lower quartile) – banks for which the decision on dissolution is made, that is, appropriate measures are taken in the context of countering offenses, within the first 85 days after the discovery of these facts, 50% (median) – reflect banks that activate counteraction measures for no more than 93 days (3 months). The decision on the largest number of banks (75%) and measures to counter cyber fraud is made within 124 days after the facts of offenses are revealed, that is, within 4 months.

Table 3. Percentile survival functions of distribution of banks for which a decision on dissolution is made

Percentiles	Percentiles of (Spreadsheet1 the Survival Function Survival Time
25'th percentile (lower quartile)	85,0255
50'th percentile (median)	93,8276
75'th percentile (upper quartile)	124,0000

Source: compiled by the authors

The current national system for countering cyber fraud and criminal proceeds legalisation still has certain gaps that hinder its effectiveness. And to achieve such comprehensive efficiency, certain economic and mathematical models are used, aimed at effectively countering the laundering of illegal income, combating cybercrime and cyber fraudsters. It should be noted that economic and mathematical modelling of the effectiveness of the national system for countering cyber fraud and criminal proceeds legalisation clearly demonstrates the scientific significance and practical importance of applying complex models in the study of financial and economic processes and actions, which in its result allows us to get positive results in stabilising the country's economic security.

Taking into account the above, the authors emphasise that the proposed modelling based on methods of survival analysis would allow financial analysts both at the state level and at the level of business entities to analyse, understand, evaluate, and predict financial and economic processes and the likely consequences of their occurrence in time in the line of countering cybercrime and preventing the legalisation of illegal income. This will allow foreseeing possible scenarios for the occurrence of negative consequences from possible fraudulent attacks on the state's economic system, developing and implementing measures to combat financial and economic crimes in a timely and effective manner.

Conclusions

Thus, in the conducted study, a bibliometric analysis of existing papers concerning the problems of the effectiveness of cyber fraud and countering the legalisation of funds obtained by criminal means is carried out. As a result, based on the VOSviewer software, a bibliometric map of keywords and concepts of research papers is built. The conducted research allowed more thoroughly formalising the theoretical aspects of the spread of cyber fraud and criminal proceeds legalisation in modern conditions within the framework of contextual, evolutionary, and spatial analysis. Among the fundamental categories of analysis of the effectiveness of cyber fraud, such concepts as "anti-money laundering", "funds obtained by criminal means", "crime" and others were identified. It is also established that insufficient attention is paid to cyber fraud and money laundering in the economic sectors, although in recent years, due to the development of digitalisation and e-commerce, the problem has become more urgent and causes significant damage to the economy.

The article implements economic and mathematical modelling of the effectiveness of the national system for countering cyber fraud and criminal proceeds legalisation, which is based on the use of survival analysis methods. For this purpose, at the first stage, the input data base was formed from 9 selected indicators for 70 banks of Ukraine for 2019. At the second stage, the effectiveness of the national system for countering cyber fraud and criminal proceeds legalisation based on survival tables was investigated. The third stage investigated the effectiveness of the national system for countering cyber fraud and criminal proceeds legalisation based on the Kaplan-Meyer method, including assessing the survival function and risk function. And as a result of the conducted modelling, the dependence of the effectiveness of the national system for countering cyber fraud and legalisation of criminal proceeds obtained illegally on the time interval after the detection of violations was revealed.

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