




Legal Aspect to Ensuring Sustainable Development in Jordan: Countering Crime and Shadow Operations

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ABSTRACT

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In Jordan, addressing crimes such as corruption, smuggling, and unregulated economic activities through robust legal measures is crucial. These activities can significantly hinder sustainable development by diverting resources, harming the environment, and fostering inequality. In such conditions, the goal is to develop an approach that could assess the influence factors of shadow business on the sustainable development of Jordan. For this, the scientific task should include determining what is the possible connection between sustainable development in Jordan and security in the country. The system of sustainable development of the economic system of Jordan was chosen as the object of study. For this, the methodology involves the application of the method of correlations, the method of variance analysis and the method of nonlinear analysis. PESTLE and SWOT analyzes of the impact of shadow business operations in the region on ensuring sustainable development were conducted. All complex calculations were carried out using special software for working with data analysis. As a result, a detailed analysis was carried out and substantiated conclusions were formulated on the dynamics of the corruption perception index in Jordan. An assessment is made of the state of the country's economic security over the past five years and its impact on sustainable development. The study found that economic crimes and criminal offenses have a significant impact on sustainable development in Jordan.

1. INTRODUCTION

Combating shadow operations in the system of ensuring sustainable development occupies an important place in the modern socio-legal paradigm. Given the global challenges associated with the environmental, economic and social aspects of sustainable development, the need to solve the problem of the shadow economy is of particular relevance. Shadow operations, including a wide range of illegal activities from tax evasion to the financing of illegal activities, undermine the foundations of sustainable development, making it difficult to achieve its key goals.

The essence of the problem of shadow transactions in the context of sustainable development lies in their ability not only to distort the real economic situation but also to cause significant social and environmental losses. These operations make it more difficult to implement effective social policies, reduce opportunities for investment in environmental projects and sustainable development, and increase public health risks due to illegal activities associated with the production and distribution of goods.

It should be noted that in this study the concept of “shadow operations” will be used in the context of specific economic activities carried out outside the legal framework of the national economy and its spheres. These transactions cannot be traced due to official statistics, since they do not fall under

the scope of monitoring of the government regulator and are often part of illegal activities. Shadow operations can range from minimal amounts of hidden trading in order to reduce overall taxes, to more serious activities such as money laundering and other large-scale economic crimes that directly contradict the legal framework of the country. In the context of this study, the issue of shady transactions is divided to include Jordanian business practices that are both informal and criminalized. This spectrum includes a wide range of illegal actions: conducting unlicensed forms of business, tax evasion in full, corruption, bribery and others. All of the above operations lead to the deterioration of the economic system, slow down market development and jeopardize the pace and progress of sustainable development (Figure 1).



Figure 1. Business activity in Jordan

However, the implementation of such strategies faces a number of challenges and problems. Among them are the imperfection of the legislative framework, the lack of effective coordination between different levels of government and the lack of resources to conduct comprehensive inspections. In addition, there are difficulties in identifying and proving shadow transactions, especially in the context of the rapid development of digital technologies and cryptocurrencies.

Overcoming shadow operations requires not only improving the legal framework but also changing social consciousness, creating zero tolerance for corruption and illegal activities. An important role is played by educational programs aimed at increasing the legal awareness of citizens, as well as the development of a civil society capable of identifying and counteracting manifestations of the shadow economy.

In the context of sustainable development, counteracting shadow transactions also involves increased international cooperation. Given the transnational nature of many shadow operations, effective combat against them is impossible without close interaction and coordination of efforts at the international level.

Unfortunately, despite the high level of cooperation and significant efforts on the part of the international community, progress in the subject under study is slowing down for a number of reasons. Thus, the key one is the existence of differences in the legal framework for combating the shadow economy in different countries, differences in economic interests and priorities, as well as the presence of political conflicts and disagreements between countries. The presence of such problems indicates an insufficient level of international dialogue and awareness of all participants in the international market of the importance of countering any manifestations of the shadow economy in the world.

No less important is the issue of environmental context in the study of the influence of shadow economic processes and sustainable development. Thus, illegal activities related to environmental crimes, such as illegal logging, poaching and environmental pollution, have a direct negative impact on sustainable development.

Thus, countering shadow transactions in the system of ensuring sustainable development is a multifaceted task that requires an integrated approach, involving various sectors of society and international cooperation. This is the only way to achieve significant progress in this important area, ensuring sustainable development for future generations.

The main purpose of the article is to formulate a theoretical and methodological approach to determining the influence of factors of shadow business operations in the system of ensuring sustainable development. The system of sustainable development of the economic system of Jordan was chosen as the object of study. The importance of this study lies in its commitment to unearthing the legal dimensions and ramifications of economic crimes that stealthily undermine development efforts. By delving into the Jordanian context—a microcosm of larger regional economic dynamics—the research aims to distill actionable insights that can recalibrate the scales of economic justice and sustainability.

2. LITERATURE REVIEW

The study of modern literary sources on the topic of countering shadow operations in the system of ensuring

sustainable development from the socio-legal aspect is crucial for understanding the complexity and scale of this problem. The modern world is characterized by rapid changes in the economic landscape, technological progress and globalization processes, which directly affect the development of shadow economic relations. Particular attention to the analysis of the latest scientific works and research allows not only to identify current trends and challenges faced by the world community in the fight against the shadow economy but also contributes to the development of effective strategies and mechanisms for its minimization. This, in turn, is key to achieving sustainable development, since ensuring economic security, social justice and environmental sustainability is impossible without taking into account and effectively managing the risks associated with shadow activities.

So, in the study by Sylkin et al. [1] methods of anti-crisis management are explored in the context of the financial security of an enterprise. The authors consider strategies to effectively counteract crisis phenomena that may be associated with the activities of the shadow economy. This source provides a theoretical framework for understanding the relationship between crisis management and strengthening financial security, which is critical for sustainable development.

At the same time, Alazzam et al. [2] analyze the legal challenges of e-commerce, which are important in the context of the shadow economy, as the digitalization of trade opens up new opportunities for informal transactions. The study suggests ways to address these challenges in Jordan and other jurisdictions, highlighting the need to adapt legislation to combat the shadow economy in e-commerce.

