

Modelling information support for combating corruption in the economic security management system of the state

Marta Kopytko*

Doctor of Economic Sciences, Professor
Lviv State University of Internal Affairs
79007, 26 Gorodotska Str., Lviv, Ukraine
<https://orcid.org/0000-0001-6598-3798>

Oleksandr Sylkin

PhD in Management
Rzeszow University of Technology
35-959, 12 Powstańców Warszawy Ave., Rzeszów, Poland
<https://orcid.org/0000-0001-9381-9872>

Abstract. The premises of the study – the escalation of threats and negative factors in the management of the economic security of the state necessitates the examination of various issues, including the information support for combating corruption within the state's economic security management system. The purpose of the study is to enable contemporary information support for combating corruption within the state's economic security management system. To achieve this purpose, modelling of information support for combating corruption within the economic security management system was conducted. Key research method – graphical modelling based on Data Flow Diagrams, describing data sources, recipients, logical functions, data flows, and data repositories accessed in the context of information support for combating corruption within the economic security management system of the state. The outcome is the construction of a key model for information support for combating corruption within the economic security management system. The major functions of information support for combating corruption within the state's economic security management system are considered and presented. Innovation of the obtained results is demonstrated through the proposed methodological approach. The developed model enhances the efficiency of information support for combating corruption within the state's economic security management system. The paper elucidates essential functional aspects of information support for combating corruption within the state's economic security management system. The theoretical and practical value of the results lies in the provided methodological approach for ensuring anti-corruption measures within the state's economic security management system

Keywords: trend analysis; model formulation; data flow diagrams; security assurance; state-level security; monitoring; national competitiveness

Introduction

The prerequisites for the study are increased attention to the management of the economic security of the state. This leads to the actualisation of the investigation of such problems as information support for combating corruption in the state's economic security management system. In Ukraine, as in many countries of the world, the scale of corruption and the degree of its negative impact on the development of economic security require a new assessment of this phenomenon. This does not refer to individual cases of influence on management decision-making but to the formation of a system that becomes a serious threat to the national economic security of countries and a challenge to the

bodies designed to ensure it. Corruption reduces economic growth, limits the potential of civil society institutions, is associated with human rights violations, and has other negative consequences.

One of the priority tasks of Ukraine was and remains its constant development, including economic, and, as a result, continuous provision of economic security, which provides, in particular, countering the negative impact of corruption threats. The Economic Security Strategy sets certain state priorities, which also include the fight against economic crimes. Therefore, countering corruption-related crimes has been and remains an actual area of activity of the internal affairs

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*Corresponding author



bodies, which are entrusted by the state with the task of preventing and suppressing threats of economic and corruption.

It is important to understand that the fact of transformation of corruption into one of the key internal threats to economic security requires re-understanding the place and role of its examination as a social phenomenon in criminology and other branches of science, from a broader, sociological point of view, to critically assess the effectiveness of traditional measures to prevent and combat corruption crime. Specialists need to try to move away from the usual but outdated schemes and simplified approaches to analysing this complex socially destructive phenomenon and determining the possibilities of countering it. This makes it possible to turn, in particular, to the tools of the economic approach.

Many papers have been written about corruption as a negative phenomenon in society. This is due to the fact that the phenomenon of corruption is too complex and multifaceted. In general, the literature (Navickas *et al.*, 2016; Shynkar *et al.*, 2020) describes that corruption within the state's economic security management is often the result of unclear and opaque procedures, rules, mechanisms, and legislative installations. This also applies to the system of anti-corruption prohibitions, restrictions, and obligations, the wording of which should be mutually agreed upon, clear, understandable by both officials and ordinary people, leave no room for free or ambiguous interpretation, the mechanisms for monitoring their compliance are clear, and the procedures for performing duties should be correctly regulated and transparent.

