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**The Main Prerequisites for Sectoral Financial and Credit Cooperation
Between Territorial Communities, Objects of the Nature Reserve Fund
of Ukraine, and Environmental-Oriented Entrepreneurs: Theoretical Aspects**

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Abstract. In the context of the decentralisation reform, the objects of the nature reserve fund have an outstanding potential for the economic and environmental development of territorial communities and promotion of the region on the national market. The purpose of the study is to develop theoretical and methodological provisions regarding the development of mechanisms for cooperation between territories and objects of the nature reserve fund of Ukraine, territorial communities and financial institutions, the development of stable intersectoral relations and the emergence of new vectors of economic activity that would meet the modern needs of society. The method of quantitative literature review (meta-analysis) was used during the investigation of the practice of financial and credit cooperation between territorial communities, state authorities and administrations of protected areas. Using the systematisation, destructive factors were identified and the main conflicts of regulatory, economic and organisational nature were identified, which can weaken and slow down the latest transformations in the post-military economic space of Ukraine, especially in terms of financial and credit cooperation with banking and other financial institutions. Using the comparison, the main vectors of cooperation between eco-oriented representatives of the private sector of the economy and financial institutions, which are typical for EU countries, and the possibilities of their implementation in the national economic system were identified. The study suggests using commercial lending tools to develop the economic potential of protected areas and innovative forms of business management. Lending is considered as an industry-specific institution of financial support for environmental-oriented entrepreneurs who carry out their economic activities in protected or adjacent territories. As a result of the conducted research, the essence and role of financial institutions, in particular credit unions, in the system of balanced economic and ecological development of protected areas and environmentally oriented economic activities are determined. Mechanisms for the establishment of protected areas as subjects of market relations that have investment attractiveness for various sectors of the national economy are proposed. It is proved that the economic and environmental development of protected areas requires constant extra-budgetary investment flows, through cooperation not only with environmental-oriented entrepreneurs but also with financial institutions. The establishment of a system of cooperation between institutions of the nature reserve fund, banking and other financial organisations, representatives of business groups, state authorities and territorial communities would ensure the development of a favourable investment environment for eco-business, the comprehensive development of the ecosystem "man-nature-business" and the emergence of new vectors of economic and environmental inclusion in the regions, the establishment of nature reserves and other protected areas as socio-economic and cultural hubs

Keywords: ecological hub, protected areas, investment and financial instruments, protected lending, eco loans

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Introduction

Sustainable development of Ukraine's economy requires the establishment of adaptive mechanisms to attract investments to protected and nature reserves of the national economy. As of today, the traditional view of the growth of the Ukrainian nature reserve fund, as proprietary protective tools, conservation, and reproduction of natural resources, does not meet the socio-economic needs of the population. The natural reserve fund of Ukraine can be a complex polyfunctional zone. The economic and ecological development of such territories would facilitate the establishment of new vectors in the business activity, the launching of environmentally oriented start-ups, the acquisition of new business subjects.

The development of environmental and economic relations in these areas requires the introduction of innovation

and marketing approaches that would encourage the creation of sustainable investments to industry, and contractual areas of cooperation between different actors in public relations.

Aimed at increasing financial and investment flows in the environmental and nature reserves of the national economy, the introduction of innovative institutions of intersectoral cooperation, it is necessary to attract additional businesses to participate in environmental and economic relations, including financial institutions. Banking, factoring institutions, and credit unions have sufficient organisational and economic resources to enter the relevant industries, and to ensure sustainable investment flows (Fig. 1).

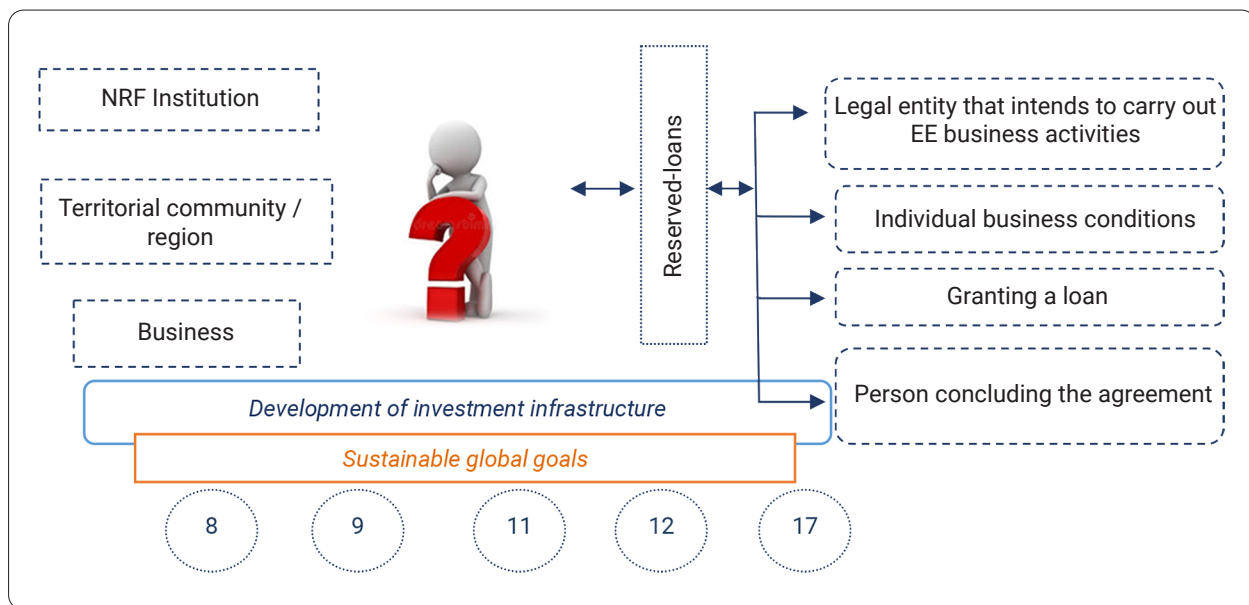


Figure 1. Sustainable development vs personal reserved loans

Source: author's own development

Nowadays, one of the main subjects of financial and investment assistance of extra-budgetary nature are banks, and other financial institutions that can be the foundation of appropriate economic and organisational, material and technical components for the development of assets of protected areas and business representatives, intending to carry out environmental and economic activities.

To date, the most common tool for cooperation of environmentally friendly businesses, environmental funds, organisations and financial institutions is environmental insurance and lending [1; 2]. Financial institutions can become

not only a source of investment support for the industry, but also a vehicle for innovative interdisciplinary connections [3; 4].

However, the predominant cooperation is carried out exclusively with banks, which necessitates the expansion of financial counterparties, in particular, credit unions [5]. The main financial authorities consist of the following: banking institutions, credit unions and factoring institutions, which ties with each other. This combination can significantly reinforce many links between financial institutions, ecologically oriented entrepreneurs and economic and local communities (Fig. 2).

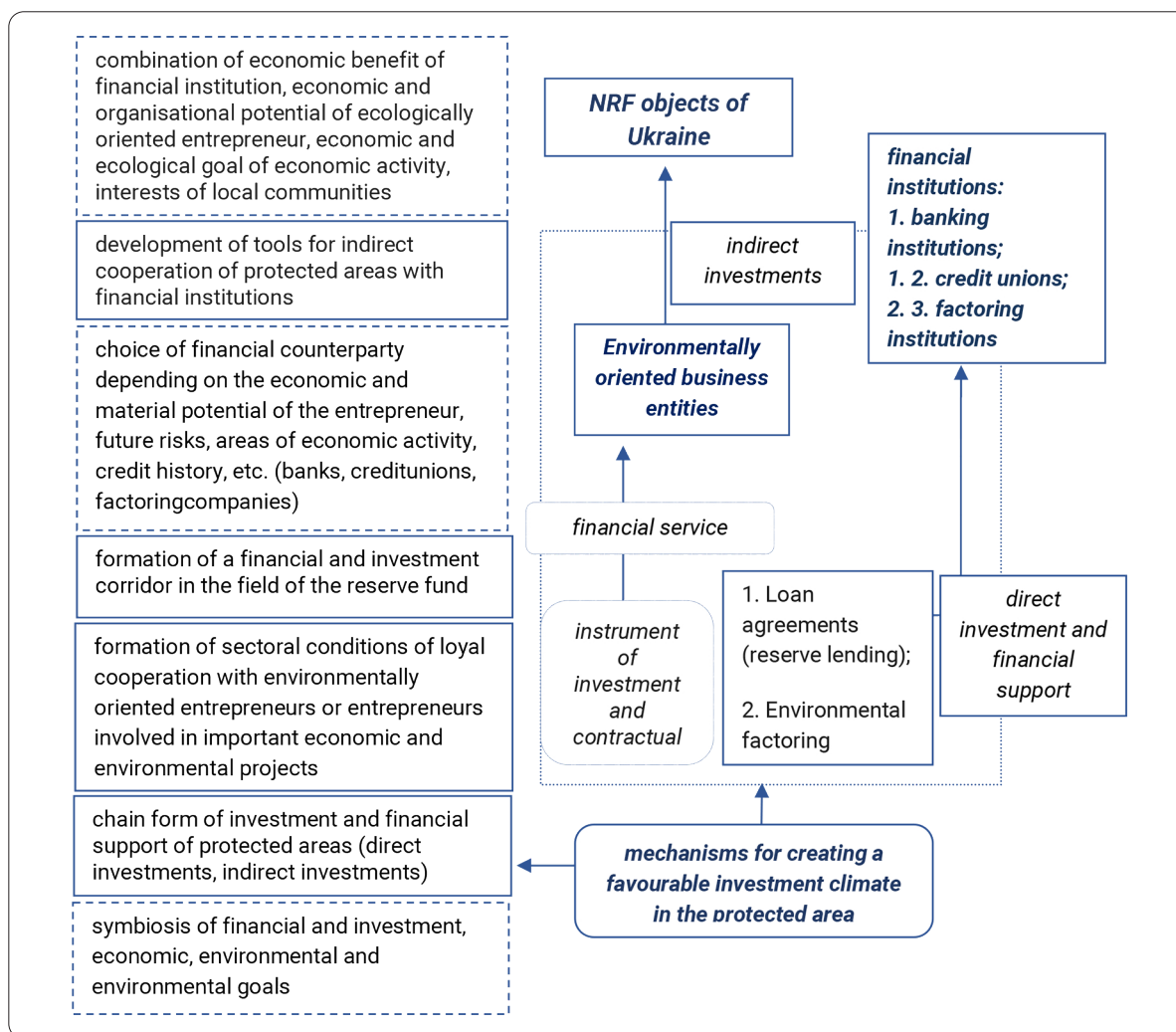


Figure 2. The main elements of the formation of a favourable investment climate in the field of NRF of Ukraine
Source: author's own development

In Ukraine, the current legislation provides for mandatory state or commercial environmental insurance of interested enterprises [6], but all other financial services or instruments of cooperation with financial institutions are not directly provided by law, and require more detailed analysis. As of today, the administrations of nature reserves of Ukraine have a very limited number of contractors, which is conditioned by the insufficient level of development of economic, organisational, regulatory, administrative, and environmental support, in terms of mutual obligations.

In general, the development of competitiveness among banks by segmenting the financial services market contributes to the growth dynamics of this type of lending, such as environmental lending [7]. The international community is developing new vectors of environmentally friendly credit lines, which are created with the support of major MFIs/donors/financial institutions (European Bank

for Reconstruction and Development (EBRD), International Finance Corporation (IFC), European Investment Bank (EIB), World Bank, Asian Development Bank (ADB), KfW, Austrian Development Bank (OEDB), Nordic Environment Finance Corporation (NEFCO)) [8; 9].

Representatives of the private sector of the economy, engaged in eco-entrepreneurial activities, and aiming to receive financial support, should cooperate with banking or other financial institutions on general credit terms. However, considering the specifics of environmental and nature reserves of the national economy, specific or preferential mechanisms for cooperation with financial institutions should be created for economic entities.

F. Corten [10] notes that environmental crises are the basis for the development of environmentally friendly lending. The researcher concludes that environmentally friendly loans can lead to the following problems: their

volume is ahead of effective implementation, and debt repayment in foreign currency is likely to accelerate environmentally harmful exports.

Ch. Hing [11] suggest that only green innovations promote access to corporate credit. At the same time, the disclosure of environmental information prevents businesses from obtaining more credit. Greenwash tools also serve as a guide for companies, banks, and governments in decision-making.

M.J. Billiot & J.W. Daughtrey [12] believe that environmental lending is interrelated with environmental responsibility, as environmental responsibility should include not only environmental commitments but also financial reporting.

According to L. Wu & L. Xu [13], governance and environmental responsibility are prerequisites for the sustainability environmental lending tools. Cooperation between state and corporate responsibility can be the key for developing an innovative system of eco-loans, designed to reduce harmful emissions.

F. Shi [14] et al. point out that environmental performance is part of risk management theory, as regions with higher levels of pollution need a wider range of environmental credit mechanisms than regions with moderate or low levels of pollution.

G. Escribano [15] suggests that green investment and credit, and lobbying for political interests do not always coincide with the socio-economic objectives of the country.

O. Weber [16] et al. consider that there is a correlation between sustainable development and credit risks. In addition, the sustainable development of financial support from banking institutions should become a trend of green economy and green investment, because without integrated environmentally oriented development of all sectors of the national economy, the economy of any country would not have effective growth rates [17].

Eco-oriented business is a form of reducing industrial expansion into the national economy, so financial support for such vectors of business development would reduce pressure on the environmental sector, promote environmental and economic initiatives, and increase social responsibility on the part of business structures [18].

According to V.-S. Alvarez & T.-G. Merinos [19; 20], eco-lending is a form of adaptive financial mechanism for the development of environmental and economic strategy of the country, which provides the emergence of evolutionary processes for resources and opportunities in general.

The purpose of the study is to reveal the economic, environmental, and organisational tools of cooperation between credit unions, nature reserves of Ukraine, and local communities. This cooperation can ensure the comprehensive financial assistance package for nature reserve fund. The main objectives of the study are to analyse and consider the organisational and socio-economic feasibility of cooperation between financial institutions and environmentally oriented businesses, the need for specialised commercial loans for eco-business as a separate segment in the financial services system.

The main task is to substantiate the need to expand the tools of cooperation between the institutions of the nature reserved fund of Ukraine and financial institutions; lending and insurance of environmental measures as tools for additional extra-budgetary financing of projects for the development of economic activities of environmental and economic line, and mechanisms for cooperation with representatives of the private sector.

Materials and Methods

A number of scientific methods and approaches were applied to investigate the subject matter. Theoretical and methodological provisions are based on the fundamental studies by Ukrainian and foreign experts and researchers in the field of economic and environmental development of protected areas. The application of the regional approach as the basis for methodological analysis of protected areas reform problems is characterised by a social, economic, and political characteristics of different regions, which considerably affects the development participation of financial capacity. Using the search and problem methodology, a problem was found and recognised, which will be solved in the future by selecting the valuable option. Other theoretical methods that were used include: systematisation, comparison, summary of empirical and generalisation of theoretical results. A quantitative literature review (a meta-analysis) was conducted to investigate the market without inter-study differences. The systematisation was used to establish indicators of the economic feasibility of commercial loans for eco-oriented entities. The comparative method was used to form the main vectors of cooperation between eco-entrepreneurs and financial organisations in the EU countries and the possibility to adapt these tools to the Ukrainian economy. The Commercial Code of Ukraine does not regulate the procedure for cooperation with eco-entrepreneurs as a separate business structure [21]. Eco-entrepreneurs do not have tax benefits, although their production is more expensive than conventional one [22]. R. May [23] et al. note that the cooperation of financial institutions with environmental institutions will contribute to the creation of innovative financial networks that can be the basis for transformation processes in the economy.

Other scholars suggest that the field of financial services is under excessive political pressure, so the expansion of lending instruments is significantly hampered by political and social instability in countries, and problems of interaction between industrial and natural capital [24].

For conclusions, the method of empirical generalisation and generalisation of the findings were used. Thus, the financial services are underdeveloped, as incentives for borrowers are weak, because the payback period is much longer than other areas of Ukrainian economy [25].

Comparative legal approaches in EU countries have contributed to establishing the specificities of the implementation of a comprehensive reform in the area of the natural reserve fund. From individual trees to sweeping sites covering hundreds of thousands of square kilometres,

Europe's protected areas are vital to nature conservation. With more than 100.000 distributed across 54 countries, Europe has more of such areas than any other region in the world. They include national parks, natural parks, nature reserves, and protected landscapes – all of which are designated by individual countries – and the 27.000+ areas of the Natura 2000 network, which the European Union (EU) established in 1992. The need to make parks in Europe wilder was addressed by Schepers at the EUROPARC Conference 2021, which was held online in early October with the title "Parks in the Spotlight". M. Selman [26] et al. claim that a poll among the 150 participating EUROPARC members was taken, with those most active in park management asked to rank their protected area in terms of wildness. On a scale of 1 to 10 (10 being fully wild), it was interesting to note that most awarded their area a score of 7 or 6, and many even lower.

The research is one of the triggers of the reform of Ukraine's legal framework in nature reserve fund, aiming to align it with that of the EU. The study was conducted to identify key potential milestone points linked to the implementation of economic and environmental reform in nature reserve fund in the context of decentralisation. The government should react fast and respond to the urgent needs of regions and local communities.

Results and Discussion

As of today, the main tool to support the development of entrepreneurial activity is lending to businesses, the subjects of which are banking institutions. The current legislation of Ukraine provides for such forms of financial institutions, as credit unions, pawn lenders, leasing companies, trust companies, insurance companies, funded retirement institutions, mutual funds and corporations, other legal entities (the sole business of which is providing financial services) [7].

But for financial institutions, and for the administrations of nature reserves, such cooperation should be mutually beneficial. The study will consider the algorithms of cooperation between NRF institutions and credit unions, as financial institutions that are not currently involved in cooperation in the field of protected areas. The relevant literature was reviewed to ascertain the knowledge gap left by earlier scholars.

A. Caldarelli [27] et al. explore how the implementation of enterprise risk management (ERM) practices can help organisations to pursue both economic and social goals.

I. Catturani & M.-L. Stefani [28] consider banks that lend small loans to local farmers and craftsmen in rural

areas where they were in most cases the sole banking institutions, have become capable of competing against commercial banks in wider areas.

The development of new cooperation instruments would provide comprehensive support for environmentally oriented entrepreneurs, despite financial and other risks. N. Liston [29] suggests that the high growth in assets and loan to members is related to high financial performance.

Lending to small businesses does not always have a sufficient level of financial benefit for banks or credit organisations, but it allows expanding the market of potential customers and creating a new product. I. Catturaniet [30] consider that the share capital and market shares of the CTOs are linked and that the links are closer when the banks lend to small businesses. When the types of associations are separated depending on their particularist or universalist nature, the results show that it is mainly the latter that counts.

Therefore, this study confirms the need to expand financial products for entrepreneurs, especially eco-oriented. But economic development cannot be considered separately from social, political, or environmental institutions, as they are interconnected and form a complex multi-level system.

One of the tools of cooperation between financial institutions and administrations of the NRF can be a targeted lending programme for entrepreneurs who intend to engage in economic activities in protected areas. In particular, even credit unions (hereinafter – CU), as non-profit organisations [31] can finance private entrepreneurs who intend to carry out economic activities of environmental-economic (hereinafter – EE) nature and lending in this area. The area of environmental protection should receive state support for flexible mechanisms of cooperation with financial institutions, development of instruments of subsidiary support, as this sector of the national economy not only has a minimum level of anthropogenic pressure on natural ecosystems, but also aims to minimise existing negative impacts [32].

