MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

National University of Kyiv-Mohyla Academy

Faculty of Social Sciences and Social Technologies

School of Public Health

MASTER THESIS

on topic: “MODERN ANTI-CORRUPTION COMPLIANCE STRATEGIES FOR REDUCING CORRUPTION RISKS IN THE PROCUREMENT OF PHARMACEUTICALS IN UKRAINE”

Prepared by:
2nd year student
of the faculty of social sciences and technologies
specialization 073 Management
on the educational scientific program
“Management in Health Care ”
Artur Kaiun
Scientific supervisor
Doctor of Medical Sciences, Associate professor
Maryna V. Shevchenko

KYIV-2023

National University of Kyiv-Mohyla Academy

Faculty of Social Sciences and Social Technologies

School of Public Health

Master Degree

Specialty 073 “Management”

Master Program “Management in Healthcare”

ABSTRACT

Artur Kaiun

Modern Anti-Corruption Compliance Strategies for Reducing Corruption Risks in the Procurement of Pharmaceuticals in Ukraine

Corruption in the medication procurement process has become a major concern in many countries, with potentially devastating consequences for healthcare system outcomes. This study examines the nature, extent, and potential impact of corruption in medication procurement with a focus on the context of Ukraine and modern anti-corruption strategies to detect and prevent corrupt practices in the procurement domain.

Key words: anti-corruption compliance, public procurement, corruption risks, digital technologies.

Kyiv 2023

Національний університет «Києво-Могилянська академія»

Факультет соціальних наук і соціальних технологій

Школа охорони здоров'я

Другий (магістерський) рівень вищої освіти

Спеціальність 073 «Менеджмент»

Освітньо-наукова програма «Менеджмент в охороні здоров'я»

АНОТАЦІЯ

Каюн Артур Олексійович

Сучасні антикорупційні комплаєнс стратегії для зниження корупційних ризиків при закупівлях лікарських препаратів в Україні

Корупція у процесі медичних закупівель стала серйозною проблемою у багатьох країнах, що може призводити до руйнівних наслідків системи охорони здоров'я. У цьому дослідженні розглядаються сутність, масштаби та потенційний вплив корупції у сфері закупівель лікарських засобів з акцентом на український контекст та сучасні антикорупційні стратегії для виявлення та запобігання корупційним практикам у сфері закупівель.

Ключові слова: антикорупційний комплаєнс, публічні закупівлі, корупційні ризики, цифрові технології.

Київ 2023

TABLE OF CONTENTS

LIST OF ABBREVIATIONS 5
INTRODUCTION 6
CHAPTER I 9
UNDERSTANDING CORRUPTION IN THE PROCUREMENT OF PHARMACEUTICALS AND ITS CONSEQUENCES. 9
1.1. Review of the corruption extent, risks and typologies in the procurement of pharmaceuticals. 11
1.2. Consequences, impact, and cost of corruption in the pharmaceutical public procurement process. 17
Conclusions to CHAPTER I 22
CHAPTER II 23
RESPONSE TO CORRUPTION IN THE PROCUREMENT OF PHARMACEUTICALS 23
2.1. Ukraine: overview of the historical context, problematics and measures implemented to fight the corruption in public procurement 24
2.2. Public Procurement in Ukraine: An Overview of the Legal Framework 28
2.3. Anti-Corruption reform and Anti-Corruption Strategy in Ukraine 34
2.4. EU: overview of corruption challenges in public procurement and legal framework 40
Conclusions to CHAPTER II 46
CHAPTER III 48
EXPLORING STRATEGIES AND APPROACHES TO FIGHT THE CORRUPTION IN THE PROCUREMENT OF PHARMACEUTICALS 48
3.1. General overview of principles and best practices preventing corruption in public procurement 49
3.2. Corruption risk-assessment: mapping corruption risks in public procurement process 57
3.3. Overview of modern digital technologies to enhance anti-corruption compliance in public procurement 63
Conclusions to CHAPTER III 70
CONCLUSIONS 72
REFERENCES 76

LIST OF ABBREVIATIONS

EU – European Union

WHO – World Health Organization

OECD – Organization for Economic Cooperation and Development

ACTA – Anti-corruption, transparency and accountability

UNDP – United Nations Development Programme

UNICEF – United Nations International Children's Emergency Fund

NABU – National Anti-Corruption Bureau of Ukraine

NACP – National Agency on Corruption Prevention

SAPO – Specialised Anti-Corruption Prosecutor’s Office

TI – Transparency International

WTO – World Trade Organisation

ISO – International Organization for Standardization

SE MPU – State Enterprise “Medical Procurement of Ukraine”

