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Adaptation of the employer brand of a Ukrainian company in the EU market during the full-scale russian-Ukrainian war

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Abstract. This study is relevant because the impact of the opening of offices of Ukrainian companies in the EU on the adaptation of their value proposition as an employer has not been investigated in the scientific community. There is no information about the migration of Ukrainians as a result of the russian-Ukrainian war and how it affected the market of Poland, Germany, and the Czech Republic. The purpose of the study is to suggest ways to adapt the employer brand to the requirements of the EU labour market. The study is based on the results of two audience surveys in Ukraine and EU countries in 2022. The number of respondents to the Ukrainian audience of candidates is 1,003 respondents. The EU respondents were recruiters and HR managers – 253 companies with more than 1,000 employees each. Both forms used closed-ended questions. The analytical method was used to determine the main trends in the EU labour market, the graphical method was used to display the results of analysis, and expert assessments are used to evaluate the value proposition. As a result of the study, the main differences in the value proposition of Ukraine were identified: ensuring the smooth operation of the office in conditions of blackouts, the safety of the team during air alarms, support for the Armed Forces of Ukraine or internally displaced persons. For EU candidates, the requirements include a policy of equality for all colleagues and candidates. At the same time, a remote work format is a prerequisite for candidates for employment in the company. It is noted that the reputation and compliance with legal requirements should be covered in the company's social networks in order to build trust among the local population in the Ukrainian company. Ukrainian IT companies have increased their level of competition for talent in local markets due to the opening of new offices abroad. Instagram Facebook, LinkedIn, and Instagram are the top social networks for building an employer brand. The practical significance of the study is to adapt the value proposition of a Ukrainian employer to the market requirements of Poland, the Czech Republic, and Germany

Keywords: reputation; crisis management; employer; value proposition; remote work

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Introduction

Since the beginning of the full-scale Russian-Ukrainian war, Ukrainian employers have been forced to evacuate part of the team abroad. Accordingly, most companies opened offices in different countries of the European Union in 2022 to ensure the comfort and productivity of employees. According to the Polish edition of Business Insider, there was a high activity of registering new businesses by Ukrainians in Poland (Business Insider, 2022). In January 2022, there were 188 Ukrainian companies in Poland, and in September – 2,273. At the same time, the average monthly growth rate of new company registrations ranged from 1.5-2.5%. The share of IT companies in the total number was about 16%, but it created competition in the labour market among native Polish residents (Business Insider, 2022). As a result, Polish employers were forced to raise the salaries of existing IT specialists of medium and high skill level (about 34% on average in the market), as there was a high probability of dismissal and transfer to other companies due to higher material motivation (Lis, 2022).

According to Eurostat, the employment rate of the population (74.4%) aged 20-74 years for the third quarter of 2022 and the unemployment rate (5.9%) remain stable compared to the second quarter of the same year (Eurostat, 2022). The largest migration of refugees from Ukraine is observed in Poland – 1,546,354, Germany – 1,021,667, and the Czech Republic – 473,736 (Eurostat, 2022). Among Ukrainians, the largest migration abroad is observed among residents of the West, central regions of the country, and Kyiv (Gradus Research Company, 2022). Territorial placement, social payments and government support for refugees are the main criteria for choosing these countries for temporary shelter. Therefore, it is worth considering adapting the employer brand of Ukrainian companies in these three countries.

The goal is to suggest ways to adapt the employer brand in the EU countries. The main objectives of the study are:

- analyse trends in the development of the employer brand in Poland, Germany, and the Czech Republic;
- analyse and characterise the development of the employer brand of Ukrainian companies in Ukraine;
- make a comparative analysis of the value propositions of Ukrainian companies in the EU markets;
- suggest ways to improve the employer brand of a Ukrainian company in the labour market of Poland, the Czech Republic, and Germany.

The object of research is the employer brand, that is, associations and a list of value propositions that arise when choosing a company for employment. The subject of the research is theoretical and practical provisions for adapting the employer's value proposition to the requirements of the EU labour market.

The main hypothesis of the study is that in order to form a value proposition for a Ukrainian company in the EU, it is necessary to update the list of components in accordance with the specifics of the region and market trends.

The scientific originality of the study consists in the development of a competitive value proposition of Ukrainian companies in the EU market. The theory of the employer brand and its components was studied by Y. Salo (2022), O. Dragan (2022), I. Varis *et al.* (2022), N. Turunen (2022), J. Silva & H. Dias (2022), M. Dzhalai *et al.*, (2022), I. Paicu (2022). The impact of the COVID-19 epidemic on the labour market, changes in candidates' requirements for choosing an employer, and criteria for evaluating the attractiveness of working in the company were analysed by I. Paicu (2022), I. Prymak (2022), Z. Haldzhun & R. Bakai (2020), S. Bharadwai *et al.*, (2022), N. Kuchеров, & V. Tsybova (2022), J. Joglekar & T. Tan (2022). Migration of Ukrainians under the influence of the Russian-Ukrainian war to EU countries and changes in the labour market were analysed by Eurostat (2022), European Council of EU (2022), Gradus Research Company (2022). Features of the development of an employer brand in the Polish market were revealed by M. Seltak (2021), and in the Czech Republic – Rantstard (2022).

In the scientific sphere, there are no studies on changes in the company's employer brand to market requirements and criteria for choosing an employer by the local population in Poland, the Czech Republic, and Germany. In the labour market, there is a movement and opening of new offices outside of Ukraine to evacuate the company's employees and hire new ones.

Literature Review

A well-developed employer brand and effective management of the company's talent are key factors for retaining IT workers in medium-sized companies in the EU. J. Macalik & A. Sulich (2019) found that the fundamentals of sustainability theory, environmental management principles, and corporate social responsibility are interrelated. Accordingly, the employer brand is recognisable and increases the employer's loyalty. The employer's external brand for Generation Z is formed based on the corporate social responsibility report, the employer's career website, and the company's social networks. Cal J. Halvorsen & E. Erin (2021) found that an employer brand with a high level of attractiveness among candidates directly affects the reputation of the corporation and the candidate's intention to apply for a job. The components of attractiveness are social value for the employee, material advantage, openness of information about the company on all resources. Based on this, a single conceptual model of interaction between the employer brand and the number of resumes (reviews from candidates) for an open position is formed.

L. Löffler & C. Giebe analysed various approaches in the theory of components of the employer's value proposition and as a result divided them into types: focus on personal development of the employee, focus on the company's competitiveness, attributes of corporate culture, functional requirements for the workplace, and material motivation.

After analysing the characteristics of generations and attitudes to the banking sector, it was revealed that Generation Z strives for mobility and multiple choice of functions, an individual approach from the manager, and the ability to work remotely (Löffler & Giebe, 2021). For candidates in Ukraine, when choosing an employer, the priority is the level of salary, training in the company, remote work format, official employment, and the absence of the company in the Russian market. For candidates without work experience, the main selection criteria are material motivation, the opportunity to study and combine work with studying at the university. T. Bilorus & S. Firsova (2019) have created a methodology for assessing the level of development of the employer brand, which is influenced by organisational, functional, economic, and psychological attributes. Y. Salo (2022) investigated the difference between the marketing goal and the employer brand, namely: the target audience of the candidate, the development of the corporate spirit, and the growth of the attractiveness of the employer in the labour market. During remote work, it is recommended to implement a combination of office visits and remote work format. In the Ukrainian market, the most popular job search platforms are special career sites, Telegram with a selection of vacancies, friends/acquaintances.

In 2022, as a result of a full-scale war, 62% of businesses were forced to move their businesses to EU countries, most of them to Poland and Germany. O. Dragan (2022) found that the main criteria for selecting countries were demand for business products/services, developed infrastructure, and fewer legal barriers to company registration. As a result, the value of forming an employer brand for businesses increases. Since the growth of competition for talents of Ukrainian companies with regional ones and higher requirements for the value proposition among the local population have affected labour market trends.

According to the forecasts of Content Stadium specialists of the Czech labour market in 2023, the projected unemployment rate will increase by 0.1 percentage points and will be 3.5% (Content Stadium, 2022). As a result, employer brand development managers must use a marketing approach to find new candidates. Recruiters receive the largest number of job reviews on job search sites, career pages and the company's website, and a referral system for employees. Therefore, the advertising budget for promoting the employer brand should be directed to these sources of candidate search.

According to the analysis of 253 representatives of companies surveyed in Germany, Great Britain, the Netherlands, France, and Belgium, in 2022, only 64% of employers have a well-formed strategy for developing the employer brand and 46% have formed an employer value proposition. The respondents were recruiters, HR managers, and employer brand development specialists. The key components of positioning the employer brand online are the integrity and reliability of the company, conciseness

and clarity in statements, and high-quality visual design of pages in social networks. I. Varis *et al.*, (2022) found that the main goal of a company's social media presence is to increase the number of job candidate reviews (64%). This decision is part of the employer brand development strategy, since during a remote work format; this is a direct contact with the candidate. The most popular candidate search networks are LinkedIn and Facebook (more than 70%). Instagram is in the third place (45%). These platforms are the most popular tools for forming an employer's external brand according to their survey (Varis *et al.*, 2022). Accordingly, these platforms should be key to building an employer brand in social networks. The work and advertising budget with platforms should be prioritised depending on the target audience.

N. Bazalziiska, D. Bazhakova analysed key trends in the development of the employer brand in the EU that emerged under the influence of COVID-19. It was found that there will be no 100% return to the office work schedule. Corporate culture changes towards trust in the employee when performing tasks and making independent decisions. The higher the level of trust of the company's management, the higher the employee's belonging to the company and identification with it. The employer brand of companies that have a remote work format receives a greater response to vacancies (Bazalziiska & Bazhakova, 2022). At the same time, 52% of candidates consider only flexible working hours with a remote format. Integrating diversity and equality policies at all levels of the company has a positive impact on the attractiveness of the employer (33%). As a result, the implementation of this policy increases the company's profitability by about 27%. A social programme to support the physical and mental health and well-being of employees is one of the trends, as 49% of respondents experience chronic stress.

Bilorus defines the concept of an employer brand – a positive image of the company and an attractive place to work for the target candidate (Bilorus, 2019). Y. Salo (2022) suggests that the goal of creating an employer brand is to attract talent, create a corporate culture, increase the brand's competitiveness in the labour market, and retain the company's staff. O. Dragan (2022) suggests distributing value propositions according to employee categories (by age or work area) and appropriate communication, which will become components of a successful employer brand. A. Savina & I. Torianyk proved that the employer's value proposition is the basis for increasing the attractiveness of working in the company. Its absence negatively affects the company's reputation. The employer's attractive value proposition matrix consists of four areas: financial and physical well-being, corporate culture and social well-being, work environment and mental well-being, and talent development (Savina & Torianyk, 2022). Therefore, when changing or adapting the employer's value proposition, it is necessary to consider all areas. I. Varis, *et al.* (2022)

analysed the digital environment for employer brand development. Platforms include social networks, corporate websites, job search sites, online forums, electronic publications, and digital communications (Zoom, Teams, Google Meet). N. Bazaliyska (2022) suggests dividing work with the employer brand into an internal and external audience. Internal – employees of the company, external – target candidates. The task for developing the employer brand for the internal audience is to develop projects and measures to increase employee loyalty and engagement, develop effective communication with personnel at all levels of management. The task for the external one is to increase the recognition of the employer and attractiveness for target candidates in comparison with competitors (Bazaliyska, 2022). The criterion for completing tasks is characterised by numerical measurements and depends on the state and goals of each company.

Materials and Methods

The choice of online platforms is one of the key tools for adapting the employer brand in the European market. Online platforms include job search sites, social networks, LinkedIn, Instagram, and Facebook. Therefore, it is necessary to conduct a comparative analysis of online job search platforms for the local population of the EU, the criteria for choosing a future employer, and the components of its value proposition. This should help employers develop their brand positioning in new markets and fill vacancies faster.

The analysis was carried out based on surveys conducted by the Ukrainian audience and able-bodied respondents of EU countries in 2022. The survey of the Ukrainian audience was conducted in May 2022. The survey involved 1,003 respondents – 53% of whom were social science professionals, 25% had no work experience, and 22% had more than 3 years of experience. To collect the data, the authors communicated with employment centres and student councils of Ukrainian universities on the protection of personal data when filling out the survey form. All respondents agreed to the processing of personal data in accordance with the law of Ukraine. Survey questions:

- Since the full-scale war, how has your work situation changed?
- Choose 5 important factors for you when choosing a company for an internship/job;
- What resources are you currently using to find an internship/job;
- What difficulties did you face when looking for a new job;
- What format of work is most comfortable for you?

The EU respondents were recruiters and HR managers of 253 companies with more than 1,000 employees each. Both forms used closed-ended questions:

- Do you or your team use social media as a communication channel for recruitment and/or employer branding purposes?
- Which social media channels does your recruitment or employer branding team use?

- What is/are your main goals for your social media channels?
- What content topics do you usually post on your social media channels?
- What type of content do you usually post on your social media channels?
- What would be your top tip or piece of advice for teams that want to use social media for employer branding and/or recruitment purposes?
- How does social media content that features photos of your employees perform compared to content that does not feature anyone?
- Do you encourage employees to share and engage with your recruitment social media content?
- What challenge are you currently facing when it comes to creating your social media images and videos?

The ranking of value proposition criteria or the choice of social networks in different countries was based on a score from 1 to 5 points, where 5 is the highest priority for respondents.

The SWOT analysis methodology was used for the value proposition of the employer brand for the EU market (Tymchenko, 2019). Abbreviations of the method name are deciphered:

S – Strengths – strengths, advantages of the employer's value proposition over competitors that require maximum use;

W – Weaknesses – weaknesses and disadvantages of the research object. The purpose of this technique is to identify and level them;

O – Opportunities – external factors that determine potential opportunities for increasing the competitiveness of the employer brand of a Ukrainian company;

T – Threats – external factors that can potentially worsen the processes of developing an employer brand in the EU market. These factors include the actions of competitors, changes in legislation, and changes in expectations on the part of voters.

Based on the graphical assessment, the components of the value proposition were identified, which will allow specialists to develop a strategy for forming the employer brand for target candidates in new markets – the local population.

The analytical method was used to determine trends in the EU labour market, the requirements of the local population of Poland, the Czech Republic, and Germany for employers. The expert assessment method was used to determine the priorities of value job offers and select sources of job search. Graphic methods were used to illustrate practical materials. Statistical analysis was used to analyse the results of an expert survey using Microsoft Excel software suite.

Results and Discussion

Trends in employer brand development in the Polish labour market include a variety of job offers for candidates of different profiles, internship opportunities for graduate students, employment promotion for internal employees,

and team training (Setlak, 2021). In the Czech labour market in 2022, the most important criterion for choosing an employer was an attractive salary and additional bonuses – 70% of respondents (in 2021, 74%). Long-term life insurance is also an important trend in shaping the employer brand in the Czech market. In third place is a pleasant working atmosphere (Randstad, 2022). For the second year in a row, the most attractive company to work in is Microsoft. The employer's value proposition includes life insurance, competitive wages, and a positive reputation. In the German market, trends in the development of an employer brand are the preservation of a remote format of work as part of the company's culture, inclusivity and equality in recruitment. Moreover, the third important component is the creation of measures for the well-being of employees (Paicu, 2022). Trends in the development of

the employer brand in the labour market of Ukraine are:

- reducing the budget for creating an employer brand for external candidates;
- growing number of job candidates due to job loss during a full-scale war;
- social networks as one of the main tools for finding candidates and increasing employer brand awareness (Prymak, 2022).

To adapt the employer brand of a Ukrainian company to the EU market, the main differences between the value proposition and the source of job search were analysed. During the COVID-19 pandemic, most companies were forced to increase their presence on social networks and career platforms to find targeted candidates. The choice of online sources for finding vacancies or internships depends on the country (Poland, Czech Republic, or Germany) (Fig. 1).

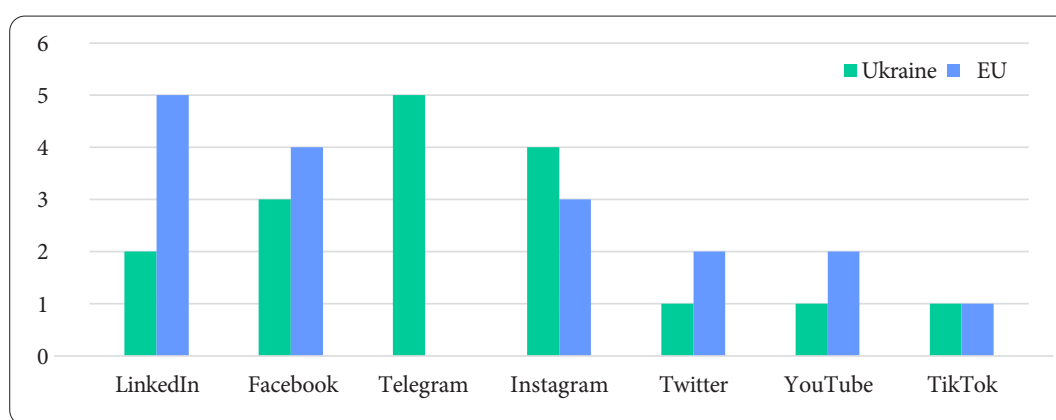


Figure 1. Ranking the priority of choosing social networks for job search by candidates

Source: developed by the author based on a sociological survey

The distribution of communication according to the target audience and the social network should differ. This is necessary to create a positive and attractive image of the employer in comparison with competitors. Facebook, Instagram, and LinkedIn should be the top priority sources for developing the employer brand in social networks in EU countries, based on the survey analysis. LinkedIn is expected to be a popular network for candidates, as it brings together professionals from all over the world (LinkedIn, 2022). It is worth noting that the Telegram platform is not used in the EU for job search or job placement. New platforms for finding candidates and forming an employer brand for Ukrainian companies are Twitter and YouTube. Now Ukrainians perceive them as media for entertainment and receiving news (Haldzhun & Bakai, 2020).

The employer's value proposition must consider new components and meet the requirements of candidates. An excellent criterion is the withdrawal of the company's international representative offices from the Russian market and support for the Armed Forces of Ukraine and internally displaced persons. This is relevant only for Ukrainians who are in Ukraine and work under martial law. Therefore, this criterion was excluded from the comparative rating of

the components of the value proposition. The criterion of inclusivity is equal access to the position and working conditions in the company for candidates with disabilities and physically healthy people. In the EU countries, this factor is a component of the value proposition and contributes to the development of a culture of inclusivity in the company. However, only in the last few years has a policy of supporting candidates with disabilities been implemented in Ukraine. To rank the priority of choosing an employer by candidates in accordance with the value proposition, scores from 1 to 5 points were used, where 5 points were the highest for respondents (Fig. 2).

The most important criterion for candidates when choosing a workplace in the EU is the level of salary that meets the requirements of the labour market and is consistently paid to employees. In second place is training from the employer, which ensures the growth of professionalism and the level of expertise of employees. Training and development is based on internal requirements and programmes for training specialists, periodic evaluation of employees, creation of development plans and improving the level of competence. After the start of the COVID-19 pandemic, a remote format is necessary for

employees. The majority of respondents are not ready to return to an office-based work format. Therefore, comfortable working conditions should ensure not only work in the office, but also remotely from home – high-quality appliances, a headset, and stable Internet. According to the analysis of research, a mandatory requirement for

employment in a company should be official employment in accordance with the requirements of the legislation of the EU country.

To objectively assess the compliance of the value proposition with the requirements of the EU market, it is necessary to conduct a SWOT analysis (Fig. 3).