Under Ukraine's current legislation, financial institutions do not market segmentation in various fields of the national economy, so the policy of environmental lending is an internal vector of financial activities of banks, and therefore apart from the internal policy of bank loyalty to environmentally friendly entrepreneurs, there are no other mechanisms [7; 33]. Analysing the credit policy of all financial institutions of Ukraine, including banks and credit unions, it becomes evident that interest rates on commercial loans do not reflect the state of sectoral provision of economic entities and are approximately at the same level (Table 1; Table 2) [34].

Table 1. Information on interest rates on non-consumer loans to commercial loans by banking institutions for 2020

Name of financial institution (bank)	Lending period (months / years)	Interest rate
Oschadbank JSC	5	15.5%
UkrGasbank JSC	5	15%
UkrEximbank JSC	5	16%
PUMB JSC	5	19%

Table 1, Continued

Name of financial institution (bank)	Lending period (months / years)	Interest rate
Megabank JSC	4	10%
Alfa-Bank JSC	3	15-27.5%
CB Privatbank JSC	3	16%
Raiffeisenbank Aval JSC	18 months	16.10-17%
Tascombank	3	16.32%
OTBbank JSC	5	36%
Sberbank	5	12.40%
Prominvestbank	5	17%
Ukreximbank	5	17-18%
EXPRESS-BANK JSB	5	25%
CLEARING HOUSE JSB	5	27%
INDUSTRIALBANK JSCB	5	25-30%
ALPARI BANK JSC	12-18 months	19%
BANK GRANT JSC	5	~28%
Investment and Savings Bank JSC	3	18-28%
BM BANK JSC	5	26%
KIB JSC	3	20%
City Bank JSC	3	15-20%
MetaBank JSC	5	16-20%
PIRAEUS BANK MKB JSC	18 months	25-35%
ProCredit Bank JSC	5	16-19%
SKY BANK JSC	5	18-22%
UKRBUDINVESTBANK JSC	5	17%

Source: developed by the author based on [35; 36]

Table 2. The information on interest rates by commercial loans (July-August 2020)

Name of financial institution (bank)	Oschadbank JSC	UkrGasbank JSC	Ukreximbank JSC	PUMB JSC	Megabank JSC	Alfa-Bank JSC	CB Privatbank	Raiffeisenbank Aval JSC	Tascombank	OTBbank JSC
Loan term (months/years)	5	5	5	5	4	3	3	18 months	3	5
Interest rate	15.5%	15%	16%	19%	10%	15-27.5%	16%	16.10-17%	6.32%	36%

Source: developed by the author based on [37]

In addition to Table 1, interest rates on commercial loans are quite high, which will increase the financial burden on local business. Many entrepreneurs engage in economic activities that do not bring large profits, but are important for the socioeconomic importance of the regions.

Considering the statistics in Table 2, it can be concluded that despite the declarations of credit unions, numerous loyalty programmes and the profitability of joining the CU, interest rates on loans are quite high. When lending for commercial needs by the actual banking institutions, lending rates are much lower. Members of a credit union receive a loan at a certain interest rate, that is, in addition to

the amount of principal, an individual must pay interest. At the same time, a natural person-entrepreneur, or a natural person who is a founder, co-founder, or member of another legal entity, has the right to provide financing exclusively in the form of a loan agreement or a loan [37].

The price for credit services of a credit union is in the form of a percent rate on the loan. Percent rates on different types of loans in each credit union depend on the level of competition in the region and the structure of the loan portfolio. As a rule, loans, issued to credit union members for business purposes have a higher interest rate than for consumer needs lending (Table 3).

Table 3. The ratio of interest rates by non-consumer loans

Name of the credit union	CU "Zlet" ("Zlet", 2020)		"Credit Union" (Credit Union, 2020)		CU "Center for Financial Services" (Center for Financial Services, 2020)	CU "Ukrainian Leading" (Ukrainian Leading, 2020)		CU 'Anisia' (Anisia, 2020)
Loan amount (in UAH)	<100000	≥100000	<100000	<100000	<100000	≥100000	–	–
Purpose of the loan								
Commercial credit	60-36%	16%	54%	43.7%	78-90%	60-72%	53-60%	58%
Loans provided for the management of peasant farms	60-40%	16%	–	–	72-90%	60-66%	67%	55-70%
Loans provided for personal farms	55-40%	16%	–	–	72-90%	60-66%	65%	55-65%

Source: developed by the author based on [38-40]

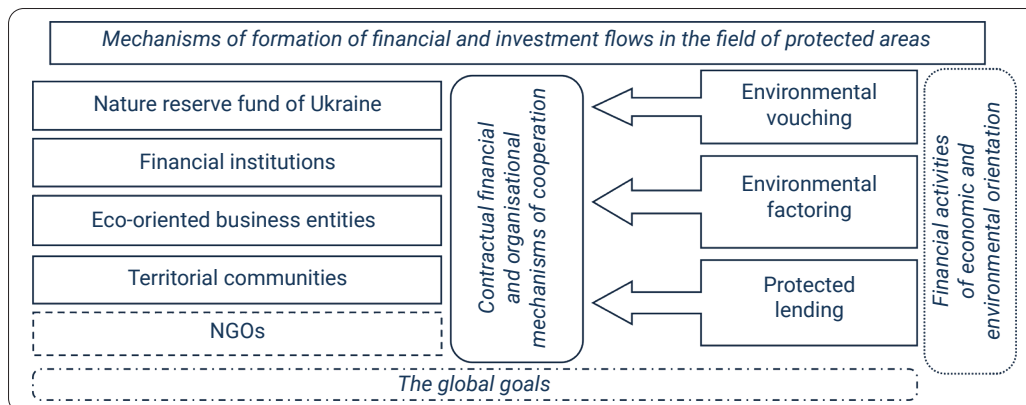
Table 3 indicates that interest rates on credit unions are much higher than in banking institutions. However, credit unions have a more flexible loan procedure, which is relevant for start-up entrepreneurs. Despite the high financial burden of working with credit unions, it is also a form of mobilising the spectrum of contractors in the field of protected areas [41].

That is, depending on the form of conducting a statutory activity of the actual financial person, its mechanisms depend on cooperation with eco-entrepreneurs and the degree of their mutual benefits for both parties. Taking into account the above, we see, there are instruments for cooperation between financial institutions and eco-entrepreneurs, that can have economic feasibility for both parties.

In turn, depending on the method of economic activity in the field of nature reserves of Ukraine, it is proposed to conditionally zone it to:

– economic and ecological entrepreneurial activity, i.e., ecologically oriented economic activity (provision of ecosystem services, production of ecologically clean goods and products, implementation of economic activity on the territories of NPF objects, provision of services). Entities engaged in direct environmentally oriented business activities were attributed to the main entrepreneurs [42; 43];

– eco-oriented financial activities, i.e., economic entities do not participate in the provision of ecosystem services or production of eco-goods/products, but provide permanent, temporary or one-time financial or other economic or organisational support (depending on contract terms) sub-economic entities that implement economic and environmental entrepreneurship (e.g., environmental vouching, protected lending, franchising agreements). In turn, such entities are entrepreneurs-donors [44] (Fig. 3).

**Figure 3.** The market segmentation in different parts of the country's economy of NRF

Source: author's development

Financial activity in the field of nature reserve fund of Ukraine is proposed to be zoned depending on the normative and legal, organisational and economic essence of cooperation with private entrepreneurs, namely:

- environmental factoring, as an agreement and financial service, according to which the client assigns the receivables of another eco-entrepreneur to the factoring company under certain conditions. The institute of ecological factoring should aim not only to satisfy the financial interests of the factoring institution, but also to promote ecologically oriented development of regions, support ecosystem economic

activities aimed at combining environmental and economic interests (Fig. 4);

- “reserved” lending, as a sectoral institution of lending to business entities engaged in economic activities in protected or adjacent areas;

- environmental vouching, as an agreement under which the essential terms of the voucher (guarantor) undertake to the creditor to bear the burden of economic, environmental or other legal liability for the debtor, in case of default or failure to perform its obligations to the creditor [45].

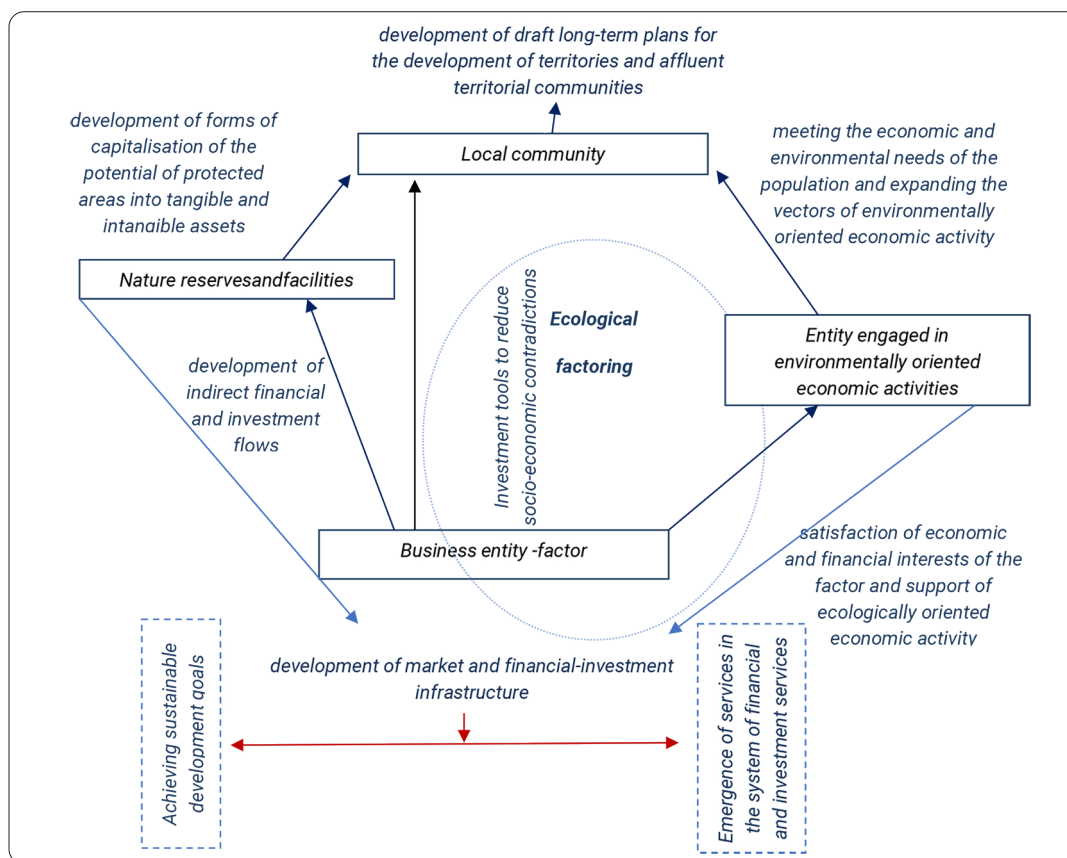


Figure 4. Institute of ecological factoring in the system of sustainable economic and ecological development

Source: author's own development

In turn, it may differentiate the participation of credit unions, as financial institutions, in investment flows aimed at developing environmental and economic activities (in particular, according to the principles of responsible investing [45]):

1. depending on the form of participation:

- environmental lending (providing funds in cash or non-cash for a certain period of time at interest);
- environmental financing (provision of funds in cash or non-cash forms on contractual terms without interest);

2. depending on the subject of participation:

- the credit union itself, as a financial institution;
- a member of a credit union, as a person engaged in independent economic activity;
- a member of a credit union as an intermediary;
- a member of a credit union, as a private investor or lender.

The institute of targeted protected lending can become an innovative mechanism of investment and financial support for representatives of business groups that intend to carry out environmentally friendly economic activities and provide ecosystem services. In turn, for financial and credit and banking institutions, the appropriate form of cooperation can be a source of additional income and a guarantee of proper implementation of economic and environmental obligations for the state by private entrepreneurs. The system of protected lending is a targeted form of cooperation between financial institutions, territorial communities, and territories and objects of the nature reserve fund of Ukraine, and therefore, it must have a number of individual economic, environmental and financial and organisational instruments. “Reserved credit” should consider the peculiarities of economic activity in nature reserve fund's

areas, and therefore, have atypical conditions that will be beneficial not only for the financial institution, but also for the private entrepreneur. Thus, the institution of protected lending to the business sector, which aims to carry out economic activities, or other forms of environmentally oriented entrepreneurship in protected areas, should become not only a profitable part of banking, but also effective support for environmental and economic format of entrepreneurship.

Conclusions

Market transformation in the environmental economy requires significant investment flows, which are not able to be provided by the state. Involvement of financial organisations in the area of lending to business, who aim to implement their economic activity in the reserve territories, would reduce the financial and organisational burden on the state side, to form innovative and marketing mechanisms for development relations in this area. During the cooperation of financial institutions and eco-entrepreneurs, the specificities of the system must consider the actual economic activity and the area of its implementation.

Business entities, operating in the format of reserved business, should form a separate segment of entrepreneurship, which requires a special form of cooperation with financial institutions in the face of banks and credit unions.

Credit unions, as financial institutions, can become tools for generation investment flows in the nature reserve fund industry. Involvement of credit unions as financial counterparties requires improvement of administrative and regulatory and organisational and economic support of such relations.

As of today, credit unions have the right to provide loans in the form of lending (at interest rates), as actually legal institutions, and financing (without interests), in the way of re-lending to their members, who intend to establish independent economic activity or financing other representatives of the private sector economy. However, interest rates on loans, which credit unions currently can propose, are quite high. The terms of cooperation with credit unions are

not economically beneficial enough for private entrepreneurs, at the same time, a number of entities do not have sufficient conditions to obtain a loan from banks. Such category of entities can be conditionally classified as “economically marginal”, and the CU, providing loans at higher interests, are more loyal to potential counterparties.

“Reserved credit” should consider the peculiarities of the implementation of economic activity in the reserve areas, and therefore, have atypical conditions that will be beneficial not only for financial institutions, but also for the private entrepreneur. Thus, protected lending of entrepreneurs, aiming to carry out economic activity in the protected areas, should become not only an income-creating area of active banking activity, but also an effective support for the growing of environmental and economic format of protected areas.

Improving of banking practice of reserve credit is linked not only to the improvement of the method of determining interest rates, but also with a number of individual conditions for cooperation with business representatives. The implementation of that approach would allow forming an effective mechanism of protected lending to business entities, as a tool for segmenting the market of their services and creating an innovative product. Since the system of reserve lending is closely linked to such a sector of the national economy, as the reserve, and the actual essence of protected enterprise, and therefore, it must have a number of individual economic, environmental, and financial and organisational tools.

The conclusion of the study based on findings reveals that the cooperation between the financial facilities and eco-entities has positive impact on the regional financial performance.

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Основні передумови секторальної фінансово-кредитної співпраці територіальних громад, об'єктів природно-заповідного фонду України та екологоорієнтованих підприємств: теоретичні аспекти

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Анотація. В умовах реформи децентралізації, об'єкти природно-заповідного фонду мають неабиякий потенціал для економіко-екологічного розвитку територіальних громад та промоції регіону на національному ринку. Метою статті є розробка теоретико-методичних положень в частині формування механізмів співпраці територій та об'єктів природно-заповідного фонду України, територіальних громад та фінансових установ, розвитку сталих міжгалузевих зв'язків та появи нових векторів господарської діяльності, що задовольнятиме сучасні потреби суспільства. Під час дослідження практики фінансово-кредитної співпраці територіальних громад, органів державної влади та адміністрацій заповідних та інших природоохоронних територій були використані метод кількісного огляду літератури (мета-аналізу). За допомогою методу систематизації було виокремлено деструктивні чинники та окреслено основні колізії нормативно-правового та економіко-організаційного характеру, що можуть послаблювати та гальмувати новітні перетворення на пост військовому економічному просторі України, особливо в частині фінансово-кредитної співпраці з банківськими та іншими фінансовими установами. Завдяки методу порівняння було виокремлено основні вектори співпраці екоорієнтованих представників приватного сектору економіки та фінансових установ, що є характерними для країн ЄС, та можливості їх імплементації у національну економічну систему. У дослідженні запропоноване використання інструментів комерційного кредитування для розвитку економічного потенціалу заповідних територій та інноваційних форм ведення бізнесу. Кредитування розглядається як галузевий інститут фінансової підтримки екологоорієнтованих підприємств, що здійснюють свою господарську діяльність на заповідних або прилеглих до них територіях. Унаслідок проведених досліджень визначено сутність та роль фінансових установ, зокрема кредитних спілок, у системі збалансованого економіко-екологічного розвитку заповідних територій та екологоорієнтованої господарської діяльності. Запропоновано механізми формування заповідних територій як суб'єктів ринкових відносин, що мають інвестиційну привабливість для різних галузей національної економіки. Доведено, що економіко-екологічний розвиток заповідних територій потребує позабюджетних інвестиційних потоків постійного характеру, шляхом співпраці не тільки з екологорієнтованими підприємствами, але й з фінансовими установами. Формування системи співпраці установ природно-заповідного фонду, банківських та інших фінансових організацій, представників бізнес-угруповань, органів державної влади та територіальних громад забезпечить розвиток сприятливого інвестиційного середовища для еко-бізнесу, комплексного розвитку екосистеми «людина-природа-бізнес» та появи нових векторів економіко-екологічної інклюзії в регіонах, становлення природно-заповідних та інших природоохоронних територій, як соціо-економіко-культурних хабів

Ключові слова: екологічний хаб, заповідні території, інвестиційно-фінансові інструменти, заповідне кредитування, еко-кредити

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Price Trends in the Pork Market

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Abstract. The pig industry and the pork market occupy an important place in providing the population of both the world and Ukraine with basic food products. The economic development of individual countries of the world and population growth increase the demand for pork, which leads to an increase in its production. Pig breeding in Ukraine is a historically established, traditional industry. However, its current state does not ensure sustainable and efficient pork production in Ukraine and requires significant improvement. The purpose of the study was to investigate the price situation in the pork market and describe the factors that caused it. In the course of the research, a set of methods was used: monographic, retrospective, comparative analysis, abstract and logical, induction and deduction, graphic, which allowed identifying and substantiating the existing price trends of the pork market. The analysis of the volume of production and sale of pig meat by the main producers in live weight and the price situation on the pork market in 2017-2021 was carried out. Special emphasis was placed on detailing purchase, wholesale, and consumer prices in different regions of the country. A steady trend of rising prices in the pork market is substantiated. It is established that in Ukraine during 2017-2021 there was an increase of 1.6-2.3 times in all types of prices for pork. The study results contain analytical materials and theoretical justifications that expand knowledge about the price situation on the pork market. The obtained materials can be used by all interested parties and specialists for consideration in production activities and for further scientific study of the problems of the establishment and functioning of the pork market

Keywords: price situation, purchase price, wholesale and retail price, consumer price, demand, pork

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Introduction

Pork has occupied a significant place in the human diet for thousands of years. Its production and consumption are related to the development of the agricultural production culture. Pig farming is an important livestock industry on every continent, although many cultures do not consume pork according to their religious laws, such as Muslims [1].

Meat and lard are among the main food items. Pork is a source of high-quality protein. It is also rich in vitamins and minerals such as selenium, phosphorus, thiamine, potassium, and vitamin B6, and is considered an excellent source of iron [2]. The economic development of countries leads to an increase in the well-being of the population, an increase in demand for food, and changes in consumption patterns, where meat and meat products become dominant in consumption.