Polese et al. [3] in their article review the results of a study of the shadow economy. They highlight the potential for further research on information awareness and its impact on sustainable development. This work is important for understanding the specifics of post-Soviet countries in the context of the shadow economy and identifying ways to minimize it.

An interesting study by Williams and Horodnic [4], who in their work analyzes the shadow economy in the Baltic countries from the standpoint of the morality of taxation. The authors explore how attitudes toward taxes influence the size of the shadow economy, offering insights into how it can be reduced through improved tax morale, which is important for sustainable development.

The work of Santini et al. [5] attention is paid to the phenomenon of limited government and information management. This source highlights the impact of the information economy on sustainable development in countries with limited statehood, which has implications for understanding shadow transactions in a broader regional context.

At the same time, Rushchyshyn et al. [6] analyze the regulatory and legal aspects of ensuring the financial security of the state. They focus on the importance of legal regulation to combat the shadow economy and strengthen economic security, which is key to sustainable development.

Cooley and Sharman [7] explore how corruption networks are blurring the lines between licit and illicit transactions at the transnational level, focusing on Central Asia. The authors point out the complexity of defining and combating transnational corruption, which reinforces the importance of developing effective international mechanisms to counter this phenomenon to ensure sustainable development.

At the same time, Sylkin et al. [8] in their work they analyze the financial security of engineering enterprises as a condition for the use of crisis management. The study highlights the connection between the financial sustainability of enterprises and their ability to effectively confront the challenges of the shadow economy, pointing to the practical aspects of implementing crisis management strategies.

Of particular note is the research by Alazzam et al. [9], which examines the main threats in legal practice to ensure environmental safety during the COVID-19 pandemic. The authors focus on the importance of legal practice in protecting environmental standards, which is important for countering shadow operations that can use crisis situations to circumvent environmental legislation.

Kulich et al. [10] in their work they explore the process of innovative relations in business activities with an emphasis on the economic and legal aspects of security at the macroeconomic level. The authors identify key factors contributing to the reduction of the shadow economy and the role of legislative initiatives in ensuring economic security, which is important for stimulating sustainable development.

Medina and Schneider [11] provide an overview of global research on shadow economies over the past 20 years, highlighting changes in approaches to measuring and strategies to combat this phenomenon. The authors provide valuable analysis of trends and challenges to help understand the dynamics of shadow economies and the importance of developing effective policies to enhance economic and social resilience towards sustainable development.

Kopytko and Sylkin [12] explore the dynamics of combating corruption within the economic security management system. They offer a modeling approach to information support systems that serve as a backbone for legal frameworks in this fight against corruption. The relevance of their findings to Jordan's context is undeniable, as it provides a methodological baseline for formulating strategies against economic crimes which are pivotal to ensuring sustainable development. In a study that complements the former, Aldrou et al. [13] delve into the administrative and legal factors that influence regional sustainable development. Their research is particularly pertinent as it provides a lens through which one can view the effects of external environmental changes on the legal scaffolding necessary for sustainable growth. Kryshtanovych et al. [14] shed light on the peculiarities of implementing governance in the system of social security. This work provides valuable insights into the administrative structures that can be leveraged to strengthen the connection between social security systems and sustainable development, a connection that is critical in the context of Jordan.

Hammouri [15] tackles the socio-economic measurement of security from a criminal law perspective, with an emphasis on the pursuit of justice in Jordan. The study provides a nuanced understanding of how the perception of justice and the enforcement of criminal law play a crucial role in ensuring a secure environment for sustainable development to thrive. The influence of cutting-edge technology in administration is explored by Kronivets et al. [16], who examine the legal foundations for utilizing artificial intelligence in educational processes. While not directly linked to economic crime, this study is germane to the discussion due to the transformative role education plays in shaping legal understanding and compliance, thereby impacting sustainable development. Shtangret et al. [17] investigate antisipative management in ensuring economic security at the enterprise level. Their

findings underscore the importance of proactive management strategies in mitigating risks related to economic crimes, which is a cornerstone of sustainable development in a legal context. Alazzam et al. [18] propose a methodical approach to selecting business management strategies in light of commercial activity changes. The study is relevant to Jordan as it highlights the importance of adaptive business strategies in maintaining economic security under changing legal frameworks, a factor that can influence sustainable development. Albalawee et al. [19] emphasize the role of public administration in the economic security system through human rights protection. Their findings inform the dialogue on balancing economic security and human rights in a politically and legally dynamic environment, a balance that is fundamental to sustainable development. Yesimov and Borovikova [20] presents a discourse on the administrative and legal implementation of business entities' rights. They provide insights into the administrative scaffolding necessary for protecting business rights, which is an essential component of legal strategies to counter shadow operations. Finally, Alazzam et al. [21] examine the formation of an innovative model for e-commerce development, essential for the economic security of businesses. Their research has practical implications for Jordan, where e-commerce can be a tool for transparency and the reduction of shadow operations, thus bolstering sustainable development.