In scientific and practical literature (Melnik *et al.*, 2020; Tytykalo *et al.*, 2023) it is often noted that there are currently many developments on ways and means of combating corruption. Most often, when covering anti-corruption issues, the importance of external control over the government and bureaucracy, both by the opposition and by the media, is emphasised. Moreover, this control should not be passive. The opposition should be able to make claims against the authorities, and the authorities should be forced to take into account the opinion of the opposition. The mass media should also be independent and, where necessary, conduct investigations and publish their results truthfully and independently of any factors.

Corruption in the management of the economic security of the state is not only a problem of society as a whole, it is largely caused by society (Mouselli *et al.*, 2016; Abramova *et al.*, 2022). citizens give illegal benefits to make life easier and simplify the passage of any procedures. If members of the society offer officials illegal benefits, they will likely accept it. There is no single universal method or technique to fight corruption, to minimise this phenomenon, it is necessary to use an integrated approach and systematic measures. Strengthening responsibility for illegal benefits is necessary to combine with the simultaneous improvement of the culture of society as a whole, and educate members of society to refuse to give illegal benefits. Only such actions can lead to a reduction in the level of corruption (Mihus *et al.*, 2020; Iskajyan *et al.*, 2022).

However, the problem of information support for combating corruption in the state's economic security management system is still relevant. The main purpose of the study is to form a model of proper information support for combating corruption in the state's economic security management system. The object of the study is the state's economic security management system.

To achieve this purpose, a simulation of information support for combating corruption in the state's economic security management system was conducted. The methodology is based on the DFD (Data Flow Diagrams) modelling method, a graphical structural analysis methodology that describes data sources and recipients, logical functions, data flows, and data warehouses that are accessed as part of information support for combating corruption in the state's economic security management system. The need to use DFD diagrams is to describe the existing data flows in the structure of information support for combating corruption in the state's economic security management system. In addition, a graphical method was used to visualise the results of the study. The abstract-logical method was used to form appropriate conclusions based on the results of the study.

Problems of creating economic security mechanisms in the world and in Ukraine

As noted in the scientific literature (Waller, 1993; Pushak *et al.*, 2021), corruption in the public sector is one of the key problems of the modern world within the framework of managing the economic security of the state. The concern of the international community with anti-corruption problems is caused by the multifactorial nature of this phenomenon, its spread to almost all spheres of society, which undermines the foundations of political, economic, and social structures of the state, reduces public confidence in the authorities, and hinders the development of the country. The perception of corruption and its specific manifestations varies substantially in different cultures, both from a moral and legal point of view, which leads to the lack of a single generally accepted legal definition of corruption. Ukrainian and international legislation most often criminalises certain actions or elements that constitute corruption (United Nations Convention Against Corruption, 2003; Law of Ukraine "On Prevention of Corruption", 2014). Considering the complexity of the corruption phenomenon and the specificity of its perception, it is anticipated that any successful anti-corruption strategy must be tailored to a specific country. The development of a standard package of anti-corruption measures at the international level is now a utopian idea.

The fight against corruption is becoming quite a difficult process, especially in the context of a large state. Moreover, a fairly effective way of combating corruption within the framework of managing the economic security of the state is to reduce the conditions for it, but this is a rather ambiguous and multi-faceted way, which involves many interrelated and mutually conditioned actions. Measures such as the declaration of income by officials have proven to be ineffective. This measure can be effective when combined with oversight over officials' expenditures, their lifestyles, and subsequent comparison of these indicators. As practice shows, increasing officials' salaries is also an inefficient measure to combat corruption, as higher salaries often lead to larger illicit gains. Corruption is almost always the result of inefficient and unwise management (Mouselli *et al.*, 2016; Abramova *et al.*, 2022).

The development of a mechanism for ensuring economic security at any level (individual, society, state) involves a series of stages: recognising and defining a problematic situation; formulating a specific problem; determining the desired state of the system; identifying threats and evaluating them based on various parameters (source of origin);

quantitatively assessing potential harm; crafting a security strategy; practically implementing the planned measures; establishing proper information support. In other words, to ensure the economic security of any socio-economic system, it is necessary to identify what poses a threat, the nature of these threats, and the probability (risk) of negative occurrences. To do this, there must be an appropriate information support system.

