

# AI-DRIVEN BUSINESS INNOVATIONS AS A TOOL FOR ECONOMIC STABILITY AND DEVELOPMENT OF UKRAINE

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**Abstract.** This article examines the economic efficiency of AI-driven business innovations in combatting disinformation, which are key to ensuring Ukraine's economic stability during wartime and post-war recovery. The study focuses on the implementation of AI in systems designed to counter information threats, while examining the economic costs and effectiveness of using intelligent technologies for information security, digital resilience, and business development. The analysis shows that disinformation poses significant risks to the state and business sector, influencing investment decisions, undermining business competitiveness and causing market instability. The study aims to analyse the role of artificial intelligence-based business innovations in ensuring Ukraine's economic stability, assess their potential for innovation in post-war recovery processes, and identify key areas for developing AI technologies in a business context. The research tasks include assessing the impact of disinformation on businesses and the economy, substantiating the use of AI as an innovative tool for minimising information risks, developing an algorithm for evaluating the performance of AI systems (RAI – Real AI Impact), analysing the economic feasibility of AI investments using the benefit-cost ratio model, determining the potential of AI to drive business innovation, and identifying areas for the development of intelligent business technologies. The study emphasises that the use of AI strengthens not only information security, but also creates new business models, innovative services and digital products that provide Ukrainian enterprises with a competitive advantage. It proposes an algorithm for assessing the performance of AI systems based on the RAI indicator, as well as a model for justifying AI investments economically. This enables both businesses and public institutions to evaluate the benefits resulting from reduced disinformation risks. The modelling results show that potential economic losses from disinformation can be reduced by 81% with an AI system accuracy of 90%. A BCR value exceeding 1 indicates the economic viability of implementing AI as an innovative business solution. The study's scientific novelty lies in its combination of technological and economic approaches to evaluate the role of AI as a business innovation that enhances information resilience and supports enterprises' digital transformation. Its practical significance lies in its potential to inform the development of innovative business strategies, the creation of digital products, and the enhancement of business competitiveness, while optimising resources and supporting strategic planning under constraints. The proposed approaches will strengthen Ukraine's economic stability and accelerate its post-war recovery by developing innovative, AI-based business solutions.

**Keywords:** business innovations, artificial intelligence (AI), economic stability, disinformation, information security, post-war recovery, RAI (Real AI Impact), Benefit-Cost Ratio (BCR), digital business transformation, economic efficiency of AI.

**JEL Classification:** O33, M15, L86, E02

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## 1. Introduction

The modern conditions of the Ukrainian economy are characterised by profound transformations caused by full-scale warfare, infrastructure destruction, changes in global supply chains and intensified competition in international markets. In this context, businesses must adapt quickly to changes in the environment, optimise production processes and modernise management systems. Digitalisation and the adoption of innovative technologies are essential for enterprises to survive and develop in the post-crisis period. Artificial intelligence (AI) is of particular importance, as it can ensure qualitative changes in business models and create new sources of economic growth in the form of business innovations.

Artificial intelligence is rapidly transforming the global business environment by changing the way decisions are made, production is organised, the supply chain is managed, marketing is conducted and communications are handled. For Ukrainian enterprises, integrating AI technologies opens up a wide range of opportunities, from reducing operational costs and increasing productivity to strengthening their competitive position in the global market. However, the implementation of AI in domestic business practice is often constrained by limited investment resources, the insufficient digital competence of managers, a lack of state incentives and information security risks.

At the same time, despite the rapid global adoption of AI solutions, Ukraine still faces significant gaps in research and practical application. While scientific attention is largely focused on general aspects of digitalisation, issues such as economic efficiency, business resilience, countering disinformation, risk management and forming innovative business models based on AI remain insufficiently studied. Without systemic research into the role of AI in strengthening Ukraine's economic stability during wartime and the post-war period, the practical use of these technologies is limited.

In conditions of full-scale war and the deep structural transformation of the Ukrainian economy, implementing AI-based business innovations becomes critically important. Traditional management, planning and production organisation models are insufficiently effective in an environment of high uncertainty, disrupted logistics chains and increased risk. AI enables rapid adaptation, resource optimisation and forecasting of market changes, making it a key factor in achieving economic resilience.

Another relevant aspect is the strategic necessity for Ukrainian businesses to undergo digital transformation during the post-war recovery period. Those economies that can quickly integrate AI solutions into production and management processes demonstrate higher growth rates and are more successful in overcoming

the consequences of crises. For Ukraine, AI is not only a tool for modernisation, but also a means of gaining new competitive advantages in the global market.