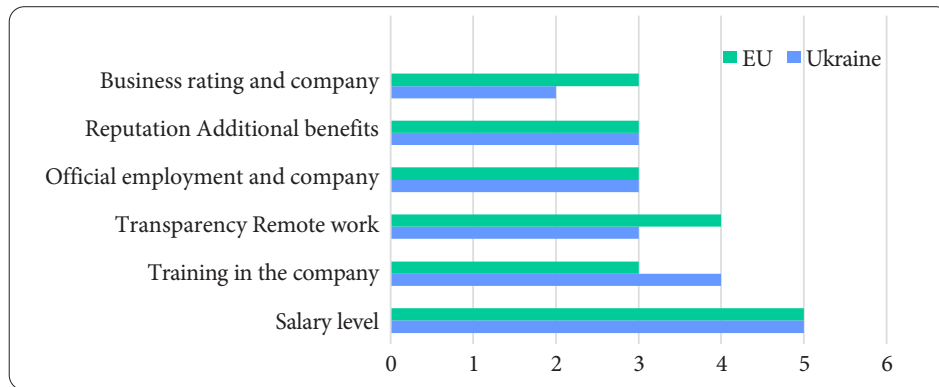


Figure 2. Ranking the priority of choosing an employer by candidates in accordance with the value proposition

Source: developed by the author based on a sociological survey

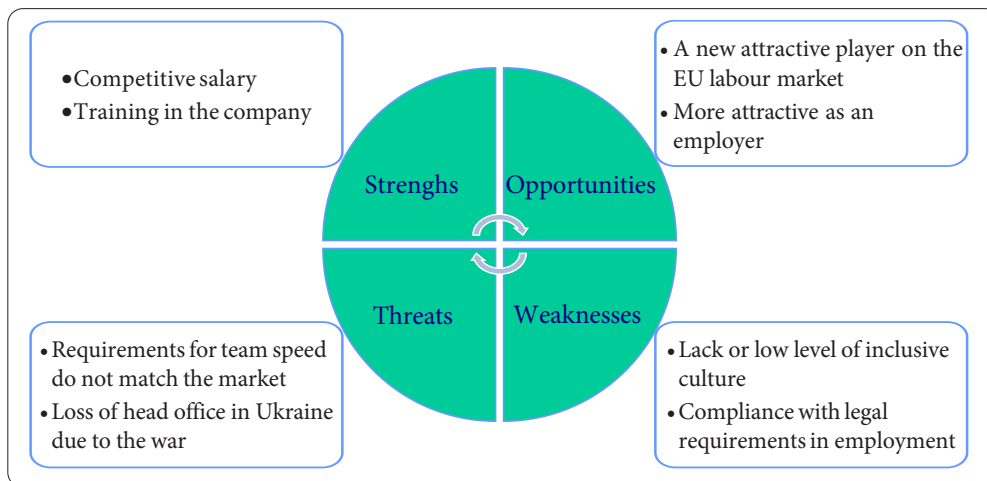


Figure 3. SWOT analysis of the value proposition of the employer brand of a Ukrainian company for the EU market

Source: developed by the author based on the analysis of Figures 1 and 2

For Ukrainian companies operating internationally, the process of adapting to the EU market is easier during a full-scale war in Ukraine. A competitive advantage is the compliance of wages with the market requirements of Poland, the Czech Republic, and Germany. However, the fight for talent in these countries is high. In second place among the competitive advantages is training within the company. Therefore, it is necessary to analyse how well the career development component is developed within the employer through feedback from the team and changes in professional skills. Development results after training should be communicated with potential employees in social networks and the company's career website. These can be interviews in text or video format.

Opportunities for Ukrainian companies to enter the labour market in Poland, the Czech Republic, or Germany are the originality and interest in a new employer among potential candidates. Therefore, it is important to create a positive image of the company as an employer and add key components of the value proposition to communication. When forming an employer's development strategy in the EU market, it is necessary to analyse the inclusivity and equality of access to work in the company. It is also important to establish the process of communication with the team in different countries and opening hours. Special attention should be paid to official employment in accordance with the requirements of the labour legislation of Poland, the Czech Republic or Germany. This factor is

important for EU candidates. Therefore, job transparency and equality of candidates during hiring should be reflected in the brand's online communication.

The main obstacles may be differences in the speed of selection for a certain position in the company and the loss of main control due to the threat of a missile strike in Ukraine. Ways to avoid the first threat are to analyse the labour market and the duration of the recruitment process in the EU target market and adapt within the company. In order to avoid the second threat, it is necessary to plan the transfer of responsibilities to a new responsible person in the event of the loss of the head of the department.

Adaptation of the employer brand of a Ukrainian company in the EU market consists of a material component: competitive wages, insurance, and training in the company. An intangible component is the ability to work remotely. The main emphasis in communication in new labour markets should be placed on these components of the value proposition.

The prerequisites for the development of the employer brand and its value proposition are determined by the organisational culture, name, and reputation of the company as a trading brand. This is a logical business process, since first the company's product or service and its marketing are formed, and after the recruitment and establishment of the team, the employer brand is developed. To reduce staff turnover, the crucial factors are recognition of the team's contribution to the company's development, team, corporate culture, and work-life balance (Rizman, 2022). The criterion of training in the company takes the second place in the priority of choosing a future employer in the EU and Ukrainian markets. Therefore, it is necessary to cover this in social networks, job descriptions or internships, and the company's career website.

To evaluate the employer brand for the company's team, it is necessary to study the level of employee satisfaction with working in the company at least once every six months or a year. In the analysis of methods for assessing the level of development of the employer brand, the criterion of team evaluation is one of the main ones. The components for conducting a survey can be different in type: financial, intangible, values, and mission of the company. That is, any that the manager considers necessary to evaluate. Different approaches to the survey components and the employer's value proposition are not analysed in the paper.

Based on the analysis of job satisfaction in the company, a positive image of the employer, components, and key messages for the communication strategy are formed. For a company entering a new labour market, the features of candidates and the specifics of communication between the local population are the basis of the preparatory stage. The company's competitive advantage in the labour market is created based on unique components of the value proposition. Therefore, the salary level and training conditions in the company should correspond to the level of competing companies or above average (Shubhangi, 2021). The paper and scientific studies do not reveal the results of

developing the employer brand of Ukrainian companies and their value propositions, so there is a need for further analysis to form reasonable recommendations.

According to the conducted research, it was proved that the effectiveness of hiring new staff increases with a positive employer brand among candidates. There is also a direct effect of COVID-19 on reducing the moderate relationship between employer branding for external candidates and employer brand-building programmes for an internal audience (team). Therefore, the use of social networks for both audiences will increase the employer brand awareness and awareness of the facts and uniqueness of the components of the company's value proposition (Kosova *et al.*, 2022). Social networks should differ from each other according to their target audience. In other words, the same content or its design will not affect candidates unambiguously effectively. That is why the scientific field analyses different methods and approaches communication and working methods for different generations. However, communication strategies in social networks as components of developing an employer brand in accordance with different generations and digital environments require detailed research.

The study reveals that the policy of inclusivity and equality of employees during employment is a weak component of the employer brand of a Ukrainian company in the new markets of Poland or the Czech Republic. Therefore, there is a need to study the impact of integrating this policy into the strategy of developing the employer brand of Ukrainian companies. The scientific research reveals the principles of integrating the policy of equality and inclusivity at all levels of personnel management: politeness in communication, documentary and visual design of the employer's value proposition in accordance with different categories of employees, transparent and understandable communication with all employees regarding the implementation of the policy, its necessity and importance (InStride, 2021).

A positive impact on the development of a positive image of the employer in social networks through publications with employees of companies was revealed. LinkedIn as a professional network is used by specialists with work experience. Therefore, content created by employees in this network and published on their personal pages about working in the company increases the competitiveness of the employer brand in the labour market (Joglekar & Tan, 2022). It is investigated that it is advisable to use social networks to involve company employees in internal communication. With the constant support of communication via online messengers, an increase in employee loyalty to the company and team was revealed (Špoljarić & Ana Tkalac Verčič, 2022). Digital technologies and the speed of communication with the employer play a key role in employment for Generation Z (Islamiaty *et al.*, 2022). It is necessary to conduct a study of which network affects the employer brand and how, and what PR activities affect candidates and employees. The study does not fully reveal the potential impact of social networks. There is an open need to

investigate the impact of other social media tools. Additional research is needed into the content posted by employers on social media. That is, what format (photo, video, audio, picture, text), style, dynamics of presentation, duration of familiarisation with the material, and trends affect different categories of subscribers and their perception of the employer brand. The analysis should consider the scale of the company, the multi-nationality of the team, and the territorial location of the office to which the hiring takes place.

Conclusions

The result of the study represents the ways to adapt the brand of a Ukrainian employer in the labour markets of Poland, the Czech Republic, and Germany. The first criterion for choosing a job for candidates in the three countries listed above is the level of salary, in the second – insurance, and in the third – training in the company. An intangible factor in choosing an employer is the format of work, mainly remote or hybrid. The employer brand in Ukraine is not a priority for Ukrainian companies due to the full-scale war in the country. However, employers are increasing their social media presence.

The development of an employer's value proposition of a Ukrainian company in the EU markets is based on trends and requirements of local candidates. Instagram Facebook, LinkedIn, and Facebook should be used to build an employer brand. The more sincere and truthful the company is about the benefits of work, the higher the number of responses to vacancies or internships. It is necessary to pay attention in the value proposition to the policy of inclusivity and equality of all employees. Integration should take place at all levels of the company and be accessible to each candidate when considering the company as a future employer. The proposed format of work should be hybrid – work from home and office. The majority of the local population of EU countries does not consider only the office format of

work after the onset of COVID-19. Therefore, comfortable working conditions should be provided in an office with inclusive needs and remotely modern equipment. What is new for Ukrainian companies is a less fast pace of work and a longer deadline for completing tasks. This is conditioned by the specificity of residents of EU countries who highly value work-life balance.

New opportunities for Ukrainian companies in the EU countries are the creation of a competitive environment for existing and well-known employers. As a result, increase the attractiveness of the employer brand through greater flexibility and rapid adaptability when entering a new job market. Accordingly, the number of responses to vacancies or internships is higher. However, it is necessary to analyse the culture of inclusivity, adapt it to the company's team, and start implementing it in Ukraine. Building an employer brand in social networks should start with LinkedIn and Facebook in English. The PR strategy should be to display the company as an employer. Honesty and openness with candidates regarding working conditions, material and non-material motivation, and uniqueness in additional benefits should be reflected on all online job search platforms. Information about reputation and official employment must be covered in the value proposition and social networks.

Further prospects for the study are to assess the adaptation of the employer brand of Ukrainian companies in the markets of Poland, the Czech Republic, and Germany. The evaluation criteria will be the level of recognition of the employer in new markets and the number of responses from the local population of countries to open positions in the company.

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None.

Conflict of Interest

None.

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Адаптація бренду роботодавця української компанії на ринку ЄС під час повномасштабної російсько-української війни

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Анотація. Дане дослідження є актуальним, оскільки у науковій сфері не досліджено повністю вплив відкриття офісів українських компаній в країнах ЄС на адаптацію їх ціннісної пропозиції як роботодавця. Відсутня інформація про міграцію українців внаслідок російсько-української війни та як це вплинуло на ринок Польщі, Німеччини та Чехії. Метою дослідження було запропонувати шляхи адаптації бренду роботодавця до вимог ринку праці ЄС. Основою дослідження стали результати двох опитувань аудиторії в Україні та країнах ЄС у 2022 році. Кількість респондентів української аудиторії кандидатів становить 1003 респонденти. Респондентами країн ЄС стали рекрутери та HR-менеджери – 253 компаній, які є мають понад 1000 працівників кожен. В обох формах використовувалися запитання закритого типу. Аналітичний метод було використано для визначення основних трендів на ринку праці ЄС. Графічний метод використаний для відображення результатів аналізу, експертних оцінок – для оцінки ціннісної пропозиції. У результаті дослідження було виявлено основні відмінності ціннісної пропозиції України – це забезпечення безперебійної роботи офісу в умовах відключень світла, безпека команди під час повітряних тривог, підтримка Збройних Сил України чи вимушено переселених осіб. Для кандидатів країн ЄС у вимогах присутня політика рівності до всіх колег та кандидатів. При цьому віддалений формат роботи є обов'язковою умовою кандидатів для працевлаштування в компанії. Зазначено, що репутація та відповідність вимогам законодавства має висвітлюватися у соціальних мережах компанії задля формування довіри у місцевого населення до української компанії. Завдяки відкриттю нових офісів за кордоном українські IT-компанії збільшили рівень конкурентності за таланти на місцевих ринках. LinkedIn, Facebook та Instagram є найбільш пріоритетними соціальними мережами для формування бренду роботодавця. Практичне значення дослідження полягає в адаптації ціннісної пропозиції українського роботодавця до вимог ринку Польщі, Чехії та Німеччини

Ключові слова: репутація; кризовий менеджмент; роботодавець; ціннісна пропозиція; віддалена робота

Public debt of Ukraine: Essence, current trends and management

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Abstract. At the present stage of the market economy, in the conditions of rapid development of globalisation and cooperation of states in political, economic, and social aspects, public debt is an objectively determined phenomenon, it is an integral part of the country's financial system. Nowadays, Ukraine is in a difficult situation caused by the outbreak of a large-scale war with Russia, which is one of the main reasons for the existence of the public debt. Due to the insufficient amount of monetary resources in the budget, the state is forced to attract financial resources in order to perform its functions. The purpose of this study was to substantiate the theoretical essence of public debt, analyse current trends in the generation of public debt, and identify optimisation ways for effective public debt management in order to reduce it. The authors used the following scientific methods: empirical (description and comparison), theoretical (analysis, synthesis, and generalisation), and statistical. The study considers the essence of public debt according to the views of foreign and Ukrainian researchers. Based on statistical data, the current state of the public debt of Ukraine is characterised, and the dynamics of the public and government-backed debt for the period 2019-2022 are analysed.

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The volume of expenditures on repayment and servicing of the public debt of Ukraine is analysed. Based on the conducted research, the main reasons for the presence and growth of debt were identified, including the COVID-19 epidemic and the beginning of armed aggression on the part of Russia; a decrease in the exchange rate of the national currency; a decline in production and a reduction in tax revenues; a decrease in the volume of the gross domestic product in real terms; a state budget deficit and a negative balance of payments; an increase in spending on ensuring the country's defence capability and servicing public debt. The proposed recommendations would reduce the country's public debt and increase the competitiveness of the economy at the world level, namely: increase the level of GDP, stimulate the development of small and medium-sized businesses to increase tax revenues to the budget, develop an effective strategy for managing public debt, etc.

Keywords: government borrowing; gross domestic product; budget deficit; public debt servicing; public debt management

Introduction

At the present stage of the market economy, in the conditions of rapid development of globalisation and cooperation of states in political, economic, and social aspects, public debt is an objectively determined phenomenon, it is an integral part of the country's financial system.

Nowadays, Ukraine is going through difficult times caused by the beginning of a large-scale war. One of the main reasons for the existence of public debt is the country's budget and balance of payments deficit. Due to the insufficient amount of monetary resources in the budget, the state is forced to attract financial resources in order to perform its functions.

Many studies are devoted to the investigation of the essence and features of public debt. Thus, O.M. Romankova (2021) analysed the current state of public debt, investigated the dynamics of the public and government-backed debt of Ukraine for 2009-2021, and suggested ways to resolve the debt problem. T. Marshalok, & I. Moroz (2019) revealed the impact of public debt on the economic development of the state and the main causes of public debt. O.R. Zakhidna *et al.* (2020) conducted a study of the structure of external debt of the state budget and noted the main foreign organisations that provide loans to Ukraine. O.Yu. Melykh (2019) revealed the role of public credit and its socio-economic consequences. The researcher assessed government borrowing and substantiated the reasons for the rapid growth of public debt. O.R. Zakhidna *et al.*, (2021) considered the ratio of public debt to gross domestic product and compared it with marginal and safe levels. In addition, they analysed the share of internal and external debt in the composition of public debt and government-backed debt. The main areas for optimising public debt management were proposed by O.Ya. Stoiko & I.A. Shubenko (2021). I.B. Khoma & S.Ye. Papirnik (2020) in their study characterised the concept of "public deficit" and its main causes, and considered the amount of spending that is required to manage and repay public debt. N. Slaviuk (2018) investigated the impact of high volumes of external government borrowing on the country's financial condition. The authors I.O. Liutyi & S.I. Zykova (2019) provided recommendations for effective public debt management in order to reduce it.

The relevance of this topic is conditioned by the fact that an increase in public debt negatively affects socio-economic

development, significantly worsens the financial condition of the state, and can lead to bankruptcy and an economic crisis in the country. Therefore, it is impossible to stay away from this problem, it is necessary to assess the state of public debt and, based on the analysis, look for ways to reduce it.

The purpose of the study is to substantiate the theoretical essence of public debt, analyse current trends in the generation of public debt, and identify optimisation ways for effective public debt management to reduce it.

The following tasks were set to achieve this goal:

- 1) reveal the concept of public debt based on different views of Ukrainian and foreign researchers;
- 2) identify the main reasons for the emergence of the public debt of Ukraine;
- 3) conduct a comparative analysis of external, internal, and government-backed debt during 2019-2022;
- 4) analyse indicators of the ratio of public debt of Ukraine to the level of gross domestic product;
- 5) analyse the costs that are necessary for the servicing and repayment of public debt.
- 6) suggest ways to optimise the reduction of public debt.

Literature Review

A significant number of researchers have considered the essence of the concept of public debt and the reasons for its growth. Western economist A. Smith (1776) revealed the concept of debt financing of public expenditures and came to the conclusion that such financing of expenditures leads to a weakening of the country's economy and a deterioration in the financial situation of the state. J.M. Keynes (1936) in his research considered credit financing and found that public debt is an integral element of public finances and an effective means of achieving demand, which encourages the growth of production and employment of the population. D. Ricardo (1817) studied the main sources of financing for public spending and concluded that government borrowing is the worst option for covering public spending.

Among Ukrainian researchers, a significant contribution to the study of the essence of public debt was made by T.P. Vakhnenko (2009), who analysed the specific features of public debt generation and proposed methods of effective management of its components during the financial crisis. N.I. Dubnytska (2007) paid considerable attention to

revealing the causes of public debt and methods of avoiding budget deficits. V.M. Oparin (2004) revealed the theoretical foundations of the nature of public debt and the main ways to reduce it. O.P. Orlyuk (2003) proposed the main areas for optimising public debt management. O.R. Romanenko *et al.* (2003) analysed the impact of public debt on the economic development of the state, identified the main causes of its occurrence, and suggested ways to avoid the debt problem caused by rapid debt growth.

In general, at different stages of development, economic scientists conducted research on the essence and generation of public debt. The first studies conducted by foreign researchers occur at the beginning of the 14th century. In the system of views of representatives of various scientific schools, such as the classical school of political economy, mercantilist, and Keynesian schools, there was no clear opinion about the essence of public debt and its impact on the country's economy. Representatives of the classical school of political economy had a negative attitude to public debt, their beliefs were that its increase contributes to a reduction in national investment and reduces the productivity of society's capital. In particular, the main representative of the classical school of political economy A. Smith (1776) argued that debt financing of public spending leads to a weakening of the country's

economy and a deterioration in the financial situation, which as a result can lead to bankruptcy. The idea was supported by A. Smith and D. Ricardo (1936), who considered government borrowing to be the worst option for covering government spending.

Moreover, the study of public debt was conducted by J.S. Mill (1848). The scientist was inclined to believe that the national debt leads to higher prices, which is the cause of crisis phenomena.

Instead, representatives of the mercantilist and Keynesian schools had the opposite opinion about public debt. They considered credit financing as a positive phenomenon, explaining this by the fact that the country's economy receives additional resources, and new sources of state income appear. In particular, J.M. Keynes (1936) considered the existence of public debt as a necessary element of public finances. In his opinion, public debt is an effective means of achieving demand, which stimulates the growth of production and employment of the population.

In modern Ukrainian scientific literature, there is no single interpretation of the concept of public debt. Many authors give different definitions of this category, focusing on certain aspects of the essence of public debt, but they are all inclined to believe that the presence of public debt negatively affects the socio-economic state of the country (Table 1).

Table 1. Views of researchers on the essence of public debt

Author	Definition of the concept
T.P. Vakhnenko (2009)	Public debt – the debt of the state in the process of forming and using additional monetary resources of the state at the expense of temporarily free funds of legal entities and individuals, foreign countries.
N.I. Dubnytska (2007)	Public debt – the total obligations of the central government, local authorities, state-owned enterprises and organisations.
V.M. Oparin (2004)	Public debt – the amount of the state's debt to its creditors.
O.P. Orlyuk (2003)	Public debt – the total amount of the government's accumulated debt on its own securities, which is equal to the sum of past budget deficits minus budget surpluses.
O.R. Romanenko <i>et al.</i> , (2003)	Public debt – the amount of debt owed on all debt obligations of the state, interest on it, and unfulfilled financial obligations of the state to economic entities.

Thus, according to the authors of this study, summarising the views of researchers, it is possible to define public debt as the total amount of outstanding public debt on internal and external borrowings, as well as on guarantees provided.

According to Article 2 of the Budget Code of Ukraine, public debt is the total amount of debt obligations of the state to repay received and outstanding loans as of the reporting date, arising from state borrowing (Budget Code

of Ukraine, 2010). Government-backed debt – the total amount of debt obligations of business entities – residents of Ukraine on loans received and outstanding at the reporting date, the fulfilment of which is secured by state guarantees (Budget Code of Ukraine, 2010).

In the structure of public debt, external and internal debt are distinguished, as well as capital and current debt (Fig. 1).

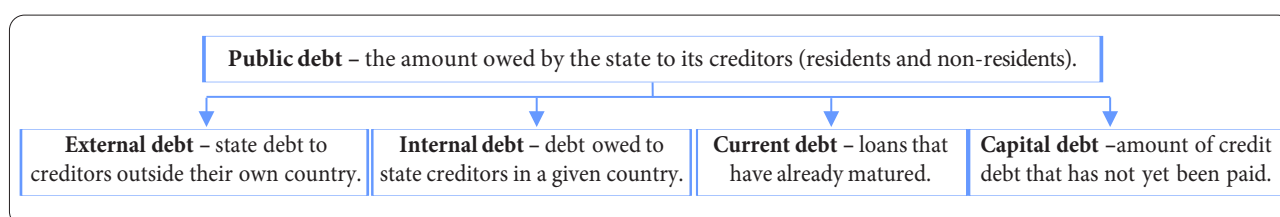


Figure 1. Structure of the public debt of Ukraine

Source: developed by the authors based on (Zubenko, 2017)

The main reason for the appearance of public debt is the insufficient amount of state budget funds necessary for the state to perform its main functions, namely: ensuring the country's defence capability, conducting economic, social, and international policies.

