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THE USE OF ARTIFICIAL INTELLIGENCE IN TRADING STRATEGIES OF BUSINESS: AUTOMATION AND FORECASTING

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ВИКОРИСТАННЯ ШТУЧНОГО ІНТЕЛЕКТУ В ТОРГОВИХ СТРАТЕГІЯХ БІЗНЕСУ: АВТОМАТИЗАЦІЯ ТА ПРОГНОЗУВАННЯ

The use of artificial intelligence has currently given rise to the phenomenon of flexible business trading strategies, defined by the ability to quickly adapt to changes in the market conditions, and competitive field. Moreover, it is undeniable that artificial intelligence, through its inherent intellectual algorithms and machine learning, is expanding its significance in shaping business trading strategies, which is particularly relevant for networked and flexible businesses. The matter is that currently, these entities operate in niches where changes in market conditions, consumer demands, and technological trends happen very rapidly. This is because consumers increasingly alter their preferences and expectations, and the product and service lifecycle are becoming shorter. For this reason, companies must continuously innovate and swiftly bring new offerings to the market. The purpose of the article is to identify the features of using artificial intelligence in the trading strategies of networked and flexible businesses. Moreover, it has been demonstrated that the use of artificial intelligence in the process of forming trade proposals influences the model of trading strategies in networked and flexible businesses. This model evolves based on the functions of employing self-regulating technical means, economic-mathematical methods, management systems, and predictive capabilities. The research results indicate that the utilization of artificial intelligence in business trading strategies provides enhanced flexibility and adaptability, particularly in actions aimed at sales sustainability. It ensures better justification for these actions and a maximally clear course of interaction with customers. Furthermore, it contributes to the speed and effectiveness of decision-making in the formulation of trade proposals and enables an efficient and rapid response to

competitive actions. Indeed, the use of artificial intelligence in trading strategies is currently leading not only to the formation of a phenomenon of a flexible trading network but also to their integration with flexible (adaptable) models of trading entrepreneurship. This integration is a result of the broad capabilities in manipulating trade proposals. Therefore, the prospects for further research may focus on detailing specific technical means, algorithms, and methods in the field of artificial intelligence that contribute to the greatest improvement in trading strategies.

Використання штучного інтелекту наразі сформувало явище гнучких торгових стратегій бізнесу, що визначаються здатністю швидко адаптуватися до змін в ринкових умовах та в конкурентному полі. Крім того, безсумнівним є той факт, що штучний інтелект, через властиві йому інтелектуальні алгоритми та машинне навчання, розширює свою значущість у формуванні торгових стратегій бізнесу. Це особливо актуальне для мережних та гнучких (змінних) бізнесів. Річ у тому, що наразі окреслені суб'єкти діють у нішах, де зміни в ринкових умовах, споживчих вимогах та технологічних тенденціях відбуваються дуже швидко, оскільки споживачі все частіше змінюють свої уподобання та очікування, а цикл життя продуктів та послуг стає все коротшим. З цієї причини компанії повинні постійно еволюціонувати інноваційно та швидко виводити на ринок нові пропозиції. Метою статті є визначення особливостей використання штучного інтелекту в торгових стратегіях мережного та гнучкого бізнесу. При цьому доведено, що використання штучного інтелекту в процесах формування торговельних пропозицій впливає на модель торгових стратегій мережного та гнучкого бізнесу, оскільки вона змінюється за функціями застосування саморегульованих технічних засобів, економіко-математичних методів і систем керування та прогностичною здатністю. За результатами дослідження констатовано, що використання штучного інтелекту в торгових стратегіях бізнесу забезпечує: гнучкість та адаптивність в діях, що націлені на сталість продажів; кращу обґрунтованість дій, що націлені на сталість продажів; максимально чіткий курс на індивідуалізацію взаємодій з клієнтами; швидкість та ефективність рішень з формування торговельних пропозицій; ефективну та швидку реакцію на дії конкурентів. Фактично, використання штучного інтелекту в торгових стратегіях вже зараз призводить до формування явища гнучкої торговельної мережі та до їх зрощування з гнучкими (змінними) моделями торгівельного підприємництва, внаслідок широких можливостей в оперуванні торгівельними пропозиціями. Відтак перспективи подальших досліджень можуть фокусуватися на деталізації конкретних технічних засобів, алгоритмів та методів у сфері штучного інтелекту, які сприяють покращенню торгових стратегій.