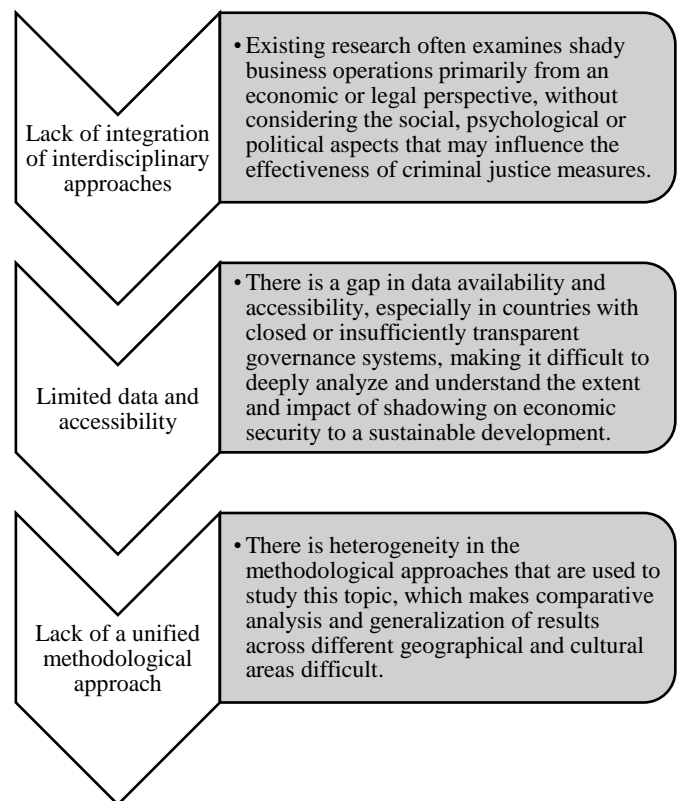


Figure 2. The main gaps in modern research into the issue of criminal legal aspects of the impact of shadow business operations in the region on ensuring economic security and sustainable development

However, despite the significant amount of existing research on the topic of countering shadow transactions in the context of sustainable development, analysis of current literature reveals the existence of a number of gaps and shortcomings that require further study and correction (Figure

2). In particular, the lack of comprehensive studies covering the relationship between the shadow economy and various aspects of sustainable development, such as environmental sustainability and social justice, points to the need for a more in-depth interdisciplinary approach. In addition, the dynamic development of digital technologies and globalization processes constantly gives rise to new forms of shadow operations, which require constant updating of data and analysis methods. Thus, to develop effective strategies to cope and adapt to the changing economic environment, it is necessary to focus on addressing existing research gaps, ensuring that scientific developments are relevant and relevant to modern challenges.

Thus, the scientific task is to establish possible connections between the level of criminalization of the general level of security of sustainable development in the country and economic security.

3. METHODOLOGY

This study employs a diverse methodology featuring sophisticated econometric models and specialized software to conduct in-depth analytical calculations. A key component of our analysis is the correlation method, which assesses the relationships among multiple variables. This method is used to analyze how individual aspects of independent variables affect dependent variables. This analysis is key to identifying and understanding the strength and significance of the detected relationship. It has the advantage of being able to quantify the interactions between variables, but it has the limitation that it may not always accurately indicate the causality of these relationships.

The use of special software for data analysis allowed us to efficiently process large volumes of information, conduct complex statistical analyses and visualize the results. This significantly increases the accuracy and objectivity of our conclusions, although it requires deep knowledge in the field of statistical analysis and knowledge of specialized programs.

Additionally, we utilize the variance analysis test to determine the statistical significance of a regression model, demonstrating its importance relative to a model lacking independent variables. In this case, Statistica software plays a supporting role, being a comprehensive statistical package used for various analytical tasks. Its version 8.0 is especially useful for detailed correlation and regression analysis, identifying relationships between variables and facilitating modelling and forecasting.

In addition, the study used the nonlinear analysis method, which is part of nonlinear modelling, which in practice is often used in statistical studies and the process of quality analysis. The use of models of this method makes it possible to assess the level of influence of one or more independent variables relative to their influence on the dependent variable, in particular when the relationship between the variables is nonlinear. Nonlinear modelling in this study was carried out using the special software CurveExpert. CurveExpert is an effective curve analysis tool that is used to identify and analyze relationships between a number of variables, and the software uses nonlinear programming to select the most optimal mathematical models for a data set. The nonlinear analysis modeling can be especially useful when analyzing dynamic systems in which the relationships between variables may change over time. Thus, the use of this method through the CurveExpert software allows us to ensure that all

conclusions that will be drawn during the research process will be relevant in the long term, which can be useful for forming plans and analyzing long-term trends. But despite this, the need to carry out complex mathematical calculations and modelling is a certain disadvantage, since it is difficult to implement, and also insufficiently accurate when using inaccurate or incomplete data.

The method of correlations is particularly suited to this study because it allows for the quantification of the relationship between two variables. In this context, it is utilized to measure the extent of the connection between economic crimes and the level of sustainable development. This method is essential for establishing whether a statistical relationship exists and the degree to which economic crime might predict changes in sustainability metrics. The method of variance analysis modeling method complements this by evaluating the significance of the regression model's results, thus ensuring the reliability of the conclusions drawn from the data. By applying this method, the study can test the hypotheses about the impact of shadow operations on economic security with greater confidence. The nonlinear analysis Modeling, traditionally used to assess economic inequality, has been adapted in this study to evaluate discrepancies in the economic landscape that may arise from shadow operations. Its application is crucial in identifying the long-term effects of such inequalities on sustainable development. Main formulms we use is in Table 1.

Table 1. The formulms we use in our article according of methodology

Formula	Characteristics
$I_{cf} = \sum W_n C_n$	where, I_{cf} is the integral level of the economic security component; w is weighting coefficients for each of the indicators established by experts; C is indicators included in the group for each component. In this case, the normalization of each indicator is performed by relating the actual value to the maximum possible.
	$I_{fs} = \sum W_n I_{sf}$

To objectify our research and ensure its practical relevance, we decided to focus on analyzing the situation in Jordan. The choice of Jordan as a research subject was driven by several key factors. First, Jordan represents a unique case of a country experiencing both internal and external economic and political factors influencing the development of its shadow economy. Secondly, Jordan has a unique legal and economic system that provides a unique context for studying the criminal legal aspects of shadow business transactions. Studying Jordan provides a deeper understanding of the specific mechanisms influencing the shadow economy in sustainable development characterized by regional instability and rapid socio-economic change. This, in turn, helps to identify possible ways to regulate and control shadow business operations in such conditions.

Such a focus on a specific country allows not only to avoid generalizations but also to take into account the local characteristics of the legal and economic systems, and socio-cultural norms that influence the development of the shadow sector in the context of sustainable development. Because Jordan is at the intersection of various economic and political influences, the results of the study in this country can provide valuable insight for understanding similar processes in other countries in the region or in countries with similar conditions.

This, in turn, contributes to the development of more effective counter-shading strategies that can be adapted to the specific conditions of other regions.