The rapid growth of the world's population, combined with an increase in per capita income, has led to changes in eating habits characterised by an increased demand for animal protein [3]. The need to meet global demand for pork caused a rapid increase in its production in the world by 4.5 times between 1961 and 2021, from 24.8 to 109.2 million tonnes. According to FAO forecasts, global pork production will increase by 13% by 2030 compared to 2018-2020 levels and reach 173 million tonnes [4].

In the European Union and the United States, the number of pigs has not changed significantly in recent decades, while in Asian countries it is increasing and mass production is increasing [5].

Pig breeding is a traditional industry in Ukraine and plays an important role in providing the population with meat. The priority of development of this industry is associated with extremely important biological and economic characteristics of pigs, in particular, multiple pregnancies, omnivory, and economical use of feed. However, in modern conditions, it is in a depressing state [6].

In recent years, the actual state of the pig industry does not meet certain strategic objectives and existing resource potential and requires significant improvement. In particular, the "National Economic Strategy 2030" contains vectors of economic development of the agricultural sector in the aspect of balanced production by increasing control over the detection of cases and elimination of the consequences of African swine fever, developing measures to combat the disease; stopping the reduction of the number of pigs and ensuring its growth; changing the structure of production by increasing agricultural enterprises; improving the quality of livestock by reducing the cost (up to 50-80% of the cost) of purchasing breeding (genetic) resources, etc. Drastic changes in the functioning of pig farming provide for maintaining stable and profitable pork production in Ukraine, promoting the increase in pork production by agricultural enterprises and increasing their share in total production [7].

Insufficiency, and often imperfection of laws and regulations regarding the functioning of the pig industry, in the aspect of insurance, disposal, and compensation of losses due to African swine fever is an obstacle to its development [8].

Prices for agricultural products are of primary importance both for the agricultural sector (they encourage

optimisation of production systems and affect their goals) and for consumers who buy specific products. Market price analysis is also an indirect means of evaluating market performance. Price volatility in European food markets has increased over the past decade, putting agribusiness at financial risk and uncertainty [9].

Price volatility is a key aspect of financial risk for all market participants, including producers, processors, sellers, and consumers [10]. The modern pricing policy of enterprises demonstrates the logic of price formation, reveals two approaches to pricing – cost and value, which determines the external and internal orientation, and market and internal factors that affect the price level and determine its choice [11].

The transformation processes taking place both in the pig industry and in the pork market in Ukraine could affect the dynamics of prices in the food chain. In the context of globalisation, the domestic and foreign markets of agricultural products affect each other and undergo certain changes, which affect the level of different types of prices. The study of the market conditions of a particular type of agricultural product and the corresponding changes in it occurs precisely from the study of prices [12].

The purpose of the study was to investigate the current state of various types of prices on the pork market and substantiate the features of their formation.

Literature Review

The issues of the establishment and functioning of the pig industry and prices in the pork market are relevant and has been the object of study by many researchers. Thus, C. Roguet, B. Duflot & M. Rieu [13] investigated the evolution of pig breeding models in Europe and their impact on technical and economic indicators. The evolution of pig farming since 2000 is characterised by a very strong structural concentration in some countries. This leads to rapid progress in technical indicators, due, in addition to genetic progress, to the disappearance of the least efficient farms, the specialisation of farms, the modernisation of buildings and, as a result, the improvement of the health, working conditions of personnel and the life of animals. This development is also reflected in the intensification of pig farming, which meets with growing opposition in society. The development of pig production and breeding models is constrained by two antagonistic forces, the relationship of which develops over time. On the one hand, a liberal and highly competitive market, which encourages the intensification of activities, and on the other – the rejection of this intensive model by society, which is expressed through the mobilisation of breeding projects [13].

To analyse consumer attitudes and perceptions of pork, an online survey of 11,294 consumers from ten EU countries and four non-EU countries was conducted. The survey showed that while animal welfare influences consumers' opinions about pork consumption, it is not their main concern. For most countries, the rating of food motifs gives preference to personal health and naturalness of the product, organoleptic qualities, and price [14].

Identifying the contribution of local pork production to the well-being of the poorest ethnic minority households in Vietnam using the propensity score comparison method and identifying factors affecting local pig farming using the generalised Poisson method was the goal of the study by N.N. Ho, T.L. Do, D.T. Tran & T.T. Nguyen [15]. The findings showed that local pig farming had a significant and positive impact on household incomes and the reduction of multidimensional poverty among ultra-poor ethnic minority households. Access to credit, the number of motorcycles, government support for poverty, the type of roads in villages, and irrigation systems have a positive impact on local pig farming, while the impact of distance from home to the nearest agricultural materials stores and access to electricity is negative [15].

W. Rembiss & D. Zawadzka [16] investigated the problem of stability of income from pig farming in Poland. The study attempts to answer the question of whether there is volatility or relative stability of income in the pig market. This issue is important not only for producers, but also for agricultural policy. Using simple statistical methods, the authors estimate income variability between 2005 and 2020, i.e., after Poland joined the European Union. Recognising that this was a heterogeneous period, the study also included income for two sub-periods, particularly 2005-2012 and 2013-2020. The accepted research hypothesis regarding the relative stability of revenue due to certain interchangeability of the price level and the volume of purchases turned out to be quite incomplete only for the period 2005-2012. For the period 2013-2020, the analysis of graphs, coefficients of variation and correlation gave different results that did not allow confirming the assumption and hypothesis [16].

The complexity of the pork supply chain for obtaining quality products is emphasised by C. Perez, R. de Castro, I. Font & M. Furnols [17]. Their research paper provides a holistic view of the pork supply chain. They prove that by treating pork production as a chain, rather than as separate stages performed by different companies, the meat sector can more easily solve the problem of accurately responding to customer requirements, including with respect to established prices. Supply chain participants get different opportunities from cooperation, which allows them to become more competitive than if they remained isolated and did not have a global understanding of the entire chain [17].

A group of researchers led by Joao G.M. Dos Reis [18] emphasises that in order to determine and minimise financial losses in the pork supply chain, it is necessary to consider the price paid by the end user and from which all participants in the pork supply chain receive remuneration.

The impact of COVID-19 and the transmission of prices in the US Meat Market were investigated by A.F. Ramsey, B.K. Goodwin, W.F. Hahn & M.T. Holt [19]. Using weekly data on wholesale and retail prices for beef, pork, and poultry, the authors characterised the behaviour of time series and dynamic relationships of meat prices in the United States before and during the COVID-19 pandemic. Meat prices at all levels of the supply chain were found to be non-stationary in levels, but co-integrated

within each market. All three meat markets are well integrated at the retail and wholesale levels. Abnormally large price fluctuations as a result of COVID-19 have been detected. However, the timing and area of these movements vary depending on the market. The largest price discrepancies were observed in May-June 2019 for beef and pork and in April-May 2019 for poultry. Overall, wholesale prices reacted faster to the shocks caused by COVID-19. Prices returned to projected levels in June-July 2019. This indicates that supply shocks in meat markets due to COVID-19 were mostly temporary. The results of this study indicate the sustainability of meat supply chains in the United States [19].

J.Y. Yoon & B. Scott [20] note that asymmetric price transmission in the US pork market looks different in distribution channels. They prove that wholesale price correction occurs relatively quickly in response to an increase in the producer price and a decrease in the retail price [20].

Significant changes in prices for agricultural products in Poland are evidenced by P. Borawski, A. Beldycka-Borawska & J.W. Dunn [21]. However, pork prices have changed the most, due to changes in production costs and competition between participants in the production chain. The pork market in Poland is facing problems due to strong global competition. In order to reduce production costs, producers import piglets from Germany, the Netherlands, and other countries [21].

Pork market participants in Zimbabwe use short-term pricing strategies, considering factors such as product portfolio, margin, processed goods, and considering the strategies of other industry players as dualistically determining objective pricing policies and price flexibility policies. Researchers recommend that decision-makers in the pork market move away from short-term pricing goals: profit-making and survival, and develop new pricing strategies based on increased sales and competitive pricing [22].

Asymmetric price transmission in the Chinese pork and pig market was investigated by X. Dong, C. Brown, S. Waldron & J. Zhang [23]. Thus, a symmetrical transmission between the prices of pork and live pigs was discovered in the period from June 1994 to June 2007. Asymmetric transmission was also observed between June 2007 and June 2016. The key factors underlying the asymmetric price transmission are poultry meat prices and China's interim policy on procurement and inventory accumulation [23].

T. Rudinskaya [24] studied the characteristics of price relations between farmers, processors, and consumers in the Czech pork market. In recent years, farm pork prices have been unstable compared to processor prices and consumer prices. The empirical results of the approaches used show that in the short term, the price of the processor and the price of the consumer react differently to an increase and decrease in the price of the farm and the price of the processor, respectively. The results showed the presence of transmission price asymmetry, and this fact is more pronounced at the second stage of the agri-food chain, that is, in the processor-retail trade relationship [24].

Theoretical aspects of pricing and profitability of agricultural production were covered by I.I. Lukinov [25].

He argued that “the impact on the level of production costs and the social value of agricultural and livestock products of natural and geographical conditions, especially soil quality, climate, and location of farms, is so great that it cannot even be compared with the impact, for example, of these factors on industry” [25].

Research led by academician Yu.A. Lupenko [26] has been aimed at identifying the structural changes taking place in the Ukrainian meat market. Thus, the researchers note that meat producers increase production volumes with the decline of certain livestock industries, and accordingly, the structure of production changes. The pork market is characterised by fluctuations due to outbreaks of African swine fever and competition from the poultry meat market [26].

A collective monograph by O.M. Shpychak [27] focuses on investigating the theoretical, methodological, and practical foundations of pricing. The researchers clarify the essential differences between the positions of representatives of classical political economy and the economic theory of physiocrats regarding the formation of an additional product. Thus, representatives of classical political economy considered human labour to be the source of its creation, and supporters of the economic theory of physiocrats – the primary role was given to solar energy, which is accumulated and stored due to human labour, which increases added value [27].

Investigating the state of the agricultural sector of the Ukrainian economy, M.V. Prysyzhnyuk, M.V. Prong & P.T. Sabluk [28] noted that “in market conditions, the price is formed by the consumer, they evaluate the goods delivered to the market, the corresponding conjuncture is formed and the price is determined, which goes through the appropriate stages of transformation in the infrastructure links of the market, and the producer receives only a part of the income, so compensation is needed to ensure an equivalent price”.

The influence of seasonality of production on the dynamics of prices for meat products in Ukraine was determined by R. Mudrak, I. Nyzhnyk, V. Lagodiienko & N. Lagodiienko [29]. The conducted study allowed confirming the hypothesis that there is a link between seasonal fluctuations in the volume of meat and dairy production and consumer prices for the corresponding products. During the year, seasonal shortages are observed in the markets of meat and dairy products, which leads to an increase in consumer prices [29].

Given the importance of these scientific developments, the dynamism and transformation of the conditions for the functioning of the pork market require constant detailed study and analysis of the real state of prices.

Materials and Methods

The time frame of the study was the period of 2017–2021. The research material consisted of annual data on the volume of raising and selling pigs in all categories of farms, agricultural enterprises and households; monthly time series of purchase prices for pigs of categories I and II;

wholesale and retail prices for pork of category II, and consumer prices for pig meat and lard. The study collected, analysed, and summarised data for the period from 2017 to 2021. The information base of the study was publications by international and Ukrainian researchers on the establishment and functioning of the pork market and price situation on it, data and analytical reports of the Ministry of Agrarian Policy and Food of Ukraine, the State Statistics Service of Ukraine.

The methodological tools of the study included a systematic approach to cognition of economic phenomena, processes, and their interrelations. In the course of the study, a set of methods was used. Thus, using the abstract and logical method, theoretical generalisations of the developed literature sources on the functioning of the pig industry, pork production, and the formation of prices for it were carried out. The resulting generalisations allowed the study to formulate specific conclusions. The methods of monographic, retrospective, and comparative analysis, induction and deduction provided the development of theoretical provisions, analysis, and identification of features of price formation in the pork market. In turn, this allowed the study to substantiate the existing price trends in the pork market. Using the graphical method, a visual representation of individual results was provided.

Results and Discussion

The pig industry is one of the most intensive and efficient livestock industries. At the same time, in Ukraine, since 2014, the pork market has been destabilised, in particular, a reduction in the number of pigs and meat production, a decrease in demand and a decrease in export volumes. In the structure of meat production in Ukraine, the share of pork tends to decrease, in 2016 it was 32.2%, while in 2000 it reached 40.7% [30].

The main reason that led to the destabilisation of the pork market is the decline in profitability, and in most cases, the unprofitability of production. The economic disinterest of key producers in raising pigs has led to a reduction in their number. The situation in the industry was further complicated by cases of the spread of ASF (African swine fever). Small and medium-sized farms that raised pigs were forced to slaughter or destroy animals in advance [31].

According to the Association of Pig Breeders of Ukraine [8] in December 2019, 509 outbreaks of African swine fever were recorded in Ukraine, which led to the destruction of more than 300 thousand pigs. It is important to note that 17.0% of reported cases of ASF were in agricultural enterprises, and the remaining 83% – in household farms.

Often, the lack of disease prevention and control strategies in the pork production chain is the main reason for the spread of ASF [8].

Thus, the most vulnerable and affected segment is and will be small owners of pigs. Only the transformation of pig farming into medium and large farms, combined

with more standardised production systems and biosafety, will contribute to the survival of the industry in the future and improve food security.

The studies show that in 2021, the volume of pigs raised by all categories of farms (in live weight) was 1.5% less compared to 2017 and amounted to 971.2 thousand tonnes (Fig. 1).

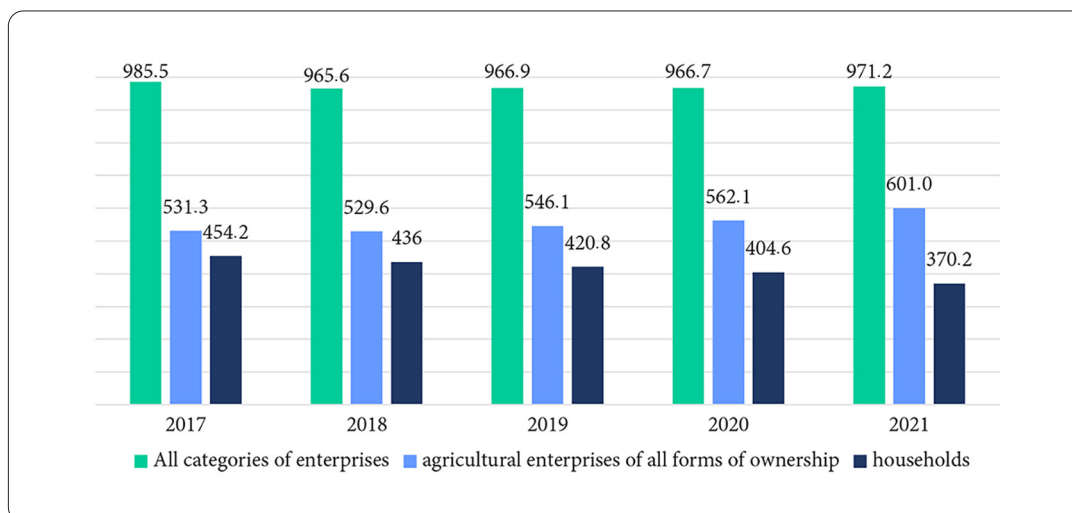


Figure 1. Raising pigs in all categories of farms in 2017-2021, thsd. tonnes

Source: developed by the author according to the State Statistics Service of Ukraine [32]

In 2021, the cultivation of pigs by agricultural enterprises (in live weight) increased by 13.1% compared to 2017 and amounted to 601.0 thousand tonnes. In the last year alone, the growing of pigs by agricultural enterprises (in live weight) increased by 6.9%. In households, the cultivation of pigs in live weight over the past 5 years decreased by 18.5% and amounted to 370.2 thousand tonnes.

Traditionally, in farms of all categories of the Kyiv, Donetsk, and Lviv oblasts in 2021, most pigs were raised in live weight. The main volumes of cultivation in these areas were provided by agricultural enterprises. Significantly fewer pigs were kept and raised in the farms of the population of these regions.

In 2021, compared to 2017, the volume of pig raising in farms of all categories increased the most in Kharkiv, Ternopil, Luhansk, and Kyiv oblasts (by 21.5-34.3%). At the same time, in Cherkasy, Kirovohrad, and Chernihiv oblasts, the cultivation of pigs in farms of all categories in live weight increased by 10-19% compared to 2017. However, most of all in 2021, the cultivation of pigs in farms of all categories in live weight in the Kherson Oblast decreased (by 59.2% compared to 2017 [32]).

During 2017-2021, the volume of sales of pigs in live weight by farms of all categories decreased by 3.3% and amounted to 987.8 thousand tonnes. The largest sales volumes were observed in 2021 in Kyiv (110.5 thsd. tonnes), Donetsk (93.2 thsd. tonnes), and Lviv (64.6 thsd. tonnes) oblasts [32].

In the study period, the volume of sales of pigs in live weight by agricultural enterprises of all forms of

ownership increased by 13.8%, while in households they decreased by 20.6%. It was found that in 2021, the volume of sales of pigs in live weight by farms of all categories was higher than the volume of growing, which indicates the slaughter of pigs [32].

It is established that in 2017-2021, the volume of sales of pigs in live weight by farms of all categories has a pronounced tendency to decrease. At the same time, in 2021, sales volumes exceeded the volume of raising pigs by farms of all categories in live weight, which indicated a massive slaughter of livestock. Moreover, this was conditioned by a massive reduction in the number of pigs in households.

The cultivation and sale of pigs depend on technological and economic factors. Technological factors include outdated technologies for raising pigs (feeding, conditions of keeping that cause feed overspending, low live weight gains of pigs), sanitary and veterinary measures; weak breeding base, import of pig genetics, insufficient fertility of sows, etc.

Economic factors include the cost of pork production, price dynamics in the resource market (feed, veterinary drugs, fuel and lubricants, electricity, etc.), the volume of supply and demand for pork, the level of purchasing, wholesale and retail prices, the purchasing power of the population, and the volume of pork imports.

The purchase price for pigs of categories I and II for 2017-2021 increased from 29.379 to 45.971 UAH/tonne, that is, by 1.6 times, and compared to 2020 – by 6.6% [33] (Fig. 2).