In the development of security problems, including economic ones, the issue of delineating the boundaries of security development is important. Information provision and quality analysis of the nature of changes in safety indicators in the monitoring process, which involves actual tracking, analysis and forecasting of these indicators, play a decisive role in this. The range of values for each security indicator can be divided into three areas: the security zone, the threat zone, and the zone of unacceptability. The security zone is an area of sustainable development, it is the area of the desired state of the system. This area is achieved only with proper information support. Discussing the desired state of Ukraine's economic security is highly complex due to challenges in countering corruption.

The COVID-19 pandemic, the climate crisis, and growing security threats around the world are fueling a new wave of uncertainty. In an already unstable world, countries that are unable to address their corruption issues exacerbate the consequences. The Corruption Perceptions Index (CPI) 2022 (2023) shows that corruption levels remained

unchanged in 124 countries, while the number of countries experiencing a decline is increasing. This has serious consequences as the global situation deteriorates, with corruption being both a key cause and consequence of this trend.

Corruption and conflict fuel each other and threaten a lasting peace. On one hand, conflict provides a fertile ground for corruption: political instability, increased resource pressure, and weakened oversight bodies create opportunities for crimes such as embezzlement.

Most countries that rank at the bottom of the Consumer Price Index (CPI) are currently experiencing or have recently experienced armed conflicts. On the other hand, even in peaceful societies, corruption and impunity can escalate into violence, fueling social discontent. The extraction of resources necessary for security services deprives a country of the means to protect its population and uphold the rule of law. Consequently, countries with higher levels of corruption are also more likely to exhibit higher levels of organised crime and increased security threats. Corruption is also a threat to global security, and countries with high CPI scores play a role in this. Over decades, these countries have welcomed dirty money from abroad, allowing kleptocrats to increase their wealth, power, and geopolitical ambitions. The catastrophic consequences of developed economies' involvement in transnational corruption became evident following Russia's full-scale invasion of Ukraine. According to this index, Ukraine's positions are very low (Fig. 1).