The existence of public debt causes the following negative phenomena:

1. Rising inflation due to a constant increase in public debt.
2. Increasing taxes to raise funds to pay off debt, which negatively affects business activity in the economy.
3. Reduction of public spending, which leads to an aggravation of the socio-economic situation of the country.
4. Reduction of investments in investment projects, as there is an outflow of capital to service external debt.
5. Deterioration of the country's financial and economic situation.
6. Reducing the international authority of the state and public confidence in the government.

Materials and Methods

The theoretical and methodological basis of the study is made up of papers by Ukrainian and foreign researchers in terms of analysing the essence of modern trends and public debt management. The sources of information in the study were materials from scientific conferences and scientific papers, namely, the study by O.M. Romankova (2021), T. Marshalok & I. Moroz (2019), based on which the impact of public debt on the economic development of Ukraine was revealed. The study by O.Yu. Melykh (2019) was used to consider public debt as a consequence of Public Credit. The paper by I.O. Liutyi & S.I. Zykova (2019) was used as a basis for identifying the main areas of public debt management.

During the study, the authors used analytical reports of the Ministry of Finance of Ukraine (2019-2022), data of the State Statistics Service of Ukraine (2019-2022) and the State Treasury Service of Ukraine (2019-2022). It allowed analysing the dynamics of changes in the volume of pub-

lic debt of Ukraine during 2019-2022 and determining the required amount of expenses for repayment and servicing of public debt.

When writing the paper, a systematic approach to the investigation of financial and economic processes and phenomena of modern trends in public debt of Ukraine was applied using the following methods: statistical research, which was used to quantify data on changes in the dynamics and trends in the volume of public debt during 2019-2022; comparative analysis of external, internal, and government-backed debt during 2019-2022; analysis, synthesis, and generalisation, which were used to characterise the indicators of the ratio of Ukraine's public debt to the level of gross domestic product and to analyse the costs required to maintain and repay the public debt. The abstract and logical method was used to formulate the conclusions of the study and provide recommendations on effective management of public debt and ways to reduce its volume.

The study included the following components:

- 1) consideration of the main approaches of both Ukrainian and foreign researchers to determine the theoretical essence of public debt;
- 2) identification of the main causes of the public debt of Ukraine;
- 3) analysis of the dynamics of changes in the volume of the public debt of the country in 2019-2022;
- 4) characteristics of expenses for repayment and servicing of public debt;
- 5) identification of optimisation ways for effective management of public debt in order to reduce it.

Results

Analysis of the dynamics of Ukraine's public debt

To analyse in detail the current state of Ukraine's debt and draw certain conclusions, the study will consider the dynamics of changes in the volume of public debt for 2019-2022, which is shown in Table 2.

Table 2. Dynamics of the volume of public debt of Ukraine during 2019-2022, mln. UAH

Indicators	2019	2020	2021	2022	Deviation 2022-2019 (+/-)
Total amount of public and government-backed debt	1.998.275.4	2.551.935.6	2.671.827.6	4.071.683.1	+2.073.407.7
Public debt	1.761.369.1	2.259.231.8	2.362.492.9	3.715.120.8	+1.953.751.7
External	931.874.0	1.258.521.9	1.299.934.1	2.325.430.5	+457.816.3
Internal	829.495.1	1.000.709.9	1.062.558.7	1.389.690.3	+560.195.2
Government-backed debt	236.906.3	292.703.8	309.334.7	356.562.3	+119.656.0
External	227.347.6	260.412.9	260.295.9	285.515.1	+58.167.5
Internal	9.558.7	32.291.0	49.038.8	71.047.3	+61.488.6

Source: developed by the authors based on data of the Ministry of Finance of Ukraine (2019-2022)

The data analysis shows that from 2019 to 2022, the national debt tended to grow, in particular, in 2020, compared to 2019, it increased by UAH 497,862.7 million. The public external debt increased by UAH 326,647.9 million, and internal debt – by UAH 171,214.8 million. Govern-

ment-backed debt increased by UAH 65,356.2 million in 2020, including external – by UAH 33,065.3 million, and internal – by UAH 22,732.3 million.

In 2021, compared to 2020, the volume of public debt increased by UAH 103,261.1 million. Public external debt

increased by UAH 41,412.2 million, and internal debt – by UAH 61,848.8 million. Government-backed debt increased by UAH 16,630.9 million in 2021, in particular, internal debt – by UAH 16,747.8 million, but the government-backed external debt decreased by UAH 117 thousand.

Compared to 2021, the public debt increased by UAH 1,352,889 million in 2022, of which the volume of external public debt increased by UAH 1,025,496.4 million, while internal debt increased by

UAH 327,131.6 million. As for the government-backed debt, in 2022, it is expected to increase by UAH 47,227.6 million, including an increase in the government-backed external debt by UAH 25,219.2 million and an increase in the government-backed internal debt by UAH 22,008.5 million.

Thus, over the past four years there has been a rapid increase in the total volume of public and government-backed

debt, in particular, in 2020 compared to 2019, increased by UAH 553,660 million, in 2021 – by UAH 119,892.0 million. This increase is explained by the spread of the COVID-19 virus, when the state needed additional funds for treatment and overcoming the disease. In 2022, compared to 2021, there was a significant increase in public debt by UAH 1,399,855.5 million. This trend is explained by the beginning of a large-scale war, during which Ukraine needed to attract additional financial resources in order to ensure the country's defense capability.

Figure 2 shows the dynamics of growth of the public external and internal debt of Ukraine during 2019-2022. In particular, the public external debt increased by UAH 1,393,556.5 million in 2022 compared to 2019. On the other hand, internal debt tended to grow moderately every year, growing by UAH 560,195.2 million over a total of four years.

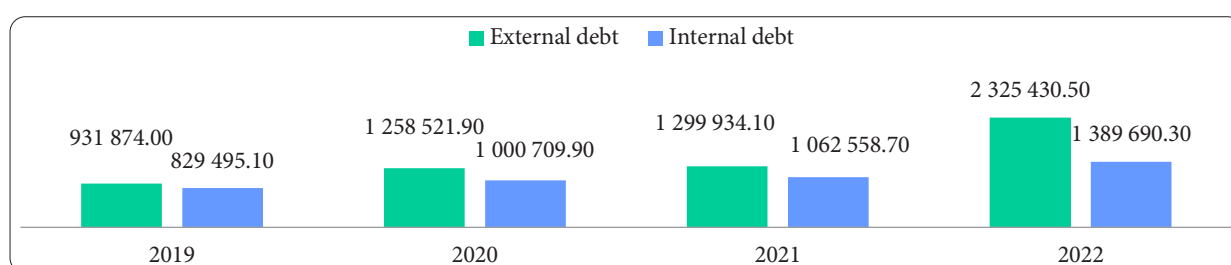


Figure 2. Dynamics of Ukraine's public debt during 2019-2022, mln. UAH

Source: developed by the authors based on data of the Ministry of Finance of Ukraine (2019-2022)

Figure 3 shows the dynamics of government-backed public debt of Ukraine during 2019-2022. Thus, as can be seen from Figure 3, the government-backed public debt, both external and internal, also tended to increase during

the study period. Notably, the government-backed external debt increased by UAH 33,065.3 million during 2019-2020, but in 2021, there was a slight decrease of UAH 117 thousand, while in 2022 it again increased by UAH 25,219.2 million.

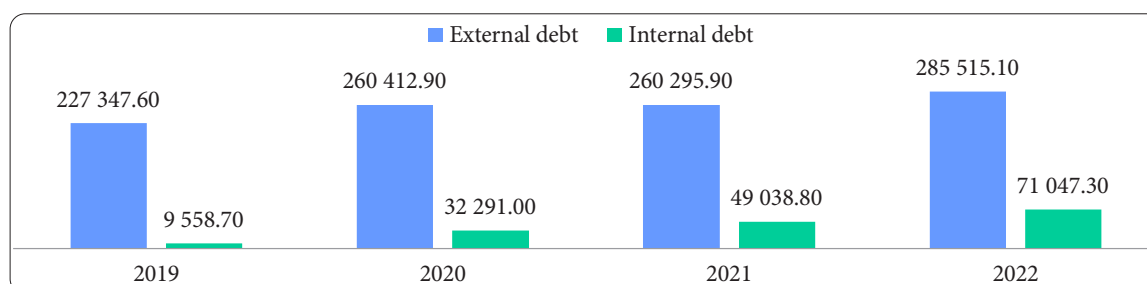


Figure 3. Dynamics of government-backed public debt of Ukraine during 2019-2022, mln. UAH

Source: developed by the authors based on data of the State Statistics Service of Ukraine (2019-2022)

Notably, the analysis of government-backed internal debt tends to increase during the study period. In total, during 2019-2022, it increased by UAH 61,488.6 million.

Table 3 shows an analysis of indicators of the ratio of the public debt of Ukraine to the level of gross domestic product based on data from the Ministry of Finance of Ukraine.

Table 3. Dynamics of the total public debt and GDP of Ukraine from 2019 to 2022 (mln. UAH)

Years	Public debt. mln. UAH	Gross domestic product. mln. UAH	The ratio of public debt to GDP. %
2019	1.998.275.4	3.974.564.0	71.8
2020	2.551.935.6	4.194.102.0	60.8
2021	2.671.827.6	5.459.574.0	48.9
2022	4.071.683.1	3.821.701.8	106.5

Source: developed by the authors based on data from the State Statistics Service of Ukraine (2019-2022)

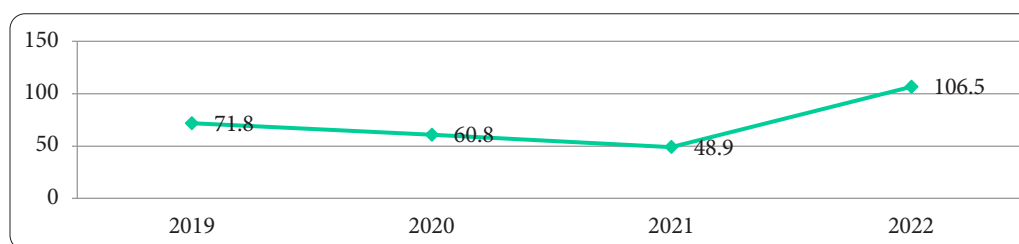


Figure 4. Dynamics of public debt in relation to GDP, %

Source: developed by the authors based on data from the State Treasury Service of Ukraine (2019-2022)

Data from Table 3 and Figure 4 indicate a negative dynamics of changes in the ratio of total public debt to GDP, since the indicator exceeds the maximum permissible value of 60%, which is defined in Article 18 of the Budget Code of Ukraine (Budget Code of Ukraine, 2010).

This leads to a significant debt burden on the Ukrainian economy and debt security in general. In particular, in 2019, the ratio of public debt to GDP exceeded the maximum permissible value by 11.8%, in 2020 – by 0.8%, and in 2021 the indicator was within the permissible value. Such positive changes are caused by the growth of real GDP and

the increase in the real exchange rate of the UAH. But in 2022, there was a rapid increase in the ratio of public debt to GDP, which exceeded the limit value of 60% by 46.5%. First of all, this trend was caused by a drop in GDP, and in 2022 compared to 2021, this indicator decreased by UAH 1,637,872.2 million.

Analysis of budget expenditures for repayment and servicing of the public debt of Ukraine

A constant increase in the volume of public debt is accompanied by an increase in the volume of repayment and servicing costs (Table 4).

Table 4. Budget expenditures for repayment and servicing of the public debt of Ukraine in 2019-2022, mln. UAH

Indicators	2019	2020	2021	2022	Deviation 2022-2019 (+/-)
Public debt repayment expenses	345 200.0	385 500.0	443 550.0	425 530.0	+80 330.0
Expenses for repayment of public internal debt	261 400.0	239 900.0	332 430.0	338 500.0	+77 100.0
Expenses for repayment of public external debt	83 800.0	145 600.0	111 120.0	87 030.0	+3 230.0
Public debt servicing costs	119 200.0	119 700.0	138 580.0	253 860.0	+134 660.0
Total expenses (for repayment and servicing)	464 400.0	505 200.0	582 130.0	679 390.0	+214 990.0

Source: developed by the authors based on data from the Ministry of Finance of Ukraine (2019-2022)

According to the analysis of budget expenditures for repayment and servicing of public debt, it can be concluded that total expenditures for repayment of public debt during 2019-2021 increased by UAH 98,350.0 million. In 2022, compared to 2021, there was a decrease in debt repayment costs by UAH 18,020.0 million. As for public debt servicing expenses, they grew every year, in particular, in 2020 compared to 2019, expenses increased by UAH 500 thousand, in 2021 – by UAH 18,880 million, and in 2022 – by UAH 115,280 million. Total expenditures on public debt

repayment and servicing during 2019-2022 have a negative upward trend. In 2020, their volume increased by UAH 40,800 million, in 2021 – by UAH 76,930 million, and in 2022 – by UAH 97,260 million.

Notably, the main source of repayment of public debt is new borrowing, so Ukraine will have to repay its debts for a long time. Based on the data of the Ministry of Finance of Ukraine, Table 5 shows the projected amount of expenditures for the next four years that Ukraine will have to allocate for repayment and servicing of public debt.

Table 5. Projected budget expenditures for repayment and servicing of Ukraine's public debt in 2023-2026, mln. UAH

Indicators	2023	2024	2025	2026	Deviation 2026-2023 (+/-)
Public debt repayment expenses	234.270.0	237.320.0	200.961.0	141.830.0	-92.440.0
Expenses for repayment of public internal debt	129.040.0	66.240.0	68.111.0	29.490.0	-99.550.0
Expenses for repayment of public external debt	105.230.0	171.080.0	132.850.0	112.340.0	+7.110.0

Table 5. Continued

Indicators	2019	2020	2021	2022	Deviation 2022-2019 (+/-)
Public debt servicing costs	119.330.0	101.140.0	86.910.0	72.900.0	-46.430.0
Total expenses (for repayment and servicing)	353.610.0	338.470.0	287.870.0	214.730.0	-138.880.0

Source: developed by the authors based on data from the Ministry of Finance of Ukraine (2019-2022)

The analysis shows that in 2023, compared to 2022, total expenditures on public debt repayment will decrease by UAH 191,260 million, of which the cost of repayment of the public internal debt will decrease by UAH 209,460 million, but the cost of paying off external debt will increase by UAH 18,200 million. Public debt servicing costs will decrease by USD 134,530 million in 2023. In general, the number of expenditures on repayment and servicing of public debt will decrease by UAH 325,780 million. During 2023-2026, there is a positive trend towards a decrease in the total amount of expenditures on repayment and servicing of public debt, in particular, in 2024, compared to 2023, the number of expenditures will decrease by UAH 15,140 million, in 2025 – by UAH 50,600 million, in 2026 – by UAH 73,140 million.

In general, it can be concluded that with each subsequent year, the volume of expenditures on servicing and repaying public debt will decrease, which is a positive phenomenon. Thus, if Ukraine does not borrow new funds, then in a few years it will be able to fully repay its debt.

The main reasons for the growth of public debt and recommendations on ways to reduce it

From the analysis, it can be concluded that the main reasons for the growth of public debt in recent years were the COVID-19 epidemic, for which significant amounts of funds were allocated and the outbreak of war on the part of Russia.

Other reasons for the increase in public debt include the following:

- 1) decline in production and reduction of tax revenues;
- 2) decrease in real GDP;
- 3) state budget deficit and negative trade balance;
- 4) accumulation of debt for repayment and servicing of public debt of the previous period;
- 5) increase in public spending without corresponding revenues;
- 6) unfavourable investment climate;
- 7) devaluation of the national currency exchange rate;
- 8) financing of state-owned enterprises and banks;
- 9) support for small and medium-sized businesses;
- 10) incompetence of state authorities in managing budget revenues and expenditures (Myskiv, 2020).

In order to improve the financial situation of Ukraine, the government's priority task should be to develop an effective strategy for public debt management. An important task in public debt management is to determine an effective model of institutional support for public credit management. Today, Ukraine uses a government and partly banking model of public debt management, in which the main tasks are performed by the Ministry of Finance and the

State Treasury, and external debt management is carried out through the Central Bank. But world experience shows the inefficiency of these management models. At the present stage, developed countries, such as Germany, France, Belgium, Austria, Portugal, etc., use the agency model of public debt management, which forms a separate structure or agency that deals exclusively with public debt management. Its main task is to select the most effective methods of public debt management (Hrynychutskyi, 2018).

According to the authors of this study, in order to effectively manage public debt and reduce its volume, the following recommendations should be proposed:

- 1) search for additional sources of funds;
- 2) development and legislative approval of the state's debt strategy;
- 3) introduction of debt security monitoring;
- 4) optimisation of the level of tax revenues by stimulating the development of small and medium-sized businesses;
- 5) fight against the shadow economy, which is the cause of tax evasion;
- 6) expansion of cooperation with international financial organisations.

Discussion

As noted earlier, a significant number of researchers have investigated the impact of public debt on the country's economy. Even the Western economist and representative of the school of political economy J.M. Keynes (1936) was inclined to believe that public debt is an integral element of public finance and is an effective means of achieving demand that stimulates production and employment growth. O.R. Zakhidna *et al.* (2020) highlighted not only the negative impact of government borrowing, but also the positive, they argued that borrowing is an incentive for domestic investment. It is worth agreeing with the opinions of T. Marshalok & I. Moroz (2019), who considered the perception of a purely positive or negative phenomenon to be erroneous. They argued that under various conditions, public debt has an ambiguous impact on the country's economy. From a positive standpoint, public debt is the attraction of additional financial resources to meet public needs in the presence of a budget deficit. While from another point, the national debt is a burden, since it requires a significant amount of budget resources for servicing. Therefore, an important task is to ensure an optimal ratio of these two alternatives, which can only be achieved by building a rational public debt management system.

French economist P. Leroy-Beaulieu (1875) also held the view that public debt can be viewed from both the

positive and negative sides. He claimed that humanity was able to make significant progress on the way to civilisation precisely because of borrowing. Instead, the researcher emphasises that it is necessary to be able to use borrowed resources, since their inefficient use can cause negative consequences for the country's economy.

Comparing the conclusions of the authors of this study with the conclusions of other researchers, they differ somewhat. Western economists, along with the negative impact of debt, consider the positive, but in this study, the authors do not consider the positive impact, since they analyse the national debt in specific conditions, namely, under martial law, and prove that public debt has an exceptionally negative impact on the socio-economic development of the state and cannot have a positive impact in any way. The authors of this study share the views of such scholars as F. Modigliani (1961), R. Barro (1979) & G. Saint-Paul (1992), who also described the negative impact of debt on economic development and argued that an increase in public debt under any circumstances leads to a decrease in economic growth. Servicing the growing public debt requires increased spending, which leads to a decline in economic growth.

For many years, researchers have been trying to investigate the dependence of GDP on the size of public debt. C. Reinhart & K. Rogoff (2010) considered the issue of slowing economic growth as a result of public debt and concluded that public debt does not have a negative impact on economic growth until it exceeds 90% of GDP. However, further studies have not confirmed these findings. I. Dmytriiev *et al.* (2022) concluded that public debt begins to slow economic growth when it reaches 70% of GDP. But in the presented study, the authors concluded that the permissible value of public debt should not exceed the maximum 60% of GDP. Whereas T. Shahor (2018) argues that relatively low levels of the ratio of public debt to GDP have a positive impact on economic growth, and only at higher levels of this ratio does the marginal effect become negative. The researcher determined that the limit of the debt-to-GDP ratio is 130%, and not 90%, as was established in previous studies.

In this study, the authors provided recommendations for the implementation of effective public debt management and reducing its volume without prejudice to the state, among which the main one is the development of an effective public debt management strategy. Also necessary measures to reduce the level of public debt are increasing the level of GDP, combating the shadow economy, stimulating the development of small and medium-sized businesses to increase tax revenues to the budget, reducing the level of external lending, and attracting loans from domestic creditors. T. Marshalok & I. Moroz (2019) provided slightly different proposals for reducing public debt. They note that, first of all, it is necessary to simplify the tax system to balance revenues and expenditures, as well as increase the amount of public spending on innovation activities. But such recommendations as the use of domestic borrowing, support for entrepreneurship can also be traced in the study. I.E. Ajayi

& D.G. Edewusi (2020) also share this view, concluding that domestic borrowing should be chosen by the government when financing the deficit. L. Mutsakani (2022) argues that in addition to recommendations developed by other authors to reduce public debt, it is worth paying considerable attention to direct investment, as this will help close capital gaps and reduce the need for external borrowing.

Thus, the existence of the public debt is a big problem and a significant burden on the country's economy, since in the presence of public debt, a large number of resources are lost, in particular for servicing and paying off public debt. But in the absence of debt, these funds could be used for the development of the country.

Conclusions

The analysis shows that public debt is an important problem for Ukraine, as it slows down the development of the country's economy.

In Ukraine, there is a tendency to increase the volume of public debt at a fairly rapid pace, so in 2022 it significantly exceeded the permissible limit and reached 106.5%.