The SWOT analysis is a strategic planning tool used to identify and understand the Strengths, Weaknesses, Opportunities, and Threats related to a project or business venture. It involves a detailed assessment of both internal factors (strengths and weaknesses) and external factors (opportunities and threats) that could impact the success of the endeavor. This method helps in mapping out a clear overview of the competitive landscape and in pinpointing strategic areas that need attention, which can be particularly useful in formulating strategies to counteract crime and shadow operations in the context of sustainable development in Jordan.

Also, as part of our study, PESTLE analysis was used. This method was used to assess criminal law and its ability to form an effective legal framework to counter shadow transactions in the context of sustainable development in Jordan. PESTLE analysis is an effective analytical tool for modern scientific research. Carrying out this analysis makes it possible to study the influence of a number of factors on the object of study: political (Political), economic (Economic), social (Social), technological (Technological), legal (Legal) and environmental (Environmental). During our research, PESTLE analysis will be used to assess the external environment in which the Jordanian criminal legal system operates. Through this analysis, key problems and opportunities will be identified that affect the level of effectiveness of countering shadow business in this country. This method makes it possible to understand how certain external factors affect the ability of the Jordanian legal system to counter the development of the shadow economy, and how this ultimately affects the overall level of national security of the country.

Thus, choosing Jordan as a research focus not only provides depth and specificity to the analysis but also makes our study more holistic and objective, allowing us to identify unique patterns and trends that may not be apparent in a more general research approach.

4. RESULTS OF RESEARCH

4.1 SWOT-analysis of aspects of the impact of shadow business operations on ensuring sustainable development

The problems of corruption, weak law enforcement, and shadow businesses in Jordan are real due to a combination of historical, economic, and political factors. Jordan's strategic location has made it a hub for trade, including illegal activities such as smuggling. Economic challenges, including high unemployment and limited natural resources, create an environment where shadow businesses can thrive as alternative income sources. Additionally, bureaucratic inefficiencies and insufficient judicial oversight contribute to corruption and hinder the effective enforcement of laws. These issues are exacerbated by regional instability, which strains government resources and makes comprehensive reform and enforcement even more challenging. Together, these factors create a complex landscape where these problems persistently affect Jordan's path towards sustainable development (Table 2).

The prevalence of corruption, weak law enforcement, and shadow business operations in Jordan is fundamentally tied to systemic challenges within its governance structures and

economic conditions. These problems are deeply entrenched due to a lack of rigorous regulatory frameworks and insufficient transparency in governmental operations, which allow illegal and unethical practices to proliferate. Economic hardships, such as high unemployment rates and limited economic diversification, push individuals and businesses towards informal economic activities to survive. This scenario is further complicated by political pressures and regional instability, which can divert attention and resources away from crucial reforms needed to address these issues effectively. Consequently, these problems continue to undermine sustainable development efforts in Jordan.

Table 2. SWOT-analysis of Jordan sustainability

S	W
<ol style="list-style-type: none"> 1. Jordan has established legal structures aimed at enforcing laws and regulations to support sustainable practices. 2. There is a significant commitment from the Jordanian government to integrate sustainable development goals into national policies. 	<ol style="list-style-type: none"> 1. Despite strong laws, the enforcement of these laws is often inconsistent, allowing criminal and shadow business activities to persist. 2. Corruption within various levels of government can impede the effective implementation of sustainability-focused laws and policies.
O	T
<ol style="list-style-type: none"> 1. Jordan has the opportunity to leverage international support and funding for sustainability projects, which can include strengthening the legal system against criminal activities. 2. Adopting new technologies can enhance monitoring and enforcement capabilities against illegal activities impacting sustainable development. 	<ol style="list-style-type: none"> 1. Unregulated businesses can lead to environmental degradation, resource depletion, and loss of governmental control and revenue, which hampers sustainable development efforts. 2. Rising criminal activities, including smuggling and corruption, threaten the stability and security necessary for sustainable development.

4.2 PESTLE-analysis of aspects of the impact of shadow business operations on ensuring sustainable development

The first step of our research is PESTLE analysis, which is an important tool for studying aspects of the influence of shadow business in the region on ensuring economic security and sustainable development of the region since it allows us to cover and analyze various external factors affecting this issue. Due to its versatility, this method not only helps to determine how the criminal legal system and other legal aspects affect underground business but also takes into account the influence of political climate, economic conditions, sociocultural factors, technological innovation and environmental conditions (Table 3).

The process of shadowing business processes, caused by criminal actions, illustrates the transition of a significant share of the country's business activity to the informal sector associated with illegal actions and illegal operations. Such actions pose a serious threat to the economic security of the state since they occur outside the framework of legislation and tax regulations. This results in a loss of government tax revenue distorts business indicators and leads to economic instability. It also weakens legal business structures, increases risks for investors and negatively affects the country's economic growth. This process can undermine citizens' trust

in the government and its ability to effectively manage the economy, an important aspect of the economic stability of any nation.

Table 3. PESTLE-analysis of aspects of the impact of shadow business operations in the region on ensuring sustainable development

P	E
1. Government stability and political environment. 2. Relations with other countries, especially neighbours. 3. Government policy on business and investment.	1. General economic climate and level of economic development. 2. Shadow economy and its impact on official business. 3. Economic crime, including corruption, money laundering, etc. 4. Tax policy and regulation.
S	T
1. Demographic properties of the population of Jordan. 2. Cultural characteristics, religious beliefs and their impact on business. 3. Level of education and qualifications of the workforce.	1. Development of infrastructure, including digital. 2. Access to new technologies and their adoption in business. 3. Investment in research and development.
L	E
1. The problems are related to water resources and energy. 2. Attitudes towards sustainable development and the green economy.	1. Legislation in the field of environmental protection. 2. The problems are related to water resources and energy. 3. Attitudes towards sustainable development and the green economy.

Increasing trends in shady business processes in Jordan, particularly due to increased criminal activity, indicate serious challenges to the development of the country and society arising from these factors. This reflects crisis phenomena in the economy, politics and social life arising from the spread of new shadowing schemes. These processes have a significant impact on the increase in destabilizing factors, counteracting which is becoming increasingly difficult.