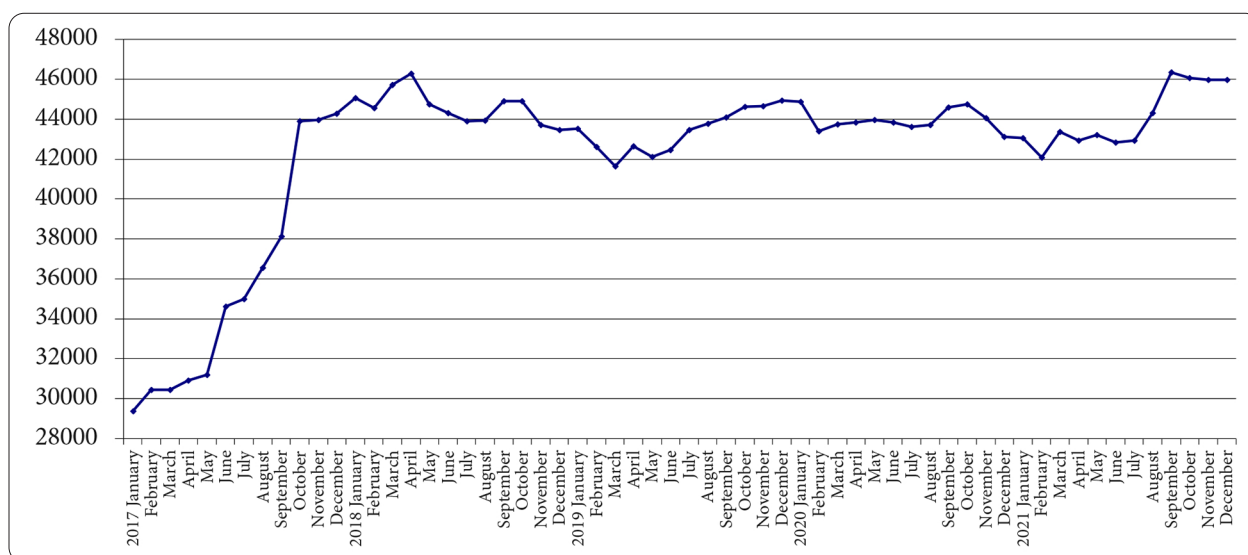


Figure 2. Purchase prices for pigs of categories I and II in 2017-2021, UAH/tonne

Source: compiled based on data from the Ministry of Agrarian Policy and Food of Ukraine [1]

During 2021, purchase prices for pigs increased by 6.8% from 43.045 UAH/tonne to 45.971 UAH/tonne. As of December 2021, in the regions of Ukraine, the highest purchase price for pigs was observed in Odesa Oblast (50.200 UAH/tonne). In other regions, prices were in the range of 42.0-50.0 thousand UAH per 1 tonne.

The lowest price was observed in the Zaporizhia Oblast (42.000 UAH/tonne) [33].

The wholesale selling price of category II pork in 2017-2021 increased by 1.7 times compared to the beginning of 2017 and by 11.5% compared to 2020 and amounted to 91.76 UAH/kg at the end of 2021 [33] (Fig. 3).

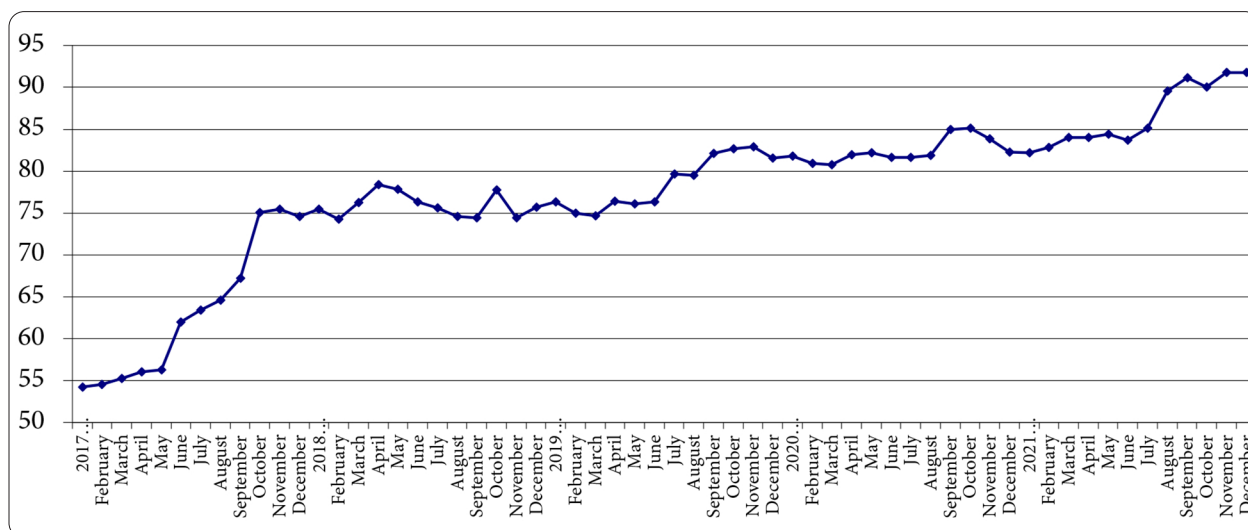


Figure 3. Wholesale and selling prices for category II pork in 2017-2021, UAH/kg

Source: compiled based on data from the Ministry of Agrarian Policy and Food of Ukraine [1]

The highest prices were observed in the Poltava Oblast (125.50 UAH/kg), the minimum price was in the enterprises of the Volyn Oblast (72.00 UAH/kg). In other regions, the price ranges from 75.00-125.00 UAH/kg [33].

In 2021, the wholesale selling price of category II pork increased by 11.6% compared to January and amounted to 91.76 UAH/kg [33]. The global market already has a significant

impact on the level of purchase and wholesale prices in Ukraine.

The consumer price of pork in 2021 continued its upward trend. Thus, according to the state statistics service of Ukraine, the consumer price of pork in Ukraine at the end of 2021 is 123.75 UAH/kg, which is 1.6 times more than in 2017 and 6.8% more than in 2020 [33] (Fig. 4).

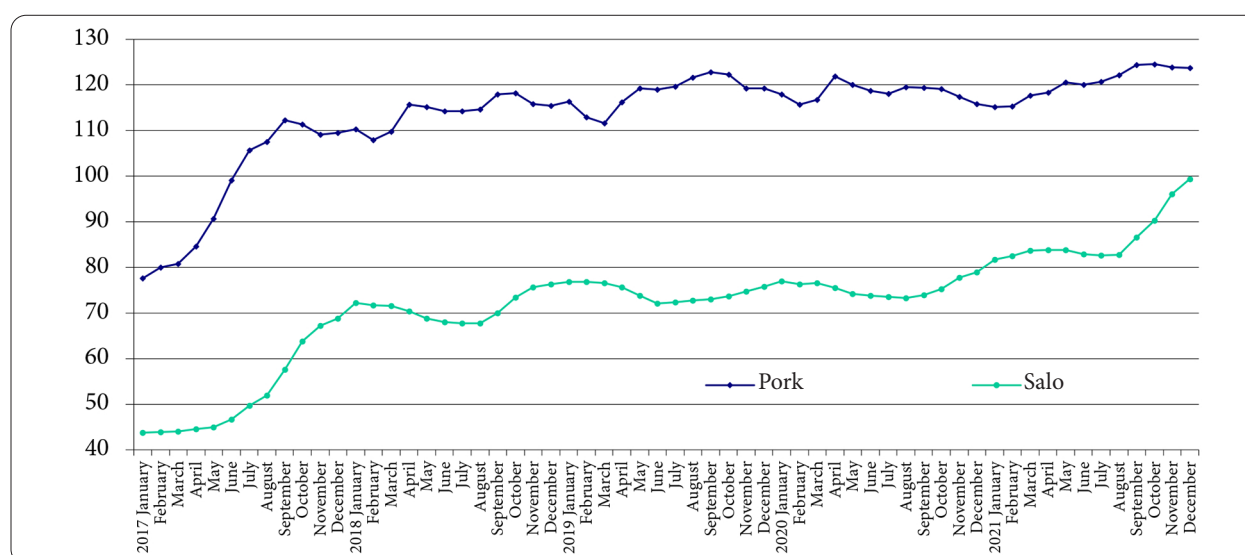


Figure 4. Consumer prices for pork and lard in 2017-2021, UAH/kg

Source: developed by the author according to the State Statistics Service of Ukraine [32]

The price of lard in December 2021 increased by 2.3 times compared to January 2017, and by 25.9% from 2020, and the average in Ukraine was 99.41 UAH/kg [32]. Notably, among the main types of meat (beef and veal, pork and poultry) in 2021, pork prices changed the least.

The analysis of data [32] on the number of the main sows allowed for the conclusion that there are no grounds for an increase in pork prices due to a reduction in the breeding stock. In particular, for the period 2017-2021, the number of pigs in Ukraine decreased by 15.9%, the number of main sows – by 20.2%, and pork production – by 1.6% [32].

It is established that the pork market is characterised by certain seasonal fluctuations in sales volumes and prices, which are associated with the most favourite holidays (New Year, Christmas, Easter, may holidays, etc. In addition, the increase in prices is caused by a reduction in the supply of pork due to a decrease in the number of pigs and the unprofitability of its production, and an increase in the price of poultry meat [30]. A significant factor in the growth of all types of prices for pork is the cost of raising pigs.

W. Rembisz & D. Zawadzka [16] argued that pork production is subject to fluctuations due to the cycle in pig farming. These fluctuations lead to the fact that the supply of pork is either too high or too low for a given demand. In the first case, prices for pig meat, especially in live weight, are low, and in the second – high. Accordingly, the revenue of agricultural producers changes [16].

Changes in the pork market conditions had a great impact on the amplitude of fluctuations in both pig raising volumes and prices in the United States. The amplitude of fluctuations in the volume of pig raising in the United States in recent years has become smaller compared to the previous decade. The reasons for this in the influence of factors on this market, which changed the ratio of supply and demand elasticity coefficients. First, according to economic theory, increased demand is accompanied by price flexibility. Second,

fluctuations in livestock prices are as strong as ever, as they depend not only on internal but also on external demand. The influence of foreign trade and the world market on the profitability and domestic market of pig meat is manifested through the exchange rates of the USD against the currencies of the countries with which the United States of America carries out foreign trade in pork [34].

Low purchasing power encourages consumers to look for cheaper types of meat. Now the advantage is for poultry meat [35]. The consumer price for poultry (chicken carcasses) in December 2021 was 70.82 UAH/kg. The consumer price of pork during this period was 74.7% higher than the price of chicken carcass. At the same time, the global trend towards healthy eating, which is also typical for Ukraine, has contributed to an increase in the number of poultry meat consumers. Today, poultry meat is one of the best sources of animal protein for the low-income population, as it is affordable, low in fat, and has limited religious taboos. The increase in demand for poultry meat contributed to an increase in significant volumes of its production.

The results obtained are confirmed by other studies. In particular, AgroPolit.com together with analysts of the Ukrainian Agrarian Association (UAA), studied the internal structure of the Ukrainian meat market and identified several interesting trends. First, meat consumption per year by one Ukrainian has not changed significantly in recent years and amounted to 52-53 kg per person. Second, the overall structure of annual meat consumption is also stable, dominated by the share of poultry meat. It makes up almost half of the diet of ordinary Ukrainians and its share is growing. The third or three types of meat from the annual diet of Ukrainians has remained almost unchanged in recent years. In addition to poultry meat, it includes pork and beef. According to the Ukrainian Agrarian Association, poultry will continue to be the main component of the meat diet. Poultry production is expected to continue

to increase in the poultry industry. A catastrophic reduction in the number of livestock and insufficient measures to prevent the spread of African swine fever in pig farming led to a reduction in pork production. However, the demand for pork in Ukraine is traditionally high, and this leads to a further increase in prices for it, which in turn, together with a relatively short production cycle, will encourage manufacturers to increase the rate of pork production [36].

The OECD/FAO forecast for 2020-2030 highlights pork as the second most popular meat in the world after poultry. In the structure of meat consumption in the world, pork accounts for 34% of the total volume, and the share of poultry meat is 41% [4].

Some of the identified trends may be related to changes in the diet of consumers and demand in general. M. Trajer & M. Mieczkowski [37], describing general trends in meat consumption in Poland, identified relatively stable pork consumption with a temporary decrease in some years and the replacement of beef consumption with poultry meat. This trend is described as a result of a high level of price competitiveness, dietary properties, and dietary changes in favour of low-calorie, low-fat options [37].

N. Jurkenaite & A. Syp [38] note that price shocks in the beef and poultry markets can be transferred to the pork market and vice versa. There have been several price shocks in pig farming caused by various crises (outbreaks of African swine fever, changes in feed costs, and changes in animal welfare standards) [38]. Many participants in the pork market face price risks of the product, especially producers, processors, and merchants. Price volatility is a key aspect of the risk associated with lower prices for agricultural products. One of the reasons for price instability is inflation. Other reasons include changes in supply and demand, consumer income, and consumer price expectations [21].

To mitigate fluctuations in various types of pig meat prices and maintain the stability of the pork market, the Central Government of China has taken a number of price control measures. In general, a system of tools for controlling the prices of pig meat in China has been established. The overall design of pork price control policies is relatively reasonable, but there are still challenges. In particular, the subject of China's policy of controlling the price of pork is the same, so it is difficult to form a resulting force. The policy focuses on price regulation in the short term, but ignores long-term adjustments to the industry structure. In particular, the emphasis is on market surveillance, but insufficient support for pig slaughter and processing. The policy focuses on production and management to improve the quality of pig development and efficiency, but does not consider social justice. It is advisable to ensure an interdepartmental division of labour and close cooperation; adjustment of the industrial structure of pig farming; establishment of a mode of operation of slaughter and processing at the production site to reduce the cost of pig farming turnover; ensure pork consumption by low-income groups, considering social efficiency and justice [39].

The study suggests that the key obstacle to the development of the pork market is the lack of regulation of economic relations between all participants in its supply chain.

Thus, the problem of pricing for agricultural products in Ukraine is not only within the interests of both its direct producers and processors, exporters, traders, etc. It has a much broader meaning. On the one hand, for ordinary citizens, it determines the price availability of ensuring daily food needs, which is basically formed in the prices of agricultural products. And this, in turn, affects the parameters of ensuring food security of the state. On the other hand, the problem under study is one of the main criteria for the competitiveness of domestic agricultural products both in the Ukrainian and global markets [40].

It is worth emphasising that the prices of the pork market in Ukraine completely repeat the trends that have developed in the world meat market. In the future, prices for incoming resources and the solvency of the population will determine the further price situation on the pork market in Ukraine.

Conclusions

Pork is one of the main food products. It has its own culture of consumption, which has been established for thousands of years. The demand for pig meat in the world is growing, which is conditioned by both the growth of the world's population and the economic development of individual countries. The pork market in Ukraine is traditional and plays an important role in providing the population with meat and meat products.

Analysis of the volume of pig raising in live weight by farms of all categories indicates their slight reduction. It is noted that in agricultural enterprises, the volume of raising pigs in live weight is growing. Households in 2017-2021 reduced the volume of pig raising. It is proved that technological and economic factors affect the volume of sales of pigs in live weight.

The results obtained confirm a steady upward trend in all types of prices on the pork market. The global market already has a significant impact on the level of purchase, wholesale and retail prices in Ukraine.

It is established that the purchase price for pigs of categories I and II for 2017-2021 increased by 1.6 times. Analysis of wholesale and retail prices for category II pork over the past 5 years confirms their increase by 1.7 times to 91.76 UAH/kg. It was determined that the consumer price of pork in 2021 was 1.6 times higher compared to 2017. At the same time, the consumer price of lard has undergone major changes. In the analysed period, it increased by 2.3 times.

It is proved that the future price situation for pork will depend on changes in the main factors. In particular, the volume of domestic production of pig meat, the volume of poultry meat available on the market and the purchasing power of the population.

Promising areas of further study are determining the influence of factors on the cost of production, assessing changes that occur during the formation of supply and demand, analysing the competitive environment and export-import operations in the pork market.

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Цінові тенденції ринку м'яса свиней

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Анотація. Галузь свинарства та ринок м'яса свиней займають важливе місце у забезпеченні населення, як світу, так і України основними продуктами харчування. Економічний розвиток окремих країн світу та зростання населення збільшують попит на м'ясо свиней, що зумовлює нарощування обсягів його виробництва. Свинарство України є історично сформованою, традиційною галуззю. Проте її сучасний стан не забезпечує сталого та ефективного виробництва свинини в Україні і потребує суттєвого покращення. Метою статті було вивчити цінову ситуацію, що склалася на ринку м'яса свиней та аргументувати фактори, що її спричинили. У процесі виконання досліджень було використано комплекс методів: монографічного, ретроспективного, порівняльного аналізу, абстрактно-логічного, індукції та дедукції, графічного, які дозволили виявити та обґрунтувати існуючі цінові тенденції ринку м'яса свиней. Здійснено аналіз обсягів вирощування та реалізації м'яса свиней основними виробниками у живій масі, а також цінової ситуації на ринку м'яса свиней у 2017–2021 рр. Особливий акцент зроблено на деталізації закупівельних, оптово-відпускних та споживчих цін у різних областях країни. Доведено стійку тенденцію зростання цін на ринку м'яса свиней. Встановлено, що в Україні впродовж 2017–2021 рр. відбулося зростання у 1,6–2,3 рази всіх видів цін на м'ясо свиней. Результати проведених досліджень містять аналітичні матеріали та теоретичні обґрунтування, які розширюють знання щодо цінової ситуації на ринку м'яса свиней. Одержані матеріали можуть бути використані всіма зацікавленими особами та спеціалістами для врахування у виробничій діяльності та для подальших наукових досліджень проблем формування та функціонування ринку м'яса свиней

Ключові слова: цінова ситуація, закупівельна ціна, оптово-відпускна ціна, споживча ціна, попит, свинина

Decoupling as a Measurement of the Environmental Impact of Economic Growth

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Abstract. Accelerated population growth on the planet leads to an increase in production, which causes the need to increase the production of raw materials, expand the construction of industrial structures, increase social infrastructure facilities, and so on. Consequently, the creation of appropriate conditions for the existence of modern civilisation leads to an exhaustible use of natural resource potential and an aggravation of global environmental problems that have a destructive impact on the environment. Considering the above, the issue of monitoring environmental consequences from economic activities acquires significant theoretical and practical significance, which determines the relevance of the subject matter. The purpose of this study is to substantiate the theoretical and methodological foundations and applied aspects of measuring the decoupling effect under the condition of an environmentally oriented course of social development. The methodological basis of the study is the methods of empirical research and theoretical cognition, in particular the method of formalisation, abstract and logical, observation, measurement, and comparison. The study used general scientific methods and techniques, in particular, analysis and synthesis, analogy and economic modelling, induction and deduction. The paper systematises the opinions of leading researchers on understanding the concept of decoupling based on the resource approach and environmental impact. The analysis provided the basis for investigating the impact of production on the environment in the context of regions in 2016-2020 and visualising an integral indicator of the regional decoupling effect. Generalisation of the value of factors in Ukraine as a whole allowed projecting the environmental consequences of economic activities for the future. The practical significance of the study is to substantiate practical recommendations for strengthening environmental policy and minimising the destructive impact on the environment, considering the challenges associated with military operations on the territory of Ukraine. Further research is aimed at considering the achieved effect of decoupling within certain branches of the national economy

Keywords: decoupling effect, decoupling factor, anthropogenic impact, economic activity, decoupling analysis, strategic areas

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Introduction

The existence of modern man is caused by excessive needs for the consumption of food and non-food products. Their production in significant quantities leads to the depletion of natural resource potential and aggravation of global environmental problems. In addition, the accelerated rate of population growth on the planet leads to a significant accumulation of industrial residues and household waste, which, due to improper disposal, cause local pollution. These challenges have led to the emergence of multiple ideas for preserving the state of the environment among researchers, among which it is worth highlighting the concept of decoupling. The term “decoupling” can be interpreted as “delineation, disconnection, and disruption of communication”. The ability to increase the pace of economic development without accumulating a destructive anthropogenic impact on the environment is called the decoupling effect. The founders of this area are considered to be Finnish researchers J. Vehmas [1] & P. Tapio [2]. At the same time, the experience of E. Weizsacker [3] regarding the multiplication of production with reduced consumption of natural resources is valuable for world science. The concept became widespread at the beginning of the 21st century, while the implementation of the decoupling effect is recognised as the main mission of the environmental strategy for the first decade developed by the Organization for Economic Cooperation and Development [4].