Key words: networked trade; flexible trade; intelligent algorithms; machine learning; trading strategy vectors; trade proposal.

Ключові слова: мережна торгівля; змінна торгівля; інтелектуальні алгоритми; машинне навчання; вектори торгових стратегій; торговельна пропозиція.

TARGET SETTING

The artificial intelligence use has currently shaped the phenomenon of flexible business trading strategies, characterized by the ability to quickly adapt to changes in market conditions and the competitive field. Furthermore, it is undeniable that artificial intelligence (AI), through its inherent intellectual algorithms and machine learning (which enable the analysis not only of a steady flow of data but also the prediction of possible developments based on various scenarios), is expanding its significance in shaping business trading strategies. It is particularly relevant for networked and flexible (adaptive) businesses. The matter is that currently, these entities operate in niches where changes in market conditions, consumer demands, and technological trends happen very rapidly. It is because consumers are increasingly changing their preferences and expectations, and the product and service lifecycle is

becoming shorter. For this reason, companies must constantly innovate and quickly bring new offerings to the market. In this context, flexible and networked businesses leverage strategic flexibility as a foundational strategic advantage, allowing their structures to quickly respond to changes. In this format, they could make decisions that enable them to be more competitive in uncertain conditions. Therefore, the article is focused on relevant direction, oriented towards studying trading strategies in the exchange of goods, services, values, and money, especially highlighting the strategic flexibility employed by flexible and networked businesses.

ANALYSIS OF RESEARCH AND PUBLICATIONS

A separate question regarding the peculiarities of forming trading strategies in networked and flexible

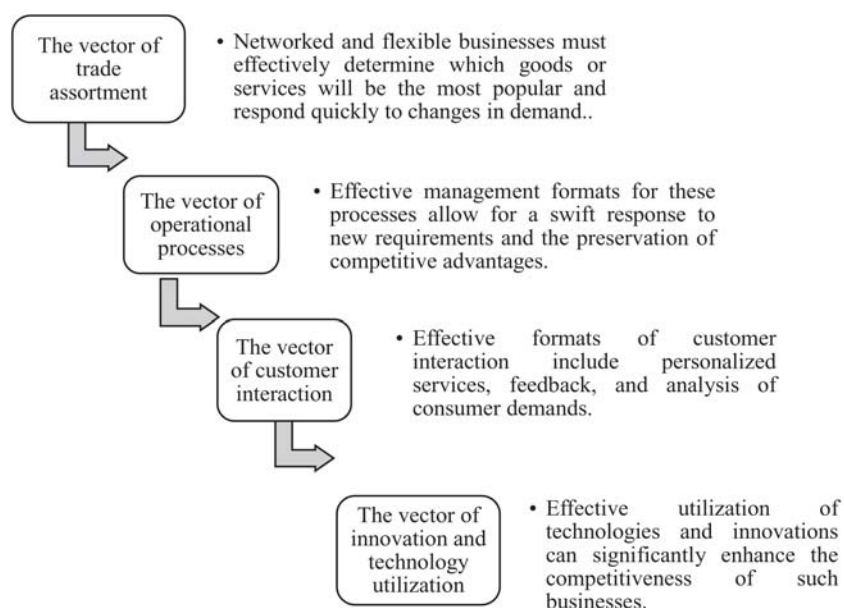


Figure 1. Key vectors of trading strategies for networked and flexible businesses operating in the sphere of the exchange of goods, services, values, and money

Source: formed based on [1; 5—6].

trading businesses has been addressed by domestic scholars such as S.B. Alekseev, N.G. Kazmerchuk-Palashchyna, L.M. Mulyarchuk, O.V. Nikitina, and others. Most leading scholars examine the mechanisms of forming trading strategies, their fundamental tools, and algorithms for resource provision in the processes of their formation. In scientific works, a thorough analysis of the research problem is conducted using various scientific approaches, a systematic analysis of foreign experience in solving the set tasks is performed, and the author expresses their opinion on the prospects for improving the processes of forming trading strategies based on the use of information technologies, including artificial intelligence.

THE WORDING OF THE PURPOSES OF ARTICLE (PROBLEM)

The goal of the article is to identify the peculiarities of using artificial intelligence in the trading strategies of networked and flexible businesses.