Artificial intelligence plays a vital role in safeguarding the information security of Ukrainian businesses, which is particularly pertinent in the context of widespread information and psychological operations, as well as disinformation campaigns. Intelligent systems can swiftly identify manipulation, combat fake content, analyse informational risks and safeguard the reputational capital of enterprises. This makes AI an essential component of both marketing management and corporate security. Furthermore, AI-based business innovations contribute to the development of human capital and the creation of new professions, which is consistent with Ukraine's trajectory towards European development. Expanding the use of AI stimulates investment in education, upskilling and professional retraining, which are necessary conditions for Ukraine's integration into the global digital space. Therefore, AI not only functions as a technological tool, but also as a driver of socio-economic change that will influence the country's development in the coming decades.

Consequently, studying AI-based business innovations in the context of Ukraine's economic stability and development is highly relevant, carrying significant scientific and practical importance.

## 2. Literature Review

In recent years, modern Ukrainian academic literature has consistently recognised artificial intelligence as a key driver of the digital economy and a factor in productivity growth. O. Tsesliv (2022) summarises the role of AI in the economy, emphasising its impact on process automation, big data analytics, increased labour productivity and the formation of new markets and financial flows. They also highlight the scale of global investment in AI and its potential to increase global GDP by 2030 (Yurchenko, 2024). S. Skrypnyk and O. Shpatakova (2023) develop a similar line of reasoning, justifying artificial intelligence as a driving force in the development of the digital economy and demonstrating its role in enhancing business process efficiency, reducing costs and generating new technological solutions. At the micro level, A. Babichev, A. Negliad and B. Samorodov (Babichev et al., 2024) examine the role of modern technologies and AI in the modernisation and innovative development of business structures. They emphasise that integrating intelligent technologies into management models enables enterprises to transition from basic automation solutions to innovative business models.

A separate line of research focuses on economic security and macroeconomic resilience in the context of digitalisation. S. Kozlovskiy and his co-authors analyse how innovative and digital transformations,

including the use of AI and smart technologies, can strengthen a state's economic security. They emphasise the importance of digital infrastructure and analytical platforms in identifying and mitigating risks (Kozlovskiy et al., 2024). In a more recent work, A. Kudinova focuses on the integration of AI technologies into the security-oriented management system of the national economy in the era of Industry 5.0, justifying the need for intelligent systems to provide early detection of crisis phenomena, cyber threats, and hybrid risks, as well as to support strategic forecasting (Kudinova, 2025). Building on this foundation, A. Kudinova, O. Maslii, and A. Buriak put forward a proposal for the formalisation of risks and threats to Ukraine's economic security in the context of digitalisation. They emphasise the necessity to adapt existing risk management models to address the novel challenges posed by the widespread adoption of digital and AI solutions (Kudinova et al., 2024).

A significant corpus of research focuses on the transformation of business models and management approaches under the influence of AI. In their study, A. Ivanchenko and D. Ivanchykov explore the influence of AI technologies on the management of organisational transformation in the context of digitalisation. They emphasise the evolution of the role of managerial decision-making, which is increasingly dependent on data analytics algorithms and predictive analytics (Ivanchenko & Ivanchykov, 2025). In their analysis of AI-oriented business models in the circular economy in the Ukrainian context, Lisova (2025) demonstrates how artificial intelligence can promote environmental and economic sustainability by optimising supply chains, managing resources, and improving the efficiency of raw material use. In the field of managerial accounting and controlling, L. Ptashchenko and A. Dobrovolska examine the development trends of controlling information technologies during the national economic digitalisation process. They emphasise that modern controlling systems are evolving towards integration with AI platforms, which offer a more in-depth analysis of financial and operational indicators (Ptashchenko & Dobrovolska, 2025).

At the sectoral and functional levels, Ukrainian authors largely focus their attention on marketing management, business process management and the impact of AI on employment structures. A. Pochtoviuk, M. Bilyk and Yu. Shyshlova analyse the marketing management of IT enterprises in the context of international business, emphasising that integrating artificial intelligence and big data into marketing activities significantly improves targeting, personalisation and evaluation of key performance indicators such as LTV, CAC, CRR and NPS (Pochtoviuk et al., 2024). O. Tsesliv and O. Mohylevska, along with several other Ukrainian researchers, examine the impact of AI on the Ukrainian

and international economies. They highlight the opportunities, such as productivity growth and the emergence of new types of employment, as well as the risks, such as job automation, the need for reskilling and ethical and legal challenges (Cherep, 2024; Markova & Markov, 2023).

In summary, existing studies have covered the key aspects of artificial intelligence's impact on the digital economy, economic security and business model transformation. At the same time, most studies either focus on the global context or highlight specific sectors or functional areas (such as marketing, controlling and risk management) in a fragmented manner. Issues that remain insufficiently developed include the systemic role of AI-based business innovations in ensuring Ukraine's economic stability and recovery during wartime, and the institutional and organisational barriers to implementing such innovations, particularly for small and medium-sized businesses. These gaps highlight the scientific novelty and practical relevance of this study, which seeks to combine previous research findings to create a comprehensive concept of AI-oriented business innovations to promote the sustainable development of the Ukrainian economy.

The study aims to analyse the role of AI-based business innovations in ensuring Ukraine's economic stability and assess their potential for post-war recovery. It will also determine key directions for developing AI technologies in a business environment.