Retrospective aspects of the development of the economic system as part of an ecosystem are comprehensively studied by the American environmental economist G. Daly [5], who argues for the need to develop the economy from quantitative to qualitative growth. The problem of environmental pollution as a result of increasing global production due to the need to meet the requirements of a growing population is thoroughly substantiated by an American team of researchers who managed to design several options for economic development [6]. These studies caused public concern about the future state of the environment and led to a heated discussion among the scientific community of ways to improve it. T. Jackson's [7] assertion that continued economic development is based on environmental destruction and social injustice, and that the key challenge for humanity is the ability to thrive on a planet with limited resources, is substantiated. As part of the implementation of modern international practice, researchers use retrospective data to prove a cyclical symmetric relationship between greenhouse gas emissions and real GDP growth, justifying the need for constant progress in their differentiation, especially in developing economies [8]. In this context, it is relevant to investigate the binary concepts of decoupling and dematerialisation, which is proposed to be evaluated both by territorial and consumer approaches using environmental elasticity as a key indicator [9].

In Ukraine, the theory of decoupling was put into scientific circulation in the early 2020s by B. Danylyshyn & O. Veklych. The researchers proposed an interpretation of “the decoupling effect as an economic phenomenon that

reflects the ability of the economy of any state to grow without increasing pressure on the environment” [10]. Measurement of effective indicators for determining the impact of economic growth on the state of the environment is investigated by A. Barzhyna [11]. The experience of world practice allowed the study to carry out a decoupling analysis in the regional aspect using indices of the physical volume of the gross regional product as a factor of economic development and emissions of pollutants into the atmospheric air by stationary sources of pollution as a factor of pressure on the environment [11]. The effect of decoupling in the context of productive land use is considered by V. Makarova [12] with the substantiation of possible options for the tangent of economic growth and environmental sustainability. The theoretical understanding of the concept of decoupling was expanded by O. Vatchenko & K. Svystun [13]. The researchers provided a classification of the degrees and effects of decoupling, provided explanations on Ukraine's international environmental obligations, and presented the opposite concept of “overcoupling”, which is noted as a phenomenon “when the increase in material flows occurs faster than the growth of GDP” [13]. O. Tur developed methodological tools for monitoring the ecological and economic model under the condition of rational consumption and restoration of natural capital [14]. A detailed description of the degree of environmental orientation of the Ukrainian economy in the framework of balanced development was provided by A. Horskyi [15]. Study on the problems of environmental awareness of modern society regarding the rational use of natural resources deserves attention [16], which is extremely relevant in the context of promoting a safe environment.

The joint efforts of researchers indicate the need for coordination of actions between countries towards preserving the environment. Consequently, the definition of “decoupling” is repeatedly mentioned in the political arena in the programmes of UN [17], OECD [4], Sustainable Development Strategies of individual countries [18], and international documents [19]. According to the Paris Climate Agreement [20], which was presented in 2015 under the UN Framework Convention on Climate Change [17], Ukraine has committed to reduce greenhouse gas emissions by 2030 to 35% compared to 1990. To achieve this goal, it is necessary to monitor the impact of economic results on the environment annually and, if necessary, adjust the action plan at the state level.

Thus, the purpose of the study is a substantiation of the theoretical and methodological foundations for assessing environmental pressure on the environment due to economic growth and the development of practical recommendations considering the military situation on the territory of Ukraine.

Materials and Methods

Achieving the set tasks in the process of scientific knowledge requires a clear algorithm of research actions, since

the inconsistency of step-by-step work may complicate the procedure for practical implementation of a scientific result. Consequently, the study of the environmental

consequences of economic growth determines compliance with the appropriate algorithm of actions, which is shown in Figure 1.

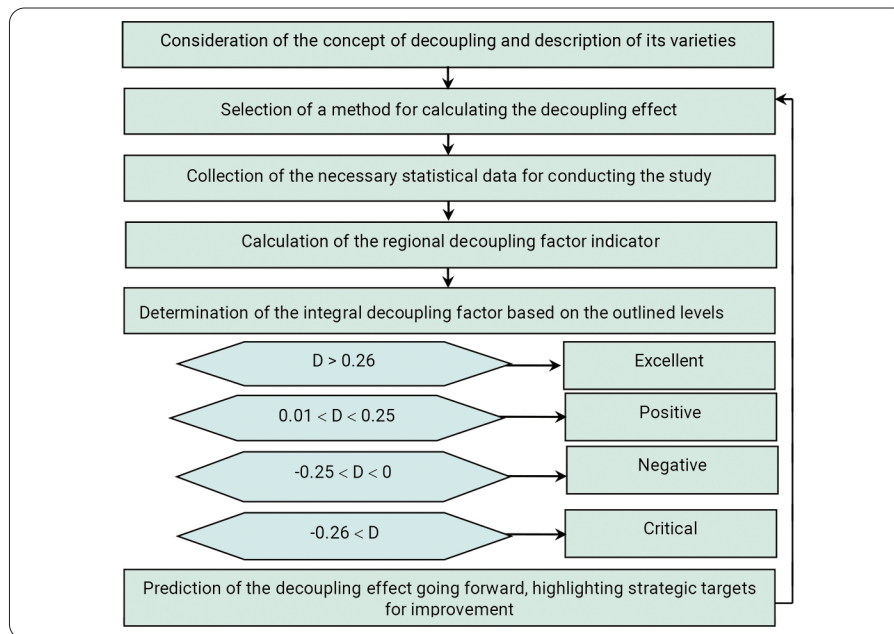


Figure 1. Sequence of actions in the process of studying the decoupling effect

Source: developed by the author based on own research

It is proposed to determine the decoupling effect using the following equation:

$$D_F = 1 - \frac{\Delta I_{EP}}{\Delta I_{DF}} \quad (1)$$

where D_F – integrated decoupling factor indicator; ΔI_{EP} – index of the physical volume of resource consumed when calculating resource decoupling; index of the volume of certain types of resources that pose a health hazard when calculating environmental impact decoupling; ΔI_{DF} – index of the economic growth indicator, expressed in terms of the index of physical volume of GDP [4].

Both types of decoupling are determined by the same equation, the difference is only in the initial data of the indicator ΔI_{EP} . As a result of mathematical actions, the calculation of the integral decoupling factor can be reflected as follows:

$$D_F = 1 - \left(\sqrt[n]{\frac{EP_{e1}}{EP_{b1}} \times \frac{EP_{e2}}{EP_{b2}} \dots \times \frac{EP_{en}}{EP_{bn}} \div \frac{DF_e}{DF_b}} \right) \quad (2)$$

where n – number of types of pollution 1,2,...; EP , $DF_{en,bn}$ – amount of resource consumed at the beginning and end of the reporting period.

According to the above calculations, provided that the Decoupling Factor is >0 and its growth is noticeable, it can be argued that there is a decoupling effect, that is, there is a decrease in the negative impact on the environment. If the Decoupling Factor is <0 and the indicator decreases,

this indicates too high an environmental impact, which can lead to negative environmental consequences. Depending on the obtained values of the Decoupling Factor indicator, it is proposed to distinguish between excellent ($D > 0.26$) and positive ($0.01 < D < 0.25$), negative ($-0.25 < D < 0$), and critical ($-0.26 < D$) effect levels indicating the close relationship between GDP and increased anthropogenic pressure on the environment.

Testing of the methodology should be carried out using mathematical and statistical research methods within each region (excluding the temporarily occupied territory of the Autonomous Republic of Crimea, city of Sevastopol, and parts of the temporarily occupied territories in Donetsk and Luhansk oblasts) for 2016-2020, which would allow identifying environmentally vulnerable areas in Ukraine. The use of the graphical method allows visualising changes in the decoupling factor indicators (comparison method) during the above-mentioned years. Observation of generalised values of the decoupling effect within the selected factors in Ukraine as a whole during 2011-2020 is the basis for economic modelling of the environmental situation conditioned by economic growth. The results of the study allow developing specific measures aimed at increasing the level of decoupling, which differ depending on the possible further scenario of environmental events within the framework of a single unchanged strategy for environmental-oriented development and are aimed at minimising the destructive impact on the environment from domestic production, considering the challenges associated with military operations on the territory of Ukraine.

Results and Discussion

The problem of irrational nature management is becoming critical for the entire population of the world, because it leads to the exhaustion of valuable natural resources and significant pollution of local and global territories. These challenges actualise the issues of monitoring the impact of economic activity on the state of the environment. Under

the specified conditions, consideration of the definition of “decoupling” has become particularly important as a basis for achieving a long-term optimal complementary link between the well-being of the population and the natural environment. At the same time, there is a slight discrepancy in the understanding of the decoupling effect, which makes it necessary to systematise the definition (Table 1).

Table 1. The concept of “decoupling” in the interpretation of researchers

Author	Year	Interpretation
Organisation of Economic Cooperation and Development (OECD) [4]	2001	The distinction between economic growth and environmental pressure, which occurs when the growth rate of environmental pressure is less than its economic driving force, for example, gross domestic product (GDP) over a certain period of time
B.M. Danylyshyn & O.O. Veklych [10]	2008	The ability of the country's economy to increase economic power, which is not accompanied by increased pressure on the environment
O.M. Tour [14]	2012	Differentiation (levelling the relationship) between economic growth and environmental pressure
A.O. Akulov [21]	2013	Inconsistency and divergence of economic growth rates at the level of countries, regions, or industries with the rate of change in indicators that characterise the negative impact on the environment, environmental damage
L.O. Kokovskyi [22]	2013	Differentiation or separation of economic growth parameters from the use of natural resources and the impact on environment
I.M. Sotnyk & L.A. Kulyk [23]	2014	Phenomenon of the gap between economic development and the degree of anthropogenic impact on the environment
O.A. Litvak [24]	2015	The process of stable long-term, controlled and managed inconsistency of trends of economic growth, consumption of natural resources, and environmental pollution at all stages of life cycle
A.V. Barzhyna [11]	2018	Two processes that have a correlation or other relationship actually move in different lines

As a result of the generalisation of the above interpretations of the concept of “decoupling”, the dual nature of its interpretation among researchers can be argued, namely: 1) decoupling as a lack of coherence between economic development and natural resources necessary to ensure appropriate growth; and 2) decoupling as an interdependence between economic development and consumed natural resources. Therefore, the binary understanding of the definition requires an organisation of the concept in the areas

that were discussed in more detail in the “Thematic Strategy on the Sustainable Use of Natural Resources”, published by the European Commission in 2005 [25]. The main goal of these prospects is to increase economic benefits with the least permissible negative consequences for the environment. This paper proposes to classify decoupling according to the factors that are studied within the concept, according to resource, and considering the state of the environment under anthropogenic pressure (Fig. 2).

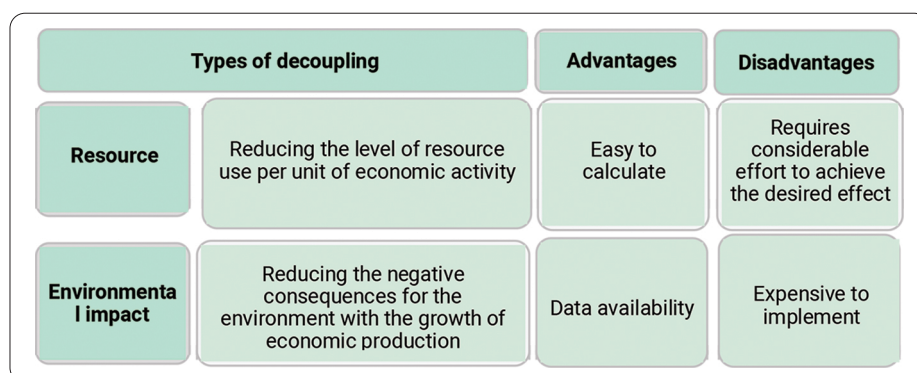


Figure 2. Streamlining the decoupling concept based on the resource approach and the state of the environment
Source: compiled by the author based on [25]

Resource decoupling is based on the consumption of a minimum amount of material, energy, water, and land resources. This area is easier in the calculation process, but more difficult if in terms of achieving positive results in the end. Basic indicators for assessing the volume of use of attracted natural resources are selected. As for environmental decoupling, the most common cases of its application are the study of resources that pose a health hazard to a particular group of people or the overall society. As a rule, its implementation as a result of calculation proves that improving production or eliminating destructive consequences requires significant material costs. Indicators of the volume of pollutants released, waste generation and discharges of contaminated wastewater are used to monitor the effect of decoupling on the impact on the environment.

According to O. Tour [14], resource decoupling is a determinant of the environmental intensity of the economy, while environmental decoupling reflects the process of measuring the environmental intensity of production. At the same time, the author's vision boils down to the need to use resource decoupling to scale the phenomenon under study. But decoupling in terms of the impact on the environment should be applied in the conditions of business entities, which allows assessing environmental losses in the process of doing business. This approach is the most successful for systematic monitoring of local results of economic growth for the environment. Therefore, the calculation of the integral indicator for determining the decoupling effect is proposed to be carried out using the method of determining the state of the environment, which will reveal the environmental consequences of business activities within a certain region (Table 2).

Table 2. Integral decoupling factor within the regions of Ukraine for 2016-2020

Oblast	Indicator of the integral decoupling factor, coefficient				
	2016	2017	2018	2019	2020
Vinnytsia	0.21	0.07	0.32	-0.02	0.25
Volyn	0.13	0.31	0.26	0.14	0.15
Dnipropetrovsk	0.12	0.23	0.14	0.04	-0.03
Donetsk	0.19	0.23	0.08	-0.01	-0.22
Zhytomyr	0.15	0.24	0.24	0.11	0.02
Zakarpattia	0.07	0.08	0.15	0.21	0.16
Zaporizhia	0.19	0.21	0.10	0.03	0.13
Ivano-Frankivsk	0.17	0.19	0.15	-0.04	0.23
Kyiv	-0.12	0.18	0.15	0.07	-0.01
Kirovohrad	0.18	0.10	0.16	-0.48	0.30
Luhansk	-0.09	0.23	0.27	0.24	0.16
Lviv	0.17	0.25	0.06	0.40	-0.04
Mykolayiv	0.25	0.17	0.15	0.18	0.06
Odesa	0.19	0.28	0.03	0.35	-0.30
Poltava	0.19	0.24	0.29	0.05	-0.03
Rivne	0.21	0.29	0.20	0.11	-0.24
Sumy	0.07	0.23	0.18	0.08	0.14
Ternopil	0.14	0.21	0.08	0.26	0.35
Kharkiv	-0.01	0.35	0.22	-0.45	0.10
Kherson	0.44	0.31	0.05	-0.30	0.69
Khmelnyskyi	0.11	0.50	0.10	0.11	0.29
Cherkasy	0.16	0.16	0.24	-0.05	0.26
Chernivtsi	0.25	0.26	0.26	0.21	0.41
Chernihiv	0.34	0.23	-0.14	0.08	0.27

Note: level depending on the decoupling effect: white indicates “excellent”, yellow indicates “positive”, grey indicates “negative”, red indicates “critical”

Source: calculated based on [26]

The study results determine the list of the most environmentally vulnerable regions of Ukraine as a result of conducting economic activities. Consequently, the calculation results indicate a critical decoupling effect for 2019-2020 in such areas as Kirovohrad, Odesa, Kharkiv, and Kherson oblasts, which requires entrepreneurs to coordinate efforts to minimise local environmental pollution. However, according to the above data, the positive dynamics of the integral decoupling factor is observed in Zakarpattia, Ivano-Frankivsk, and Cherkasy (with the exception of 2019), Ternopil, Khmelnytskyi, and Chernivtsi oblasts, which are within excellent and positive levels.

A study of the impact of production on the environment by region cannot say anything about the overall effect of decoupling in Ukraine, but it provides an understanding of which areas need more attention in the process of development of regional environmental policy and the mechanisms to ensure it. In order to detail the results and better understand the environmental consequences of doing business in a certain territory for 2016-2020, a graphical visualisation of changes in the integral indicator of the regional decoupling effect for the state of the environment is proposed (Fig. 3).



Figure 3. Dynamics of the decoupling factor indicator by region for 2016-2020

Note: areas with positive dynamics are marked in white, and areas with negative values are marked in grey

Source: compiled based on the original data contained in Table 2

The results of the study indicate negative dynamics in 10 regions of Ukraine. Considering the localisation of heavy industry enterprises, the predicted feature is negative values of indicators of individual regions. In addition, the destructive impact on the environment conditioned by economic activity is caused by the use of too worn-out equipment and outdated energy and material-intensive technologies, high

environmental intensity of production, etc. Generalisation of the value of the decoupling effect on the selected factors in Ukraine as a whole would allow specifying the destructive direction conditioned by economic growth over a long period, which would allow identifying the key cause of anthropogenic pressure on the environment and predicting development according to a trivariate scenario (Table 3).

Table 3. Integral decoupling factor within the regions of Ukraine for 2016-2020

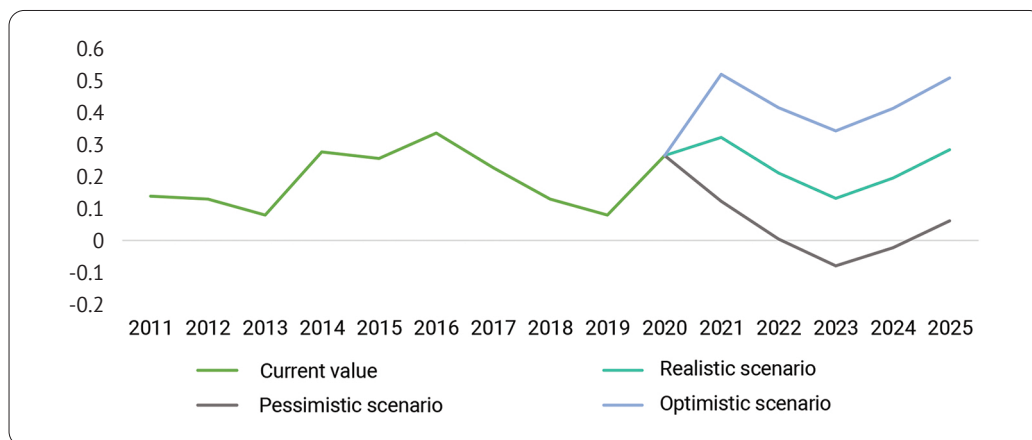
Indicator	Year									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Decoupling factor for emissions of pollutants into the atmosphere	0.12	0.12	0.05	0.25	0.32	0.07	0.34	0.25	0.16	0.30
Decoupling factor for production waste generation	0.13	0.10	0.05	0.23	0.30	0.19	0.26	0.21	0.12	0.34
Decoupling factor by volume of contaminated wastewater discharges	0.18	0.16	0.13	0.37	0.16	0.77	0.08	-0.17	-0.03	0.18
Integral decoupling factor	0.14	0.13	0.08	0.28	0.26	0.34	0.23	0.10	0.08	0.27

Source: compiled by the author based on [25]

The analysis of the results obtained reveals fluctuations in the integral decoupling factor, which indicates the instability of environmental policy in the state. The decoupling factor indicator for pollutant emissions ranged from 0.05 to 0.32 during 2011-2020. In recent years, there has been a significant decrease in waste from production, as evidenced by the calculations of the corresponding decoupling factor. The most unstable situation is related to polluted wastewater discharges, as within the

designated decoupling factor there is the highest value of the indicator (0.77) and the lowest (-0.03) of the others. It is the volume of contaminated wastewater that is the reason for the decrease in the integral decoupling factor for 2015-2020.

Predictive studies will help to design predictions of future environmental consequences from the implementation of economic activities and outline promising areas for improving the environmental situation (Fig. 4).