THE PAPER MAIN BODY WITH FULL REASONING OF ACADEMIC RESULTS

Within the research, attention is focused on networked retail business, which is a form of activity where the entrepreneur owns or controls a network of retail trading platforms (such as stores or supermarkets). Additionally, the variable retail business is examined as a form of activity in which the entrepreneur owns or controls temporary or special activity formats (such as showrooms, pop-ups, etc.).

This research perspective is driven by the fact that these business formats require a targeted approach to achieving commercial goals and success in the market based on anticipated changes, including:

— Trade assortment (it is important to consider changes in consumer tastes, and trends in the fashion and technology industries [1; 4]).

— Format of operational processes (it is important to consider changes in the structure and organization of operations and functions within the business [1]).

— Features of customer interaction (it is important to adapt to changes where the business entity approaches the role of a partner for customers, offering them individual and tailored solutions [1]).

— Utilization of innovations and technologies (it is important to align with changes where the business entity will be at the forefront of technology [1—2]).

So, the main vectors of trading strategies for networked and flexible businesses operating in the sphere of the exchange of goods, services, values, and money are illustrated by us in Figure 1.

Note that, on the one hand, orientation towards defined vectors contributes to making decisions that help networked and flexible businesses remain competitive and adaptable to rapidly changing market conditions.

On the other hand, it requires active utilization of artificial intelligence to maximize profits from offering long-term or short-term proposals on business entities' trading platforms.

It is because the array of tasks faced by such businesses is critically extensive and cannot be effectively addressed without programs and systems capable of performing tasks that typically require human intelligence.

Let's note that traditionally, the primary goal of artificial intelligence is to develop algorithms and models that enable computers to analyze information, make decisions, solve tasks, and even learn from experience.

Thus, the actual use of artificial intelligence (hereinafter referred to as AI) in this direction is aimed at changes in the processes of forming trade proposals with the following key aspects, such as [1; 4—6]:

1. General data analysis and market trends. Artificial intelligence can analyze data on demand, prices, consumer behavior, and competitors. This enables businesses to identify promising long-term and short-term proposals and promptly respond to changes in market trends.

2. Demand forecasting and inventory management. AI utilizes forecasting algorithms to determine the expected demand for goods or services. This helps optimize inventory levels (including avoiding excess or shortages and rational resource allocation), ensure automation of inventory management processes (particularly automating inventory management considering various factors [6]), and provide recommendations for optimal decisions.

3. Personalization of offers for customers. AI enables the creation of personalized offers for customers based on their previous purchases, interests, and behavior. This helps ensure the guaranteed effectiveness of marketing campaigns and a high level of customer satisfaction.

4. Analysis of the competitive landscape. AI utilizes forecasting algorithms to model competitors' strategies, allowing businesses to adjust actions promptly and identify opportunities for improving current trading proposals.

Table 1. Automation of Proposal Formation Processes Using Artificial Intelligence

Stages	Automation of long-term proposal formation processes *	Automation of short-term proposal formation processes **
Preparatory stage	Analysis of Long-Term Trends (AI can analyze long-term market trends, forecast changes in demand, and identify opportunities to maintain or alter offerings for goods with extended life cycles).	Analysis of rapidly changing market conditions (AI allows for quickly adapting offerings for goods with short life cycles to changes in short-term markets by analyzing large volumes of real-time data).
Basic algorithms startup stage	Optimization of Pricing Strategies by Proposals (AI helps determine optimal pricing strategies for extended periods, considering competitive pressure, costs, and long-term target indicators).	Dynamic pricing by proposals (AI can automatically adjust prices for short-term changes in demand, competition, or other factors, ensuring optimal pricing).
Stage of configuring algorithms for the needs of target clients	Development of Customer Interaction Strategies. AI enables the identification of individual customer needs through long-term proposals and the creation of personalized interaction strategies, fostering long-term relationships with clients.	Development of Customer Interaction Strategies. AI is utilized to identify individual customer needs through short-term proposals and to create special offers or promotions based on them.

Note:

*These are special offers or promotional campaigns that last for a specific duration.

** These are special offers aimed at providing goods or services with limited relevance or for a limited period.

Source: formed based on [3; 4; 6].