The main reasons for the growth of public debt are the COVID-19 epidemic and the beginning of armed aggression by Russia. Other reasons include: a decline in the exchange rate of the national currency against the US dollar, a decline in production and a reduction in tax revenues, a decrease in real GDP, a state budget deficit and a negative balance of payments, an increase in spending on the country's defence capability and servicing public debt.

The rapid growth of Ukraine's public debt can lead to negative economic and social consequences. If the debt is not reduced and the situation does not improve, it is easy to predict that in a few years Ukraine will be at the stage of bankruptcy.

Therefore, in order to reduce the country's public debt, first of all, it is necessary to raise the level of GDP, stimulate the development of small and medium-sized businesses to increase tax revenues to the budget, develop an effective strategy for managing public debt, reduce the level of external lending, and instead attract loans from domestic creditors, since this will not cause the outflow of domestic capital abroad. It is equally important to study the foreign experience of the economically developed countries of the world in the development of debt policy.

Thus, solving the problem of Ukraine's debt in the short term will contribute to its economic growth and ensure a stable financial situation in the country.

According to the author's team, a promising area for further research is to detail the definition of ways and optimisation tools for effective management of the public debt of Ukraine in order to reduce its volume and increase the competitiveness of the economy.

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Conflict of Interest

None.

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Державний борг України: сутність, сучасні тенденції та управління

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Анотація. На сучасному етапі ринкової економіки, в умовах стрімкого розвитку глобалізації та співпраці держав у політичних, економічних та соціальних аспектах державний борг є об'єктивно зумовленим явищем, він є невід'ємною складовою фінансової системи країни. Сьогодні Україна знаходиться у складному становищі, викликаному початком широкомасштабної війни з росією, що є однією з головних причин існування державного боргу. Внаслідок недостатньої кількості грошових ресурсів бюджету, держава змушена залучати фінансові ресурси з метою виконання покладених на неї функцій. Метою даної статті було обґрунтування теоретичної сутності державного боргу, аналіз сучасних тенденцій формування державного боргу, визначення шляхів оптимізації для ефективного управління державним боргом з метою його зменшення. У роботі авторами було використано такі наукові методи: емпіричний (опис та порівняння), теоретичний (аналіз, синтез, узагальнення), статистичний.. У статті розглянуто сутність державного боргу згідно з поглядами зарубіжних та вітчизняних вчених. На основі статистичних даних охарактеризовано сучасний стан державного боргу України, проведено аналіз динаміки державного та гарантованого державою боргу за період 2019-2022 рр. Проаналізовано обсяг видатків на погашення та обслуговування державного боргу України. На основі проведеного дослідження виявлено основні причини наявності та зростання боргу, серед яких епідемія COVID-19 та початок збройної агресії з боку росії; зниження курсу національної валюти; спад виробництва та скорочення податкових надходжень; зменшення обсягу реального внутрішнього валового продукту; дефіцит державного бюджету та негативне сальдо платіжного балансу; збільшення видатків на забезпечення обороноздатності країни та обслуговування державного боргу. Запропоновані рекомендації, що дозволять зменшити державний борг країни та підвищать конкурентоспроможність економіки на світовому рівні, а саме: підвищення рівня ВВП, стимулювання розвитку малого та середнього підприємництва з метою збільшення податкових надходжень до бюджету, розроблення ефективної стратегії управління державним боргом та ін.

Ключові слова: державні запозичення; валовий внутрішній продукт; бюджетний дефіцит; обслуговування державного боргу; управління державним боргом

Economic impact of restructuring the municipal wastewater treatment system in San Francisco: Possibilities for application in ukrainian realities

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Abstract. The relevance of the subject matter is conditioned by the existing difficulties of operating the wastewater treatment system of large modern cities and the need to make qualitative changes in the structure of their functioning. The main purpose of the study is to investigate the economic effect of restructuring the municipal wastewater treatment system in the city of San Francisco in the context of analysing the promising possibilities of applying this experience in Ukrainian realities. The basis of the methodological approach is a combination of methods of systematic analysis of the experience gained in San Francisco during the restructuring of the wastewater treatment system, with an analytical investigation of the factors influencing the assessment of the economic effect of the implementation of this event. The study revealed the need for comprehensive investment into the restructuring of the wastewater treatment system existing in a large modern city to obtain a sustainable economic effect from the implementation of such programmes and improve the quality of water use services provided to residents of modern Ukrainian cities. The results obtained and the conclusions formulated on their basis are of significant practical importance from the standpoint of prospects for improving the functioning of wastewater treatment facilities in large modern Ukrainian cities and stabilising the overall environmental situation in these cities, as well as obtaining a tangible economic effect from the modernisation of wastewater treatment systems to improve the quality of services provided to city residents

Keywords: modernisation of the wastewater system; wastewater treatment; economic effect; treatment system restructuring; municipal level; environmental situation

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Introduction

To date, an urgent problem of modern cities is the systematic improvement of the quality of wastewater treatment with the complete exclusion of their discharge into the natural water bodies of the city. In real conditions, with an increase in the load on urban wastewater treatment plants over time, the only possible way out of this situation is the modernisation of wastewater treatment plants and their restructuring, which significantly improves the quality of functioning and efficiency of wastewater treatment (Shcherbakova, 2013).

The relevance of the issues of assessing the economic effect of the restructuring of the wastewater treatment system in modern Ukrainian cities is largely based on the problems of operating sewage treatment plants in these cities. This is conditioned by the obsolescence of the equipment of purification systems, the high degree of contamination of reservoirs, and the lack of investment funds for the implementation of such projects (Nazyuta *et al.*, 2004). It is the prospect of reducing operating costs for the maintenance of sewage treatment plants, combined with an increase in the degree of purity of natural reservoirs of cities, that are key factors in assessing the degree of expediency of such measures. The ecological factor is also a crucial one, since it is the degree of purity of natural urban reservoirs that largely determines the features of their further use and affects the environmental situation and the standard of living in cities as a whole.

Ensuring the quality of available water resources depends on monitoring and controlling sources of pollution and discharges of all possible types. Polluted water bodies pose a significant danger to human health and the functioning of ecosystems of large modern cities. Uncontrolled discharges into reservoirs can lead to contamination of drinking water sources, overload of water bodies with organic substances (causing eutrophication), and accumulation of heavy metals and other harmful pollutants (Alabaster *et al.*, 2021). The way out of this situation may be the restructuring of the wastewater treatment system in large modern cities to achieve the optimal economic effect of its subsequent use and improve the quality of services provided to residents of large modern cities.

Wastewater from industrial facilities of a large modern city contains a large number of various impurities which have an extremely negative impact on the sanitary condition of reservoirs located in the city and beyond. In addition, the organoleptic indicators of the water quality of these reservoirs are undergoing changes, including possible toxic effects on people and animals living in the locality. A significant amount of organic impurities is in the solid phase of the runoff, and meltwater should be considered the most saturated in terms of the concentration of mineral and organic impurities (Shah *et al.*, 2021). For this reason, a large variety of impurities in wastewater causes the variability of their composition, which causes significant difficulties in their purification.

Industrial wastewater contains a large variety of compounds, such as hazardous organic pollutants, heavy metals, salts and nutrients, which makes it difficult to clean them.

On the other hand, wastewater treatment using existing technologies is unprofitable due to high energy consumption and contributes to the emission of greenhouse gases. Thus, the use of conventional methods of water purification is not sustainable and not always effective. In this sense, the restructuring of the existing wastewater treatment system opens up broad prospects for improving the treatment system of complex industrial wastewater and their subsequent sustainable functioning (Shah *et al.*, 2022).

The purpose of the study is to investigate the prospects for achieving a sustainable economic effect by restructuring the wastewater treatment system at the municipal level in the city of San Francisco in the context of the possibility of applying this experience in Ukrainian realities.

Materials and Methods

The methodology of this study was based on a combination of system analysis of the experience of San Francisco, which was obtained during the restructuring of the wastewater treatment system, with an analytical investigation of a complex of factors that influenced the assessment of the resulting economic effect. The research was preceded by the creation of a qualitative theoretical base designed to ensure an objective perception of the information provided, as well as the definition of key concepts of the presentation of theoretical and practical material within the framework of the stated subject of research. The theoretical basis included the findings of a number of Ukrainian and, mainly, foreign researchers involved in the modernisation and restructuring of wastewater treatment systems of large modern cities, and an assessment of the economic effect that can be achieved as a result of the successful implementation of such measures.

A systematic analysis of the experience of the city of San Francisco, which was obtained during the restructuring of the wastewater treatment system, allowed assessing the real state of the city's wastewater treatment system, since its establishment in 1952. The use of the principles of system analysis systematised the sequence of restructuring the wastewater treatment system of the city of San Francisco in the context of the relationship with the possible economic effect of the implementation of this set of measures.

The conducted study provided detailed information on the factors determining the economic effect of the restructuring of the San Francisco municipal wastewater treatment plant, including the availability of real prospects for the implementation of this experience in Ukraine.

This combination of scientific research methods predetermined the existence of its specific stages.

The annual economic effect of the restructuring of the municipal wastewater treatment system in San Francisco can be determined using the equation:

$$EE_y = (E_y - E_{nc} \times C) \times 100\%,$$

where, E_y – annual savings, the results that are achieved due to the restructuring of the wastewater treatment system in the city of San Francisco; E_{nc} – standard efficiency ratio, the

final value of which depends on the specific field of activity (for the restructuring of the city's wastewater treatment system, $E_{nc} = 0.85$); C – costs of restructuring, including upgrading the wastewater treatment system and setting up a pumping and treatment facility.

With regard to the assessment of the annual effect of the restructuring of the wastewater treatment system in San Francisco, the calculation of the annual economic effect of the restructuring of the wastewater treatment system of the city will have the form:

$$EE_y = (945,000,000 - 1,125,000,000 \times 0.85) \times 100 = 22.5\%$$

Results

The San Francisco wastewater treatment system was established in 1952. The project of restructuring the sewage treatment plant system was developed by a consortium consisting of the largest construction company MHWConstructors, specialising in the creation of projects for the reconstruction of water treatment and sanitation systems, and WebcorBuilder. According to approximate expert estimates, the total cost of the San Francisco wastewater treatment plant restructuring project amounted to USD 945 million. The annual savings from the restructuring of the treatment plant system have amounted to USD 1,125 million. The sewage treatment plant is scheduled to become operational in the summer of 2025 after the completion of its restructuring (New treatment facilities will be built in San Francisco, 2018).

To date, San Francisco uses a combined wastewater treatment system. There are two sewage treatment plants in the city – 1952 and 1993, which allows for the treatment of up to 80% of all wastewater in the city (62 million gallons of water per day) (4., 06/14/2022). The main objectives of the San Francisco wastewater treatment system restructuring project include the restoration of four main combined sewage discharge (CSD) facilities and the installation of monitoring sensors and equipment that prevents backflow. These measures are aimed at preventing the ingress of salty seawater into the combined urban sewage system at high tide, and optimising the existing wastewater treatment system.

Modernisation of the treatment plant system included the following mandatory steps:

1. Improvement of deep mechanical cleaning of clogged water drains, which is carried out in order to eliminate debris, sand and sediment removal. During the works, up to 10 tonnes of the above-mentioned contaminants were removed, preventing the normal operation of the wastewater treatment facilities.

2. Improving the quality of biological wastewater treatment with separation of activated sludge and subsequent clarification of treated wastewater. In particular, the pH level increased from 4.5 to 7.1, while the hardness index decreased from 8.6 to 6.4.

3. Conducting laboratory studies aimed at determining the level of compliance with the maximum permissible concentrations of pollutants in treated wastewater. In particular, the concentration of iron was noted at the level of 0.2-0.25 mg/l, nickel – at the level of 0.02-0.03 mg/l, copper – at the level of 0.001 mg/l. All indicators correspond to the minimum permissible limits.

4. Improvement of the process of channelling treated wastewater into the natural reservoirs of the city, in particular, into the San Francisco Bay, as well as Merced and Stow lakes.

With regard to the San Francisco sewage treatment plant system, it should be noted that the combined sewage discharge system of this city allows collecting and treating wastewater along with storm water directly in one sewage system.

The potential economic effect of the restructuring of the municipal wastewater treatment system in San Francisco is conditioned by the following factors:

1. Reduction of harmful emissions into natural reservoirs and the absence of the need for their subsequent cleaning. In particular, there was a significant decrease in emissions of iron, nickel, and copper, the content of which after all the measures corresponds to the maximum permissible regulatory values.

2. Reducing the cost of cleaning the sewage system up to 20% of the previous volume by preventing salt seawater from entering it.

3. Improving the quality of wastewater treatment by restructuring the treatment system.

When assessing the expected economic effect, 22.5% of the savings spent annually on the repair of sewage treatment plants, it is worth considering the improvement of the water quality of natural reservoirs of the city due to the reduction of harmful discharges and a decrease in the of disease among residents due to the overall improvement of the environmental situation.

Figure 1 shows a flowchart of the relationship of factors determining the overall economic effect of the restructuring of the municipal wastewater treatment system in San Francisco. Implementation of the measures is planned for the period 2018-2022.

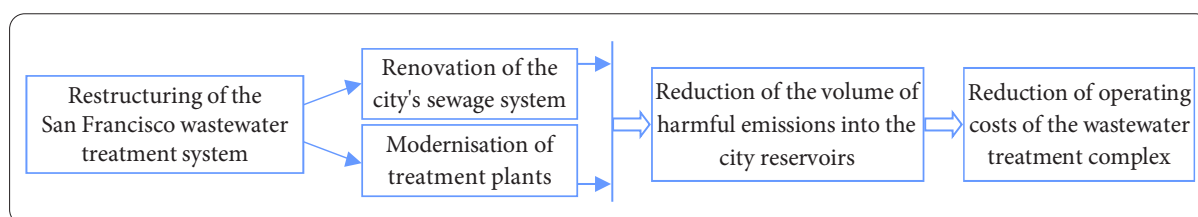


Figure 1. Factors determining the overall economic effect of the restructuring of the municipal wastewater treatment system in the city of San Francisco

The reduction of costs for the operation of the San Francisco sewage treatment system in the amount of up to 20% after their technical modernisation and restructuring of the entire system as a whole is conditioned by the following factors:

1. There is no need to carry out planned and unscheduled repairs of worn-out equipment of treatment facilities after its modernisation.

2. Improvement of the quality of wastewater treatment in general.

3. A significant reduction in the volume of emissions of pollutants into the natural reservoirs of the city, which subsequently eliminates the need for cleaning of reservoirs.

Figure 2 shows the scheme of the wastewater collection system in San Francisco.

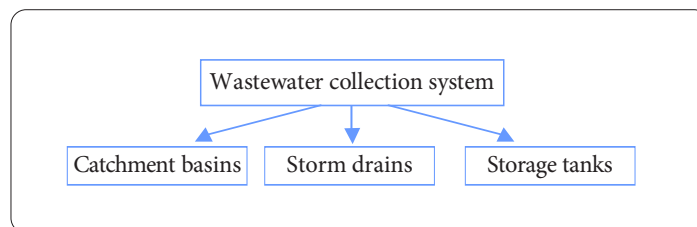


Figure 2. Wastewater collection system in the city of San Francisco

Qualitative restructuring of the wastewater treatment system involves the modernisation and increase of the total number of catchment basins in order to increase the volume of wastewater received. To date, there are over 25,000 such reservoirs in San Francisco, an increase in their number will significantly simplify the flow of storm water.

Storm drains provide redirection of water flows into sewer pipes that direct water into the bay without cleaning it. Modernisation of treatment facilities provides for redirection of water flows to them, in order to carry out cleaning before discharge into natural reservoirs.

Storage tanks are designed to collect wastewater for the purpose of their subsequent transportation to treatment facilities. Wastewater treatment is carried out in the tanks, which includes the deposition and separation of floating materials. The total capacity of the storage tanks located around the perimeter of the city today is over 200 million gallons. Currently, 95% of all discharges in San Francisco are storm water (Wastewater Collection System., 2018).

The process of restructuring San Francisco's municipal sewage treatment plants includes the following key aspects:

1. Reorientation of the city's wastewater collection system to drain water masses into the units of treatment plants.

2. Strengthening control over the functioning of the combined sewage system in order to prevent the ingress of salty seawater.

3. Launch of a Sewer System Improvement Programme (SSIP), which involves the creation of a seismically safe and robust system for monitoring the condition of the sewer system.

4. Commissioning of treatment plants that have passed the stage of modernisation in the process of restructuring the city's treatment facilities system.

The possibility of practical application in Ukrainian realities of the experience of assessing the economic effect of restructuring the wastewater treatment system of large modern cities is determined by the following factors:

- current state of the wastewater treatment system;
- actual level of pollution of urban reservoirs;
- volume of investment funds required for the qualitative

implementation of the programme of the wastewater treatment system restructuring;

- prospects for improving the complex of hydraulic treatment facilities in the future.

In this context, the organisation of surface runoff from the territories of cities and industrial enterprises is essential.

Surface runoff from the territory of cities and industrial enterprises should be considered as an intensive factor of anthropogenic load on natural water bodies. For this reason, the key purpose of sewage treatment plants for industrial wastewater at various industrial enterprises is to prepare and clean wastewater for reuse or to ensure their discharge into sewer networks. Sewage treatment reduces the content of petroleum products, fats, oils, insoluble salts and suspended solids to a minimum. A specific option for wastewater treatment in industrial enterprises should be chosen based on the available types of wastewater and the requirements that the resulting water must meet (Yamaliev & Barieva, 2014).

To date, the possibilities of applying programmes for restructuring wastewater treatment systems in Ukrainian cities are significantly limited due to the lack of funds in the city budget. In many Ukrainian large cities and small settlements, hydraulic treatment facilities are in a dilapidated state, which is conditioned by the lack of funds for scheduled and unscheduled repairs. The ecological situation in the regions also leaves much to be desired, due to the impossibility of performing a quality wastewater treatment and its large-scale pollution by industrial wastes and the daily life of the inhabitants of modern Ukrainian cities.

Discussion

O. Gorb *et al.* (2022) considered a number of problematic aspects of wastewater treatment methods, using the example of the Dikanevskiy wastewater treatment plant (Kharkiv). The researcher notes that the restructuring of the Dikanevskiy wastewater treatment plant provided comprehensive sewage treatment, with significant improvements in complete biological and chemical treatment. Wastewater

coming from industrial and municipal enterprises, as well as from the population, is being treated. The throughput capacity of the city's treatment facilities is 450 m³ per day. Mechanical water purification involves the flow of wastewater into the screen chamber, where the first stage of the process takes place. Screen and rake installations purify water from large waste. Sand and other solid waste in the wastewater is deposited in a special channel. Then the water enters the primary settling tank, which is a reservoir with a volume of 50 thousand cubic metres, where it remains for 7-8 hours. The remaining solid waste is deposited here and the light waste floats up. At the next stage, biological wastewater treatment is carried out in 7 tanks with a volume of 25,000 m³ each. Special beneficial bacteria are used for this. In general, the author's conclusions completely coincide with the results obtained in the course of this study.

E. Margolina investigated the problematic aspects of the construction of economic mechanisms to stimulate the reduction of discharges of polluted wastewater. According to the researcher, there are currently no well-established mechanisms to stimulate industrial enterprises to limit the volume of wastewater discharges into natural urban reservoirs, which complicates the work of urban wastewater treatment plants. The researcher came to the conclusion that economic methods in most cases do not work, because often the financial condition of enterprises is very complex and the ecological problem of the city is of little importance to their managers (Margolina, 2016). To date, payments for discharges of pollutants are calculated based on information contained in approved reporting forms, which are filled out by the balance sheet method by the payer enterprises themselves, based on information about the volume of output, the volume of raw materials used, data on standards for emissions of pollutants. At the same time, the exact volumes of discharges can only be determined at large enterprises that have their own chemical laboratories. This significantly complicates the possibilities of calculating payments for discharges of pollutants by modern industrial enterprises.

M. Sillanpaa addressed the issues of improving water purification systems, while considering a number of problematic aspects of restructuring the treatment plant system in the city of Boston. The researcher came to the conclusion that the qualitative restructuring of the city's sewage treatment plant system allows improving its water supply and enhancing the quality of water in urban reservoirs. The researcher notes that during the restructuring of the treatment plant system of Boston in 1948-1949, it was possible to reduce the volume of harmful impurities in the water several times, while the cost of operating treatment facilities in the city decreased by 30-35%. This saved the city budget by directing them to the implementation of a number of public and social programmes (Sillanpaa., 2020). The author's conclusions regarding the reduction of costs for the maintenance of treatment facilities through their modernisation completely coincide with the results obtained during the implementation of this study, which confirms the existence of economic

prospects for the modernisation and restructuring of the treatment facilities system.

S. Ameta and R. Ameta, in a joint scientific study, considered a number of problematic aspects of improving oxidation processes during the restructuring of the wastewater treatment system. It was revealed that the use of new, environmentally friendly chemical technologies in wastewater treatment systems of large modern cities ensures the achievement of high results in the search for an environmentally friendly method of wastewater treatment. As an example, during the restructuring of the wastewater treatment system in the city of Plovdiv (Bulgaria), results were obtained indicating a significant improvement in the state of wastewater with the introduction of technology based on the use of a series of settling tanks and filters in which water suspensions of varying severity settle. The technology is completely environmentally friendly and does not require additional use of chemically active substances. In addition, the economic effect of using such technology, according to the presented calculated data, is up to 15%, which is expressed in a reduction in the cost of operating treatment facilities (Ameta & Ameta, 2018). Thus, the experience of restructuring the sewage treatment plant system in Bulgaria clearly shows that the use of innovative solutions during the restructuring of the wastewater treatment system of a modern city can reduce the cost of operating wastewater treatment facilities and improve the quality of wastewater in a modern city.