### 3. Methods

The study takes a comprehensive approach to data collection and analysis. This includes stages of content analysis, statistical generalisation, modelling and analytical verification of results. The source base consists of open information resources, such as analytical reports from international organisations and scientific publications, as well as statistical data on the use of AI solutions in the field of information security.

Relevant empirical indicators characterising the spread of disinformation, the level of trust in information sources and the effectiveness of AI implementation in content monitoring processes were selected for data collection. Logical grouping and comparative analysis methods were employed to systematise the data.

Python was used for algorithmic modelling and Microsoft Excel for building tables, charts and visualising results.

The choice of methods and algorithms is driven by the need to ensure the reliability, reproducibility and accuracy of results. Algorithmic approaches have made it possible to evaluate the reduction in disinformation in relation to the accuracy of AI systems, and statistical analysis has confirmed the consistency of the results obtained.

#### 4. Results

During a full-scale war, Ukraine's economic stability depends largely on enterprises' ability to adapt to rapid changes in the external environment, maintain operational continuity and optimise resources. AI is one of the most effective tools for achieving these goals.

Firstly, AI enhances operational efficiency. Intelligent algorithms can optimise logistics routes, reduce energy consumption, forecast demand, identify production bottlenecks and ensure effective inventory management. This is particularly important in crisis conditions, as minimising costs and optimising resources enables enterprises to remain competitive.

Secondly, AI plays a vital part in bolstering economic security. Advanced AI systems can identify financial, logistical and informational risks, which are exacerbated by hybrid threats. Using machine learning technologies for risk management enables enterprises to forecast possible scenarios and develop adaptive response strategies.

Thirdly, implementing AI solutions ensures the resilience of businesses' information, as modern models can detect and block disinformation that could damage a company's reputation, influence consumer behaviour and distort competitive conditions. This is supported by research from Ukrainian academics, who highlight the increasing threat of information warfare in today's economy.

Fourthly, AI promotes economic recovery by encouraging the growth of new digital sectors and generating technological job opportunities. The AI-driven diversification of the economy encourages the formation of new innovation clusters, strengthens the collaboration between science and business, and speeds up Ukraine's integration into the global digital market.

Artificial intelligence acts as a catalyst for business innovation thanks to its unique technological properties, which distinguish it fundamentally from traditional IT solutions. Its capacity to learn, adapt and autonomously generate new knowledge is the foundation for innovation in business at multiple levels. AI provides in-depth analytics to help identify atypical patterns, forecast market changes and determine new strategic opportunities that would be inaccessible using traditional analytical methods. This strengthens the innovativeness of managerial decisions and minimises risk.

Intelligent systems can automate complex and non-standard processes that previously required highly skilled specialists. This paves the way for the creation of new products and services based on intelligent functions, such as self-service, forecasting, adaptability and personalisation. Machine learning mechanisms and neural networks enable the development of smart products that can analyse user behaviour, improve

autonomously and respond to environmental changes. The result is the formation of entirely new markets, such as smart sensors, automated control systems and cognitive services.

AI integrates businesses into digital ecosystems in which data, algorithms, services, and consumers interact in real time. This enables the creation of:

- Sharing-economy platforms;
- online marketplaces with dynamic optimisation;
- fully autonomous digital businesses.

Thus, enterprises are shifting towards a data-driven management model with AI. This enables them to implement innovations swiftly and rationally, reduce decision-making cycles and enhance business flexibility and adaptability during times of crisis.

The link between business innovation and artificial intelligence (AI) stems from the fact that AI is both a tool and an innovation environment, integrating data, algorithms and business processes into a single system. This makes AI the foundation of the modern innovation economy and a key factor in enterprise development during the process of digital transformation.

Figure 1 illustrates the primary ways in which the implementation of artificial intelligence has a systemic impact on the country's development. AI strengthens economic stability by boosting productivity, supporting the growth of digital sectors and creating new high-tech markets. In the labour market, intelligent technologies are transforming the employment landscape: new professions are emerging, digital competence is becoming a prerequisite, and routine tasks are being automated.

The utilisation of AI within the public sector has been demonstrated to enhance governance quality, thereby improving decision-making efficiency, forecasting processes, and the digitalisation of public services. In the domains of security and defence, the implementation of artificial intelligence has been demonstrated to enhance information analysis, unmanned systems management, and cybersecurity factors, all of which are critical during wartime. AI also plays a vital role in environmental protection and sustainable development. Technologies enable environmental monitoring and forecasting of natural hazards, improve resource efficiency and advance the "green" economy. Therefore, artificial intelligence acts as a multidimensional factor that influences the economic, social, defence and environmental stability of a state.