5. Pricing optimization. AI utilizes algorithms to analyze competitors' prices and internal factors influencing pricing. This helps businesses determine optimal prices to maximize profit and attract customers to their offers [4].

6. Automation of proposal formation processes. AI can be used to automate the processes of creating long-term or short-term proposals on trading platforms, as outlined in the specifics highlighted in Table 1.

Automation of proposal generation processes allows networked and flexible businesses to respond quickly to changing conditions and present the most competitive offers.

By the outlined directions, it is evident that the use of artificial intelligence (AI) in the processes of forming trade

proposals significantly influences the model of trading strategies for networked and flexible businesses. This model undergoes changes based on the functions of employing self-regulating technical means, economic-mathematical methods, and control systems, as well as its predictive capabilities (Figure 2). Such a change provides businesses with the ability to respond more effectively to environmental changes and adapt to the diverse demands of the market.

Specifically, the use of artificial intelligence in business trading strategies provides them with greater flexibility and adaptability in actions aimed at ensuring sales stability. So, while the classical model of a trading strategy typically relies on fixed logic and actions that require periodic

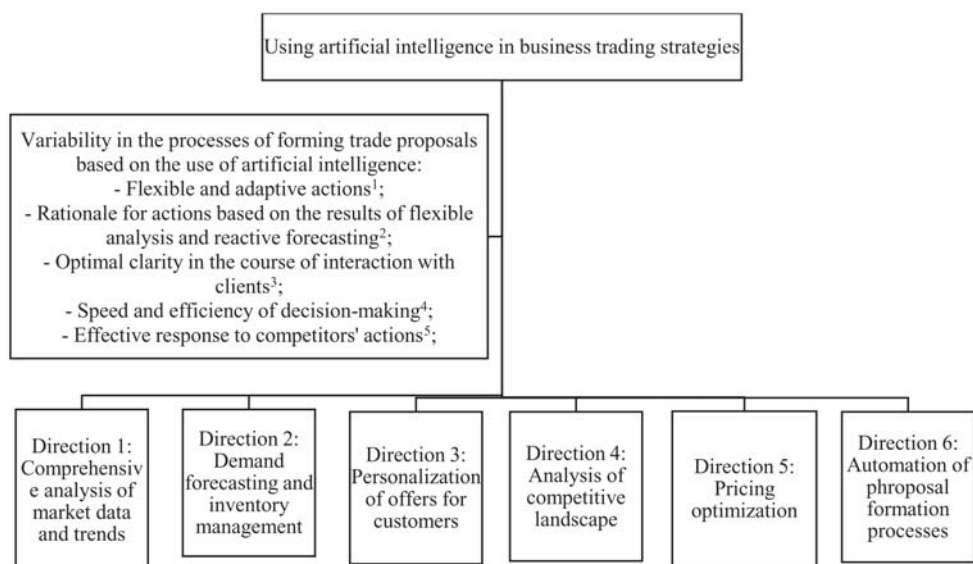


Figure 2. Model of Artificial Intelligence utilization in trading strategies for networked and flexible business

Note:

1. Actions respond instantly to new data and changes in the environment (without significant human intervention).

2. All actions are justified based on precise data analysis, identification of trends, and real-time change forecasting.

3. The customer interaction course is shaped by fundamental methods of personalization guided by Big Data analysis.

4. Decision-making occurs through automation and response to real-time data.

5. Reaction to competitor actions follows algorithms of deep analysis of their strategies, weaknesses, and strengths.

Source: formed based on [1-2; 6]

updates and corrections to adapt to changes in market conditions (such as static pricing and standard discounts for loyal customers [2]), their model with the use of AI allows for flexible and adaptive actions that respond instantly to new data and changes in the environment (including dynamic pricing, personalized discounts, and recommendations formed without human intervention [3]).

The utilization of artificial intelligence in business trading strategies ensures improved rationale for their actions based on the results of flexible analysis and reactive forecasting. While the classical model relies on econometric methods, which are somewhat limited in recognizing complex relationships and dependencies in large datasets, their model using AI applies machine learning and other algorithms for precise data analysis, trend identification, and real-time change forecasting. For example, every business can leverage an artificial intelligence system to analyze purchases, product views, and customer behavior on its website. Machine learning algorithms learn the preferences of each customer, while also analyzing and forecasting new trends in their consumer behavior.