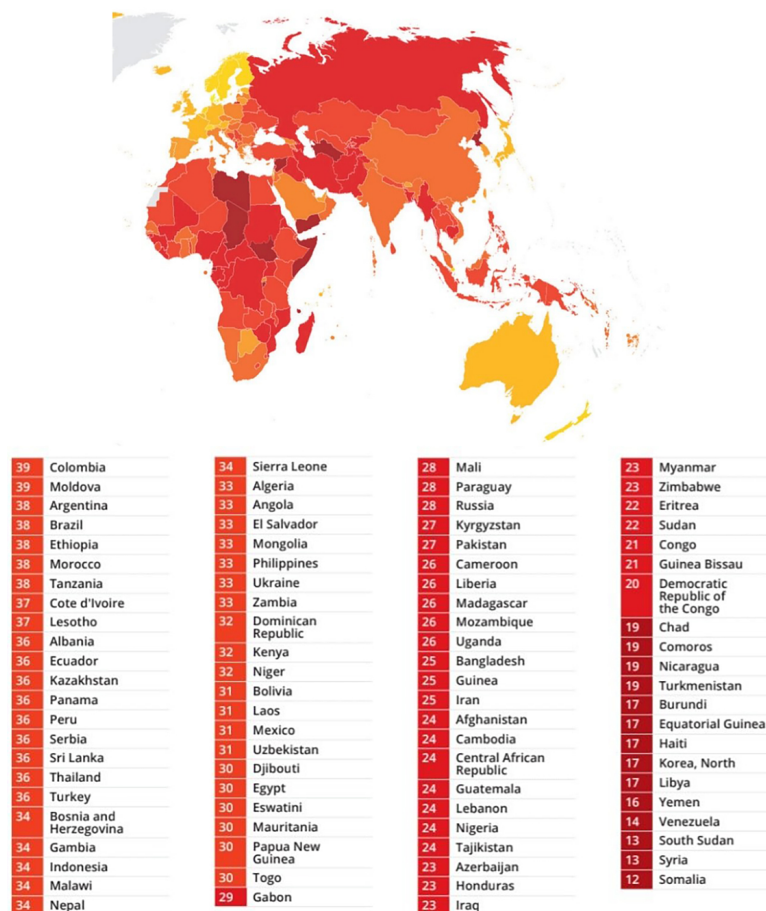


Figure 1. Corruption Perception Index in Ukraine and the world

Source: Corruption Perceptions Index 2022 (2023)

In Ukraine, during the years 2017-2021 (the analysis was conducted before the start of the full-scale war, as criticizing the government's actions within the framework of economic security management during this period

would be inappropriate), there was an observed increase in registered offences in 2020, which are classified as corruption-related. However, since 2021, there has been a decline (Fig. 2).

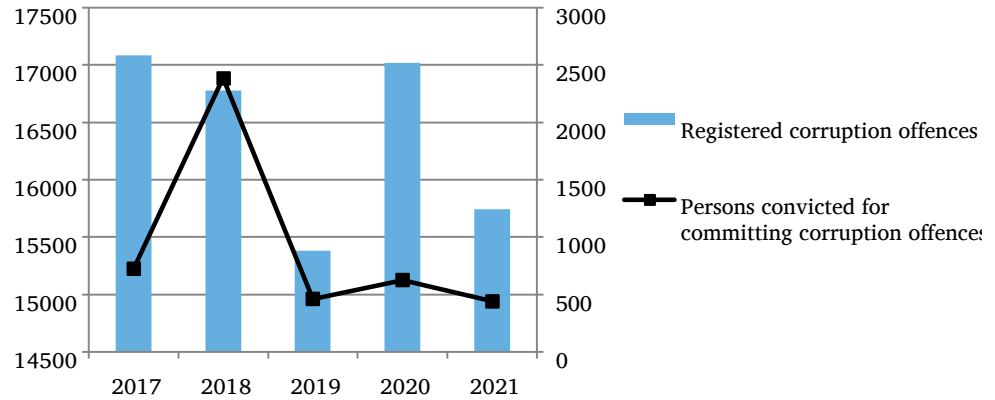


Figure 2. Dynamics of officially recorded corruption offences in Ukraine for the period 2017-2021, number of cases

Source: developed by the authors

Implementation of the information support model for countering and overcoming corruption

Based on the results of the conducted modelling, the anti-corruption information support model within the framework of state economic security management can be presented

(Fig. 3). Furthermore, the key functions that enable the implementation of the anti-corruption information support model within the state economic security management framework are presented (Fig. 4).