Artificial intelligence is becoming a key instrument in countering disinformation. It enables large-scale data analysis and the identification of fake news, as well as monitoring the information environment (Yu W. et al., 2021). However, the economic effectiveness of implementing such technologies is not well understood, which complicates decision-making regarding investments at both the state and

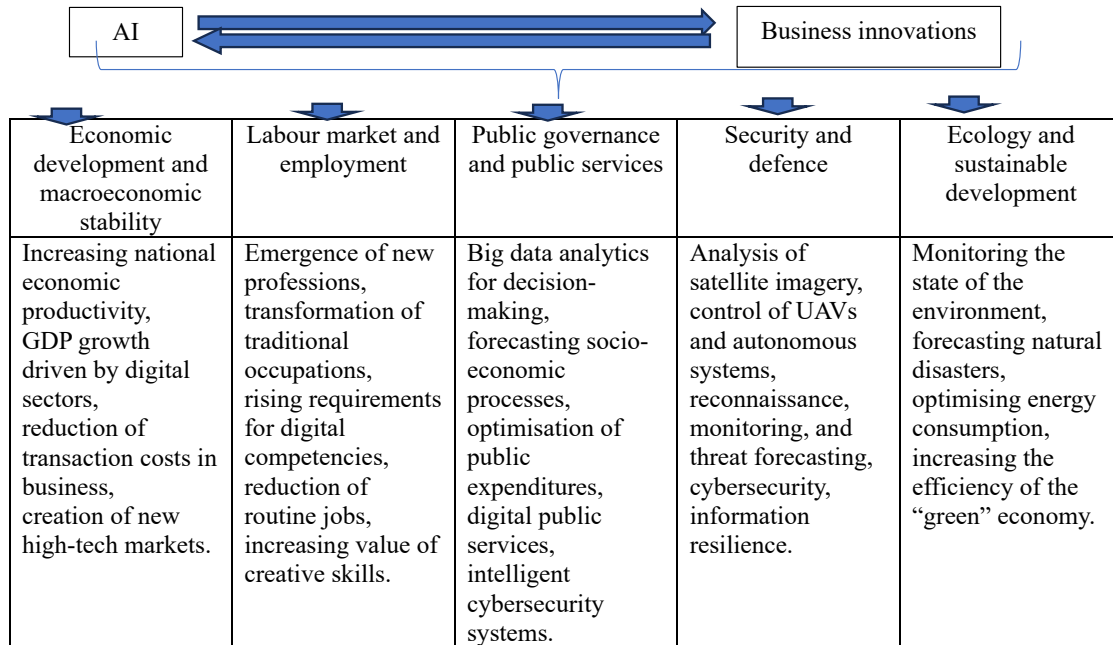


Figure 1. Key areas of artificial intelligence impact on the socio-economic development of Ukraine

corporate levels. One of the main challenges in using AI to combat disinformation is assessing its economic efficiency. On the one hand, these technologies have the potential to significantly reduce the impact of fake news and manipulation on public opinion, which is of particular importance in the context of information warfare. However, the high cost of development and implementation, the need for technical infrastructure and trained specialists may create barriers to widespread adoption.

Therefore, a systematic approach to analysing the economic aspects of such initiatives is needed in order to assess their feasibility and potential benefits for the state and businesses. An important area of research is studying the practical impact of implementing AI systems in specific government institutions and organisations. The public sector is constantly under threat from the spread of disinformation, which can affect social stability, electoral processes and national security. Using AI to automatically detect and neutralise fake news could significantly improve communication between the government and citizens, promote the dissemination of reliable information and reduce the cost of countering disinformation campaigns.

Thus, analysing the economic efficiency of such technologies will help to assess their cost-effectiveness and develop optimal implementation strategies at the level of public authorities. Introducing an AI system to detect fake news in a government institution can bring significant benefits to the organisation itself, as well as to citizens and society as a whole (see Table 1).

Modelling the economic costs of using AI to combat disinformation requires estimating the expenses

involved in developing and integrating AI systems within government institutions and the private sector. These include initial investments, personnel training costs and system maintenance, as well as projected savings resulting from the automation of monitoring and responses to informational threats (Dwivedi et al., 2023). Such modelling enables the long-term financial savings that can be achieved through the effective use of AI to be assessed.

Before applying AI tools to combat disinformation, it is essential to identify the critical factors that impact the economic costs and overall effectiveness of the system. These include the volume of data to be processed, the algorithm's accuracy and error rate, development costs, computational resources and expert support (Tam Phan Huy et al., 2024). Other important factors include the scale of AI deployment, which determines how many platforms will be analysed, and the potential economic losses from disinformation that the system is designed to reduce. These parameters are justified by the need to ensure a balance between the costs and benefits of using AI. Although high algorithm accuracy and continuous model updates require significant resources, they minimise the negative impact of fake information. The scale of implementation directly affects economic efficiency: the more sources analysed, the greater the positive effect, but also the higher the costs. Therefore, it is critically important to calculate these parameters in order to determine the feasibility of investing in such technologies.