The artificial intelligence use in business trading strategies ensures the utmost clarity in personalized interaction with customers. While the classical model often employs methods and approaches to adapt products, services, and communications to the needs and characteristics of mass customers, their model using AI utilizes fundamental methods of personalization guided by Big Data analysis (ideal for a precise understanding and addressing of individual needs and preferences of customers [2]). For instance, when a buyer enters a store's website or searches for a specific item, the artificial intelligence system offers personalized recommendations based on their previous purchases, views, and possibly even social media activity. If a customer has previously bought a certain product and its accessories, the system may suggest new models, compatible accessories, or other items frequently purchased alongside the selected product.

The use of artificial intelligence in business trading strategies ensures the speed and efficiency of decision-making in the formation of trade proposals. Specifically, while decisions within the classical model of trading strategies may require significant time for development and implementation, their model using AI enables quick and effective decision-making, especially in the face of a dynamic market (made possible through automation and response to real-time data [1]). For example, if an artificial intelligence system detects increased demand for certain clothing models or collections due to current events or trends, it can automatically raise prices for these items, ensuring a higher profit. On the other hand, in the case of decreased demand or the emergence of new competitors, the system can rapidly reduce prices, ensuring competitiveness.

The use of artificial intelligence in business trading strategies ensures an effective and swift response to competitor actions. Specifically, while the classical model reacts to competitors based on the results of periodic analysis of their actions (which relies on standard methods of comparison and short-term tracking of their strategies

[4]), the use of AI forms a corresponding response through continuous analysis algorithms of competitor strategies, their weaknesses, and strengths. An artificial intelligence system can automatically track prices for similar products in other stores and adjust prices in the store based on the obtained data to remain competitive. For example, if a competitor lowers or raises the price for a specific product, the artificial intelligence system can mimic these actions — raise or lower the price for the same product to ensure it remains competitive. The system can analyze not only trends in competitors' price changes but also observe their advertising campaigns, promotions, and the impact on consumers. For instance, if a discount on a specific product is likely to generate increased demand, the system may recommend a discount or promotion to attract customers.

In fact, the use of artificial intelligence in trading strategies is already leading not only to the emergence of flexible trading networks (capable of quickly adapting to changes in market conditions, consumer preferences, and technological innovations [1]) but also to their integration with flexible (adaptive) models of trading entrepreneurship, thanks to the extensive capabilities in handling trade proposals. As a result, there is a gradual formation of hybrid trading businesses. A characteristic example is the network of showrooms with cafes 'Okno vo Dvor' (which emerged from the experience of one of the showrooms in Kyiv, which existed in the Secret Place format since 2013 but was reorganized into the Okno vo Dvor space with a cafe), networks of showrooms of Ukrainian designers, and so on. In addition to hybridity, signs of such trading networks include the use of digital technologies for data collection and processing, enabling the automation of many processes in the supply chain and ensuring quick responsiveness to changes; the utilization of machine learning algorithms for analyzing large volumes of data, forecasting demand, and refining inventory management strategies; the establishment of flexible supply systems that can rapidly respond to changes in demand, technological, and geographical conditions; the use of precise analytical tools to minimize inventory and ensure an adequate level of goods in stock; adaptability of product assortment and services to individual customer needs.

CONCLUSIONS FROM THIS STUDY AND PROSPECTS FOR FURTHER EXPLORATION IN THIS AREA

It has been demonstrated that the use of artificial intelligence (AI) in the processes of forming trade proposals influences the model of trading strategies in networked and flexible businesses, which undergo changes in functions with the application of self-regulating technical means, econometric methods, and management systems, along with predictive capabilities. The research results lead to the following conclusions:

1. The use of artificial intelligence in business trading strategies provides them with greater flexibility and adaptability in actions aimed at ensuring sales stability.
2. The use of artificial intelligence in business trading strategies ensures improved rationale for their actions based on the results of flexible analysis and reactive forecasting.

3. The use of artificial intelligence in business trading strategies ensures the utmost clarity in personalized interaction with customers, enhancing their satisfaction and brand loyalty.

4. The use of artificial intelligence in business trading strategies ensures the speed and efficiency of decision-making in the formation of trade proposals.

5. The use of artificial intelligence in business trading strategies ensures an effective and swift response to competitor actions.