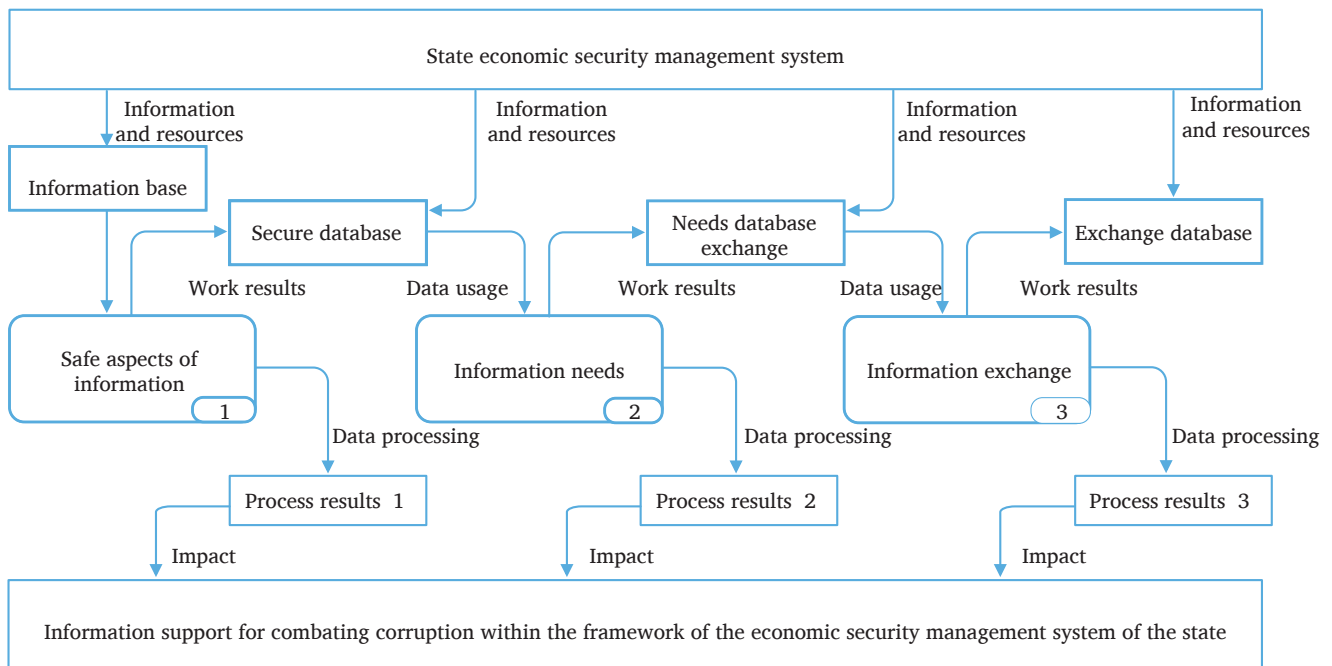


Figure 3. Model of information support for combating corruption within the framework of the state's economic security management system