The team of authors represented by A.N. Khan, M. Naushad and A.H. Hamidi, conducted a joint study of a number of problematic aspects of improving the functioning of the wastewater treatment system of a large modern city. The researchers found that during the restructuring of the wastewater treatment system of Patna (India), as a result of mistakes made during the work, a significant release of harmful substances into the waters of the Ganges River was produced, which caused large-scale pollution and significantly worsened the environmental situation in the region. It was possible to rectify the situation through the introduction of a set of measures for biological wastewater treatment, which stabilised the environmental situation and led to its gradual levelling. In turn, this helped to reduce the costs of developing new measures to improve the quality of wastewater treatment, and also reduced the operating costs of maintaining treatment facilities that have undergone restructuring (Khan *et al*, 2022). In general, the conclusions of the researchers correspond to the results obtained in the course of this study, complementing them in the context of assessing the role of biological methods of wastewater treatment in the overall complex of work on the restructuring of treatment facilities in a large modern city.

A. Stefanakis and I. Nikolaou conducted a joint study of a set of measures to organise a circular economy and assess its sustainability in the realities of the modern market system. In the course of the study, the researchers evaluated the effectiveness of the restructuring of the treatment plant system of the city of Lodz (Poland) and the impact of this

process on the allocation of city budget funds. Researchers have come to the conclusion that a uniform reduction in wastewater treatment costs, due to the modernisation and restructuring of the city's sewage treatment plant system, is completely realistic considering the prospects for obtaining a significant economic effect (Stefanakis & Nikolaou, 2021). According to the authors, the restructuring of the city's sewage treatment plant system improves the quality of wastewater treatment and reduces the cost of its maintenance up to 25% of the funds allocated from the city budget. In general, the conclusions completely coincide with the results obtained in this study in the context of assessing the economic efficiency of restructuring the treatment facilities system of a large modern city.

The high contamination of natural reservoirs in large modern cities creates great problems for the operation of sewage treatment plants. The issues of urban water resources management are directly related to the problems of restructuring existing wastewater treatment facilities in cities. In particular, various aspects of the recycling and reuse of wastewater from modern cities are of particular relevance (Srivastas *et al.*, 2022). A qualitative solution to such issues will contribute to a more rational use of urban wastewater treatment facilities and the improvement of methods for cleaning natural urban reservoirs. One of the most optimal solutions to this problem is the gradual reorientation of the wastewater discharge of urban enterprises from natural reservoirs into the system of urban wastewater treatment plants.

In the conditions of large modern cities, the optimal solution to the problem of wastewater treatment can be the modernisation of treatment facilities, in parallel with the introduction of modern complexes of biological treatment methods. One of these is floating biological reactors. They contain strains of microorganisms capable of processing water pollution, which ensures the high quality of natural water purification in urban reservoirs (Bhattacharyaj *et al.*, 2017). The subsequent release of biologically treated water into the city's wastewater treatment plant system, with its passage through the filtration system, leads to a significant improvement in the quality of municipal wastewater treatment and the environmental situation in the city.

Reconstruction and restructuring of treatment facilities do not allow the use of standard solutions. Therefore, the key principles of the reconstruction of urban treatment facilities should be the maximum reduction of material investments in capital construction, with the achievement of the maximum possible economic effect from the commissioning of treatment facilities that have undergone modernisation (Shah, Rodriguez-Couto & Biswas, 2021). The economic effect of the restructuring of the wastewater treatment system in this context should be decisive, since it is its achievement that makes it expedient to modernise the treatment system.

Microbial wastewater treatment focuses on the use of microorganisms as decontamination agents for the treatment of contaminated wastewater, which is a worldwide problem. Microbial-based processes are seen as promising technologies for solving the ever-growing problem of

polluted wastewater and natural reservoirs in modern cities. In this context, the developed technological processes are of fundamental importance to address the five main trends in wastewater treatment, including nutrient removal and recovery, trace amounts of organic compounds, energy conservation and production, sustainability and community participation (Shah, Rodriguez-Couto, 2019). Microbial wastewater treatment technologies are of fundamental importance from the standpoint of developing modern methods of restructuring the wastewater treatment system of modern large cities, and also have significant prospects from the standpoint of the practical application of the latest technologies to address issues of improving the environmental situation in a large modern city.

Reconstruction of the sewage treatment plant system, as a rule, involves equipping them with new, more modern equipment, which in the future can ensure the achievement of higher wastewater treatment rates (Ranade & Bhandari, 2014). High-quality and uninterrupted operation of this equipment for a considerable period of time guarantees a sustainable economic effect in the long term. This is conditioned by the fact that in this case, the volume of harmful emissions into natural urban reservoirs is significantly reduced, which causes the absence of the need for their regular cleaning. In addition, for a certain period of time, there will be no need to incur costs for carrying out planned repairs of treatment facilities after their modernisation.

Improvement of the functioning of sewage treatment plants can be achieved by introducing a large volume of algae and microorganisms into the purification system for water purification in natural urban reservoirs (Bandh & Malla, 2022). In combination with improving the operation of urban drains, this measure can become very effective.

Biological treatment facilities are now beginning to be actively used in cities. Their appearance is caused by the fact that very often operating sewage treatment plants are not able to fully meet the needs of the city in the quality of wastewater treatment and environmental safety of natural urban reservoirs. At the same time, the introduction of biological wastewater treatment methods into urban wastewater treatment systems often justifies itself purely from an economic standpoint (Mohammad & Ang, 2021). In particular, the modernisation of urban sewers today may include the installation of additional biological treatment units, disinfection and elimination of sediment. These are significant additions to the mechanical cleaning units, which are usually installed in the system of urban sewage treatment plants. Biological purification units perform the function of extracting organic elements from water, as well as phosphoric and nitrogenous compounds. The choice of an effective combination of water purification methods during the modernisation of urban sewage treatment plants largely determines the overall efficiency of the urban wastewater treatment plant system.

The restructuring of the wastewater treatment process of a large modern city should affect all its stages, from mechanical treatment to disinfection of wastewater. In this context,

it is mandatory to improve the hydraulic structures included in the wastewater treatment system, and to replace outdated equipment with new, more advanced ones if such a need arises. In this case, it is possible to achieve a gradual reduction in the costs of implementing the wastewater treatment process and increase the economic efficiency of the entire treatment system as a whole. The final quality of wastewater treatment is of fundamental importance from the standpoint of ensuring a high level of environmental safety for the residents of a large modern city and maintaining the proper level of environmental protection for the overall population.

Conclusions

The restructuring of the wastewater treatment system of a modern large city, which was considered on the example of San Francisco, necessarily includes the modernisation of functioning wastewater treatment facilities to improve the overall quality of wastewater treatment and, as a result, improve the overall quality of water supply and water use services provided to residents of a large city. At the same time, the expected economic effect of the restructuring of the San Francisco wastewater treatment plant system includes the difference between the results of the system's activities before and after the restructuring process, and the costs incurred to obtain similar results for changes in the operating conditions of the entire system. In the modern conditions of the city of San Francisco, this means that in order to calculate the mentioned economic effect, it is necessary to account for the costs of creating a complex for pumping and treating wastewater and upgrading the city's sewage treatment plant system.

The application of the experience of the city of San Francisco in Ukrainian realities implies careful control of the funds allocated for the work. At the same time, it is advisable to adopt the experience of successive modernisation of the city's sewage treatment plants in parallel with the modernisation of the wastewater collection system. Also particularly effective in this context will be the improvement of the sewage systems of Ukrainian cities, which would allow reorienting the city's wastewater collection systems to drain water masses into the units of treatment facilities. This will contribute to enhancing the overall efficiency of treatment facilities and improving the overall environmental situation in Ukrainian cities. In addition, the consistent modernisation of urban wastewater treatment plants with the reconstruction of urban sewers will lead to a reduction in the cost of maintenance of wastewater treatment plants, due to the reduction of harmful emissions into urban reservoirs. In general, there are real opportunities to apply the experience of San Francisco in the realities of modern Ukrainian cities. This opens up additional opportunities to improve the quality of treating of natural reservoirs in Ukrainian cities and will also allow saving the funds of the city budget allocated for their cleaning in the long term.

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Conflict of Interest

None.

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Економічний ефект реструктуризації системи очищення стокових вод на муніципальному рівні в місті Сан-Франциско: можливості в українських реаліях застосування

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Анотація. Актуальність тематики експлуатації статті обумовлюється наявністю складних систем очищення стокових вод великих сучасних міст і необхідністю внесення якісних змін у структуру їх функціонування. Основною метою роботи є дослідження посиленого ефекту реструктуризації системи очищення стокових вод на муніципальному рівні в місті Сан-Франциско, в контексті вивчення перспективних можливостей застосування отриманого досвіду в українських реаліях. Основу методологічного підходу в цьому науковому дослідженні становить поєднання методів системного аналізу досвіду, отриманого в Сан-Франциско в ході проведення реструктуризації системи очищення стокових вод, з аналітичним дослідженням факторів, що впливають на оцінку ефекту від виконання цього заходу. У ході проведення наукового дослідження були отримані результати, що свідчать про необхідність здійснення комплексних інвестиційних вливань у реструктуризацію системи очищення стокових вод, існуючих у великому сучасному місті, з метою отримання стійкого ефекту від реалізації такого роду програм і підвищення якості послуг водокористування, що надаються сучасним жителям українських городів. Результати, отримані в науково-дослідній роботі, а також сформульовані на їх підставі висновки, мають суттєве практичне значення з точки зору перспективи поліпшення функціонування системи очищення великих сучасних українських міст і стабілізації загальної екологічної ситуації в цих містах, а також отримання досліджуваного ефекту посилення. від проведення робіт по модернізації системи очищення стокових вод з метою підвищення якості послуг, що надаються жителям міст

Ключові слова: модернізація системи сточної води; очищення стокової води; економічний ефект; реструктуризація системи очистки; муніципальний рівень; екологічна ситуація

Transformation of marketing logistics for the export of ukrainian crop production in the context of a full-scale war with the russian federation

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Abstract. In the context of a full-scale invasion of the russian federation, Ukrainian exporters faced problems with the physical supply of products to traditional sales markets. The purpose of the study was to analyse trends in the transformation of marketing logistics of crop production exports caused by the influence of martial law factors in Ukraine. The methodological basis of the research was a systematic approach and comparative analysis, monographic, statistical groupings, abstract and logical methods. The study examines the views of researchers on the content and role of marketing logistics in exports and highlights the main problems of exporters of crop production caused by a full-scale war with the russian federation. Statistical data on the dynamics of the share of certain types of plant products in the total export of the country are analysed and trends in the transformation of its commodity and geographical structure are determined. The negative impact of production restrictions and marketing logistics restrictions on the export of processed crop products, which form a higher added value compared to grain crops, is established. The assessment of the transformation of the geographical structure of crop exports showed a significant increase in the share of European countries due to the availability of transport logistics to these sales markets and stimulating institutional state influences. The conclusion is made about the positive impact of the development of marketing and sales logistics in the conditions of war on the prospects for increasing sales volumes in European markets of crop production in the conditions of post-war recovery. Further implementation of measures for its development will allow domestic exporters to gain a foothold in these sales markets and restore their positions in the export of cereals and oilseeds in the traditional markets of African and Asian countries. The practical significance of the study is that its results can be used by state

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institutions responsible for the development of the agricultural sector, when substantiating measures to support the crop industry and stimulate the export of its products, commodity producers and traders – when developing export strategies, scientists – when further studying the problems of export marketing logistics development

Keywords: plant products; export markets; product distribution channels; alternative logistics systems; armed aggression; post-war recovery

Introduction

Since the beginning of the active phase of the Ukrainian-russian war on February 24, 2022, the role of marketing logistics for export-oriented companies has become strategically important. Traditional distribution channels for crop production were partially blocked. The occupation of part of the territory of Ukraine, the destruction of elevator capacities, and the periodic de-energisation of the remaining part of them led to the fact that agricultural producers and traders faced not only problems with the sale of products but also their physical safety. Under these conditions, some of them were able to reorient themselves to other sales markets, reviewing not only the distribution channels but also the degree of processing of products. The analysis of the main trends in changes in the commodity structure and export areas of Ukrainian crop production determines the degree of adaptability of the marketing logistics system of industry enterprises and substantiates proposals for its further development in the conditions of post-war recovery.

O.S. Molnar *et al.* (2022) note the importance of an enterprise's logistics mission in its marketing system. N.H. Hurzhiy (2017) suggests that the functional content of sales, which is an element of the marketing complex, includes three generalising functions: marketing, which combines market analysis, distribution and sales directly; logistics – responsible for the physical distribution of products (commodity movement); organisational and managerial – provides motivation and control of sales activities, forms an organisational sales mechanism. E. Sos (2021) emphasises that logistics should be considered as a separate industry and that cooperation with the marketing field is important, so in the long run, the development of marketing logistics strategies is necessary for effective customer service. A similar opinion is held by O.Y. Hromova & N.S. Tereikovska (2019), stating that the development of modern marketing and logistics concepts leads to the fact that none of the concepts is effective without using a different concept. D.H. Kholmamatorov (2022) simultaneously includes almost the entire complex of marketing and logistics functions in the content of the concept of "marketing logistics". G.O. Kholodnyi (2019) defines marketing logistics as "a system aimed at the most optimal customer satisfaction in order to achieve sustainable competitive advantages by integrating, optimising, and rationalising logistics flows that include material, financial, and information flows". O. Velychko *et al.* (2019) argue that marketing logistics primarily combines the areas of supply and distribution logistics. R. Bilovol & A. Chaikina (2016) came to the conclusion that marketing logistics of agricultural enterprises is

a subsystem of general logistics management of the enterprise, which is the process of managing planning, control of marketing logistics operations in order to meet consumer demand with minimal costs, considering the features that are associated with the production, warehousing, storage, and transportation of agricultural products.

The problems of developing export logistics of domestic crop production on the eve of a full-scale invasion were outlined by O. Kaliuzhna *et al.* (2019), who noted that inefficient logistics is a barrier to the future growth of grain exports from Ukraine, and identified areas for its improvement. Less categorical about the assessment of its effectiveness is I. Mayorova (2021), who suggests that "logistics schemes for grain delivery in Ukraine require partial modification". The results of the analysis of the pre-war and current state of the grain logistics system and suggestions on ways to develop it during the war and after its end are given in the paper by O. Zakharchuk *et al.* (2022). T. Larina *et al.* (2020) structure the problems of export agricultural logistics at micro-, meso-, macro-, and supranational levels, and provide proposals for increasing the export potential of the agricultural sector in Ukraine, most of which require active involvement of state institutions for their practical implementation. The role of the national government in shaping the international marketing logistics system is also emphasised by Obaid-Ur-Rehman (2016).

From the analysis of these publications, it is clear that the development of marketing logistics for the export of Ukrainian crop production is relevant, but the impact of new factors caused by martial law on it requires further study.

The purpose of the study was to analyse trends in the transformation of marketing logistics of crop production exports caused by the influence of martial law factors in Ukraine.

Materials and Methods

The theoretical basis of the research was Ukrainian and foreign studies devoted to the problems of defining the content of the concept of "export marketing logistics" and the problems of its development in Ukraine. The information base of the study was the official data of the State Statistics Service of Ukraine (Commodity pattern of foreign..., 2023; Countries by commodity structure of foreign..., 2023), operational information of the Ministry of Agrarian Policy and Food of Ukraine on the commodity and geographical structure of crop exports (The state of foreign trade in..., 2023), and the results of monitoring the dynamics and trends of its changes by specialists of the National Research Centre "Institute

of Agrarian Economics” (In January-August 2022, Ukraine exported..., 2022, In January-August 2022, the European Vector..., 2022). To achieve this goal, the research was structured into successive stages: analysis of the dynamics of exports of agricultural products of Ukraine as a whole and the shares of the main groups of crop production in it for 2017-2022; determination of the main factors of the influence of wartime on the marketing logistics of export of crop products; comparative analysis of the geographical and commodity structure of exports in the pre-war and war period and determination of trends in transformation. In the course of the research, a systematic approach to the study of economic phenomena was used, which consists in dismembering the multicomponent system of marketing logistics of export of crop production based on the principle of the greatest importance of the connections of its components and highlighting the main properties of the system object with an indissoluble connection of structure and function in their dynamics and simultaneous changes in the state and transition to a qualitatively new level under the influence of exogenous factors. The methodological basis of the study was made up of theoretical methods: retrospective, comparative analysis, statistical groupings, abstract and logical. The use of the analytical method and content analysis allowed characterising the features of marketing logistics of export of Ukrainian crop production and identifying the main factors of security, institutional, production, transport, and sales nature, instigated by the war, which affected the state and its functioning under these conditions. The retrospective method in combination with comparative analysis was used to investigate the dynamics of export volumes of the main groups of agricultural

products, their contribution to the total export revenues of Ukraine, and identify trends in their changes. Using the method of statistical groupings, trends in the transformation of the geography and structure of exports of Ukrainian crop production were determined, and the use of graphical and tabular methods for presenting indicators – to illustrate the results of the analysis of statistical indicators. The abstract and logical method was used to substantiate theoretical generalisations about trends in the development of the research subject and generate conclusions.

Results and Discussion

Dynamics of exports of agricultural products of Ukraine as a whole and shares of the main groups of crop production in pre-war and war times

Ukraine plays a significant role in maintaining global food security. 2017-2021 was characterised by a rapid increase in the volume of exports of domestic agricultural products, in particular, the increase in sales of plant products on foreign markets amounted to 68.6%, and finished grain products – 39.9% (Table 1), however, the consequences of full-scale military operations were a drop in these indicators. The current situation in Ukraine has negatively affected the level of food security in some countries of the world. According to Human Rights Watch, “... this has already exacerbated the food crisis in the Middle East and North Africa. In particular: Lebanon receives 80% of wheat from Ukraine; Egypt buys wheat and large volumes of oil; Libya imports more than 40% of wheat; Yemen – at least 27%. In addition, the authorities of northwestern Syria provide the region with wheat and flour purchased through Turkey, which also imports 90% of wheat from Ukraine” (Melnyk, 2022).

Table 1. Dynamics of exports of agricultural products of Ukraine, thous. USD

Product name according to UCT ZED	2017	2018	2019	2020	2021	2022 *
1. Live animals; products of animal origin	1.108.757	1.210.638	1.277.016	1.188.165	1.345.195	1.353.988
2. Products of plant origin. incl.	9.215.708	9.886.060	12.914.543	11.883.238	15.538.028	12.037.374
<i>live trees and other plants</i>	3.957	4.443	6.480	5.743	8.143	4.668
<i>vegetables</i>	235.369	235.683	184.515	168.147	196.607	93.554
<i>edible fruits and nuts</i>	195.287	228.564	260.112	238.390	368.197	291.816
<i>coffee. tea</i>	13.610	12.059	11.709	15.011	15.901	10.246
<i>grain crops</i>	6.501.134	7.240.558	9.633.334	9.410.669	12.343.846	8.079.764
<i>products of the flour and cereal industry</i>	181.891	175.811	202.099	154.491	148.284	119.680
<i>seeds and oilseed fruits</i>	2.060.121	1.954.150	2.563.242	1.842.431	2.435.156	3.406.193
<i>natural shellac</i>	588	1.091	819	944	3.607	2.363
<i>plant materials for manufacturing</i>	23.750	33.702	52.233	47.412	18.287	29.092
3. Fats and oils of animal or vegetable origin	4.605.666	4.496.511	4.732.237	5.746.922	7.037.234	5.434.186
4. Ready-made food products. incl.	2.826.723	3.018.601	3.220.384	3.361.028	3.788.475	2.214.411
<i>finished grain products</i>	296.408	268.310	269.366	313.079	414.599	229.368

Note: * – for January-November 2022

Source: according to data (Commodity pattern of foreign ..., 2023)

Therewith, according to K. Deininger *et al.* (2023), the implications for regional and global food security will be far-reaching, with 41.5 million hectares of highly fertile land exceeding the agricultural area of France (18 million hectares), Germany (12 million hectares), and Poland (11 million hectares) combined, given Ukraine's traditional role as a breadbasket and the main exporter of wheat and sunflower oil. The authors note that losses in the production of Ukrainian agricultural products can increase if farmers are unable to harvest due to lack of resources or do not want to do so, because they will not be able to sell it – for example, due to a lack of storage facilities, and suggest identifying areas or groups that are particularly affected by the crisis and may need short-term support. This corresponds to the results of the study on the need to support agribusiness by government and international institutions in the development of logistics infrastructure during the war to ensure the sale of products.