**Figure 4.** Integral decoupling factor forecast for 2021-2025

Source: compiled based on data from Table 3

Three scenarios for the development of events regarding anthropogenic pressure on the environment as a result of economic activity are presented. It is worth noting that an optimistic forecast is desirable for modern society, that is, an excellent level of decoupling, which provides for maximum environmental protection due to economic activity conditioned by the absence of pollutants released into the atmospheric air at the object of taxation, ensuring waste-free production, and the availability of modern equipment and modern devices for maximum wastewater treatment. However, considering the realities of today, a realistic course for the development of the further environmental situation in Ukraine is the most likely, which corresponds to a positive level of decoupling, which controls the emissions of

pollutants into the atmospheric air, uses low-waste technologies for the production of products, and wastewater treatment. According to the results of the study, the decline in the integral decoupling factor during 2022-2023 indicates a possible pessimistic scenario, close to the negative or critical level of the decoupling effect, which is primarily associated with the risks of military events on the territory of Ukraine.

The desire for positive dynamics of values in the future makes it necessary to develop strategic guidelines for neutralising destructive environmental impacts from economic activities. The proposed measures for implementing the environmental-oriented development strategy are summarised according to a possible pessimistic, likely realistic, and desirable optimistic scenario (Fig. 5).

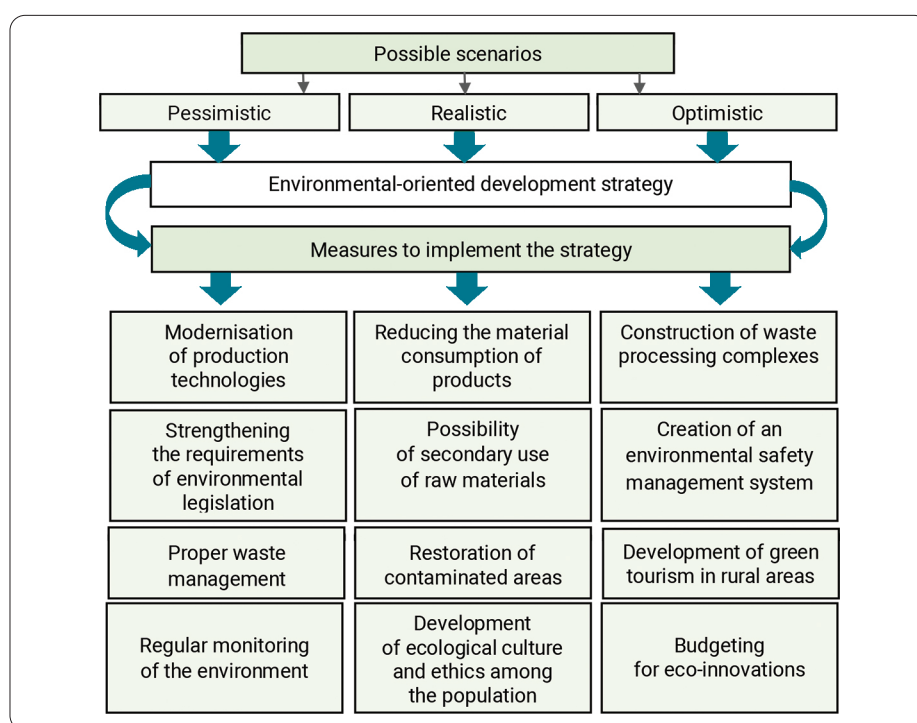


Figure 5. Strategic areas for achieving the desired decoupling effect in Ukraine

Source: compiled based on the author's own research

The proposed strategic guidelines are aimed at strengthening the country's environmental policy in general. The areas differ depending on the possible further scenario of events within the framework of a single unchanged strategy for environmental-oriented development. The implementation of the measures is aimed at increasing the level of decoupling, which means that it would allow minimising the destructive impact on the environment from production. At the same time, the outlined environmental course is too relevant in the period of war, as the problem of air, soil, and water pollution has increased due to the destruction of the ecosystem, the accumulation of chemicals and heavy metals released from destroyed equipment, burned fuels and lubricants, exploded missiles and aerial bombs, etc. As a result of military operations, sewage treatment plants fail, which provokes the build-up of a significant amount of household waste, which is dangerous to transport at the moment. At the same time, the number of environmental offences that have arisen due to the inability of the state to control the emissions of industrial enterprises during wartime is growing [27].

In general, the country's economy suffers significant losses as a result of a full-scale war, which is associated with a high level of migration of young people and working-age people, difficulties in relocating enterprises, destruction of social infrastructure, slowing down investment support, additional costs for the country's defence, and support for internally displaced persons. The blocking of ports and the inability to provide logistics routes leads to a reduction in exports. Fuel shortages lead to higher prices for goods and services, etc. The outlined results of military operations

complicate the procedure for conducting economic activities and slow down the processes of modernisation towards greening Ukrainian production, which emphasises the need to strengthen measures to implement the strategy of environmental-oriented development. At the same time, additional environmental rehabilitation measures are extremely important after the end of hostilities on the territory of Ukraine. The concentration of efforts should be directed to the disposal of military scrap metal in order to avoid problems of groundwater contamination and loss of soil fertility. Forestry enterprises will be faced with the task of reproducing a large area of forests, and fish farms will be faced with stocking rivers to renew bioresources. Government business support programmes will encourage the creation of additional jobs and the restoration of social infrastructure.

Conclusions

The concept of decoupling characterises the relationship between economic growth and consumed natural resources and reflects anthropogenic pressure on the environment. The dual nature of the concept gives grounds to consider resource decoupling and assess the impact of environmental consequences from conducting economic activities in general.

The authors' position boils down to the need to use an integral indicator for determining the effect of decoupling on the impact on the environment for systematic monitoring of local environmental results of economic growth. According to the obtained values, it is proposed to divide the decoupling effect into four levels: excellent, positive, negative, and critical. The study of the decoupling effect within individual

regions indicates a critical level of the indicator for 2019-2020 in 4 regions of Ukraine, which requires increased attention in the process of implementing measures to strengthen the environmental policy. At the same time, in most regions of the country, there is a positive level of local decoupling in 2016-2020 with slight fluctuations. A steady upward trend of the decoupling factor indicator was observed in 7 regions during the study period.

Possible scenarios of environmental development were created using the forecasting method based on data from decoupling analysis based on selected factors in Ukraine during 2011-2020. Measures for implementing

environmental-oriented development are proposed within the framework of a possible pessimistic, likely realistic, and desired optimistic scenario corresponding to the level of the integral decoupling factor. In the long run, the situation is complicated by military operations on the territory of Ukraine, which leads to devastating impacts on the ecosystem as a whole. Therefore, the desire to achieve an excellent and positive level of decoupling makes it necessary to coordinate joint efforts of the state, business structures, international organisations, and scientific institutions in ensuring the implementation of strategic measures to reinforce the environmental-oriented development of Ukraine.

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Декаплінг як вимір екологічних наслідків економічного зростання

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Анотація. Прискорене зростання чисельності населення на планеті зумовлює збільшення обсягу виробництва, що викликає необхідність нарощування видобутку сировинних ресурсів, розширення будівництва виробничих споруд, примноження об'єктів соціальної інфраструктури тощо. Відтак, створення належних умов буття сучасної цивілізації призводить до виснажливого використання природо-ресурсного потенціалу та загострення глобальних екологічних проблем, які мають деструктивний вплив на довкілля. Беручи до уваги вищезазначене, питання моніторингу екологічних наслідків від господарської діяльності набуває вагомого теоретичного та практичного значення, що обумовлює актуальність обраної тематики. Метою даної статті є обґрунтування теоретико-методичних засад та прикладних аспектів вимірювання ефекту декаплінгу за умови еколого-орієнтованого напрямку розвитку суспільства. Методологічною основою дослідження є методи емпіричного дослідження та теоретичного пізнання, зокрема метод формалізації, абстрактно-логічний, спостереження, вимірювання, порівняння. У процесі дослідження застосовуються загальнологічні методи та прийоми, зокрема метод аналізу і синтезу, аналогії та економічного моделювання, індукції та дедукції. У статті систематизовано думки провідних учених щодо розуміння концепції декаплінгу за ресурсним підходом та впливом на довкілля. Проведений аналіз став підґрунтям для дослідження впливу виробництва на стан довкілля у розрізі регіонів за 2016–2020 рр. та візуалізації інтегрального індикатора регіонального ефекту декаплінгу. Узагальненні значення за факторами в цілому по Україні дозволили спроектувати екологічні наслідки від здійснення господарської діяльності на перспективу. Практична цінність дослідження полягає у обґрунтуванні практичних рекомендацій зміцнення екологічної політики та мінімізації деструктивного впливу на довкілля враховуючи виклики, пов'язані з військовими діями на території України. Подальші дослідження спрямовані на розгляд досягнутого ефекту декаплінгу у межах окремих галузей народного господарства

Ключові слова: ефект декаплінгу, декаплінг-фактор, антропогенний вплив, господарська діяльність, декаплінг-аналіз, стратегічні напрями

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Development of an Employer's Value Proposition for Young Professionals

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Abstract. This study is relevant because the main components of the employer's brand and their priority for Generation Z have not been investigated in the academic field. In addition, there is no information about the most attractive employer companies whose value proposition is a reference for young people. The purpose of the study was to analyse the main components of the employer's value proposition and systemise them. The basis of the study is an expert survey of the audience of Generation Z (born in 1997-2012) using the Google Form online tool and analysis in Microsoft Excel software. The monographic method and the method of theoretical generalisation were used to search for the components of the value proposition, the system method – for their systematisation, and the method of expert assessments – for prioritisation. Visualisation of theoretical and practical results was created using the graphical method. It is customary to divide the components of the company's value proposition into tangible and intangible. Material factors include: wages, official employment, and the material motivation system. Non-material components are additional benefits, office, rating and reputation of the company, the type of activity of the company, and the possibility of training and personal development. The components of the value proposition are systematised for their intended purpose. The trend is revealed in the insufficiency of examples of its adaptation by the employer for Generation Z. A list of employers' value propositions in the labour market for Generation Z has been compiled, the most important of which are the salary level, internship schedule, and training in the company. The results of the author's survey among students (1.341 respondents) with and without work experience are analysed. A rating of attractiveness factors for staying in the company after an internship was built, which demonstrated that the most popular ones are the ability to combine work with education, a team, and access to training. Priority communication channels during job search are identified – Telegram and job sites. The most attractive social networks that are followed by young professionals – Telegram and Instagram – are identified. The aspects that employers need to pay attention to first of all for the establishment of a value proposition in the labour market when selecting personnel for specialists without or with minimal experience are identified, namely: part-time employment, the social impact of the project, the team, the opportunity to train in the company. This data can be used by HR brand agencies, and HR departments of international and Ukrainian companies. Using the results of the study on employer brand development for young professionals would allow enterprises to consider the expectations of their target audience

Keywords: employer brand, brand management, employer company, internship, Generation Z

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Introduction

To develop an employer's value proposition in 2022, it is not enough just to have a comfortable office with a recreation area and the status of an international company. After the beginning of COVID-19 pandemic, the priority changed from material motivation to non-material motivation, namely to ensure the well-being of employees. The remote format of work requires a new approach to the development of components of the employer's value proposition [1]. According to the Harvard Business Review study, 11 trends in the global labour market in 2022 were identified [2]. In the first place – honesty and equal access to any benefits of the company, regardless of the status of the employee. In other words, the same access to the remote work schedule of all teams, the same competitive salary level for an employee, regardless of their territorial location. In second place is the company's provision of employee safety during the COVID-19 pandemic and any other external factors. The struggle for talent in the international market leads to a decrease in the number of working days and, accordingly, the growth rate of the level of payment (2% instead of the usual 4%). Remote work format is and will continue to be the norm on an ongoing basis. However, 90% of companies in 2022 will set a clear schedule for a mixed format of work: remotely and in the office. This is conditioned by the difficulty for managers (64% of the surveyed managers) to measure the effectiveness and level of employee engagement during remote work [2]. Formats for supporting the comprehensive well-being of employees will continue to develop in the future. At the same time, the company will monitor the level of implementation of these tips. Each employer implements appropriate communication and activities to increase the number of active hours for employees. After all, according to the survey, 40% have problems with this [2].

Accordingly, the presence of an employer's value proposition is important for reducing talent recruitment costs. However, the biggest problem of international companies in its implementation is the lack of differentiation of the target audience (if necessary). In other words, the value proposition should include the characteristics of the values and character of the generation. According to the theory of generations, there are Baby Boom Generation (1943(46)-1960(64)), Generation X or Unknown Generation (1961(65)-1980(83)), Generation Y or Millennials, (1978(83)-1990(2003)), Generation Z or Centennials, (1991(2003)-2000(23)), and the Generation Alpha (born after 2010 (15)) [3]. About a third of the world's employees are Generation Z [3]. However, not all companies have adapted the value proposition to the characteristics of this generation and considered labour market trends.

Especially new approaches to work are important for Generation Z, which primarily considers only remote

work. The criteria for selecting a place for a future internship are values that inspire and coincide with the values of the company and the applicant. The employer should highlight and focus on the training and professional development of the company. 75% of young professionals strive to get a promotion or professional growth during their first year in the company. It is also worth noting that Generation Z is the first full-fledged digital generation [4]. The adaptation of the value proposition for Generation Z does not significantly depend on the region. This is conditioned by constant digital communication with peers from different countries, international exchange during university studies, and their rapid development of mentality.

In addition to new components of the value proposition, it is necessary to analyse channels and approaches to communication with applicants. The stages of communication start from the moment of placing an ad about recruitment for an internship or vacancy. After that, the candidate analyses the company's career pages on social networks, career website, social position, and their values. In addition, at each stage of selection, communication with young specialists requires adapting the value proposition in accordance with their priorities and needs.

The purpose of the study is an analysis of the most relevant components of the employer's brand value proposition based on the survey results and their typification.

Literature Review

An employer's value proposition is an established set of advantages, material and non-material motivation to work in a company for a certain target audience. The first stage of forming a value proposition is to define goals and objectives to ensure a positive brand of the employer. The most common task is to reduce staff turnover or increase company awareness. The second stage is the establishment of a team of specialists who will be engaged in the implementation of EVP (Employee Value Proposition). The tools are methods of personnel management, development of their professional qualities, marketing and communications. The third stage is to conduct market analysis, namely, review the existing value propositions of competing companies, create new components and approaches in communications. The next step is to determine the target audience based on their needs, namely: what age, year of study, target universities, speciality, minimum or no work experience, areas of interest, and communication paths. After determining the target audience, it is necessary to test the developed value proposition of the company (Fig. 1) with a focus group. The final stage is the development of a plan for the implementation of the proposal with the help of responsible persons. Control and quality of performance is carried out using benchmarks and deadlines [5].

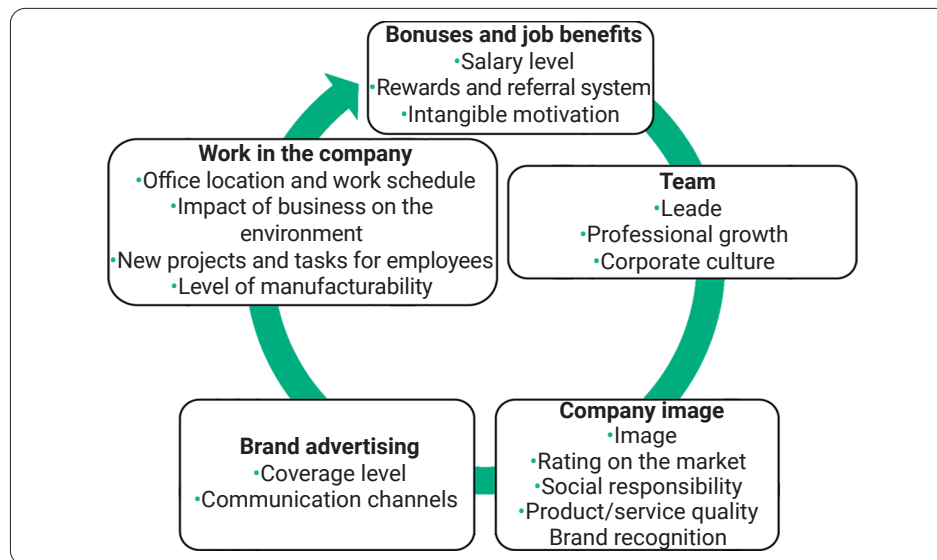


Figure 1. Components of the employer's value proposition

Source: compiled by the author based on the study by M. Tkalych [6]

Association with the company's brand, experience in communicating with the employer, loyalty of the target audience to the brand, and familiarity with the value proposition affect the size of the employer's brand value. The result of the research of the HR consulting company "Sibson Consulting" is the built "Reward of Work" (ROW) model, which includes winning elements and processes for creating an attractive place of work [7]. This model is transformed into the employer's EVP value proposition. The main winning elements in the model are defined as:

- compensation – material remuneration in the form of salary and additional payments;
- benefits – cash payments for health insurance, retirement, and dismissal (at the request of the employee) from the company;
- component of work tasks – employee's satisfaction and level of involvement in completing tasks and goals;
- career – professional development and prospects in the company;
- affiliation – the level of employee involvement in the corporate culture and the establishment of a favourable atmosphere in the company.

The main task facing the company's management is to create a unique set of value proposition, job benefits, and remove any barriers between the employer or employee's desire to receive the promised offer and a valid EVP. According to the survey by Sibson Consulting (1.059 respondents), the component of work tasks is important for all age categories of employees.

During the online recruitment period, there is an influence of factors on the attractiveness of the employer

and familiarity with the EVP. First of all, the company's reputation determines the fullness and content of career pages and page search sites, which, in turn, increases the competitiveness of EVP [8]. However, there is not enough research on EVP competitiveness during online recruitment [9].

It is studied that the components of EVP directly affect the level of productivity of employees, their loyalty to the employer, increase the value of fulfilling promises for employees, and determine further communication in the company [10]. The employer's brand value proposition focuses on internal customers – employees. Employees themselves have an influence on the development of company values. Satisfaction feedback is obtained using the following tools: anonymous audience surveys, outgoing interviews with laid-off employees, and analysis of trends in the employer market. Internal employee activities and internal research in the company in different departments affect the increase in EVP. An important factor in the quality of employer-employee interaction is the consistency between EVP promises and reality. At the same time, it is important to grant autonomy to employees when making decisions [11].

Thus, the main components of a value proposition have economic, emotional, and functional characteristics. It is necessary to consider the peculiarities of Generation Z behaviour in the process of creating a work environment during remote work and choosing the components of the employer's brand for young people. According to the Forbes international business publication, 32% of the modern population are representatives of Generation Z [12]. In any case, this is the numerical and most attractive part of the labour market, since this generation represents the future

development of the nation of each country. Accordingly, the value proposition of the employer's brand should consider the characteristics of this generation. The business publication defines the main components of the value proposition: opportunities and prospects for growth in the company, a team without restrictions for inclusive employees, a project for work (most Generation Z are interested in working in a start-up or small company), how the company's activities affect the environment, additional non-material incentives (including encouragement to volunteer activities or social projects) [12].

The current value proposition of the employer for graduates of educational institutions requires a new definition due to the peculiarities of the Generation Z mentality and new approaches to working with personnel. According to the author of this study, the employer's value proposition for graduates of educational institutions is an ecosystem of support, recognition, and values that exists in the company for employees to achieve the highest level of professional development of employees and potential candidates.