Source: developed by the authors

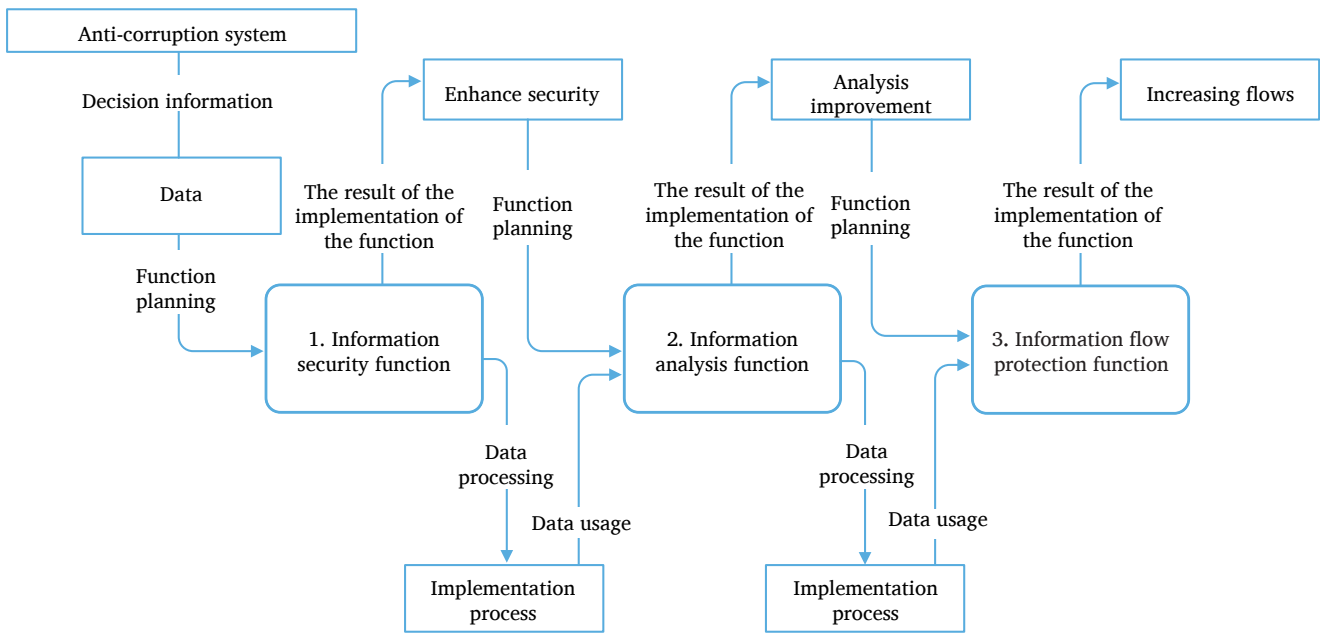


Figure 4. Key functions enabling the implementation of the anti-corruption information support model within the state economic security management framework

Source: developed by the authors

Thus, the core anti-corruption information support model within the state economic security management framework and the key functions that enable its achievement can establish a solid foundation for the flow of data that contributes to achieving the desired socio-economic impact.

When discussing the results of the study, it is advisable to compare them with similar ones. For example, a comprehensive examination of the essence of corruption, the reasons for its formation, transformation, evolution, and sustained reproduction, and the manifestations on a global scale and in Ukrainian society, along with the justification of measures that contribute to its overcoming, is an important issue for social-humanitarian and especially legal knowledge (Sylkin *et al.*, 2018). Manifestations of corruption in social life significantly diminish the value and effectiveness of laws, undermine the population's trust in institutions of power and the rule of law, contribute to increased social inequality through the redistribution of social goods in favour of narrow social groups, create discrepancies between ideal and actual values, fostering cognitive dissonance (double standards) of behaviour among society members (Rushchyshyn *et al.*, 2021; Zhavoronok *et al.*, 2022).

According to other researchers, corruption distorts the mechanism of market competition, as winners in economic competition often become participants in corrupt schemes. Corruption acts as a "hidden tax" for potential investors, deterring them from active investment activities. Corruption-related offences are one of the causes of inflation, as the increased financial burden on consumers of goods and services due to the inclusion of bribery of officials in the cost of production and sales leads to price and tariff increases. Moreover, corruption leads to inefficient allocation of budgetary funds, resulting in underfunding of various functions within economic security management (Shtan-gret *et al.*, 2021; Marhasova *et al.*, 2022).

As presented in the findings of other researchers, the goal of combating corruption must be a long-term perspective, as otherwise, by fighting against illicit gain, other sectors might suffer. Achieving long-term perspectives requires gradually raising societal well-being and the level of responsibility for corruption-related crimes (Ianioglo & Polajeva, 2017; Sylkin *et al.*, 2019). Such global problems cannot be instantly resolved but require a plan and its strict execution, which not only necessitates the creation of a fight plan but also tracking its implementation. For Ukraine, the attitude to corruption is a choice between long-term and short-term prospects. Today, corruption is convenient for many, which means that the fight against it increasingly does not have any long-term prospects. However, from a strategic perspective, corruption undermines the country's competitiveness, which is particularly crucial at present (Britch-enko *et al.*, 2018; Shynkar *et al.*, 2020; Ilyash *et al.*, 2022).

In discussing the obtained results, it should be noted that they have certain differences. The originality of the obtained results lies in the proposed methodological approach. In general, the proposed processes for achieving this goal also deserve special attention. Thus, the formulated model enables the enhancement of the effectiveness of information support for combating corruption within the framework of the state's economic security management. The main distinction of this study lies in the methodological approach used for information support in combating corruption within the framework of state economic security management.