The volume of data processed is one of the key factors that determine the effectiveness and cost of

Table 1

**Advantages and outcomes of implementing an AI system for detecting fake news in a government agency**

No.	Advantage	Outcome	Description
1	Increased effectiveness in combating disinformation	Process automation	AI can significantly reduce the need for manual news monitoring by automatically detecting fake news based on the analysis of text, images, video, and other sources.
		Rapid response	Through automated algorithms, AI can instantly react to the emergence of fake news, enabling faster protection of society from their spread.
2	Improved accuracy of fake news detection	Reduction of human error	The AI system can analyse large volumes of data and identify patterns that may be overlooked by humans, which helps reduce errors in identifying fake news.
		Adaptability	The system can continuously improve its algorithms, taking into account new patterns of disinformation and fake content, as well as adapt to changes in the information environment.
3	Cost reduction	Resource optimisation	Automation reduces the need for a large number of analysts and specialists to monitor news, enabling a decrease in personnel costs.
		Long-term savings	Although initial investments in an AI system may be significant, in the long term it allows a reduction in expenses associated with traditional methods of combating disinformation, which typically require extensive human and time resources.

Source: compiled by the authors based on (Markova, 2023; Cherep et al., 2024)

using artificial intelligence to combat disinformation. The more texts, videos, social media posts and news articles that need to be analysed, the greater the demand for algorithmic capacity, computational resources and processing speed. At the same time, increasing coverage improves the system's effectiveness by reducing the influence of unverified or manipulative information on public opinion and decision-making (Acemoglu & Johnson, 2023).

The accuracy of AI performance and its error rate have a direct impact on the quality of disinformation detection. Insufficient accuracy can result in a high number of false positives and false negatives, which can undermine the system's credibility and reduce trust in its operation. However, achieving high accuracy requires significant expenditure on model training, high-quality training datasets and regular algorithm updates. Therefore, finding an optimal balance between the costs of improving accuracy and the economic benefits of an effective system is crucial when deciding to implement such a system.

Whether or not it is economically feasible to apply AI largely depends on the relationship between the costs of its development, maintenance and upgrading, and the potential losses caused by disinformation. Development and maintenance costs include the remuneration of specialists, the cost of server infrastructure, and adapting algorithms to changes in the information environment. The greater the scale of deployment, the higher the total costs – but also the greater the impact on reducing the spread of fake news. Therefore, before deciding to launch the system, it is necessary to carefully analyse the potential economic impact and compare it with the implementation costs.

The analysis presented by Ivanov (2020), which discusses the use of fuzzy models for the effective processing and analysis of large volumes of employee-

related data, can be applied in this context. Such models allow for more accurate forecasting of personnel requirements, better decision-making and more personalised human resource management.

At the first stage of the study (Fig. 2), key parameters influencing the effectiveness of AI systems in detecting disinformation are identified. Stage 2 of the algorithm involves dividing the total costs into four main components (1):

$$C_{total} = C_{dev} + C_{compute} + C_{staff} + C_{update}, \tag{1}$$

Development costs ( $C_{dev}$ ) include remuneration for the specialist team, model architecture design, and training using appropriate datasets. Computational costs ( $C_{compute}$ ) involve the use of servers, cloud solutions, and other resources required for efficient AI operation. Staffing costs ( $C_{staff}$ ) reflect continuous expenses related to system maintenance, updating the knowledge base, and monitoring system performance. Updating costs ( $C_{update}$ ) are critically important for adapting the AI system to new threats, changes in the information environment, and improving its accuracy.

Analysing this formula makes it possible to assess the financial implications of implementing AI, compare the costs with the potential economic losses caused by disinformation and establish the break-even point. If the implementation costs are lower than the potential damage caused by disinformation, deploying the system is economically justified. Otherwise, it is necessary to explore ways to optimise expenses, such as reducing the scale of the project or applying less resource-intensive algorithms.

AI development costs

$$C_{dev} = N \times W \times T, \tag{2}$$

where  
 $N$  – number of specialists;  
 $W$  – average monthly salary of a specialist;  
 $T$  – development time (months).

$$C_{\text{compute}} = D \times C_{\text{perTB}}, \quad (3)$$

where  $C_{\text{perTB}}$  is the average cost of processing 1 TB of data.

$$C_{\text{staff}} = N \times W \times M, \quad (4)$$

where  $M$  is the number of months of operation after the AI system is deployed.

AI update costs

$$C_{\text{update}} = k \times C_{\text{dev}}, \quad (5)$$

where  $k$  is the update coefficient (usually 0.1–0.3, meaning 10–30% of the initial development cost).

The RAI (Reduction of Artificial Intelligence) indicator is used to quantitatively assess the effectiveness of implementing AI technologies in combating disinformation. It measures the system's ability to reduce the spread of false information. Formula (6) considers two key parameters: the accuracy of the AI system ( $A$ ) and its error rate ( $E$ ). This enables the real impact of AI on limiting information threats to be evaluated. For example, if the system achieves 90% accuracy with a 10% error rate, its actual efficiency in reducing disinformation is 81%, indicating a high level of reliability. This approach enables different AI solutions to be compared in terms of effectiveness and economically justified recommendations to be made for technology selection.