EVP for graduates of educational institutions should be aimed at developing the professional and leadership qualities of future candidates and the possibility of growth in the company. The level of salary is a less important factor for candidates without or with minimal work experience. Due to the peculiarities of Generation Z, it is necessary to investigate and analyse the method of communication at different stages of recruitment: brand awareness, initial assessment, interview, job offer, and adaptation period [13]. Generation Z has more advanced digital skills and starts working earlier than Generation Y. However, remote work helps students combine work and education. Therefore, it is necessary to identify the main components of the employer's value proposition for students when they are looking for a future job.

The main characteristics of Generation Z consist of three components: context, interaction, and consumption. The first – mobility, networking in social media, and a digital component of their skills. The second – self-identification without setting up for a specific direction, communicators, realists. The third – they have their own principles and values, value uniqueness, and have no framework [14]. When purchasing products, representatives of Generation Z analyse the impact on the environment and the company's brand. The topic of ecology and equality of all segments of the population is the main one during the discussion. Generation Z is the most dependent on the internet and social media compared to other generations. 58% of them cannot avoid using the internet for more than 4 hours [15].

Materials and Methods

The object of research is the employer's value proposition. The subject of research is theoretical and practical provisions for the development of an employer's value proposition for young professionals.

The main hypothesis of the study is that to form a company's value proposition, a new list of components is needed in accordance with the characteristics of generation

and market trends. Analysis of different approaches to the components of the employer's value proposition, typing of components, ranking of the highest priorities when choosing a company and reasons to stay to work further after the internship should solve the problem of forming information messages, communication activities, and value propositions for Generation Z.

The student audience survey was conducted in May 2021 in cooperation with Ukrainian universities and student organisations. The anonymous survey involved 1,341 respondents who identified the company's priority in each industry for internships and jobs. The form used closed-type questions. For students without work experience or with up to 1 year of experience and students or graduates with more than 1 year of experience, there were 13 questions each:

1. Are you planning to work in your speciality?
2. Work experience;
3. Which retail companies would you like to get an internship at? (multiple choice);
4. Which FMCG companies would you like to get an internship at? (multiple choice);
5. What IT companies would you like to get an internship at? (multiple choice);
6. Rank the level of significance of the factor for you when choosing a company for an internship (where 0 – not important, 3 – very important);
7. How do you find out about the company's internships/vacancies? (multiple choice);
8. Are you ready to move to another city in Ukraine for employment purposes?
9. Are you ready to move abroad for employment purposes?
10. In which social networks do you subscribe to the company's career page? (multiple choice);
11. What format of work is comfortable for you? (considering that the quarantine will end);
12. What difficulties did you encounter during your training/internship?
13. Rank the level of significance of the factor that influenced your decision to stay after the internship at the company to work (where 0 – not important, 3 – very important).

The audience of respondents is as follows: 776 students without work experience and 565 students or graduates with 1 to 5 years of experience. Respondents are bachelor's degree students (1st year – 20.5%, 2nd year – 22.9%, 3rd year – 23.7%, 4th year – 16.6%) and master's degree students (1st year – 7.2%, 2nd year – 0.6%), graduates (1 year after graduation) – 5.5%. Accordingly, the criteria for selecting a company for an internship were developed, which allowed comparing the choice of companies by students and graduates with and without work experience, to determine a comfortable work schedule for students after the COVID-19 pandemic. The expert survey was conducted online using the Google Form. Microsoft Excel (USA) software suite was used to analyse the results of the expert survey.

Using the graphical assessment, the criteria were determined that would allow HR managers to manage the company's value propositions when forming such a proposition for young professionals and develop a set of measures for their implementation in the company's activities.

The monographic method and the method of theoretical generalisation were used to define scientific approaches for identifying the components of a value proposition. A systematic approach was used to systematise the company's value propositions in the labour market and typify them. The method of expert assessments was used to determine the priorities of value propositions of

employment, internships, and the choice of communication channels with company representatives. Graphic methods were used to illustrate theoretical and practical materials. Statistical analysis was used to analyse the results of an expert survey.

Results and Discussion

Based on the research of the literature on gender aspects of the establishment of the employer's value proposition in the labour market and its impact on personnel engagement, the typification of the components of the employer's brand value propositions in Figure 2 was developed [16; 17].

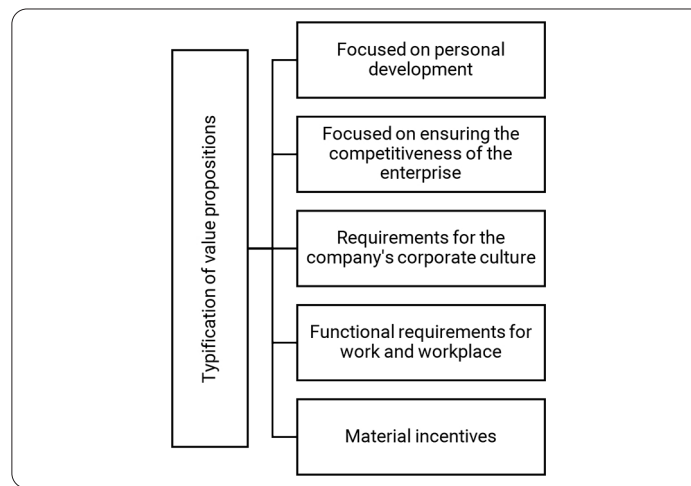


Figure 2. Typification of employer value propositions

Source: developed by the author based on [16; 17]

Material incentives are one of the most important factors when choosing a job. These include the level of wages that must correspond to the labour market and be competitive, official employment, additional benefits and compensation. Health insurance, maternity leave payments for men and women, retirement benefits, KPI's achievement bonus, partial or full coverage of gym membership fees, and placement of employees' children in school or kindergarten.

Value propositions focused on personal development are second only to material incentives when choosing an employer. These are opportunities for training and development of employees, the opportunity to gain international experience, and career advancement. These values are often paramount when choosing your first job or gaining experience.

The company's image as an employer, the company's rating as an employer, the company's business rating, and the products/services that the company creates are value propositions focused on ensuring the company's competitiveness. The higher the company's rating, the more attractive the employer is to job seekers. This type of typing is not the top factor when looking for a job.

Work schedule, work-life balance, use of the latest technologies, creativity/office design, office location, and

comfortable workplace are requirements for the functionality of work and workplace. This type of value proposition partially loses its relevance in remote work, as most companies work remotely due to the COVID-19 epidemic. Thus, the usual work schedule from 9 to 18 loses its relevance. The priority for company managers is to fulfil tasks and achieve goals by employees.

When building a corporate culture, it is necessary to include the company's values that relate to the establishment of relationships between all employees of the company and are determined in the behaviour of each of its members. This is manifested in the company's attitude to society, which can be manifested in the presence of social projects. Each international company chooses one or more UNICEF Sustainable Development Goals. In the modern format of work, candidates are looking not only for the most attractive payment option, but also for an employer based on common goals and values. This is especially true for Generation Z, for whom volunteering and solving environmental and social problems are important in their daily lives.

The main channels of communication with young professionals are the Telegram messenger app, the job site (section "for students" or "without work experience"), and the company's social media page (Fig. 3).

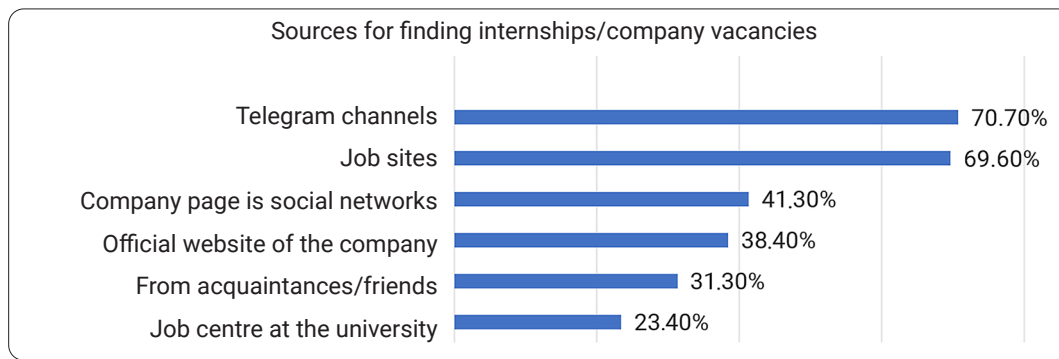


Figure 3. Ranking of communication channels when looking for a job for young professionals

Source: developed by the author based on a sociological survey described in the methodology

During COVID-19, the development of an employer's brand on social media is one of the new areas for HR professionals. This area combines the tools of SMM (social media marketing), recruitment, and brand management. Online communication with your target audience

only through job search sites, a company's career site, or a LinkedIn page is not enough. In the Ukrainian market, Telegram channels with opportunities for young people and the Instagram social network are most prioritised (Fig. 4).

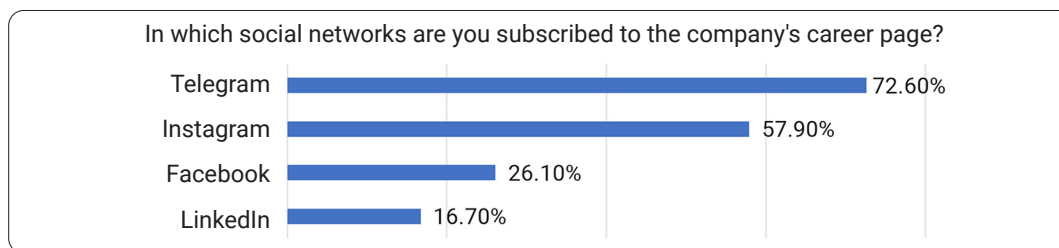


Figure 4. Ranking the priority of the company's social networks for young professionals

Source: developed by the author based on a sociological survey described in the methodology

For most young professionals, an internship in the company is an opportunity to get an offer for permanent employment in the company. When choosing a company for an internship, the student learns about

further career development during the selection stages. However, the final decision to continue working for the company depends on the results of their internship and new criteria (Fig. 5).

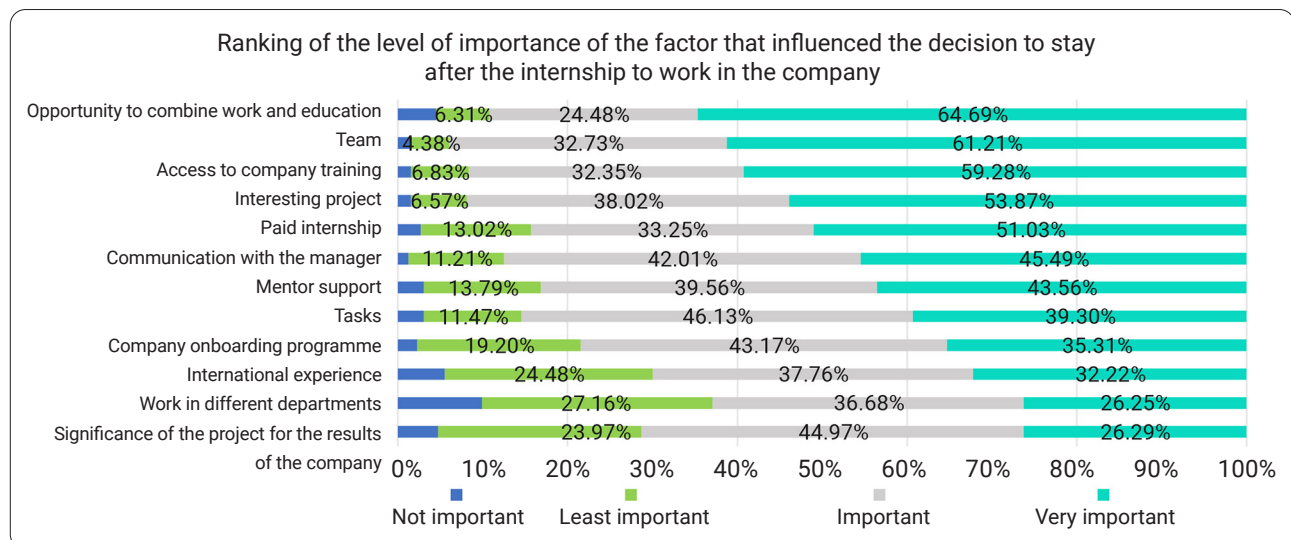


Figure 5. Ranking the priority factors to stay in the company after an internship for young professionals

Source: developed by the author based on a sociological survey described in the methodology

Accordingly, when forming an internship programme and vacancies for young professionals, special attention should be paid to the possibility of part-time employment, a team, and access to training in the company. In addition, for Generation Z, the importance of the project and its social significance are an important criterion. HR managers form project teams based on the following criteria: skills and abilities, values of each team member, their motivation to work and professional experience. Professional growth of young professionals takes place not only through trainings, but also through the exchange of experience with the team, mentoring support of the manager.

Conclusions

Through the trend search study of “knowledge management”, it was found that the decline of knowledge management search trend was closely related to Chinese traditional holidays, such as Spring Festival and National Day. An analysis of the attributes of the “knowledge management” population proved that there were obvious differences in gender when it came to the attention to “knowledge management”. Men pay more attention to knowledge management than women. Beijing, the most advanced political center in Chinese mainland, pays attention to knowledge management, ranking first in all provinces and

cities in China. The search trend of “knowledge management system” related to “knowledge management” is analyzed in the same period, and it is found that the search trend of “knowledge management system” was consistent with that of “knowledge management”. However, the overall daily average and moving daily average of “knowledge management” are higher than those of “knowledge management system”.

Sorting out and gathering knowledge management data information is helpful to analyze the public's search behavior and psychology, and can greatly promote the development of knowledge management in China. Based on the Baidu Index, it is possible to understand the online attention to knowledge management in different regions and different genders in China, to analyze the user psychology and needs behind the search behavior. However, a deeper study of knowledge management Baidu index needs to be continuously developed and improved in future.

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Формування ціннісної пропозиції роботодавця для молодих спеціалістів

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Анотація. Дане дослідження є актуальним, оскільки у науковій сфері не досліджено основні складові бренду роботодавця та їх пріоритетність для покоління Z. Крім цього, відсутня інформація про найбільш привабливі компанії-роботодавці, ціннісна пропозиція яких є еталонною для молоді. Метою роботи було проаналізувати основні складові ціннісної пропозиції роботодавця та типологізувати їх. Основою дослідження є експертне опитування аудиторії покоління Z (народжені у 1997–2012 роках) за допомогою онлайн інструменту Google Form та аналіз в програмному забезпеченні Microsoft Excel. Монографічний метод та метод теоретичного узагальнення використовувались для пошуку складових ціннісної пропозиції, системний – для їх систематизації, метод експертних оцінок – для пріоритизації. За допомогою графічного методу була створена візуалізація теоретичних та практичних результатів. Прийнято поділяти складові ціннісної пропозиції компанії на матеріальні та нематеріальні. До матеріальних відносяться: заробітна плата, офіційне працевлаштування, матеріальна система мотивації. Нематеріальними складовими є додаткові пільги, офіс, рейтинг і репутація компанії, вид діяльності компанії, можливість навчання та розвитку. Здійснено типізацію складових ціннісної пропозиції за цільовим призначенням. Виявлено тенденцію у недостатності прикладів її адаптації роботодавцем для покоління Z. Складено перелік ціннісних пропозицій роботодавців на ринку праці для покоління Z, найбільш важливими яких є рівень заробітної плати, графік стажування, навчання в компанії. Проаналізовано результати власного дослідження – опитування серед студентів (1341 респондент) з досвідом та без досвіду роботи. Побудовано рейтинг факторів привабливості залишитися працювати в компанії після стажування, який продемонстрував, що найбільш затребуваними є можливість поєднувати роботу з навчанням, команда та доступ до навчання. Виявлено пріоритетні канали комунікації під час пошуку роботи – Телеграм та сайти з пошуку роботи. Визначено найбільш привабливі соціальні мережі, за сторінками яких слідкують молоді спеціалісти, – Телеграм та Інстаграм. Встановлено аспекти, на які роботодавцям потрібно звернути увагу в першу чергу для формування ціннісної пропозиції на ринку праці при підборі персоналу для спеціалістів без або з мінімальним досвідом, а саме: часткова зайнятість, соціальний вплив проекту, команда, можливість навчатися в компанії. Ці дані можуть бути використані HR-бренд агенціями, HR-відділами міжнародних та національних компаній. Використання результатів проведеного дослідження формування бренду роботодавця для молодих спеціалістів дозволить підприємствам враховувати очікування своєї цільової аудиторії

Ключові слова: бренд роботодавця, управління брендом, компанія-роботодавець, стажування, покоління Z

Using Baidu Index to Investigate the Spatiotemporal Characteristics of Public Concern Towards Knowledge Management in China

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Abstract. In the era of knowledge economy, knowledge has become the guide to creating economic and social value. Knowledge economy calls for knowledge management, and modern knowledge management is a new management theory and management method emerging in the time of knowledge economy, which explains the relevance of this research. Baidu is the largest Chinese search engine in the world, and the Baidu Index developed by Baidu is one of the most important statistical analysis platforms of the Internet and even the whole data age. The purpose of this paper is to investigate spatiotemporal characteristics of Chinese public attention to knowledge management through the Baidu index. Text analysis and process tracing are used to explain the reasons for the spatial and temporal characteristics of the Chinese public's attention to knowledge management. Through Baidu index network search engine, this paper analyses search trend, demand graph, and demographic and geographic distribution. This paper selects the time period from January 1, 2011 to January 1, 2022. The results of the study show that the search trend of "knowledge management" in the past 11 years peaked at the end of 2016, and the decrease appeared around the Spring Festival and National Day each year. "Learning organization", "knowledge base" and "information management" are the words most concerned by the public. It was stated that the groups concerned about "knowledge management" were mainly distributed in Guangdong, Beijing, and Shanghai. Among them, the predominant group was male aged 20-29. The factors that affect the changes in the search volume of "knowledge management" mainly include the traditional Chinese holidays, the Spring Festival, the National Day, and the release of knowledge management-related norms. In addition, the study found similar search trends for "knowledge management" and "knowledge management system". This paper only takes "knowledge management" in Baidu Index as the research object. Whether it is suitable for all network engines, needs to be tested furtherly

Keywords: knowledge economy, search engine, web search query data, computational social science

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Introduction

With the development and change of global economy and the intensification of industrial competition, the virtual, information-based, networked and intelligent knowledge-based economy has gradually replaced the industrial economy, which has become the distinctive label of this era [1]. The research of knowledge management (KM) started with the advent of knowledge economy era [2]. Although discussion of knowledge management has been going on for many years, its definition has not formed a unified understanding and definition. However, the academic world has never lacked the definition of knowledge management. Sensuse et al. believe that knowledge management is a new concept of managing, developing, and retaining organizational knowledge [3]. Knowledge management is considered to solve the organizational problems of managing their organizational and individual knowledge. Lönnqvist considers the added value that knowledge management as an approach can bring to the management of knowledge-intensive organizations [4]. Palacios et al. [5] recognize that the importance of knowledge management for organizational competitive advantage, which seems to be a widely accepted issue in most management works of today, and acknowledges that effective and efficient knowledge management leads to superior organizational performance. Garcia's findings suggest that business organizations should promote and implement more knowledge management to positively impact organizational performance in the short and long term [6]. Demircioglu found that the theoretical and empirical evidence of knowledge management in organizations could prove that knowledge creation might occur internally or through knowledge spillovers [7]. Hussain et al. [8] agreed with Bhatt that knowledge management is knowledge creation, followed by knowledge organization, knowledge sharing, knowledge dissemination, knowledge application and use. And through the study, it was pointed out that knowledge creation, knowledge collection, knowledge organization, knowledge dissemination and knowledge application had a positive and significant impact on the innovation capability of SMEs. Koloniari et al. [9] concluded that knowledge management had obvious benefits for improving the organizational and competitive performance of the library and information major, as well as future career choices.