COC – Code of Conduct

DSS – Decision Support System

AI – Artificial Intelligence

ML – Machine Learning

INTRODUCTION

Corruption certainly remains a prevalent characteristic and a persistent feature of human societies over time and space (Aidt, 2003). The corruption phenomenon, with its entirety and permanence, is not restricted to a specific type of health system framework. It can manifest in healthcare systems that are either public or private, have adequate or inadequate funding, and are characterized by either technical simplicity or complexity (Transparency International, 2006a). The problem of the existence of a relationship between the corruption component and public procurement of medicines remains certainly relevant over the past decade. The public procurement process in Ukraine has always faced numerous corruption risks, both directly and indirectly jeopardizing the proper use of budgetary funds, impacting the timely provision of medications to patients. Reflecting Ukraine's course toward the European Union integration, nowadays there is an urgent need for improving existing approaches combating corruption in the country, ensuring full compliance with EU requirements, standards and criteria, modern anti-corruption approaches and recommendations including those regarding public procurement area. The covid-19 pandemic, the impact on the procurement process caused by martial law, and related corruption risks, as well as other unpredictable circumstances, create additional risks that require an effective response of the current healthcare system of Ukraine, when addressing these challenges.

The primary purpose of this thesis is to provide a rationale for integration, application, and use of modern anti-corruption approaches and strategies in the Ukrainian context and develop recommendations for improving existing techniques enforced for reducing corruption risks in the procurement of pharmaceuticals in Ukraine.

As part of the purpose, the study aimed to fulfil the following *tasks*:

1. Examine the phenomenon of corruption within the context of public procurement of pharmaceuticals to identify its consequences and the resulted potential impact on healthcare systems.

2. Explore the response to corruption in medical procurement, examining the measures and efforts that have been implemented to mitigate corrupt practices occurring in Ukraine.

3. Describe and analyze principles and modern anti-corruption strategies being undertaken to detect and reduce corruption risks in the procurement of pharmaceuticals.

4. Contribute insight towards the improvement of modern anti-corruption approaches employed in Ukraine in relation to public procurement.

Therefore, the object of the study is defined as modern anti-corruption compliance strategies as an instrument/tool to fight corruption in the procurement of pharmaceuticals, and the subject of this study is defined as criteria making the strategies efficient to the context of Ukraine.

To complete the purpose of the study in accordance with specified tasks, the following research methods were favored: (1) **the logical research method** to ascertain the nature of corruption in the public procurement sector and its forms, as well as to assess the impact of corruption in the sector. As part of this research method, a review of available articles on the anti-corruption mechanism in the sector and procurement was applied, and a study of the anti-corruption legislation of Ukraine was carried out; (2) **the comparative method**, which involves the comparison of various forms of corruption that may be committed by authorities or individuals. Additionally, it includes a comparison of anti-corruption provisions and approaches implemented in several countries. The objective of these comparisons was to derive recommendations and/or formulate hypotheses on the potential application and improvement of these approaches; (3) **descriptive analysis** of literature. The research was focused on publications relating to public procurement, pharmaceutical management, digital technologies, and corruption issues. The search included peer-reviewed literature,

working papers, reports published by international and local organizations, media articles, etc.; (4) **systematization and theoretical processing** of the found information.

The study includes an analysis of the current recommendations and approaches available within the domain of digital technologies and their application in the context of public procurement.

The study shall contribute to the development of a robust and efficient risk management system that effectively addresses and combats corruption in public procurement in Ukraine. Through the examination of existing practices, strategies, and measures, the study seeks to provide valuable perspectives and recommendations that can enhance the integrity and effectiveness of the procurement process, ultimately fostering a transparent and accountable environment while mitigating corruption risks.

The structure of the thesis is the following:

CHAPTER I presents a comprehensive review of the extent of corruption, risks, and typologies associated with the procurement of pharmaceuticals. It also delves into the consequences, impact, and cost of corruption within the pharmaceutical public procurement process.

CHAPTER II focuses on providing an overview of the historical context surrounding public procurement in Ukraine. It examines the problematics associated with corruption and explores the measures that have been implemented to combat corruption in the procurement sector. Additionally, it discusses the anti-corruption reform initiatives in Ukraine and highlights the anti-corruption strategy adopted by the country. Furthermore, this chapter addresses the challenges faced by the European Union in relation to public procurement.

CHAPTER III offers a summary of the principles and best practices that are employed to prevent corruption in public procurement. It discusses the importance of risk assessment in combating corruption and provides insights into modern digital technologies that can enhance anti-corruption compliance and risk identification in the public procurement process.

CHAPTER I
UNDERSTANDING CORRUPTION IN THE PROCUREMENT OF PHARMACEUTICALS AND ITS CONSEQUENCES.