The need for in-depth research on the extent and dynamics of shadow business processes in Jordan for the period 2019-2023 is important, and identifying the main trends in their development is key. Figure 1 presents the results of the study demonstrating changes in the overall level of shadow business processes and their impact on real GDP in Jordan over this period. From the research data it is clear that there is no clearly defined trend in the country towards an increase or decrease in shadow criminal business activities.

Especially in 2020, as a result of the COVID-19 pandemic, the level of shadowing of national business processes increased, stabilizing at 27% in 2020 and 28% in 2021. These indicators reflect the growth of negative trends in the economy, politics and society with an increase in the integral indicator from 24% of the official. GDP in 2019 to 28% in 2021. The coronavirus crisis has created conditions for the expansion of shadow criminal business activities, especially stimulating the development of digital payment systems, which have acquired significant scale and become the basis for criminal economic transactions.

4.3 Key indicators of sustainable development in Jordan

In 2023, under the influence of the Israeli-Palestinian

conflict, the situation with shadow business processes worsened. The conditions of the conflict contributed to the intensification of shadow criminal business activities in neighbouring countries, and new methods of shadowing led to an increase in illegal activities in the official sector of the national economy. It also contributed to increased corruption, a share of the proceeds of which was channelled to support shadow criminal economic activities, deepening the country's socio-economic problems and widening the gap between economic and social development (Figure 3).

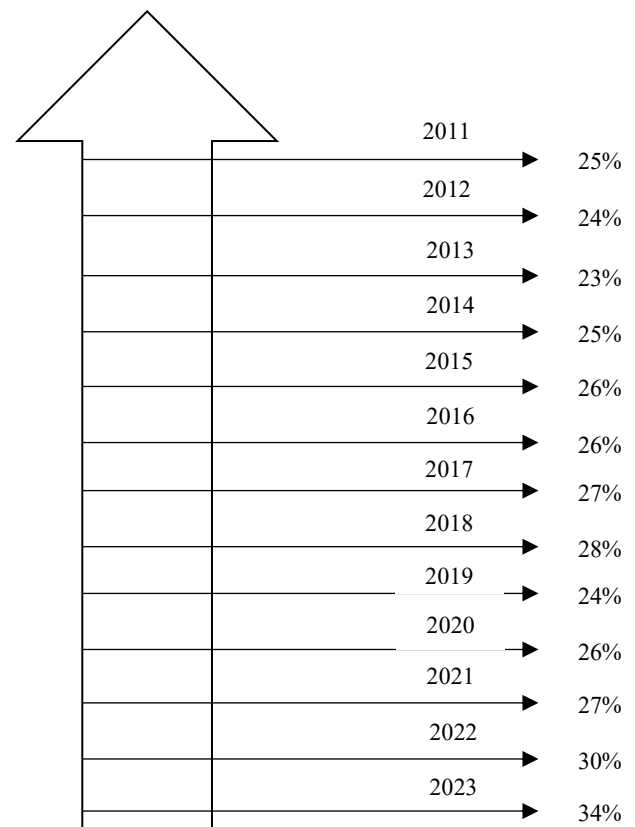


Figure 3. Level of criminalization of the economy in Jordan over the past 12 years

Corruption, identified as a key criminal offence, seriously undermines not only the economic security of the state but also its sustainability in the context of sustainable development. Because corruption undermines trust in government and public institutions, which are critical to good governance and the sustainability of a country, loss of trust can lead to political instability and a threat to the economic system. Corruption causes significant losses to the state through the illegal redistribution of resources and tax evasion, which reduces government revenues, undermines funding for sectors important to sustainable development, such as education, health and the environment, and causes growing social inequality. It also distorts market competition, reducing economic productivity and discouraging potential investors, both of which are critical to economic growth and sustainable development.

Thus, corruption becomes a significant obstacle to stable, equitable and healthy economic development, having a direct impact on a country's ability to achieve the Sustainable Development Goals (SDGs). The fight against corruption in Jordan, which is one of the main directions for reducing criminal activity and shadowy business processes, contributes

not only to strengthening economic security but also ensures the ongoing management of resources, reducing inequality and creating sustainable economic growth.

The data analysis from 2019 to 2023, illustrated in Figure 3, shows a positive trend in Jordan's fight against corruption, with the corruption perception index increasing from 19 in 2019 to 23 in 2023. This indicates a steady improvement but also underscores the need for ongoing, vigorous efforts at every government level to enhance transparency and accountability. Projections for 2024-2025 suggest a potential further rise in the Corruption Perceptions Index, hinting at the growing effectiveness of anti-corruption strategies. This trend could pave the way for sustainable business practices in Jordan, ensuring a resilient future (Figure 4).