In summary, when knowledge management is used in enterprise organization management, knowledge management can bring competitive advantage and significant performance to the enterprise in the short or long term. Knowledge management is not only applied to enterprise management, but also to other various fields, mainly including the application in cultivating the core competitiveness of the organization; application in knowledge innovation; in new product development; in marketing, etc. In the era of knowledge economy, knowledge has become an important intangible asset and core competitiveness. Today, China's economy has shifted from a stage of high-speed growth to a stage of high-quality development.

Knowledge management is the driving force for economic development. Strengthening knowledge management is of great significance to improving China's international competitiveness and comprehensive national strength, and reaching China's goal of becoming an innovative country.

Today, the Fourth Industrial Revolution is at hand [10]. The rapid development of emerging technologies such as the Internet, the Internet of Things, and 5G communication networks has brought opportunities for people to make full use of the enormous value of network Big Data [11]. As an important way for users to obtain information, search engine plays a leading role. Baidu (Baidu.com) is the largest search engine in China. Baidu's Baidu Index Big Data Intelligent Analysis Platform can be used in academic research, social behaviour research and other aspects.

Today, the research on knowledge management in China using network search data is less concerned. Thus, this study uses Baidu index to analyse the spatiotemporal characteristics of the public's attention to knowledge management.

The purpose of this paper is to investigate spatiotemporal characteristics of Chinese public attention to knowledge management through the Baidu index.

Materials and Methods

The geospatial scope covered by the data analyzed in this study mainly includes 31 provinces (municipalities and autonomous regions) in China (excluding relevant data from Hong Kong, Macau and Taiwan). This study uses Baidu index as a research tool to evaluate the spatiotemporal characteristics (the changing characteristics of the spatial distribution of a certain thing in the temporal dimension) of the knowledge management of the public at different times uses "knowledge management" as the search keyword to study the online search trend, demand graph, and demographic and geographic distribution of "knowledge management" from January 1, 2011 to January 1, 2022. At the same time, the related keyword "knowledge management system" of "knowledge management" is compared with the search trend in the same period.

The data presented by the Baidu Index Demand Graph is the relevant search term demand shown by the user in the change of search behaviour before and after searching for a certain term. Microsoft Excel was used to analyse the collected information. Based on this, it is possible to analyse which keywords the user has a demand for in addition to the keyword and develop derivative products for the industry and products and services for reference. The demand graph summarizes the data in one year with the "week" as the statistical unit.

However, the Baidu Index can only be used in the Baidu search engine, and the data source is limited to China. Therefore, this study did not evaluate data obtained by other search engines. Although Baidu Index can analyse trend research, demand maps and crowd portraits, it cannot obtain demographic data for the time being. Baidu Index

Table 1. Top 10 Search Terms Related to knowledge management in the Baidu Index

Order	Keywords	Frequency
1	Learning organization	25
2	Knowledge base	24
3	Information management	16
4	Knowledge	13
5	Knowledge management system	13
6	Knowledge economy	8
7	Landray group	6
8	Process reengineering	6
9	Knowledge graph	5
10	Information resource management	5

The search trend of Baidu Index can be divided into 3 sections: personal computer (PC) trend, mobile trend, and PC trend + mobile trend. The main reasons for the peak in the search trend of “knowledge management” at the end of 2016 are: First, on December 13, 2016, the national standard “Intellectual Property Management Regulations for Colleges and Universities” (GB/T 33251-2016) was approved by the National Quality Supervision of the People's Republic of China Released by the General Administration of Inspection and Quarantine and the Standardization Administration of China. Intellectual property, also known as “knowledge (property) ownership” and “intelligence (property) ownership”, refers to the rights that the right holder enjoys in accordance with the law to the results of one's intellectual labor [12]. Intellectual property management is an important part of enterprise knowledge management. For innovative enterprises and knowledge enterprises, intellectual property management will become the core of enterprise knowledge management. Colleges and universities are the cradle of knowledge and the origin of national scientific and technological innovation. According to statistics, 70% of the important scientific and technological achievements affecting people's lives come from inventions in colleges and universities [13]. Strengthening management of intellectual property rights Chinese universities is of great significance for enhancing the core competitiveness of China's scientific and technological achievements in the world [13], and the management of intellectual property rights in universities is of great significance. The release of this specification has attracted widespread attention. Second, the online academic journal “Knowledge Management Forum” (ISSN 2095-5472, CN11-6036/C) published by the “Library and Information Work” magazine, which oversees the Chinese Academy of Sciences and sponsored by the Documentation and Information Center of the Chinese Academy of Sciences, was newly revised in 2016 and formed a new editorial board. “Knowledge Management Forum” is the only professional academic journal in the field of knowledge management, focusing on all knowledge-related research results and practical cases, including: Internet and knowledge innovation, big data and knowledge computing, data protection and knowledge organization, community of practice and

knowledge operation Content management and knowledge sharing [14]. The new establishment of the editorial board of the “Knowledge Management Forum” is of great significance in promoting the creation, organization, and effective use of knowledge in the age of knowledge, and promoting the rapid, extensive, and effective dissemination of knowledge management research results, leading to the public's attention to “knowledge management”. The valley value of “knowledge management” generally occurs around the Spring Festival and National Day each year. Every year from the end of January to the beginning of February is the most grand and traditional festival in China, the Spring Festival. The Spring Festival and the National Day are both official holidays in China, and the vacation time generally comprises seven days. Whether it is the Spring Festival or the National Day, people stop working or study to spend the festival, which leads to a decrease in the search index of “knowledge management” each year.

Comparing the PC computer terminal and the mobile terminal, it is found that the search trend of the PC computer terminal is not consistent with the search trend of the mobile terminal. From the perspective of the trend, overall PC computer terminal shows a downward trend, while the mobile phone terminal shows an upward trend. The number of netizens using mobile phones in China is huge. Based on the 48th “Statistical Report on Internet Development in China” released by the China Internet Network Information Center, the number of mobile netizens in China is 1.007 billion, an increase from December 2020. There are 20.92 million mobile netizens, and 99.6% of netizens use mobile phones to access the Internet [15]. Obviously, mobile phones have successfully become the preferred way for people to communicate with the world due to their advantages of simple operation and convenient carrying, which naturally leads to an increase in the search trend of mobile phones and a decline in the search trend of Personal computers.

This study summarizes top ten related words of “knowledge management” weekly search popularity from December 2020 to December 2021, and top 10 related words with the highest popularity words were recorded (Table 1). Among them, “learning organization” and “knowledge base” are the most frequently searched. Marquardt described the

“Learning organization” as follows: “learning as an entire organization at all levels to adapt and succeed with the environment that continually changes” [16]. “Knowledge base” refers to many facts with various entities and relationships [17]. It can be seen from the above definitions that learning organizations are based on information and knowledge, and knowledge management and learning organizations have an inseparable and close relationship. Learning organizations are one of the carriers for knowledge management to be implemented, and knowledge management is learning the core and essence of the organization. When the searcher searches for “knowledge management” in the Baidu index, the keywords “learning organization” and “knowledge

base” with high correlation are also included in the search content and have the highest search frequency (Table 1).

From the geographical distribution of the Baidu Index functional module group portraits, Eastern China and Northern China pay more attention to “knowledge management”, and Beijing’s attention to “knowledge management” ranks first in both provinces and cities (Fig. 3). From the crowd attributes in the crowd portraits of the Baidu Index function module, it was established that the age 20-29 (40.07%) and men (53.78%) are the main sources of people who search for “knowledge management” related content (Fig. 4). Meanwhile, search trends for “knowledge management system” and “knowledge management” were similar (Fig. 5).

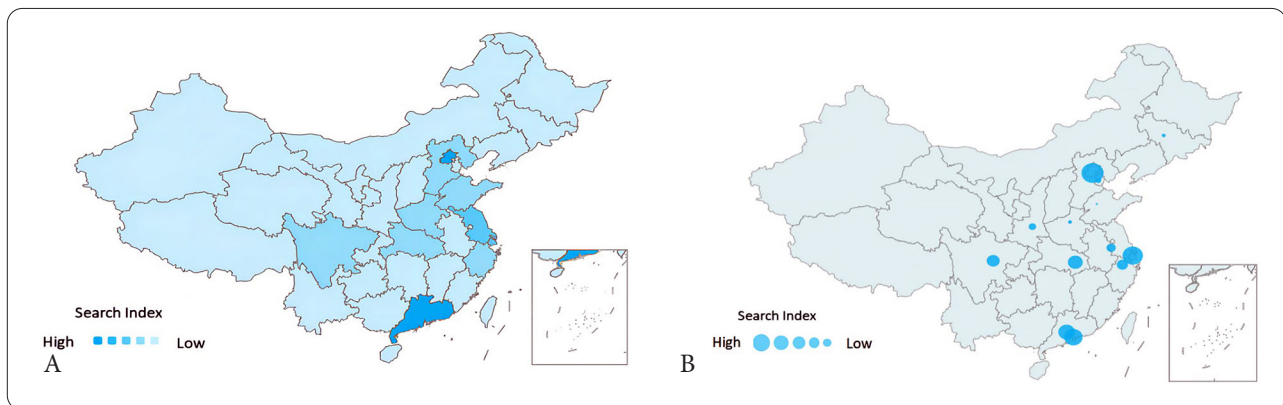


Figure 3. Baidu Index maps for “knowledge management”: A – province; B – city

Source: authors’ own research

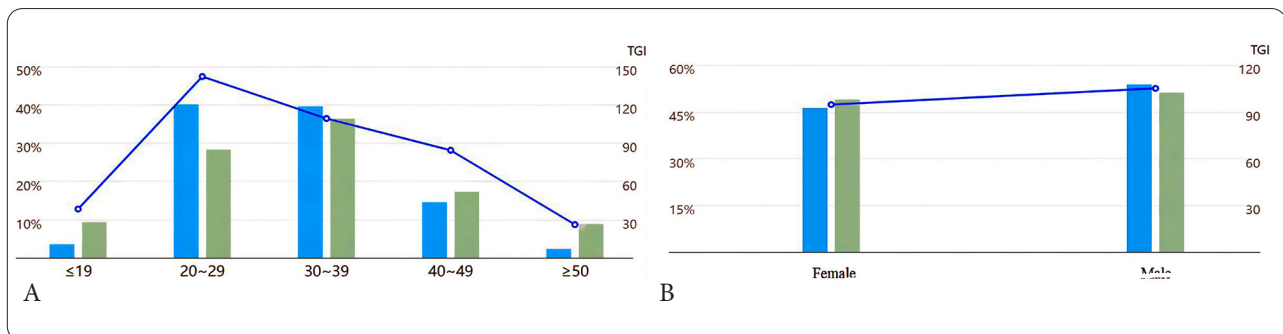


Figure 4. Demographic profiles by age (A) and gender (B)

Source: authors’ own research

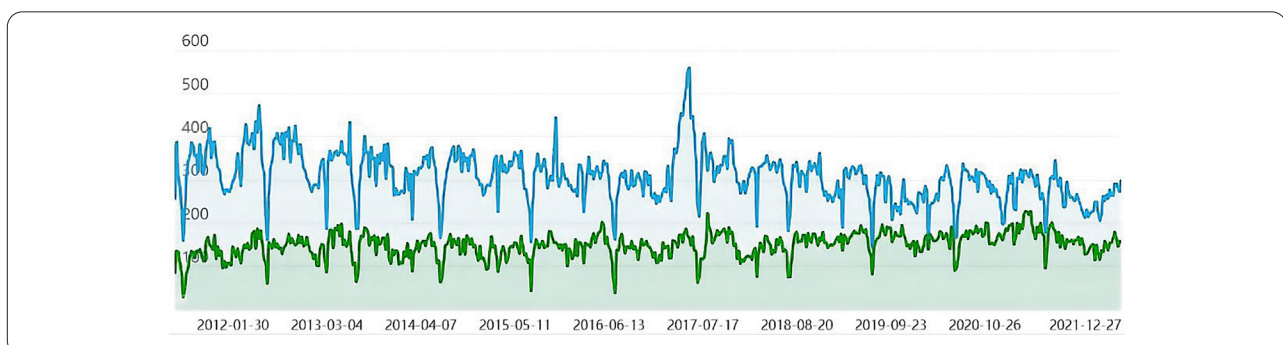


Figure 5. Baidu search volume index for “knowledge management” (blue line) vs “knowledge management system” (green line)

Source: authors’ own research

Demographic and geographic distribution of the Baidu Index can focus on which regions users come from. Geographical distribution of the data of “knowledge management” has been provided since July 2013. The analysis of the geographical distribution of “knowledge management” shows that the search behaviors of users in the four regions of Beijing, Shanghai, Guangzhou, and Shenzhen are more common (Fig. 4). Both Beijing and Shanghai ranked in the top two in terms of provincial rankings and city rankings. The reason why Beijing ranks first is related to the journal Knowledge Management Forum (ISSN 2095-5472). The journal was founded and published in Beijing. In addition, Beijing and Shanghai are the political and economic centers of China. The comprehensive strength and competitiveness of cities in mainland China are at the most advanced level. Today, knowledge management has been applied to agriculture, industrial construction, transportation, post and telecommunications, business, education, health, finance, industry, etc. Beijing and Shanghai, the first-tier cities with strong comprehensive strength, are bound to practice knowledge management in various industries.

The population attributes can be used to understand the gender and age distribution of users who follow a certain keyword. As Baidu Index provides the data of population attributes on a monthly basis, this study summarizes the social attention data from January 1, 2021 to January 1, 2022, and analyzes the crowd attributes (Fig. 4). The analysis data shows that the gender ratio of men and women is 53.78% and 46.22% respectively, which shows that men pay more attention to knowledge management. In the age distribution, the 20-39-year-old group pays the most attention to knowledge management, with a total of 79.65%, of which the 20-29-year-old group pays attention to 40.07%, and the 30-39-year-old group pays 39.58% attention. The 20-39-year-old group represents the attention of scientific researchers and company management to knowledge management. Groups aged 40-49 paid less attention (14.51%); those aged less than 19 paid 3.54%; those aged over 50 paid the least attention, only 2.29%. In addition, TGI (Target Group Index) is an index that reflects the strength or weakness of the target group in a specific research scope. TGI index can indicate the preference of users with different characteristics to pay attention to problems. TGI index is greater than 100, which means that some users have more corresponding tendencies or preferences. The larger the value, the stronger the tendencies and preferences. If it is less than 100, it means that this kind of users' relevance tendency is weak (compared with the average); and equal to 100 means at the average level. TGI analysis is a method often used in data analysis, and its calculation method is: $TGI\ index = \left[\frac{\text{the proportion of groups with certain characteristics in the target group}}{\text{the proportion of groups with the same characteristics in the whole population}} \right] \times \text{the standard number}$ is 100. In the gender distribution, the TGI of women was 94.66 and that of men was 105.1, indicating that the male public is more interested in knowledge management-related information.

The study found similar search trends for “knowledge management” and “knowledge management system” (Fig. 5). However, regarding search index, both the overall value of average daily and the mobile value of daily average of “knowledge management” are higher than those of “knowledge management system”. Knowledge management system refers to the use of an information system to manage organizational knowledge [18]. This definition clarifies the relationship between knowledge management and knowledge management system, in other words, knowledge management system is a tool for knowledge management. Knowledge management systems are used only when the amount and complexity of knowledge accumulation within an organization reaches a certain level. Therefore, the keywords entered by users in Baidu Index are knowledge management first, and only when users have demands on the knowledge management system, they will further understand it.

Since the early 21st century, the related research in the field of knowledge management in the world has been rising and continuing. Kavalic et al. put forward a structural model of knowledge management process, which shows the relationship among knowledge generation, knowledge sharing, knowledge storage and knowledge utilization, and its influence on organizational knowledge management performance [19]. It provides empirical support for the core role of knowledge management in enterprise performance. The research by Lei et al. provides theoretical support for knowledge management to improve enterprise efficiency and strengthen enterprise core competitiveness [20]. The study by Zhou et al. shows that enterprise knowledge management plays a positive role in promoting organizational innovation ability and industrial development [21]. It provides direction for the development of enterprise knowledge management and the improvement of innovation ability. Similarly, the results of the presented study showed that the intellectual property management was an essential part of enterprise knowledge management. In addition, it can be suggested that for innovative enterprises and knowledge enterprises, intellectual property management would become the core of enterprise knowledge management. Thus, it can be argued that the findings of this study coincide with the statements of other researchers in this subject area.

Conclusions

Through the trend search study of “knowledge management”, it was found that the decline of knowledge management search trend was closely related to Chinese traditional holidays, such as Spring Festival and National Day. An analysis of the attributes of the “knowledge management” population proved that there were obvious differences in gender when it came to the attention to “knowledge management”. Men pay more attention to knowledge management than women. Beijing, the most advanced political center in Chinese mainland, pays attention to knowledge management, ranking first in all provinces and cities in China. The search trend of “knowledge management system” related to “knowledge management” is analyzed

in the same period, and it is found that the search trend of “knowledge management system” was consistent with that of “knowledge management”. However, the overall daily average and moving daily average of “knowledge management” are higher than those of “knowledge management system”.

Sorting out and gathering knowledge management data information is helpful to analyze the public's search behavior and psychology, and can greatly promote the development of knowledge management in China. Based on the Baidu Index, it is possible to understand the online attention to knowledge management in different regions and

different genders in China, to analyze the user psychology and needs behind the search behavior. However, a deeper study of knowledge management Baidu index needs to be continuously developed and improved in future.

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Використання індексу Байду для дослідження просторово-часових характеристик управління знаннями в Китаї

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Анотація. В епоху економіки знань знання стали провідником для створення економічної та соціальної цінності. Економіка знань вимагає управління знаннями, а сучасний менеджмент знань – це нова теорія менеджменту та метод управління, що виникають у часи економіки знань, що пояснює актуальність цього дослідження. Байду є найбільшою китайською пошуковою системою у світі, є однією з найважливіших платформ статистичного аналізу в Інтернеті та навіть у всій епосі даних. Метою цієї статті є дослідження просторово-часових характеристик уваги китайської громадськості до управління знаннями за допомогою індексу Байду. Аналіз тексту та відстеження процесу використовуються для пояснення причин просторових і часових характеристик уваги китайської громадськості до управління знаннями. За допомогою пошукової системи індексної мережі Байду у статті аналізується тенденція пошуку, графік попиту, а також демографічний і географічний розподіл. У рукописі вибрано період часу з 1 січня 2011 року до 1 січня 2022 року. Результати дослідження показують, що тенденція пошуку «управління знаннями» за останні 11 років досягла піку в кінці 2016 року, а зниження відбулося близько Весного фестивалю та під час щорічного Національного дня. «Організація, що навчається», «база знань» та «менеджмент інформації» – це слова, які найбільше хвилюють громадськість. Було заявлено, що групи, які стурбовані «управлінням знаннями», були в основному розподілені в Гуандуні, Пекіні та Шанхаї. Серед них переважали чоловіки віком від 20 до 29 років. Фактори, які впливають на зміни в обсязі пошуку «управління знаннями», в основному включають традиційні китайські свята, Свято Весни, Національний день і випуск норм, пов'язаних з управлінням знаннями. Крім того, дослідження виявило подібні пошукові тенденції для «управління знаннями» та «системи управління знаннями». У цьому документі об'єктом дослідження є лише «управління знаннями» в індексі Байду. Необхідно додатково перевірити, чи підходить він для всіх мережевих механізмів

Ключові слова: економіка знань, пошукова система, дані веб-пошуку, комп'ютерна соціальна наука

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