It is reasonable to expect that various stakeholders, including public officials and companies operating in the private sector, are motivated to engage in healthcare corruption. The healthcare sector is a rapidly growing and sizable component of the global economy, with health expenditure accounting in 2020 for nearly 11% of the world's gross domestic product (GDP), according to the World Bank, where in the case of Ukraine, this figure reached almost 8% (World Bank Open Data, n.d.).

Bilyk (2016), when discussing in her article pathways on addressing corruption in the healthcare sector, identifies four distinct levels of corruption. Firstly, corruption can occur at the individual level, involving interactions between patients and healthcare providers. Secondly, corruption may manifest within healthcare institutions, where employees engage in corrupt practices with the hospital management. Thirdly, corruption can be observed at the state level, specifically concerning the public procurement of medicines. Finally, the fourth level pertains to systemic corruption that permeates the entire healthcare system.

When it comes to public procurement, which represents the third tier of corruption, it is worth highlighting that in several nations, the rate of public procurements in relation to the gross domestic product (GDP) ranges from 13% to 20% (Transparency International, 2020b). Thereby, the magnitude of public procurements create a tendency toward corruption particularly in the health sector (Dikmen & Çiçek, 2022). As such, vulnerability of the healthcare sector to corruption in the procurement of pharmaceuticals has been expressed globally for a long time compromising the patient-centricity concept and overall impacting health system sustainability. Public procurement corruption risks, in turn, remain being hard to detect because of the size, number, and complexity of the transactions involved, where such transactions often require a certain level of technical expertise at all stages of the process (U4 Anti-

Corruption Resource Center, n.d.). Moreover, corruption schemes in procurement processes are technically challenging, and often perpetrated by individuals who have the knowledge about how to abuse the system (U4 Anti-Corruption Resource Center, n.d). Finally, the level of risk associated with this situation increases in conjunction with the nature of the procurement process itself, which even beyond the corruption topic, is inherently complex, expressing several challenges concerning supply chain, legal aspects, pricing, tender award criteria, monitoring the performance of suppliers, procurement body, and clinicians' prescribing choices (World Health Organization. Regional Office for Europe, 2016).

The issue of corruption within procurement is a pervasive problem with a notable level of prevalence globally impacting even the economies with advanced levels of development and infrastructure. Consequently, when it comes to the context of the EU healthcare sector, the one has been also susceptible to corrupt practices, which triggered EU Member States to develop certain strategies and reforms to confront the challenge, where informal payments and corruption in public procurement and in the pharmaceutical sector remained a matter of concern (European Commission, 2014). Ukraine, in parallel, is facing a situation, where the public procurement process in the healthcare industry has been historically associated with inefficient spending of taxpayer funds, constant supply delays, corruption, and other controversies (Sinichkina, 2020).

Based on all of the aforementioned, it can be inferred that a comprehensive framework with appropriate effective measures should be implemented to counteract and respond to corruption violations.

To substantiate this, as a primary step, the literature review intended to explore the nature and forms of corruption in the procurement of pharmaceuticals and formulate and emphasize the consequences, impact, and cost of corruption in the public procurement process.

1.1. Review of the corruption extent, risks and typologies in the procurement of pharmaceuticals.

During a literature review, no specific definition for public procurement corruption was found. However, this expression can be defined as referring to the unlawful practices and actions taking place during the procurement process led by government entities, where this process is intended to ensure that public funds are used transparently, impartially, and through fair competition only. Different forms of corruption can jeopardize the integrity of public procurement, resulting in the waste or improper use of public funds with a number of significant consequences.

To ensure that practical solutions for reforming public pharmaceutical procurement are appropriate and effective, it is imperative to first understand and define corruption typologies that may occur in this area. This will enable enforcing a targeted and comprehensive approach to identifying and addressing the specific weaknesses and vulnerabilities that make the procurement of pharmaceuticals susceptible to corruption. By comprehending these various types of corruption, policymakers and stakeholders can develop and implement effective anti-corruption measures.

This would be also essential since the medication procurement cycle is a complex and multi-layered process, where numerous parties are actively and continuously engaged in its implementation. Such parties may include different pharmaceutical industry stakeholders, product manufacturers, distributors, and other various healthcare suppliers and providers supporting the end-to-end procurement process. Each of these parties may have different interests and agenda behind, which can create further opportunities for corruption with its severe consequences for health systems and patients. As such, for example, a healthcare provider may accept kickbacks or other forms of compensation from a product manufacturer or distributor as an incentive for selecting their products over the other competitors. Similarly, a product manufacturer may offer bribes to a distributor or healthcare provider in

exchange for exceptional treatment during the procurement. Under these circumstances, the motivations and personal gains of the stakeholders involved in the procurement process may supersede the health and welfare of the patients, leading to compromised transparency and integrity of the procurement process.