N.M. Ngoc *et al.* (2022), examining the risks to the global supply chains of the Russian-Ukrainian war, also concluded that “the war has created additional pressure on the already strained global supply chain. Freight rates, especially for sea and rail transportation, are already very high and may increase even more due to the negative consequences

of the conflict. The impact of food disruptions is also inevitable, as Russia and Ukraine together account for more than a quarter of wheat exports, 19% of corn exports, and 80% of global sunflower oil exports, with Ukraine alone accounting for almost a quarter of sunflower oil exports”. At the same time, the concern of economists that problems with supply chains can delay global economic growth and lead to higher inflation in all countries, and the search for alternative sources of raw materials requires long-term investment before it is possible to supply products to the world market, contributed to the search for opportunities to develop alternative logistics systems for supplying Ukrainian agricultural products to foreign markets.

According to the published data of the State Statistics Service of Ukraine for January-November 2022, there was a significant reduction in exports of finished grain products (-39.4% compared to the same period of the previous year) and vegetable products (-12.1%), with the exception of seeds and fruits of oilseeds (+49.7 %) (Table 1).

The share of the main groups of crop production in January-November 2022 in the total volume of exports of Ukrainian producers increased compared to previous periods, which is conditioned by a significant decrease in absolute and relative terms of most types of industrial products (Table 2).

Table 2. Dynamics of the share of certain types of plant products in the total export of Ukraine, %

Product name according to UCT ZED	2017	2018	2019	2020	2021	2022 *
Plant-based products	21.3	20.9	25.8	24.2	22.8	29.6
Grain crops	15.0	15.3	19.2	19.1	18.1	19.9
Products of the flour and cereal industry	0.4	0.4	0.4	0.3	0.2	0.3
Seeds and oilseed fruits	4.8	4.1	5.1	3.7	3.6	8.4
Fats and oils of animal or vegetable origin	10.6	9.5	9.5	11.7	10.3	13.4
Finished grain products	0.7	0.6	0.5	0.6	0.6	0.6

Note: * – for January-November 2022

Source: according to data (Commodity pattern of foreign ..., 2023)

At the same time, the authors share the opinion of P. Putsenteilo *et al.* (2018) and O. Zakharchuk (2021) that the raw material orientation of Ukrainian exports makes Ukraine's position in foreign markets vulnerable, since the demand for raw materials is unstable and characterised by significant seasonal price fluctuations, and the experience of many countries shows that producers receive the greatest profit from the sale of processed products, and not from the sale of raw materials. Therefore, developed countries process raw materials before exporting their products in order to sell the final product of consumption at a higher cost.

The main factors of wartime influence on the marketing logistics of crop production exports

In the pre-war period, the high potential of the Ukrainian grain sub-complex did not provide proper performance for all grain market participants, which was explained by the imbalance between domestic consumption and export supplies, the high price of financial resources, and the lack of

clarity of state functions (Kazmir, 2021). At the beginning of a full-scale invasion, new problems generated by the war were added to this complex of unsolved problems.

Military actions on the territory of any country affect the functioning of the economy and the behaviour of economic entities. This impact is determined by the duration and intensity of the war. In agricultural production, which forms the export supply, the consequences can be divided into short-, medium-, and long-term.

With the beginning of the second active phase of the Ukrainian-Russian war, the agricultural sector of Ukraine faced the following problems (Nimani & Spahija, 2023):

- Occupation of Ukrainian territories: destruction of production capacities, infrastructure, problems of organisation of the sowing, lack of animal feed, shutdown of agricultural enterprises, a large number of mined territories (about 100 thousand hectares – Chernihiv, Luhansk, Donetsk, Kharkiv, Kherson, Zaporizhzhia, Kyiv oblasts).

- Problems with logistics: the aggressor's blockade of sea transportation, which negatively affected the implementation of foreign trade operations of national economic entities, the release of capacities for storing grain of the future crop; the destruction of transport infrastructure, the destruction/out-of-sync of logistics chains within the country and outside.

- A decrease in the volume of the domestic market and a decrease in the purchasing power of the majority of Ukrainians. The deficit of consumption of meat and dairy products by Ukrainians, which was observed even before the war, increased significantly during wartime.

- Lack of resources for agricultural production: lack of fuel, lack of feed, shortage of certain types of fertilisers, lack of plant protection products, problems with resources and facilities, as well as rising prices for the means of production of the agricultural sector.

- Problems with the labour force: internal and external migration, mobilisation to the Armed Forces of Ukraine, rising unemployment, psychological problems of personnel: work under constant stress and anxiety.

- Theft of Ukrainian agricultural machinery and products: grain, oil, vegetables, fruits, etc.

This list can include the disruption of distribution channels due to the shutdown of some processing and elevator companies, and unpredictable changes in the price situation on the market for each type of commodity.

A shortage of storage capacity in the 2022 season, caused by the inability to export sufficient output, and a war-induced shortage of key resources such as fuel, fertiliser, seeds, or labour, can affect farmers' decisions regarding crops and crop management in 2022 and subsequent seasons (Deininger *et. al.*, 2023).

Under such conditions, the creation of an alternative logistics system became an urgent issue of the national economy as a whole, since Ukraine had the opportunity to export already produced agricultural products (harvest 2021) for USD 7-10 billion, which would ensure the receipt of foreign exchange earnings in the country and this would be an important component of supporting its economy in war conditions. In addition, farmers had to free up storage capacity for a new crop.

Comparative analysis of the geographical and commodity structure of crop production exports in the pre-war and war periods and determination of transformation trends

Analysing the geographical structure of grain exports, it can be stated that in 2021 they were delivered to 122 countries of the world, but 79.9% of deliveries in monetary terms accounted for 15 countries, in particular, China – 20.7%, Egypt – 11.2%, Turkey – 7.4%, Indonesia – 6.1%, Spain – 5.2%, the Netherlands – 4.2%, Iran – 4.3%. The value of exports to these 6 countries amounted to USD 7,337,496.1 thousand (Fig. 1), which accounted for 59.4% of the total export amount for this group (Countries by commodity structure..., 2022).

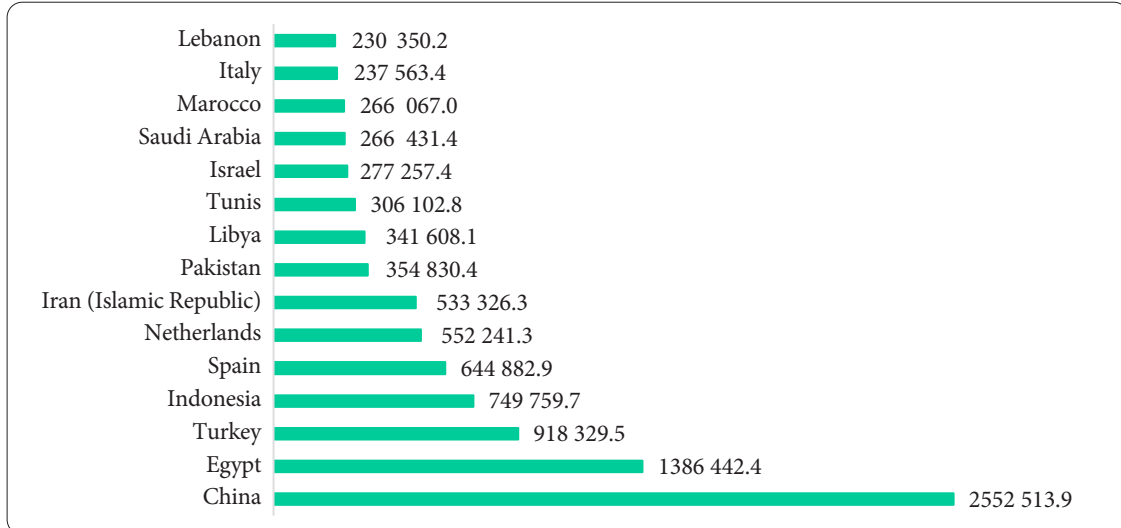


Figure 1. Largest exporting countries of Ukrainian grains in 2021, thousand USD

Source: based on (Countries by commodity structure..., 2022)

For 11 months of 2022, grain exports in monetary terms decreased by 24.8% compared to the same period of the previous year, but only by 5.3% compared to 2020. According to the National Research Centre "Institute of Agrarian Economics", the largest buyers of Ukrainian grain in January-August 2022, as before, were the countries of Asia, the European Union, and Africa. The leading position in the

rating of the main importers of Ukrainian grain is held by China, whose share in total exports during this period amounted to 14.4% of the cost of deliveries. This Asian country purchased USD 749 million worth of Ukrainian grain (In January-august 2022, Ukraine..., 2022). At the same time, there is an increase in the total share of European countries, which account for more than 35% of exports (Fig. 2).

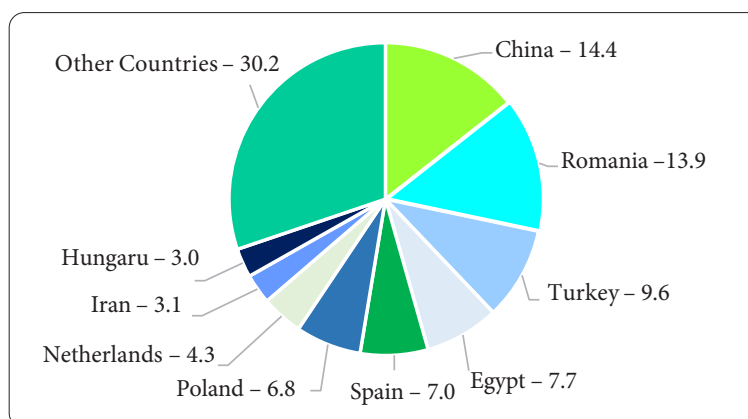


Figure 2. Shares of individual countries in the exports of Ukrainian grain crops in monetary terms in January-August 2022, %

Source: based on (In January-august 2022, Ukraine exported..., 2022)

The products of the flour and cereal industry form a higher added value compared to grain. According to G. Kundieieva & O. Kulish (2017), each tonne of flour sold brings an additional USD 100 more in foreign exchange earnings compared to wheat exports. But it occupies a small share in the total volume of exports of domestic products and the negative trend is its reduction in dynamics, while

in absolute terms the decrease amounted to USD 33,607.3 thousand in 2021 compared to 2017. In 2021, the products of this group were delivered to 132 countries of the world, among which 13 provided 57.3% of the total sales of products of this group, while relatively insignificant percentage values for each of the buyer countries indicate the diversification of sales markets (Fig. 3).

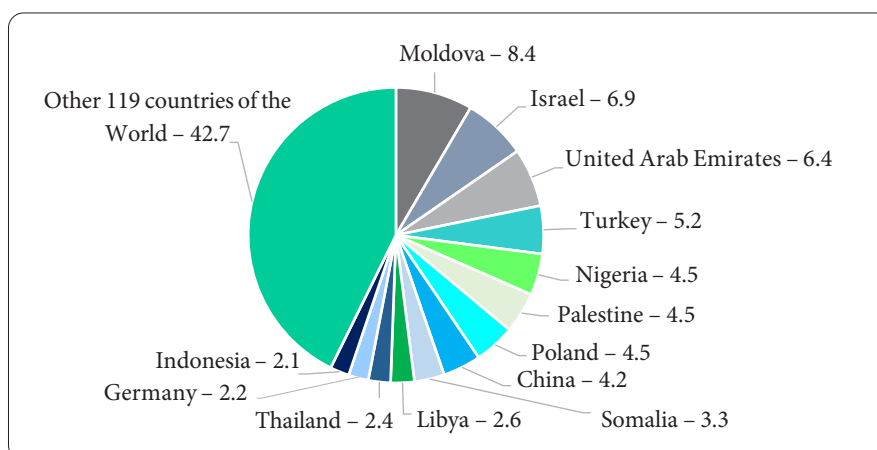


Figure 3. Shares of individual countries in exports of Ukrainian products of the flour and cereals industry in monetary terms in 2021, %

Source: based on (Countries by commodity ..., 2023)

The main volumes of exports of flour and cereal industry products in 2022 fell on the second half of the year, as exporters gradually mastered new logistics supply routes, mainly to EU countries after opening their market for Ukrainian products by abolishing duties and quotas (Fig. 4).

In 2021, Ukraine exported seeds and oilseed fruits to 92 countries, but only 13 of them accounted for 90.6% of the total value of products sold in this group on the foreign market and more than 60% to European countries (Fig. 5).

A significant increase in the export of seeds and oilseed fruits in 2022 was mainly conditioned by the difficulty of selling vegetable oils that were traditionally exported by sea, and the logistics of land transport for the transportation of these products was not adjusted, which led to mass exports in 2022, primarily sunflower seeds, the logistics of supplies to European countries was well established. For 8 months of 2022, the so-called "leader" – buyers have changed (Fig. 6).

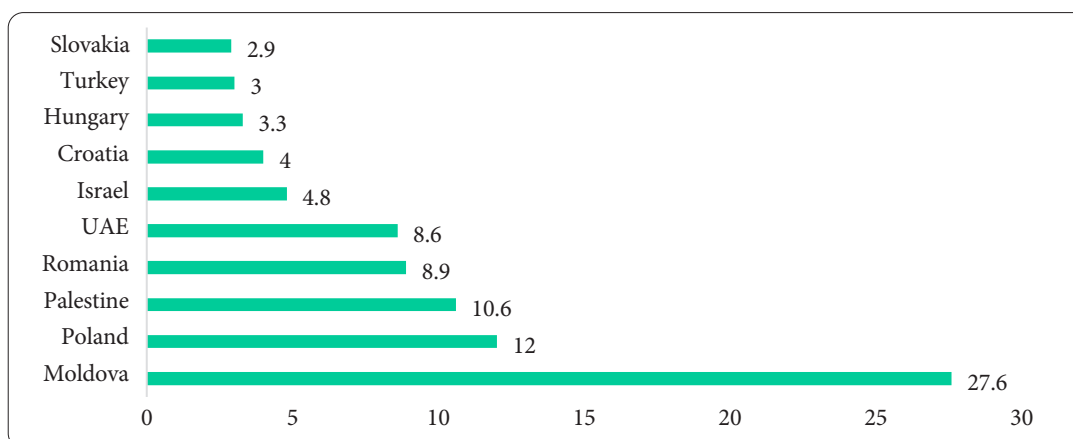


Figure 4. Shares of individual countries in the export of Ukrainian flour in 2022, %

Source: (Flour exports from ... Ukragroconsult, 2023)

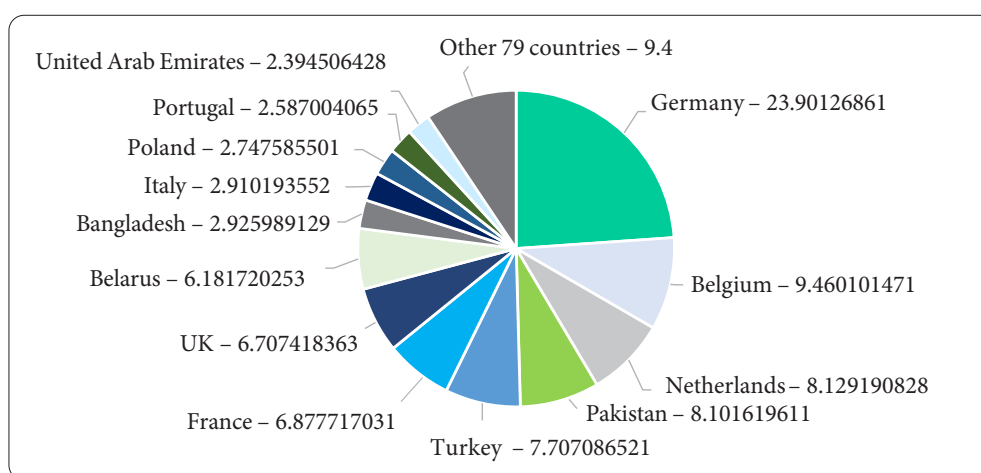


Figure 5. Shares of individual countries in exports of Ukrainian seeds and oilseed fruits in monetary terms in 2021, %

Source: (Countries by commodity 2 2023)

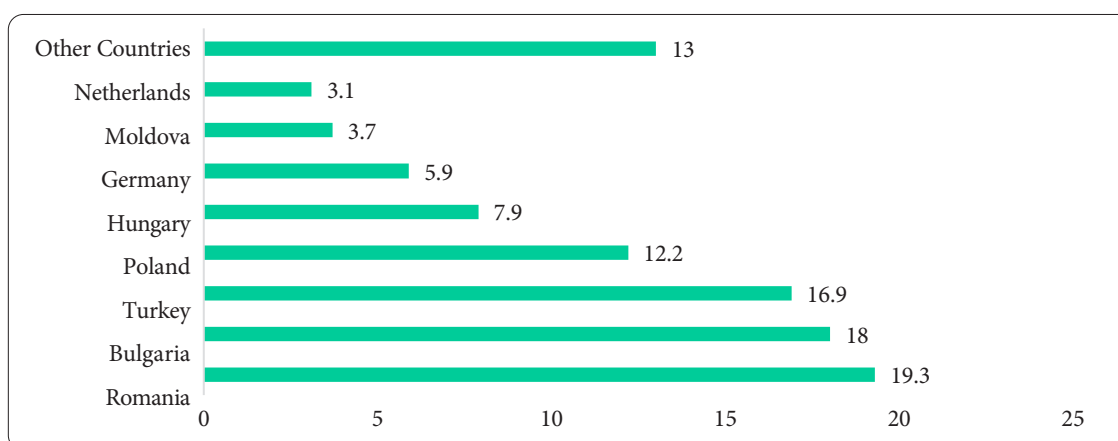


Figure 6. Shares of individual countries in exports of Ukrainian seeds and oilseed fruits in monetary terms in January-August 2022, %

Source: (In January-August 2022, the European vector..., 2022)

The production of fats and oils of animal or vegetable origin creates a large added value compared to the products of the previous group, so the positive trend was to increase the volume of its exports by 65.5% in 2021, compared to 2017. Trade in these goods in 2021 became the fourth for Ukraine in terms of foreign exchange revenue after trade in ferrous metals (sold for a total of USD 13.96 billion),

cereals (USD 12.35 billion) and ore (USD 7.13 billion) (It became known ..., 2022). In total, deliveries in 2021 were made to 149 countries, but the main buyers were mainly Asian and European countries. Thus, India, China, and Iraq accounted for 45.9% of exports in monetary terms, while the Netherlands, Spain, Poland, Italy, France, and the United Kingdom accounted for a total of another 33.2% (Fig. 7).

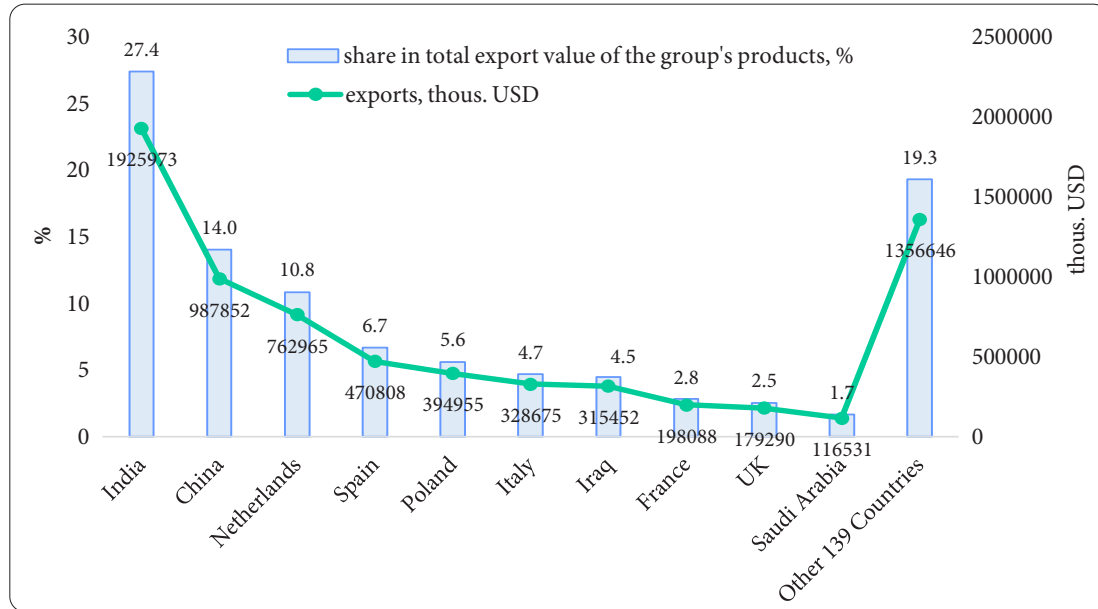


Figure 7. The cost of exporting Ukrainian fats and oils of animal or vegetable origin and the share of individual countries in it in 2021

Source: (Countries by commodity ...State Statistics Service of Ukraine. 2023)

The reduction in foreign exchange earnings from the export of oilseeds and fats in 2022 is conditioned both by the complete shutdown of industrial enterprises, in particular, oil-producing and fat-oil in the war zones and in the temporarily occupied territories of Ukraine, and due to the blocking of the ports of the Black and Azov seas in the first months of the war. This forced exporters to create

new logistics chains, search for alternative sales markets, and reorient exports from closed ports to western borders, using rail transportation. After the resumption of exports through the Black Sea ports, the supply of products of this group sharply intensified, but these trends affected the geography of exports (Fig. 8) and the total share of European countries in it has increased markedly.