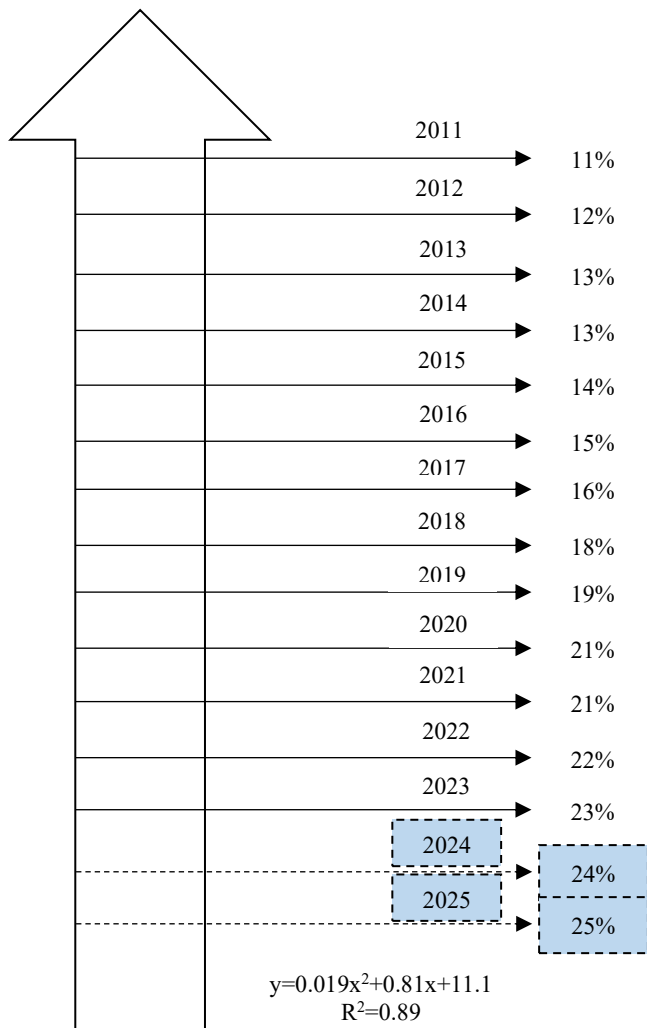


Figure 4. % corruption in Jordan for the last 12 years with a forecast for the next two

4.4 The results of modelling

Our research revealed that during socio-economic and political crises in Jordan, not only the shadowing of business processes increases, but also the level of corruption increases, which undermines the foundations of the country's sustainable development. The relationship between shady business processes and mutually reinforcing corruption points to the need to integrate anti-corruption measures into detection strategies aimed at continuously strengthening Jordan's economic security. Thus, when developing anti-corruption programs and strategies to combat the shadow economy, it is

important to focus on creating the conditions for sustainable and inclusive economic growth. Actively combating corruption is critical to achieving the de-shadowing of Jordan's national economy, which will help reduce crime rates and stimulate sustainable development.

To further assess the level of economic security in Jordan that is important for sustainable development, our study covers modelling on key aspects:

Budget security. The relationship between the state budget deficit and surplus, the level of GDP redistribution, as well as service obligations and repay public debt as part of budget revenues, were analyzed, taking into account their impact on the sustainability of public finances.

Debt security. Included analysis of the ratio of public debt to GDP and external debt, which are key indicators of financial stability and sustainable development.

Cash safety. Indicators were considered that affect the stability of the national currency and the country's ability to respond to external shocks, which is important for maintaining sustainable economic growth.

Currency safety. The level of international reserves and the stability of the exchange rate were analyzed since these are important aspects of ensuring foreign economic security and protection from currency fluctuations in the context of globalization.

Bank safety. Indicators reflecting the stability of the banking system, and its ability to withstand crises and maintain sustainable financing of the economy were considered.

Security of the non-bank monetary sector. The role of insurance and capitalization of companies in ensuring economic sustainability and stimulating investment for sustainable development was studied.

Each of these aspects is important to ensure the economic security and sustainable development of Jordan, allowing the country to better respond to the challenges of our time and ensure the well-being of future generations.

Consequently, Jordan's economic security has recently shown an overall decline in most of its aspects. In the area of fiscal security, fluctuations were observed, including changes in the state budget surplus or deficit, variations in budgetary and extra-budgetary funds, as well as fluctuations in the level of GDP redistribution and the ratio of payments for public debt to state budget revenues. Debt security has also come under pressure due to rising government debt relative to GDP, rising levels of gross external debt and changes in government bond yields and other economic indicators. Monetary security noted a decline due to changes in the ratio of cash outside the banking system to the total money supply, fluctuations in interest rates, changes in the structure of consumer loans and in the volume of financial resources exported outside Jordan.

Our research indicates that financial and socio-political instability significantly affects Jordan's economic and financial activities, leading to the proliferation of shadow business operations. As economic players move outside the formal sector, there is a consequent rise in criminal activities, including illegal trade, tax evasion, and other economic crimes. These activities hinder Jordan's sustainable socio-economic development. Therefore, it is crucial to develop and implement effective strategies to move business activities out of the shadow and enhance economic security, thus reducing business criminalization. Additionally, our analysis in 2023 demonstrates how the Israeli-Palestinian conflict influences Jordan's economic security, given its proximity to the conflict

zone (as depicted in Figure 5).

The results of this study suggest that the increasing shadowing of business processes occurs during periods of declining economic security in the country. This emphasizes the importance of a detailed study of the factors contributing to the development of shadow economic processes and the search for effective approaches to strengthening the financial stability and security of the state (Figure 6).

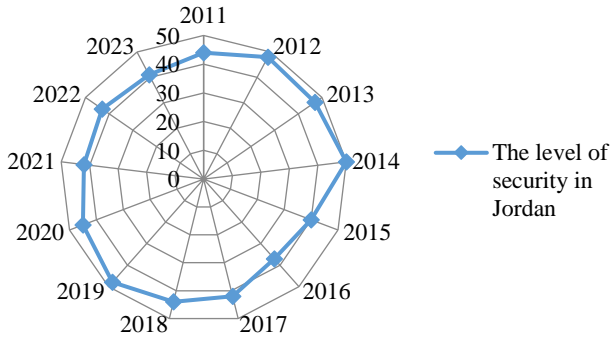


Figure 5. The level of integrated security in Jordan over the past 12 years

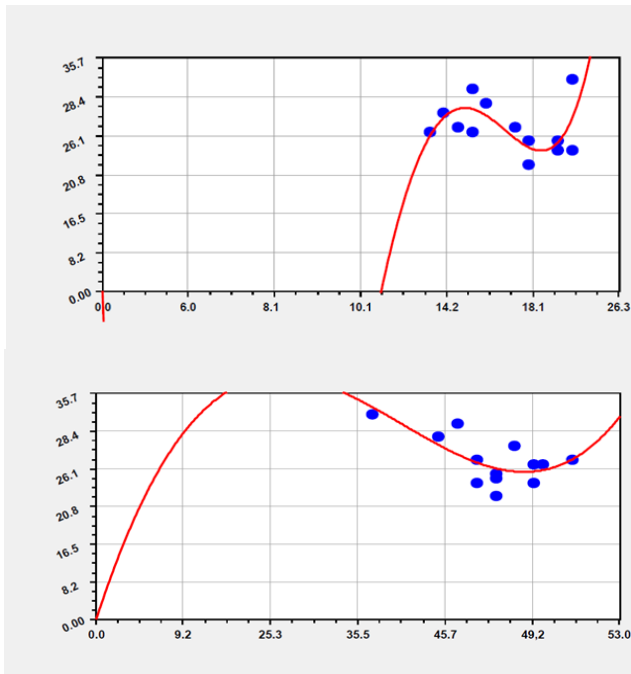


Figure 6. Results of modeling the impact of corruption and security on shadow business over the past 12 years