RAI is useful for both national-level strategic planning and corporate risk management. It helps to identify the most effective systems, predict potential levels of information security and evaluate the feasibility of investing in specific technologies within resource constraints during wartime or post-war recovery.

$$\text{RAI} = A \times (1 - E), \quad (6)$$

where  $A$  is AI accuracy,

$E$  is the error rate.

If  $A = 0.9$  (90% accuracy) and  $E = 0.1$  (10% error), then:

$$\text{RAI} = 0.9 \times (1 - 0.1) = 0.81$$

Thus, AI reduces disinformation by 81%.

Comparing Costs and Disinformation Losses

The benefit-to-cost ratio is calculated as:

$$\text{BCR} = L / C_{\text{total}}, \quad (7)$$

where

$L$  – economic losses caused by disinformation without AI,

$C_{\text{total}}$  – total AI implementation costs.

If  $\text{BCR} > 1$ , the implementation of AI is economically justified.

Formula (7) demonstrates the accuracy with which the AI system performs its task, taking into account the error rate. For example, if the algorithm is 90% accurate with a 10% error rate, its actual disinformation-reduction efficiency is 81%. This means that the system significantly reduces the impact of false information, which is an important factor when assessing feasibility.

To justify the economic case, the benefit-cost ratio (BCR) is calculated by dividing disinformation-related

losses by total AI costs. If the BCR exceeds 1, the financial losses from disinformation without AI will exceed the cost of AI development and maintenance, making implementation economically feasible. If the BCR is low, the implementation parameters must be reconsidered or the costs optimised.

The results of the effectiveness assessment show that, assuming 90% accuracy and a 10% error rate, an artificial intelligence system can reduce the spread of disinformation by 81%. This level of effectiveness confirms the feasibility of using AI to combat fake news, as it significantly reduces information risks and negative impacts on public opinion. The economic assessment of AI implementation is based on an analysis of the benefit-cost ratio (BCR). If the BCR exceeds 1, this suggests that the financial losses caused by disinformation are much higher without AI than the cost of implementing the technology. This confirms the economic feasibility of adopting AI systems. When BCR is below 1, it is advisable to revise system parameters, optimise costs or improve algorithms to enhance accuracy. Systematic monitoring of effectiveness and model updates ensures a sustained reduction in disinformation and the rational use of resources.

The economic impact of using AI in information security is primarily seen in reducing potential losses caused by misinformation. This includes mitigating reputational risks and preventing panic-driven reactions among the population. It also helps to avoid financial market disruptions caused by fake messages and reduces public distrust of state institutions. A disinformation-detection system capable of reducing the volume of disinformation by at least 80% would give government bodies a powerful tool for preventing crisis situations resulting from information manipulation. Furthermore, AI enhances the effectiveness of public communication by enabling a timely response to threats, the automated analysis of large datasets and rapid decision-making. This strengthens public trust in official sources, creates a more stable information environment and improves the resilience of state institutions. These factors are particularly crucial during wartime and post-war recovery, as ensuring information stability is essential for economic security and sustainable development.

The results obtained can be explained by the structured approach applied to evaluate the economic effectiveness of AI technologies in countering disinformation. The analysis is based on an algorithm (see Fig. 2) which covers the key stages of modelling costs and evaluating the performance of implemented solutions. Formula (1) makes it possible to break down the total cost ( $C_{\text{total}}$ ) into four main components: development ( $C_{\text{dev}}$ ), computing resources ( $C_{\text{compute}}$ ), staffing ( $C_{\text{staff}}$ ), and updates ( $C_{\text{update}}$ ), providing a transparent and accurate assessment of the financial resources needed for the AI system to operate.