Conclusions

In summary, there are numerous anti-corruption mechanisms established by the state, which play a role in enhancing the effectiveness of countering corruption within the state's economic security management system. Among these, notable measures include improving the system and structure of government bodies, establishing a regime of public

oversight over their activities, implementing anti-corruption standards (i.e., establishing a unified system of prohibitions, restrictions, and permissions in relevant domains to prevent corruption), ensuring citizens' access to information about government activities, guaranteeing the independence of media, maintaining the principles of judicial independence, eliminating unjustified bans and restrictions, particularly in economic spheres, and optimising and specifying the authorities' responsibilities and those of their employees, which should be reflected in administrative and job regulations.

A major challenge in the path towards building a rule of law is the escalating level of corruption. The impact of corruption is so substantial that it diminishes the effectiveness of a market economy, undermines existing democratic institutions, erodes people's trust in the government, intensifies political and economic inequality, fosters organised crime, and poses a threat to the country's economic security. The issue of countering corruption within the economic security management system is relevant not only for Ukraine but for other countries as well. Many nations have amassed valuable experiences in combating this phenomenon, and depending on each country's circumstances, the approach can vary from soft management methods to stricter measures. Effective management of anti-corruption skills contributes to reducing corruption within public service, and since

legislation evolves, continuous updating of knowledge and skill development in this field is necessary.

The originality of the obtained results lies in presenting a new methodological approach to information support for countering corruption within the framework of the state's economic security management system. In addition, the functions that contribute to this type of support were presented.

As a result, a key model for information support in countering corruption within the state's economic security management system was introduced. The primary functions of information support for countering corruption within the state's economic security management system were also considered and presented.

This study has limitations in terms of considering the specifics of information support for countering corruption within the framework of Ukraine's economic security management. Future research prospects will focus on expanding the modelling process of information support for countering corruption within the state's economic security management system.

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Conflict of interest

None.

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Моделювання інформаційного забезпечення протидії корупції в системі управління економічною безпекою держави

Марта Іванівна Копитко

Доктор економічних наук, професор
Львівський державний університет внутрішніх справ
79007, вул. Городоцька, 26, м. Львів, Україна
<https://orcid.org/0000-0001-6598-3798>

Олександр Сергійович Силкін

Доктор філософії в галузі менеджменту
Жешувська Політехніка імені Ігнація Лукасевича
35-959, Алея Повстанців Варшави, 12, м. Жешув, Республіка Польща
<https://orcid.org/0000-0001-9381-9872>

Анотація. Передумови дослідження – посилення загроз та негативних чинників щодо управління економічною безпекою держави, що актуалізує вивчення низки проблем, як-от інформаційного забезпечення протидії корупції в системі управління економічною безпекою держави. Мета роботи – уможливити сучасне інформаційне забезпечення протидії корупції в системі управління економічною безпекою держави. Для досягнення поставленої мети проведено моделювання інформаційного забезпечення протидії корупції в системі управління економічною безпекою держави. Ключовий метод дослідження – графічне моделювання на основі діаграм потоків даних (Data Flow Diagrams), що описує джерела та адресатів даних, логічні функції, потоки даних та сховища даних, до яких здійснюється доступ в рамках інформаційного забезпечення протидії корупції в системі управління економічною безпекою держави. У результаті побудовано ключову модель інформаційного забезпечення протидії корупції в системі управління економічною безпекою держави. Враховано і представлено основні функції інформаційного забезпечення протидії корупції в системі управління економічною безпекою держави. Інноваційність отриманих результатів продемонстровано у вигляді запропонованого методичного підходу. Сформована модель уможливує підвищення ефективності інформаційного забезпечення протидії корупції в системі управління економічною безпекою держави. У статті розкрито ключові функціональні аспекти інформаційного забезпечення протидії корупції в системі управління економічною безпекою держави. Теоретична й практична цінність результатів полягає в представленому методичному підході щодо забезпечення протидії корупції в системі управління економічною безпекою держави

Ключові слова: тенденційний аналіз; формування моделі; діаграми потоків даних; гарантування безпеки; безпека на рівні держави; моніторинг; конкурентоспроможність країни