An analysis of quality of life index data and poverty rates in Jordan for the period 2011-2023 (Table 4) points to an important link: as the proportion of the poor population increases, the quality of life decreases. Significant changes were identified in 2023, when poverty levels reached high levels, highlighting the critical need for socio-economic reforms and social support for vulnerable groups. These observations highlight the importance of integrating sustainable development principles into a country's policy decisions and development strategies. To improve the quality of life and reduce poverty in Jordan, it is necessary to focus on creating inclusive, sustainable and effective social programs that take into account the needs of all segments of the

population, in particular ensuring access to quality education, healthcare, adequate housing and decent work. This approach will not only help solve pressing problems of poverty and quality of life but will also contribute to achieving sustainable development goals, in particular, reducing inequality, ensuring economic growth and improving the social community in the country.

Table 4. Quality of life indicator in Jordan over the past 12 years in the context of sustainable development

2011	2012	2013	2014	2015	2016
55.2	64.2	81.7	77.6	64.2	94.9
2017	2018	2019	2020	2021	2022
110.3	113.8	114.6	117.8	120.2	123.5
2023					
118.3					

In 2020, Jordan experienced a rise in poverty due to the challenges posed by the coronavirus crisis and subsequent economic restrictions. By 2021, there was an improvement and stabilization of poverty levels. However, by 2023, influenced by the Israeli-Palestinian conflict and its severe impacts on the region, poverty levels and quality of life in Jordan deteriorated to critical levels. This situation led to significant refugee migrations, adding further strain on the national economy. These conditions highlighted the fragility of Jordan's economic structure and resulted in an uptick in criminal activities, including human trafficking, illegal labor practices, and financial crimes. These trends, which underscore social disparities and financial system imbalances, urgently call for comprehensive strategies to address and mitigate these criminal threats.

To rigorously analyze how destabilizing factors affect the quality of life in Jordan, our study will utilize correlation and regression analysis to examine the impact of various elements including the criminalization of business processes, economic security, corruption, and poverty levels on the population's quality of life. We will conduct this analysis using Statistica 8.0 software. In our model, the quality of life index serves as the dependent variable (Y), while the independent variables (factors) are: x_1 - an integral indicator of business shadowing due to criminal activity in Jordan, x_2 - the level of economic security, x_3 - the extent of corrupt criminal actions, and x_4 - the poverty level among the population.

The findings reveal a strong linkage between these variables, evidenced by a high correlation coefficient ($R=0.9$) and further supported by the statistical significance of the model, with an F-test value of $F(5,7)=8.9$. Key statistical metrics include a determination coefficient (R^2) of 0.86 and a p-value of less than 0.0005. Each factor distinctly influences the quality of life index, displaying both direct and inverse relationships. Notably, increases in the shadowing of business processes, reflected by a regression coefficient $r = 0.15$, correlate with declines in quality of life. Similarly, higher poverty levels are linked to poorer quality of life, as indicated by regression coefficients $r=0.09$ and $r=0.103$. The detrimental effects of business shadowing—encompassing financial losses and heightened criminal activities like illegal trade and financial crimes—are emphasized. These findings highlight the need for a holistic approach to tackle these challenges, blending economic and social strategies (as shown in Figure 7).



Figure 7. Sustainable development mechanism to counter shadow business and crime in Jordan

The findings provide empirical support for the creation and refinement of policies aimed at reducing the shadow economy. Legislators can use this research to draft more targeted anti-corruption laws and regulations that directly address the nuances of economic crime in Jordan.

5. DISCUSSIONS

The next step of our research is to compare the latter with existing studies. This is important for our research, in the context of objectifying the findings by comparing them with the results of existing research in this area. This approach allows us not only to highlight the uniqueness and significance of our work, but also to identify possible general trends, disagreements, or even gaps in existing scientific approaches. The comparative analysis provides a deeper understanding of the context of the topic of countering shadow operations in the system of ensuring sustainable development, taking into account the socio-legal aspect, and contributes to the formation of more substantiated and balanced conclusions. This analytical phase is therefore key to establishing the significance of our study in the broader scientific dialogue and contributing to the development of this topical discipline.

Thus, in the study, Boanada-Fuchs and Boanada-Fuchs [22] develop a classification of informationality in their study, analyzing the various forms and scales of information activity.

They attempt to unravel the complexity of information practices through a theoretical framework that allows for a better understanding of their impact on the economy and society as a whole. Our study examines these aspects through the prism of sustainable development, focusing on socio-legal mechanisms to combat shadow activities, which allows us to identify potential ways to integrate the information economy into the legal sector.

At the same time, Bazyliuk et al. [23] explore institutional changes in the field of publishing and printing activities in Ukraine, analyzing both methodological and practical aspects of development. They focus on the regional aspect, identifying the specifics of institutional differences. In our study, we use a similar methodological approach to analyze the impact of the shadow economy on regional development, but with a broader focus on economic security and sustainable development, identifying socio-legal strategies to ensure them. Phelps [24] emphasizes the creative potential of the information economy, viewing it as a source of innovation and adaptation in different socio-economic contexts. Phelps focuses on the positive aspects of information awareness that contribute to the development and strengthening of the economy. In the context of our study, we also recognize this innovative potential, but we add to the analysis a critical assessment of the negative impacts of information activities on sustainability, offering a comprehensive view of socio-legal challenges and opportunities. Alazzam et al. [25] analyze the impact of the