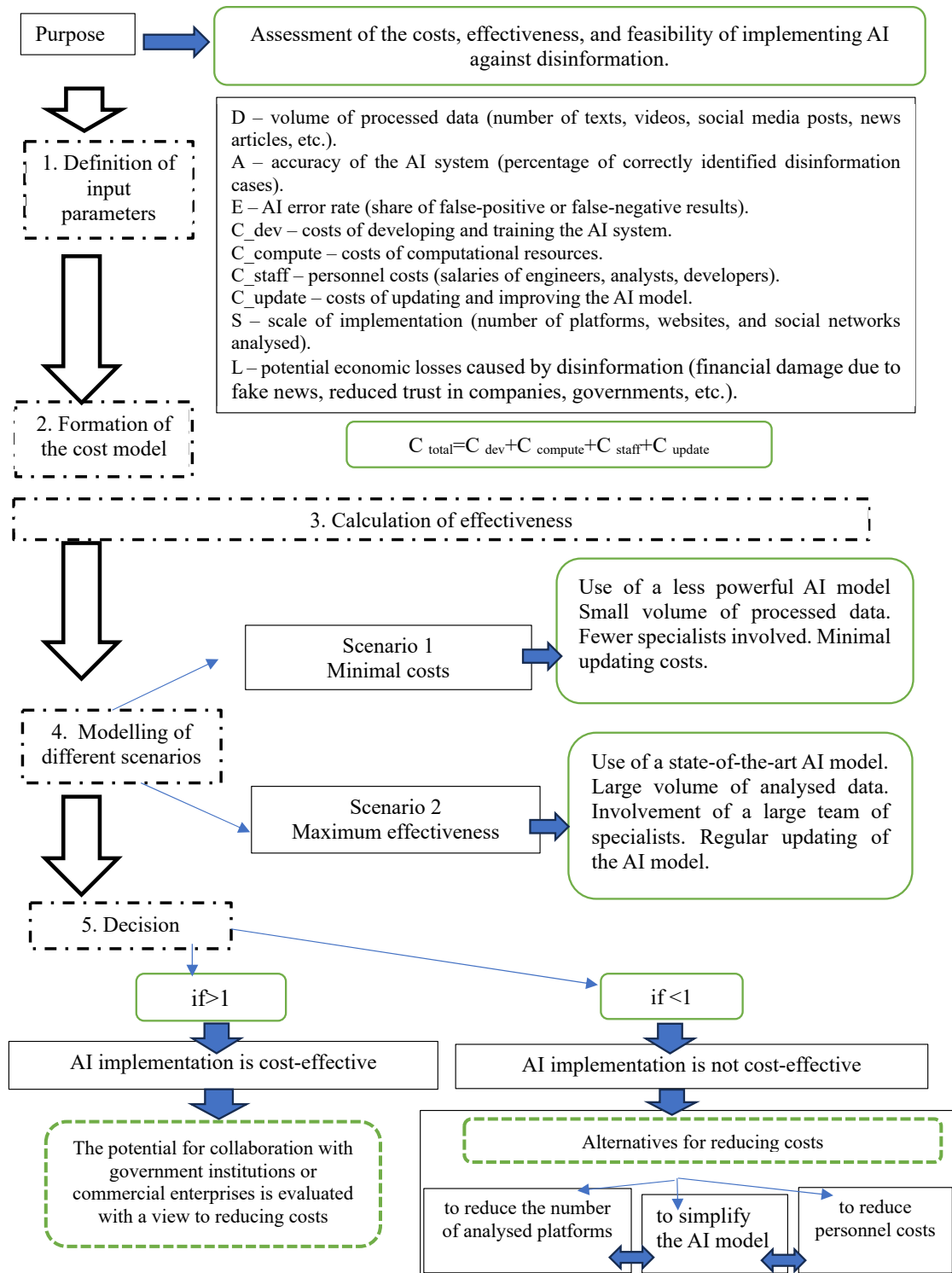


Figure 2. Algorithm for modelling the economic costs of implementing AI to counter disinformation

Detailed calculations of each cost component, based on formulas (2)–(5), have helped to identify the elements that are most resource-intensive and have provided opportunities for further optimisation. For example, formula (2) shows that human resources play a significant role in development costs, and formula (5) shows that regular system updates are important

for maintaining relevance in a dynamic information environment. Formula (6), which defines the AI effectiveness indicator, confirms that the AI system can reduce disinformation by 81% with 90% accuracy and 10% error, demonstrating the tool's high effectiveness. Furthermore, formula (7) has been used to calculate the benefit-cost ratio (BCR), which shows that

investments in AI are economically viable when  $BCR > 1$ , since the losses caused by disinformation in the absence of AI exceed the costs of its deployment.

An important confirmation of these findings is also provided in Table 1, which systematizes the advantages of implementing an AI-based system for detecting fake news within a governmental body. This underscores not only the economic viability but also the socio-communicative advantages, encompassing the alleviation of information tension, the fostering of enhanced trust in public institutions, and the facilitation of more efficacious responses to information threats. Thus, the study's results are explained by a thorough consideration of financial, technical and performance-related factors, enabling well-founded recommendations to be made for the implementation of AI technologies to combat disinformation during wartime and the post-war recovery period.

The experimental part of the study was based on an analysis of statistical, analytical and content data reflecting the scale of disinformation dissemination and the effectiveness of the artificial intelligence technologies used to detect it. The research employed:

- Official reports from international organisations containing quantitative indicators of AI application in countering disinformation;
- scientific articles and analytical reviews (Aitken & Pozetti, Gorwa & Ash, Voronkova V., Cherep A., and others);
- media-monitoring data from open information sources, including analytical cybersecurity platforms;
- aggregated statistical materials on the effectiveness of AI technologies implemented in the public and corporate sectors of Ukraine and EU countries.

A comprehensive methodological approach was adopted for processing and analysing the data, combining content analysis, statistical modelling, mathematical analysis and the algorithmic evaluation of the effectiveness of the AI system.