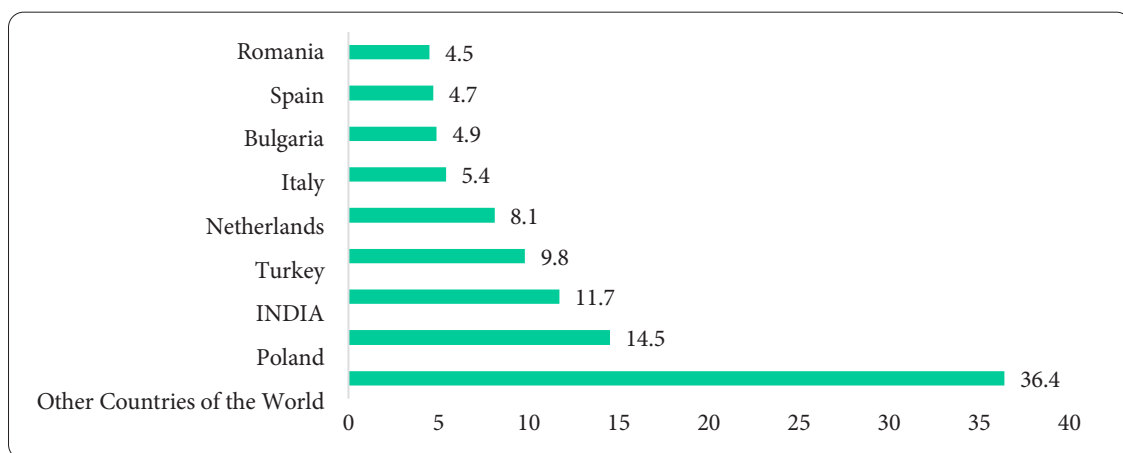


Figure 8. Shares of individual countries in exports of Ukrainian fats and oils of animal or vegetable origin in monetary terms in January-August 2022, %

Source: (In January-August 2022, the European vector..., 2022)

Analysis of the transformation of transport logistics routes for agricultural products shows that during the first months of the war, export volumes decreased by more than four times compared to the pre-war period. In this situation, subjects of foreign economic activity with the participation of the government of Ukraine began to search for alternative opportunities for product distribution. At that time, the only possible export destination was the western border of Ukraine, and traders paid attention to the routes of movement of products that were traditionally not popular with them in the past. An alternative to sea transportation was to be road and rail transport, using the capabilities of the ports of Izmail and Reni with further transportation for European consumers of grain along the Danube River, and for others – through Romanian ports. However, each of these options had significant drawbacks.

The radius of use of road transport for grain transportation increased by 2.5 times compared to the pre-war indicator and amounted to 1 thousand km. This dramatically increased transportation costs due to the high cost of fuel and lubricants, which negatively affects profitability. Theoretically, it is possible to export grain by road, but the costs incurred made the business unprofitable or even detrimental. As for railway transport, in this context, the problem, on the one hand, was the use of different widths of railway tracks in Ukraine and the EU (respectively 1,520 against 1,435), and on the other – until recently, the European railway was not massively used for the transportation of grain and oilseeds, which led to a shortage of European-style grain wagons. In addition, six railway border crossings (on the border with Poland – Izov – Hrubieszów, Mostyska – Medyka, and Jagodin – Dorohusk; with Romania – Vadul-Siret – Dornești; with Slovakia – Chop – Čierna nad Tisou; with Hungary – Chop – Zahony) had a total capacity of 534 grain wagons per day. Consequently, both modes of transport could not fully meet the needs of exporters and mainly worked only on the territory of Ukraine, and their main task was to

transport grain and oil to the so-called “dry ports” (a multimodal logistics centre with an infrastructure that allows the cargo owner to enjoy all the advantages of a seaport, but on land) on the western border. Further, as a result of joint work of European partners and the government of Ukraine, the products continued their movement to the addressee due to the so-called “Solidarity Lanes”. The implementation of this area of logistics allowed doubling the volume of deliveries from April to July. Agricultural products were exported through 12 checkpoints on the border with Romania, Hungary, Slovakia, and Poland, as well as on the Moldovan-Romanian border. At various stages of development, there were 15 more transport routes where Ukrainian grain and seeds were to be delivered to the ports of the Baltic, North, Mediterranean, and Adriatic seas (Polska, 2022).

Since the first months of the war, the Danube River ports were actively involved in the export of products, through which grain was transhipped to Romanian seaports. However, this area had a significant drawback due to the lack of sufficient capacity for unloading/loading. In addition, during the harvest period, experts predicted the appearance of logistical problems associated with seasonal loading of Romanian, Serbian, Hungarian, and Bulgarian winter wheat and barley, for which this is a traditional transportation channel. This did not inspire confidence in the future stability of the work.

Positive developments in the development of alternative ways of exporting products did not allow Ukraine to compensate for the loss of direct sea transportation and reach pre-war volumes, since they provided only 50% of what is needed. Given the aggravation of the food crisis in certain regions of the world, the UN and Turkey joined the solution of the problem, which signed an agreement with the Russian Federation on the creation of the so-called “grain corridor” (“Black Sea Grain Initiative”). Since the beginning of its operation (1.08.2022), it has been possible to significantly increase the volume of exports of cereals and oilseeds (Fig. 9).

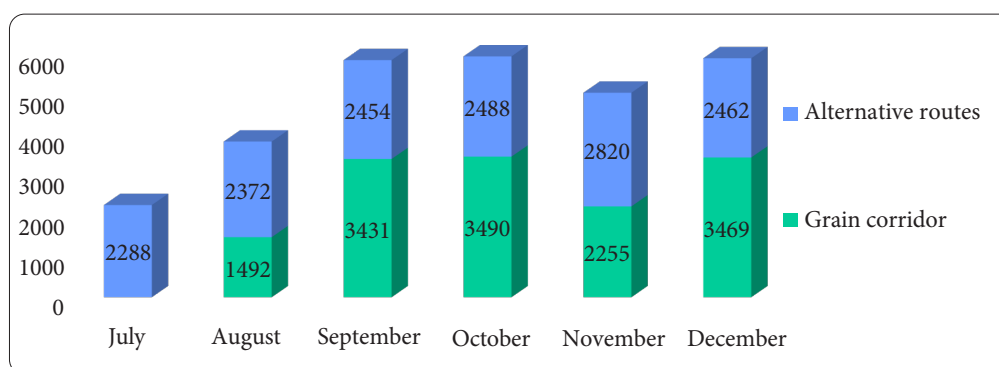


Figure 9. Export of grain and oilseeds by the “grain corridor” and alternative routes in July-December 2022, thous. tonnes

Source: (The state of foreign ..., Ministry of Agricultural policy and food of Ukraine, 2023)

Thus, despite the extreme challenges of wartime and logistical restrictions, Ukrainian producers and traders of crop products managed to partially reorient themselves to

new European markets, but their consumers do not physically need all the grain and oil that Ukrainian farmers are able to offer for export.

Conclusions

Military operations on the territory of Ukraine after a full-scale invasion of the Russian Federation forced exporters of crop products, in conditions of limited access to traditional sales markets due to the blocking of sea transport routes, to look for opportunities to organise new marketing logistics systems. The active support of the international community, in particular the UN and Turkey, to unblock Black Sea transportation, although allowed the supply of products to the markets of Asia and Africa, but in very limited volumes, compared to the pre-war period. As the analysis showed, in 2022 there was a change of "leaders" among buyers of all varieties of such products and a significant increase in sales volumes in the European market. This became possible, first of all, due to the abolition of export quotas and duties by the European Commission and the active work of Ukrainian officials to develop new export logistics routes. At the same time, Ukrainian entrepreneurs have gained more experience in new markets and established new business contacts. The key task after the victory of Ukraine for domestic exporters is to consolidate in these markets, as there is a constant demand for crop products with relatively high added value – Ukrainian vegetable oils and products of the flour and cereal industry, and to

restore their positions in the export of cereals and oilseeds in the traditional markets of African and Asian countries. Further development of marketing logistics of Ukrainian grain exports directly depends on the consolidated efforts of Ukrainian and foreign governmental and intergovernmental institutions, since individual economic entities – market participants – are not able to solve the problems of free access to foreign markets, attract investment in the restoration and development of warehouse and transport infrastructure, and support farmers in demining fields. A promising area of transformation is to increase the production and export of finished products from grain crops, which would allow Ukrainian enterprises to get higher incomes, increase employment, reduce the tonnage of external supplies and increase the cost of 1 tonne of exports. Therefore, further research is needed on the problems of forming external demand and stimulating sales in the export markets of Ukrainian ready-made food products.

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Conflict of Interest

None.

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Трансформація маркетингової логістики експорту української продукції рослинництва в умовах повномасштабної війни з рф

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Анотація. В умовах повномасштабного вторгнення рф українські експортери зіткнулися з проблемами фізичного постачання продукції на традиційні ринки збуту. Метою статті був аналіз тенденцій трансформації маркетингової логістики експорту продукції рослинництва, зумовлених впливом чинників воєнного стану в Україні. Методологічну основу дослідження складав системний підхід та методи порівняльного аналізу, монографічний, статистичних групувань, абстрактно-логічний. В дослідженні розглянуто погляди науковців на зміст та роль маркетингової логістики в експорті та виокремлено основні проблеми експортерів продукції рослинництва спричинені повномасштабною війною з рф. Проаналізовано статистичні дані щодо динаміки частки окремих видів рослинної продукції у загальному експорті країни та визначені тенденції трансформації її товарної й географічної структури. Встановлено негативний вплив виробничих обмежень і обмежень маркетингової логістики на експорт продуктів переробки рослинництва, що утворюють більшу, порівняно з зерновими культурами додану вартість. Оцінка трансформації географічної структури експорту рослинницької продукції показала значне зростання частки європейських країн внаслідок доступності транспортної логістики до цих ринків збуту та стимулюючих інституційних державних впливів. Зроблено висновок щодо позитивного впливу розвитку маркетингової збутової логістики в умовах війни на перспективи нарощування обсягів збуту на європейських ринках продукції рослинництва в умовах повоєнного відновлення. Подальша реалізація заходів з її розбудови дозволить вітчизняним експортерам закріпитися на цих ринках збуту й відновити свої позиції по експорту зернових та олійних на традиційних ринках африканських та азійських країн. Практичне значення дослідження полягає в тому, що його результати можуть бути використані державними інституціями, відповідальними за розвиток аграрної сфери, при обґрунтуванні заходів з підтримки рослинницької галузі та стимулюванні експорту її продукції, товаровиробниками і трейдерами – при розробці експортних стратегій, науковцями – при подальшому вивченні проблем розвитку експортної маркетингової логістики

Ключові слова: продукти рослинного походження; експортні ринки; канали розподілу продукції; альтернативні логістичні системи; збройна агресія; повоєнне відновлення

**Criminal economy of Cuba, Venezuela, and Colombia:
Structure, intersection points, profitability assessment**

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Abstract. The spread of the criminal economy is the biggest problem in the global financial environment. Cuba, Venezuela, and Colombia are characterised by a fairly high level of economic crime. In these countries, criminal economic activity flourishes, which reduces the social development of states and spreads unemployment and poverty in their territories. That is why the issue of the criminal economy of Cuba, Venezuela, and Colombia and the specifics of the structure, intersection points, and assessment of the level of profitability in these countries is quite relevant. It is in these areas that the problem of developing the criminal economy is poorly regulated and along with criminal activities there is a problem of poverty and the presence of military conflicts. That is why the purpose of this study is to investigate and generalise aspects of the criminal economy of Cuba, Venezuela, and Colombia, and to determine the features of its structure, intersection points, and assessment of the level of profitability. Theoretical methods were used during the study – analysis and synthesis. In particular, it was determined that the intersection points of the criminal economies of Cuba, Venezuela, and Colombia are focused on the activities of the transnational criminal organisation National Liberation Army. It is established that the main structural elements of the criminal economy in cooperation in these countries are drug trafficking, fuel smuggling, illegal gold mining, prostitution, and human trafficking. The assessment of the level of profitability showed that the countries under study are disadvantageous, which is explained by the presence of a high level of criminal economy. Based on the results of the study, measures were developed and proposed to combat the criminal economy in relation to the intersection points in Cuba, Venezuela, and Colombia. It is determined that the main areas for reducing the level of the criminal economy should be measures aimed at combating the transnational criminal group – the National Liberation

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Army, actions to eliminate businesses for the production and sale of drugs, fuel smuggling, prostitution, and human trafficking in the territory of the considered countries. Thus, the practical significance of the study is that the identified measures to combat the criminal economy can be used in Cuba, Venezuela, and Colombia to improve the social situation in these countries and raise the standard of living in these areas

Keywords: drug trafficking; money laundering; fuel smuggling; human trafficking

Introduction

In the modern world, the criminal economy plays an important role in the functioning of financial markets. In the course of the research, it is advisable to consider the essence of the concept of "criminal economy" and the features of its origin. The term "criminal economy" is considered one of the components of the shadow economy. Yu. Biliavska *et al.* (2023) noted that the shadow economy consists of a grey economy, a white economy, and a criminal economy. The researcher considers grey economy as a production or entrepreneurial activity that is accompanied by partial or complete tax evasion. The researcher considers the white economy as a sphere of activity that does not produce anything but only deals with the redistribution of income that was obtained illegally. At the same time, the researcher interpreted the concept of "criminal economy" as a sphere of activity in the aspect of income generation, which is accompanied by criminal liability. The author identified drug trafficking, prostitution, fraud, and trafficking in counterfeit medicines and weapons as examples of criminal economic activities.

O.M. Podmazko interprets the concept of "criminal economy" as an illegal economic activity that inherently violates the law. The researcher identifies drug trafficking, sex trafficking, human trafficking, large-scale smuggling, arms production and trade, racketeering and the use of force as a manifestation of criminal economics (Podmazko, 2013). I.V. Suprunova explains the criminal economy as a set of legally prohibited activities. The researcher also includes drug trafficking, prostitution, illegal production, robbery, usury, smuggling, and adds gambling to this aspect. That is, the criminal economy is considered to be an activity aimed at attracting income that is directly prohibited by law (Suprunova, 2020). D.A. Nesterpova also considers the criminal economy as an activity that is aimed at generating income by violating criminal legislation. The researcher notes that the criminal economy can be carried out through unorganised crime (bribery, petty fraud and violations in the form of cheating by counting or weighing) and on the basis of organised crime, which is also associated with corrupt municipal and state employees (Nesterpova, 2016). G. Gutiérrez, considering the current state of the criminal economy, noted that economic organised crime is always accompanied by political crimes and corruption. In other words, the author draws special attention to the fact that the high level of criminal economy in the country is accompanied by the participation of government officials at various levels. After all, organised crime would not be possible if the functions of civil

servants and politicians were fully fulfilled (Gutiérrez, 2015). M. Button, B. Gok and D. Shepherd note that the criminal economy is formed based on the functioning of economic crime. The authors pay quite considerable attention to economic crimes, which build the development of the criminal economy. These crimes include fraud, bribery, corruption, economic cybercrime, money laundering, and industrial espionage (Button, 2022). Thus, it can be concluded that the criminal economy is an activity aimed at generating income through strict violation of criminal legislation. Examples of such activities are drug trafficking, prostitution, human trafficking, money laundering, smuggling, and bribery, while cybercrime is also gaining momentum in this regard. The advantage of the criminal economy, among the composition of the shadow economy, is that it can be combated.

Nowadays, every country has a criminal economy to some extent. The highest level of criminal economy is typical for states that have both internal and external armed conflicts. There are states that have a well-defined criminal economy and have armed conflicts between the government and criminal groups. These countries are Colombia, Venezuela, and Cuba. It is Colombia that is characterised by constant armed conflicts between the government and criminal organisations, in which Venezuela and Cuba were involved. That is why it is advisable to establish the specifics of the intersection points of the criminal economy of Cuba, Venezuela, and Colombia, while finding out its structure and determining the level of profitability.

Materials and Methods

The theory and methodology of the study are based on the research by Ukrainian experts and scientists from Sweden, Mexico, Europe, Latin America, the United States of America, and the European Union on the development of the criminal economy and the specifics of the functioning of criminal organisations. The following methods were used in the study. A systematic approach was applied to determine the category of "criminal economy", establish the essence of criminal activity, and determine the main aspects of the structure of the criminal economy. This method was also used to determine the main intersection points of the criminal economies of these countries.

Using the analysis, the current state of the criminal economy of Cuba, Venezuela, and Colombia was considered, data on the generation of the gross domestic product of these countries were systematised, and the dynamics of money supply indicators in Colombia and Venezuela were

developed. This method was also used to determine data on Colombia's revenue and expenses. The analysis allowed investigating latest studies by researchers from Sweden, Mexico, Europe, Latin America, the United States of America, the European Union, as well as Ukrainian scientists on the interaction of Cuba, Venezuela, and Colombia in the development of the criminal economy to determine the specifics of carrying out tax measures to combat crime in Colombia and Venezuela. The paper considers the specifics of the activities of the transnational terrorist group National Liberation Army (ELN) on the Colombian-Venezuelan border.

In the study of the structure and intersection points of the criminal economies of Cuba, Venezuela, and Colombia, the subject-object method was used to determine the main areas of economic crime development during the interaction of these countries. This method was used to determine the specifics of the state of the criminal economy in each country under study and identify the main shortcomings of crime management. The study also used a mathematical calculation that allowed building an estimate of the level of profitability in Colombia. Using the method of induction and deduction, the features of the current state of interaction between the criminal economies of Cuba, Venezuela, and Colombia were determined, and the main aspects of drug production and sale in these territories were considered. This method also established the main principles for the development of fuel smuggling on the Cuban-Venezuelan border. The method of induction and deduction revealed features of illegal mining and sale of gold in these states and highlighted the features of the functioning of prostitution and human trafficking. It also provided an opportunity to consider the interaction between the activities of transnational criminal groups in the aspect of the criminal economy of the countries under study. Through an integrative approach, the main areas of combating the criminal economy at the intersection points of Cuba, Venezuela, and Colombia were identified.

The information base of the study is the papers by Ukrainian scientists as well as researchers from Sweden, Mexico, Europe, Latin America, the United States of America, and the European Union on the criminal economy, articles and research papers by experts from the Crisis Group of Latin America, the Stockholm International Peace Research Institute on the structure and intersection points of the criminal economies of Cuba, Venezuela, and Colombia. The basis for profitability assessment was data from the World Bank (GDP..., 2021; Unemployment, total..., 2021; Broad money..., 2021); (Expense..., 2021; Revenue, excluding..., 2021) in relation to the indicators of GDP, money supply, income and expenses of each country.

Results

The existence and development of a criminal economy in any country negatively affect the world economy as a whole. The open conduct of the criminal economy in one country serves as an example for citizens of other states in the aspect of the deployment of criminal activities. Some

of the most world-famous countries with high levels of uncontrolled crime are Colombia, Venezuela, and Cuba. In the course of studying the features of the criminal economy of these countries, it is advisable to identify the main problems with crime in each specified state.

In Colombia, the authorities have been fighting crime for decades. Colombia is officially considered a coffee country, but in the criminal world, this state is the main producer and seller of drugs (Golovchenko, 2018). According to this, large-scale armed conflicts continued between the authorities and the main criminal group (the Revolutionary Armed Forces of Colombia), which ended with the conclusion of a peace agreement. The Colombian government is fighting various criminal groups: the National Liberation Army, the People's Liberation Army, and the Gaitanist Self-Defence Forces of Colombia. At the same time, armed conflicts between these organisations continue. The Gaitanist Self-Defence Forces of Colombia are also known by the name of the Gulf Clan, which is considered one of the most powerful criminal entities in the country and is focused on fighting the drug business (Armament..., 2021).

It is important to note that the criminal group National Liberation Army has a transnational level and is present in Venezuela. This organisation focuses its activities on the control of drug trafficking, human trafficking, illegal mining and smuggling in both of these countries. The government of Colombia is actively fighting the criminal economy and crime in the country, according to which it provides data on criminal entities. In Venezuela, this trend is not observed, and the current government most likely supports criminal activity in the state. In accordance with this, in 2020, a military conflict unfolded between these countries on the basis of Colombia's accusations of Venezuela of harbouring criminal armed groups in Colombia (Armament..., 2021). It follows that the Venezuelan authorities contributed to the spread of the criminal economy in the field of drug trafficking, human trafficking, smuggling, and illegal mining. In 2022, the Venezuelan authorities were fighting criminal transnational Colombian groups. The Venezuelan Armed Forces warned of possible terrorist attacks and destroyed a drug lab of Colombian criminal organisations (Newman, 2022).

As for Cuba, this state has a totalitarian regime of government and the authorities keep information about crime and the state of the criminal economy closed both from its own citizens and from the whole world (Tymchuk, 2010). But during the unfolding conflict between the Colombian government and the National Liberation Army group in 2019, it was Cuba that did not hand over the members of this criminal group to the authorities for trial (Loaiza, 2020). In 2021, there was a high number of refugees from Cuba to Colombia, which is explained by the low social standard of living of Cubans against the background of high crime and criminal economy and inaction of the authorities (Stavridis, 2021). Accordingly, it can be concluded that Cuba also leads the criminal economy and supports

it at the government level. Based on the study of the features of the criminal economy of Cuba, Venezuela, and

Colombia, the features of its structure and intersection points were determined (Fig. 1).