COVID-19 pandemic on the legal regulation of global trade activities using the example of medical drugs. This study aims to identify and analyze new challenges arising from the pandemic in the field of international trade and legal regulation. The authors consider issues related to the legalization and regulation of medications that have become relevant in the context of the global crisis. Our research complements this work by examining the impact of shadow operations on pandemic responses and the socio-legal responses to them. Hassan and Schneider [26] in their work updated and analyzed the size and development of shadow economies in 157 countries over the period from 1999 to 2013. The authors identify the main trends in the development of the shadow economy and its impact on the global economy. Our research examines aspects of economic security and socio-legal challenges arising from the existence of the shadow economy, focusing on finding strategies to counter these phenomena to ensure sustainable development. Oliinyk et al. [27] in their study, they conduct a comparative analysis of measures to ensure economic security through criminal policies in Western and European countries. The authors consider different strategies and approaches to combating economic crime and ensuring economic security in the context of criminal law. Our study complements this analysis by focusing on the socio-legal aspects of shadow transactions and identifying the gaps in legal regulation for sustainable development. Sylkin et al. [28] explore crisis management strategies in the system of ensuring the financial security of engineering enterprises. They analyze the theoretical and practical aspects of such strategies and their effectiveness in the context of financial sustainability. Our study complements this analysis by focusing on the socio-legal aspects of combating shadow transactions for sustainable development.

At the same time, Quintano and Mazzocchi [29], in their study, conduct a comparative analysis of the shadow economy in the European Union using a discriminant data analysis model. They explore the factors influencing the size and development of the shadow economy in EU countries and also try to understand its impact on the region's economy. Our study adds the socio-legal dimensions of shadow transactions to this analysis, focusing on their impact on sustainability. Bardal et al. [30] analyze factors contributing to the implementation of sustainable development goals in regional and local planning based on the experience of Norway. Our study adds to this context by exploring the impact of shadow operations on the sustainability of the implementation of sustainable development goals, especially in the context of socio-legal aspects. Sustainable development is a multifaceted goal that intertwines economic growth, social inclusion, and environmental protection. In Jordan, ensuring sustainable development is particularly challenging due to the presence of crime and shadow operations, which hinder progress towards achieving sustainability goals [31].

By comparing our research with existing literature, we found that our work is not only relevant but also makes a significant contribution to scientific innovation in the field of countering shadow transactions with an emphasis on ensuring sustainable development of the socio-legal aspect. Our study expands our understanding of the complex links between the shadow economy and sustainable development, highlighting new aspects not fully covered in previous work. In particular, we focused on the importance of an interdisciplinary approach and the need to take into account the latest technological and globalization challenges, which allows for a deeper analysis

and understanding of the mechanisms of influence of shadow operations on different spheres of society. Thus, our study not only highlights the relevance of the topic in modern scientific discourse but also provides a new dimension of analysis and understanding of the issue, which contributes to the further development and improvement of strategies to combat the shadow economy in the context of sustainable development.

Moreover, the reliance on the corruption perception index and recorded crime rates as primary data sources may not fully capture the extent of shadow operations, as these measures are themselves based on reported incidents and perceptions which could be influenced by factors not addressed in the study. Additionally, while the advanced statistical methods employed are powerful tools for understanding correlations and impacts, they cannot definitively prove causation. The economic indicators and legal frameworks are complex systems with many interdependent factors, where causality can be multi-directional and obscured by external variables not accounted for within the scope of this research. Despite these limitations, the study's findings have significant practical implications. The clear link established between economic crimes and sustainable development challenges underscores the urgent need for legal reforms that target the shadow economy. By demonstrating the impact of economic crimes on both regional and national scales, the research underscores the necessity for a multifaceted legal approach. This could involve enhancing transparency, tightening regulatory frameworks, bolstering law enforcement capacities, and fostering international cooperation to curb cross-border economic crime.

6. CONCLUSIONS

Combating shadow businesses and their negative impact on sustainable development is an important challenge for governments and the international community around the world. The shadow economy, encompassing activities conducted outside formal regulatory and taxation channels, undermines the foundations of a healthy economy, promotes corruption, tax evasion and reduces the resources needed for investment in social and environmental projects. These actions jeopardize the achievement of sustainable development goals because they have a negative impact on environmental sustainability, economic growth and social justice.

In the final part of the study, devoted to the analysis of the influence of shadow business factors on the system of ensuring sustainable development with a special emphasis on the economic system of Jordan, we formulated a number of important conclusions. A detailed analysis based on the use of correlation and regression analysis, modelling of method of variance analysis, the nonlinear analysis Modeling and the abstract logical method made it possible to identify the significant impact of the shadow economy on the state of the country's economic security and its sustainable development.

It has been established that the level of criminalization and the overall level of security and sustainable development in Jordan are closely interrelated. In particular, the dynamics of the corruption perception index showed that acts of corruption and economic crimes have a significant impact on the country's ability to achieve sustainable development goals. The high level of the shadow economy is a significant barrier to effective reform and investment in sustainable development.

The analysis showed that improving Jordan's economic security has a direct positive impact on strengthening sustainable development at both the micro and macroeconomic levels. Reducing corruption and combating the shadow economy can serve as powerful catalysts for improving people's quality of life, ensuring environmental sustainability and economic growth.

At the same time, the results of the study highlight the need for further detailed research in this area, especially taking into account the specifics of the regional context. The urgent need to expand the geographical scope of research to obtain a more generalized understanding of the interaction between the shadow economy and sustainable development is obvious.

The limitations of the study in focusing on one country, Jordan, provide a basis for further work in this direction. It seems promising to involve a wider range of countries in the Middle East, which will allow us to identify universal and specific factors influencing sustainable development in the region.

In conclusion, it can be argued that effectively combating the shadow economy and related criminal activities is a key element in achieving sustainable development in Jordan. Taking into account the data obtained, the importance of an integrated approach to solving these problems, including legal, economic and social aspects, is emphasized. Future studies should undertake a comparative analysis with countries that have similar economic and political structures to Jordan but differ in their legal frameworks. This would allow for a clearer understanding of how specific legal systems influence the proliferation of shadow operations and their containment. While the corruption perception index is a valuable tool, future research should incorporate a wider range of economic indicators, including direct measures of the informal economy, to provide a more comprehensive economic profile.

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