In particular, the following algorithms were used for modelling effectiveness:

- Logistic regression (to assess the probability of correct classification of information as reliable or fake);
- decision trees (to form a set of rules for disinformation detection).

To assess algorithm quality, the following standard metrics were applied:

- Accuracy (share of correctly classified messages);
- error rate (percentage of false classifications);
- integral indicator describing the extent of disinformation reduction due to AI implementation;
- economic efficiency indicator (ratio of benefits to implementation costs of AI solutions).

The following software environments were used for calculations and modelling:

- Python 3.11 with NumPy, Pandas, scikit-learn, Matplotlib (for statistical analysis, modelling, and visualisation);

- Microsoft Excel 365 (for creating tables, computational dependencies, and graphical illustrations).

The technical implementation of the experiment was performed on a personal computer with an Intel Core i7 processor, 16 GB of RAM, and Windows 11 Pro.

The experimental work included the following stages:

1. Selection of information sources and dataset formation.
2. Preprocessing, normalisation, and cleaning of data from duplication and noise.
3. Training classification models based on selected examples of reliable and fake messages.
4. Testing models, evaluating accuracy, error rate, and constructing integral efficiency indicators.

5. Due to further refinement, the experimental section became more methodologically complete: materials were clarified, methods and algorithms described, along with software platforms and the data-processing procedure.

The study has several limitations. Firstly, the applicability of the proposed solutions is limited by the fact that the model is designed for the specific conditions of AI use within the public sector. Adaptation may be required for other sectors. Secondly, the effectiveness of the results depends heavily on the stability of the information environment. AI accuracy is closely linked to the quality of the input data and variability in information flows. Another limitation is the reproducibility of results, which depends on staff qualifications and the technical infrastructure available. Outcomes may vary between organisations due to differences in personnel skills and resource availability. Finally, given the dynamic nature of external factors such as technological changes and the emergence of new types of threats, the model requires regular updates to remain relevant.

One of the study's key shortcomings is its limited empirical basis – the results are based on modelling rather than real-world cases of AI deployment in government institutions. This restricts the ability to verify reproducibility under different scenarios. Furthermore, the study does not adequately consider the dynamic nature of the information environment, including the emergence of new forms of disinformation and changes in dissemination tactics, both of which require continuous model adaptation. These limitations could be overcome in future through pilot projects, real-time effectiveness monitoring and improvements to the model that take social and behavioural factors into account.

Further development of this research involves improving models for evaluating the economic efficiency of AI implementation by considering business

innovation dynamics during wartime and post-war recovery. This also involves applying more advanced algorithms to improve system accuracy. However, mathematical modelling challenges, methodological issues with effectiveness criteria and difficulties in collecting reliable data may also arise. Overcoming these challenges requires a comprehensive, interdisciplinary approach.

The implementation of AI systems is expected to significantly reduce disinformation by up to 81%, given the high accuracy of the algorithms. This will minimise economic losses caused by fake news, increase public trust in official information sources and improve the effectiveness of public information policy. Automated analysis of large datasets and timely responses to information threats will contribute to these outcomes. In wartime and during the recovery period, this is a vital factor in ensuring stability and fostering sustainable business innovation.

## 5. Conclusions

Artificial intelligence is emerging as a vital business tool for combatting disinformation. It facilitates the automated processing of large volumes of data, enabling the rapid identification of fake content and the continuous monitoring of the information landscape. For businesses and public institutions, this means transforming communications digitally, reducing the risk of reputational damage, and increasing resilience to information attacks. Integrating AI solutions into corporate processes enhances competitiveness by reducing the influence of human error, optimising analytical costs and improving the accuracy with which informational threats are detected. While investments

in development, infrastructure, staff training and algorithm updates are significant, the long-term savings, particularly from reduced losses caused by disinformation, offset these costs.

By assessing data volumes, accuracy parameters, error rates, scaling models and potential economic losses, businesses can determine the feasibility of investing in innovative AI technologies. This systematic approach provides a solid basis for strategic decision-making and enhances economic stability by establishing robust information protection measures.

The developed algorithm for modelling costs and assessing the effectiveness of AI technologies in combating disinformation offers businesses a novel way to make informed investment decisions. The first stage involves identifying the key parameters that influence system performance, such as data volume, algorithm accuracy and error rate, implementation scale, and the cost of development, computation, personnel and system upgrades.

Modelling confirms that AI with 90% accuracy and a 10% error rate can reduce the spread of disinformation by 81%, demonstrating substantial innovative potential for the corporate sector. If the BCR is greater than 1, the system is economically justified and has a positive impact, enhancing information security, minimising crisis risks and optimising resource use. Thus, the proposed algorithm serves as a universal business tool for forecasting costs, assessing efficiency and optimising the implementation of AI solutions. By applying it, public and private organisations can make sound strategic decisions, strengthen innovative development and ensure economic resilience in Ukraine in the face of growing information challenges.

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