Indeed, the use of artificial intelligence in trading strategies is already leading not only to the formation of a phenomenon known as a flexible trading network (which can rapidly adapt to changes in market conditions, consumer preferences, and technological innovations) but also to their integration with flexible (adaptive) models of trading entrepreneurship, thanks to the broad capabilities in handling trade proposals. Therefore, the prospects for further research may focus on detailing specific technical means, algorithms, and methods in the field of artificial intelligence that contribute most to the improvement of trading strategies. Additionally, the study of ethical and legal aspects of using AI in business is crucial.

Література:

1. Алексєєв С.Б. Механізм формування та вибору стратегічних цілей торговельної мережі на підставі аналізу її зовнішнього стратегічного потенціалу, Механізм регулювання економіки, 2014, Вип. 2. С. 88—95.

2. Казмерчук-Палащина Н.Г. Формування мотиваційної системи в процесі здійснення стратегічних змін на торговельних підприємствах України, Економіка та держава, 2012, Вип. 5. С. 45—47.

3. Мулярчук Л. М. Науково-практичні засади стратегії розвитку сервісних торговельно (побутових) підприємств, Економіка та держава, 2011, Вип. 11. С. 77—81.

4. Нікітіна О. В. Теоретичні аспекти формування товарної стратегії підприємств роздрібної торгівлі, Вісник Донецького національного університету економіки і торгівлі ім. М. Туган-Барановського (Серія Економічні науки), 2006, Вип. 88. С. 75—81.

5. Федулова Л. Вплив світових технологічних трендів на формування "розумного" ритейлу. Зовнішня торгівля: економіка, фінанси, право, 2018. Вип. 1. С. 5—21.

6. Чорна М.В., Кушнір Т.Б., Волосов А.М. Світовий ритейл: тенденції розвитку та конкурентні позиції, Науковий вісник Ужгородського університету. Серія Економіка, 2016, Вип. 1 (47). Т. 1. С. 293—300.

References:

1. Alekseev, S.B. (2014), "The mechanism of formation and selection of strategic goals of the trade network based on the analysis of its external strategic potential", *Mekhanizm rehulyuvannya ekonomiky*, vol. 2, pp. 88—95.

2. Kazmerchuk-Palashchyna, N.G. (2012), "The formation of a motivational system in the process of implementing strategic changes at trade enterprises of Ukraine", *Ekonomika ta derzhava*, vol. 5, pp. 45—47.

3. Mulyarchuk, L.M. (2011), "Scientific and practical foundations of the development strategy of service, trade and household enterprises", *Ekonomika ta derzhava*, vol. 11, pp. 77—81.

4. Nikitina, O.V. (2006), "Theoretical aspects of the formation of the product strategy of retail trade enterprises", *Visnyk Donets'koho natsional'noho universytetu ekonomiky i torhivli im. M. Tugan-Baranovs'koho (Seriya Ekonomichni nauky)*, vol. 88, pp. 75—81.

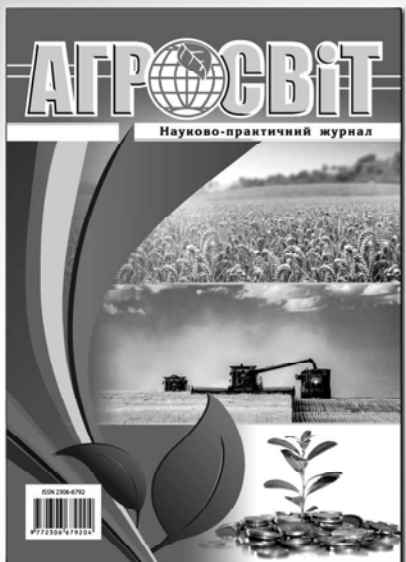
5. Fedulova, L. (2018), "The influence of global technological trends on the formation of "smart" retail", *Zovnishnya torhivlya: ekonomika, finansy, pravo*, vol. 1, pp. 5—21.

6. Chorna, M.V., Kushnir, T.B. and Volosov, A.M. (2016), "World retail: development trends and competitive positions". *Naukovyy visnyk Uzhhorods'koho universytetu, Seriya Ekonomika*. vol. 1 (47), no. 1, pp. 293—300. *Стаття надійшла до редакції 11.11.2023 р.*



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