Figure 1. Structure and intersection points of the criminal economy of Cuba, Venezuela, and Colombia

Source: developed by the author

The main point of intersection of the criminal economy of Cuba, Venezuela, and Colombia is the functioning of a transnational criminal group – the National Liberation Army (ELN – Ejército de Liberación Nacional) (Disorder on the Border..., 2020). This criminal entity extends its activities to Colombia and Venezuela and receives support and shelter from Cuba. That is, if the authorities of Colombia and Venezuela are actively fighting the National Liberation Army, then the state authorities of Cuba continue to receive and shelter high-ranking leaders of this criminal organisation. In general, the criminal aspects of Cuba's activities are hidden, but it is known that prostitution is legalised, arms trafficking, black market fuel, drug trafficking (cannabis, marijuana, and cocaine), human trafficking, and money laundering are present in the country (Shaw, 2014). That is why Cuba is more likely to support the criminal group of the National Liberation Army because it works closely with it in the implementation of the criminal economy.

Drug trafficking is at the forefront of the criminal economy in Colombia, Venezuela, and Cuba. United Nations researchers found that coca cultivation in Colombia increased by 24% compared to 2019, and in 2021, more than 41,711 hectares were sown in Norte de Santander (Disorder on the Border..., 2020). After processing, narcotic drugs are transported to Venezuela and Cuba, and then enter the international market. Fuel smuggling is a fairly significant component of the criminal economy of the countries under study. Fuel is similarly transported from Colombia to Venezuela and more likely to Cuba, where it is further illegally sold. Some of the smuggled fuel is used in laboratories in the manufacture of drugs. In addition, the crisis caused by the spread of the COVID-19 pandemic forced the poor segment of the Venezuelan population to illegally extract gold. This gold is transported to Colombia

and is already being sold there on the international market. Colombian and Venezuelan criminal organisations operate a network of human trafficking, mainly for the purpose of sexual exploitation (Disorder on the Border..., 2020). It can be assumed that Cuba cooperates with Venezuela and Colombia in this aspect, because, as noted earlier, prostitution in this country is legal.

In the course of further research, in order to assess the level of the criminal economy in Cuba, Venezuela, and Colombia, it is advisable to consider unemployment rates and gross domestic product, as these indicators characterise the shadow economy (Kirzhetsky, 2009). Since the shadow economy in these countries is built on the basis of a criminal one, these concepts are identical.

Table 1 shows that the level of GDP in Colombia during the study period decreased by 15.3% and at the end of 2021 amounted to USD 314.3 billion, which indicates the expansion of the criminal economy. Cuba is experiencing GDP growth of as much as 46.8%, which can be explained by the legalisation of criminal activities in the country and the direction of revenues from the criminal economy to the state budget. As for Venezuela, GDP figures according to the World Bank are reflected only for 2012-2014, and in this period its value increased by 26% (GDP..., 2021). This trend indicates a narrowing of the criminal economy in the country by improving state regulation.

According to preliminary studies, it is known that the expansion of the money supply in circulation reflects the growth of the shadow economy in the country. That is why it is advisable to consider the dynamics of the level of money supply in the countries under study. It is important to note that according to the World Bank, Cuba did not reflect this indicator, and indicators for Venezuela are provided only for 2012 and 2013.

Table 1. Dynamics of gross domestic product (GDP) and unemployment rates in Cuba, Venezuela, and Colombia during 2012-2021

Indicator	Country	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Growth rate, %
GDP, billion USD	Colombia	370.9	382.1	381.1	293.5	282.8	311.9	334.2	323.1	270.3	314.3	-15.3
	Cuba	73.1	77.1	80.7	87.1	91.4	96.9	100.1	103.4	107.4	-	46.8
	Venezuela	381.3	371.0	482.4	-	-	-	-	-	-	-	26.5
Unemployment rate in % of labour force	Colombia	9.7	9.1	8.6	8.3	8.7	8.9	9.1	10.0	15.0	14.3	54.4
	Cuba	3.5	3.3	2.7	2.4	2.0	1.7	1.7	1.7	2.6	2.8	-24.2
	Venezuela	6.6	7.5	6.9	6.1	5.3	5.1	5.0	5.1	6.6	6.4	0.4

Source: (GDP..., 2021; Unemployment, total..., 2021;)

Table 2 shows that the money supply relative to GDP occupied a high share and ranged from 42-58%. This trend indicates a high level of the shadow economy in these countries. Since the shadow economy is based on criminal activity in these countries, it can be concluded that the criminal economy forms 42-56% of the GDP level (Broad money..., 2021). The money supply in Colombia increased relative to GDP in 2012-2020, but in monetary terms, it decreased by 0.7%, which can be explained by a decrease in the GDP indicator itself. Therefore, it can be concluded that the criminal economy in Colombia developed during 2012-2020. As for Venezuela, according to existing data, only for 2012-2013, there was an increase in cash in cir-

ulation, which indicates the development of the criminal economy in this country. Cuba does not reflect data on the money supply at all, because criminal activity is the main aspect of the functioning of government bodies. That is why it can be concluded that the criminal economy is the main characteristic of the functioning of Cuba.

In the course of further research, it is advisable to assess the profitability of the considered countries. During the development of the data set, it turned out that the World Bank reflects income and expenses indicators only for Colombia, while data on Venezuela and Cuba are not available. Therefore, it is impossible to assess the level of profitability in Cuba and Venezuela.

Table 2. Dynamics of the money supply in Venezuela and Colombia during 2012-2020

Indicator	Country	2012	2013	2014	2015	2016	2017	2018	2019	2020	Growth rate, %
Money supply, % of GDP	Colombia	42.7	45.4	46.4	49.0	48.9	49.0	48.0	48.7	58.3	36.3
	Venezuela	45.73	52.9	-	-	-	-	-	-	-	15.7
Money supply, % of GDP	Colombia	158.6	173.4	176.8	143.8	138.4	152.9	160.5	157.4	157.5	-0.7
	Venezuela	174.4	196.3	-	-	-	-	-	-	-	12.6

Source: (Broad money..., 2021)

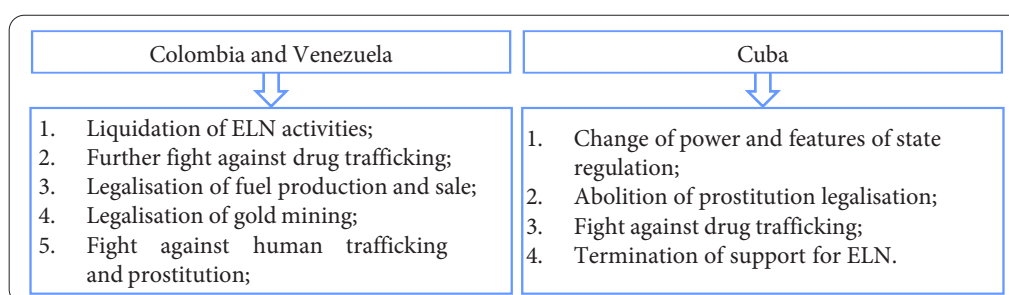
Table 3 shows that expenses as a percentage of GDP in Colombia during 2012-2020 increased by 45.4% and ranged from 25-36%. This trend reflects an increase in the level of expenses in the country, which can be explained by the expansion of government activities in the fight against crime. In monetary terms, Colombia's expenses during 2012-2020 increased by 6% and amounted to USD 98.4 billion at the end of 2020 (Expense..., 2021). At the same time, revenue as a percentage of GDP during the study period decreased by 8.6%, which is accompanied by a decrease in the level of GDP in the country. Colombia's monetary revenues for 2012-2020 decreased by 33.4% to USD 65.1 billion at the end of 2020 (Revenue, excluding..., 2021; Electric power..., 2021; Poverty head..., 2021). This trend in revenue dynamics suggests that measures to combat the criminal economy in Colombia are ineffective and there is an outflow of funds

from the budget to the shadow economy. Based on data on revenue and expenses, it was possible to determine the specifics of generating profit in Colombia. Table 3 shows that the profitability in Colombia was present only in 2012 and amounted to 4.8 billion USD. In the subsequent period of the study, Colombia was unprofitable, and there was no level of profitability (Sergeev, 2022; Castillo & Marquardt, 2021). The loss had unstable dynamics and at the end of 2020 was high and amounted to USD 33.3 billion. The lack of profitability in Colombia proves the effectiveness of the criminal economy in this state. Due to the widespread criminal activity in the country, the state budget receives a low share of revenues, incurs high costs, and generates losses (Calamunci, 2020).

Based on the conducted research, it is possible to determine the main further ways to combat the criminal economy in the countries under study (Fig. 2).

Table 3. Assessment of the level of profitability in Colombia during 2012-2020

Indicator	2012	2013	2014	2015	2016	2017	2018	2019	2020	Growth rate, %
Expenses, % of GDP	25.0	33.3	30.2	26.8	28.6	27.5	29.9	31.3	36.4	45.4
Expenses, billion USD	92.9	127.2	115.0	78.7	81.0	85.8	100.0	101.1	98.4	6.0
Revenue, % of GDP	26.3	24.5	23.4	24.1	24.2	22.6	23.5	25.6	24.1	-8.6
Revenue, billion USD	97.7	93.6	89.4	70.7	68.5	70.4	78.5	82.7	65.1	-33.4
Profit, billion USD	4.8	-33.6	-25.6	-8.0	-12.5	-15.3	-21.6	-18.4	-33.3	-789.6

**Figure 2.** Ways to combat the criminal economy in relation to intersection points in Cuba, Venezuela, and Colombia

Source: developed by the author

A high level of the criminal economy in any country hinders social development and is a guarantee of poverty and high mortality. In order to improve the economy, the countries under study need to implement a number of measures aimed at combating the criminal economy. First of all, Colombia and Venezuela should direct all measures to eliminate the largest transnational criminal group among them – the National Liberation Army. At the same time, it would be advisable to intervene in the formation of Cuba's state regulation and, by changing the government completely, eliminate interaction with the National Liberation Army (ELN) (McIntosh & Li, 2012; Mills *et al.*, 2013). Having lost support from Cuba and with the assistance of the authorities of Colombia and Venezuela, this criminal group will be eliminated. Eliminating the activities of the National Liberation Army on the territory of Colombia and Venezuela would allow fighting the main part of drug trafficking, legalising the extraction and sale of fuel, legalising gold mining, and eliminating human trafficking and prostitution in these countries. At the same time, a change in state power and the specifics of the country's governance in Cuba would allow not only abolishing the legalisation of prostitution but also further fighting it and drug trafficking. It is quite important to implement all these measures simultaneously, because in this case, the level of criminal economy in Cuba, Venezuela, and Colombia will be significantly reduced.

Discussion

The specifics of the criminal economy of Cuba, Venezuela, and Colombia are currently under-investigated. It is

important to note that the issue of intersection points of the criminal economies of Cuba, Venezuela, and Colombia has not been previously studied, and only reviews of the shadow economy and crime for each country are available separately. V. Golovchenko conducted research on the specifics of the path of social reconciliation in Colombia. In this study, the researcher calls Colombia the country of drugs and identifies two main classes of drug lords in this country – Medellin and Cali. It was the fight against these drug groups that turned the country into the most terrorist state in Latin America. The researcher also notes that the fight against drug trafficking in Colombia was hindered by Venezuela. In the 21st century, when the conflict between the Colombian authorities and criminal drug trafficking organisations unfolded, then-President Hugo Chavez quite openly supported the partisans of Colombia and allowed them to settle on the territory of Venezuela or retreat to it under the attacks of Colombian state troops. The author notes that further, the Venezuelan leadership supported the Colombian authorities in the fight against drug trafficking (Golovchenko, 2018). The researcher identified political aspects of the development of Colombian-Venezuelan relations, but the foundations of the criminal economy are only considered with the activities of criminal organisations.

E. Newman conducted a study of the specifics of Venezuela's offensive against criminal groups in Colombia in February 2012. The author notes that the Venezuelan Armed Forces continue to carry out operations against military and criminal organisations operating on the Colombian-Venezuelan border. The Venezuelan government

believes that criminal groups act with the Colombian authorities, destroying drug production laboratories (Newman, 2022). In 2021, J. Stavridis noted that although Colombia has a number of criminal groups, it is already in a better place compared to previous years. The researcher also focused on the fact that due to poverty, lack of work, medical disasters, including COVID-19, and repression by the presidential dictatorship, there is a high level of migration from Venezuela to Colombia. It is noted that Venezuela, as well as Cuba, can be declared a state that supports terrorism and criminal activities (Stavridis, 2021). These studies superficially determine the relationship between Cuba, Colombia, and Venezuela and form only assumptions about the intersection points of the criminal economy of these countries.

In the study by the Latin American Crisis Group on border disorder and the preservation of peace between Colombia and Venezuela, quite significant attention is paid to the intersection points in the development of the criminal economy of these countries. The study showed that it is poverty and weak state institutions along the Venezuelan-Colombian border that require the implementation of the provisions of the Colombian peace agreement on rural development and broad economic reconstruction in Venezuela. It is also noted in this paper that Colombia and Venezuela need to hold peace negotiations with a criminal group – the National Liberation Army – because providing assistance to victims of crimes of this group significantly reduces the level of profitability of these countries. It is noted that although there was a closure of the borders between Venezuela and Colombia in connection with the COVID-19 pandemic, but the weak level of state regulation in these countries leaves the same attraction of income illegally and slows down the official level of the economy. Informal criminal trade at the borders of these countries is flourishing and since 2013, subsidised fuel and food products have been smuggled from Venezuela to Colombia. It is also noted that the drug trade in this region is quite effective. The sharp increase in fuel smuggling was a shock, as US sanctions were imposed on the oil industry. Sanctions against Venezuelan crude oil exports have significantly weighed on Venezuela's import of light fuel for transport, which has become more scarce in Venezuela and reduced the level of gasoline smuggling to Colombia. This study also explains that fertile and hilly land in the Colombian border state of Norte de Santander has become the main centre of drug production in the world and a major factor in the spread of the criminal economy in the region under study. The researchers note that smuggled Venezuelan fuel and illegally extracted gold are the main sources of income for criminal syndicates, armed groups, and corrupt border security officers. Human trafficking is also distinguished among the criminal economies in this study. It is also recommended to conclude peace agreements with the main transnational criminal group ELN, which, according to researchers, will solve violent incidents in these countries (Disorder on the Border..., 2021). Scientists also pay more attention to criminal activity on the border of Venezuela and Colombia, but although the main components of the criminal economy are

noted, the issue of the intersection points of the criminal economies of these countries with Cuba is not disclosed at all.

Research led by M. Shaw, in terms of defining the global crime index, considers the illegal sale of weapons to be the main focus of Cuba's criminal activities. It is noted that Cuba helps stimulate the global and regional illegal arms trade by supporting criminal groups in Venezuela. Cuba has a significant shortage of oil reserves, according to which there is a strict fuel rationing regime. This led to the emergence of a local black market for stolen gasoline and fuel. Government employees or thieves often redirect fuel from objects or tanks, and law enforcement officers allegedly cooperate with robbers, giving them way to state facilities in exchange for bribes. The study also shows that the main criminal figures in Cuba are government employees and officials. Supply shortages have set the stage for several black markets in the country. This has led to the endemic illegality that underpins much of the economy. Military, intelligence, and law enforcement agencies are actively involved in such markets, which control a significant part of them. In addition, state entities participate in currency manipulation, control businesses, distribute activities in the grey market, and use their enterprises for the purpose of illegal enrichment or money laundering. The study also notes that Cuba's economy is centralised, meaning that it is the state authorities who own and control all businesses, while preventing the development of the private sector and limiting legitimate economic opportunities. It is precisely this regime of state regulation that does not provide the necessary goods and incomes to a large number of Cuban households and, consequently, creates a high level of criminal economy. Cuban legislation controls all aspects of money laundering, but does not control financial institutions that carry out operations related to the proceeds of the international drug trade (Shaw, 2021). This review focuses on economic crime in Cuba and does not address the specifics of the country's criminal financial ties to transnational criminal groups in Venezuela and Colombia.

Thus, comparing the results obtained with previous studies on the criminal economy of Cuba, Venezuela, and Colombia, it was found that they do not determine the main points of intersection of the criminal economy and do not provide an analysis of the financial indicators of these countries. The conducted research, in contrast to the previous ones, not only establishes the features of the structure and intersection points of the criminal economy of Cuba, Venezuela, and Colombia, but also defines the main ways to combat the criminal economy in the aspect of the interaction between these states. At the same time, the study allows using economic indicators to assess profitability and form an idea of the level of criminal economy in Cuba, Venezuela, and Colombia.

Conclusions

A study of the criminal economies of Cuba, Venezuela, and Colombia has helped to establish that these countries have high crime rates, as a result of which the main component

of the country's economy is income from illegal activities. It is important to note that in connection with the conduct of the criminal economy, Cuba and Venezuela do not highlight the indicators that form the financial system of these countries. Using the present indicators of the countries under study, it can be concluded that they are characterised by a high level of criminal economy. The main point of intersection of the criminal economies of Cuba, Venezuela, and Colombia is the functioning of the transnational criminal group National Liberation Army, because its activities are focused on the Colombian-Venezuelan border and are supported by the Cuban authorities. The structure of the criminal economy in these countries is based on drug trafficking, fuel smuggling, illegal gold mining, prostitution, and human trafficking.

The analysis of GDP and unemployment indicators in the considered countries showed that, despite active efforts to combat criminal activity, there is a high level of criminal economy in Cuba, Colombia, and Venezuela. The lack of indicators of the money supply, income and expenses of Cuba and Venezuela only confirms the focus of the authorities on the development of a criminal economy. Colombia, on the contrary, is actively trying to reduce the level of the criminal economy, but the increase in the money supply in circulation and the presence of damage in this country indicates

the ineffectiveness of the authorities' actions in overcoming the criminal economy.

That is why it is quite important, in order to eliminate the criminal economy both in the countries under study and in the world, firstly, to review the specific features of public administration in Cuba and it is recommended to change the features of the organisation of power. It is necessary to eliminate the focus of the authorities on criminal activities, abolish the legalisation of illegal industries, and stop any support for the National Liberation Army. At the same time, Colombia and Venezuela should direct all their forces to fight the above-mentioned criminal organisation. At the same time, it is important to focus attention on drug production and sale, fuel smuggling, and illegal gold mining.

Further research on the specifics of the criminal economy of Cuba, Venezuela, and Colombia should be based on the study of the economic criminal relationships of these states in the field of drug trafficking, illegal extraction of minerals, and fuel smuggling.

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Conflict of Interest

None.

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Кримінальна економіка Куби, Венесуели та Колумбії: Структура, точки перетину, оцінка рівня прибутковості

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Анотація. Поширення кримінальної економіки є найбільшою проблемою у світовому фінансовому середовищі. Досить високим рівнем економічної злочинності характеризуються Куба, Венесуела та Колумбія. В даних країнах процвітає кримінальна економічна діяльність, котра знижує соціальний розвиток держав та поширює безробіття та бідність на їх територіях. Саме тому питання кримінальної економіки Куби, Венесуели та Колумбії та особливості структури, точок перетину та оцінки рівня прибутковості в даних країнах є досить актуальним. Адже саме на цих територіях проблема розвитку кримінальної економіки є низько регульованою та поряд зі злочинною діяльністю існує проблема бідності та наявності воєнних конфліктів. Саме тому метою даної роботи є дослідження та узагальнення аспектів кримінальної економіки Куби, Венесуели та Колумбії та здійснення визначення особливостей її структури, точок перетину та оцінки рівня прибутковості. Під час дослідження було використано теоретичні методи – аналіз, синтез. Зокрема, було визначено, що точки перетину кримінальної економіки Куби, Венесуели та Колумбії зосереджені на діяльності транснаціональної злочинної організації Національній визвольній армії. З'ясовано, що основними структурними елементами кримінальної економіки при взаємодії в даних країнах є наркобізнес, контрабанда палива, незаконне добування золота, проституція та торгівля людьми. Проведена оцінка рівня прибутковості показала, що досліджувані країни є збитковими, що пояснюється наявністю високого рівня кримінальної економіки. З урахуванням отриманих результатів дослідження, були розроблені та запропоновані заходи стосовно шляхів боротьби з кримінальною економікою відносно точок перетину в Кубі, Венесуелі та Колумбії. Визначено, що основними напрямками зниження рівня кримінальної економіки мають стати заходи, спрямовані на боротьбу з транснаціональним злочинним угрупованням – Національною визвольною армією, дії стосовно усунення на території досліджуваних країн бізнесу з виробництва та реалізації наркотиків, контрабанди пального, проституції та торгівлі людьми. Таким чином, практична значимість дослідження полягає в тому, що визначені заходи боротьби з кримінальною економікою можуть бути використані в Кубі, Венесуелі та Колумбії з метою покращення соціального стану даних країн та підвищення рівня життя на даних територіях

Ключові слова: наркобізнес; «відмивання» грошей; легалізація доходів; контрабанда пального; торгівля людьми

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