To further explore public procurement corruption typologies, it is worth referring to the definitions and examples put forth by professionals in the relevant field.

Kohler and Dimancesco (2020) define two main types of corruption when it comes to the procurement of pharmaceuticals including isolated and systemic corruption, where the isolated type would involve a limited number of participants and acts and may include improper gifts and bribes given to a procurement official working on a tender of low value. As per the author, this type of corruption is considered relatively straightforward when it comes to investigations and sanction implementation, although remains seldom detected.

As for systemic corruption, this type is defined as an entrenched phenomenon in dealings between the public and private sector, widely accepted as routine, and being expanded on a much larger scale. Systemic corruption would include extensive and complex systems that remain difficult to untangle and involve the participation of organized crime (Kohler & Dimancesco, 2020).

The tendering process comprises of a sequence of three distinct stages part of the procurement chain: pre-bidding, bidding, and post-bidding. First, the pre-bidding phase, is initiated when the tender is being prepared and entails making decisions about the design of the tender. Second, the bidding phase, involves the parties submitting their bids, and the assessment, award decision, and announcement of the successful bidder takes place. Finally, in the post-bidding stage, the awarded contract is negotiated and the final contract is signed by both parties. With the complexity of the procurement process and several stakeholders' involvement in mind, it is crucial to highlight that one may result in procurement corruption manifesting in different forms and occur at any phase of the procurement.

The below table (Table 1.1) was adapted reflecting a list of corruption manifestations defined as per the stage of the procurement process.

Table 1.1

Corruption risks in pharmaceutical procurement

Stage	Pre-bidding	Bidding	Post-bidding
Manifes-tation	▪ Circumvention of tender procedures ▪ Tailored tendering ▪ Falsified type or amount of product ▪ Fabricated bidders ▪ Bids drafted to favour a particular company ▪ Forged documentation ▪ Bidding vendors provide bribes and kickbacks to government officials ▪ Information regarding contracts distributed in an unequal manner	▪ Favoritism ▪ Tender influenced by bribery and extortion ▪ Conflicts of interest that may influence tenders overlooked ▪ Exclusion of bids not justified ▪ Bribery and kickbacks during the bid evaluation	▪ Falsified invoices ▪ Inflated contracts ▪ Rewritten contract terms ▪ Goods not delivered

Note. Adapted as per Kohler and Dimancesco (2020) and Almici (2015)

As demonstrated, various acts of corruption and fraudulent activities have the potential to take place at any point in the procurement process.

The pre-bidding stage may include corruption linked to corruptive needs assessment, circumvention of tender procedures, and tailored tendering (Almici, 2015). During this stage, corruption may happen when a need as part of the need assessment is falsified, or a bid is drafted to favour a predetermined company or party meaning that a form of kickback may be offered to one or more public officials involved in the process and making an impact accordingly (Kohler and Dimancesco, 2020).

Under the bidding stage, bribery, kickbacks as part of the bid evaluation, favoritism, and collusion and/or market division in bidding can occur (Almici, 2015). The bidding stage is considered vulnerable to direct procurement corruption when a tender winner would be selected through bribery or extortion (Kohler and Dimancesco, 2020).

The post-bidding stage includes false invoicing and changing contract agreements (Almici, 2015). Contract implementation and monitoring will be the main activities during the post-bidding phase and therefore corruption in these instances may

include false invoicing and rewriting of the terms of the contract agreements (Kohler and Dimancesco, 2020).

As can be observed from the preceding, the pre-bidding phase of procurement is particularly prone to the risks associated with corruption, as evidenced by the various forms of corruption that can arise during this stage. However, it should be noted that other stages of procurement remain vulnerable to corruption as well, despite the emphasis placed on the pre-bidding phase. This highlights the importance of implementing effective anti-corruption measures throughout the entire procurement process, rather than solely focusing on one specific stage.

In summary of the aforementioned, it can be stated that it is essential to ensure that all stages of procurement are thoroughly monitored to mitigate the risk of any fraudulent activity or corruption. It is important to incorporate the measures that advocate for transparency at each stage of the tendering process, as for that reason the potential for any behaviour beyond ethical principles to occur can be significantly reduced leading to a more sustainable and efficient tendering with trustful cooperation established among the involved parties. Various manifestations and complication of such corruption risks depending on the stage of the process require comprehensive practical anti-corruption, transparency, and accountability interventions implemented when reforming this area.

Eliminating the classification of corruption risks within the realm of public procurement holds significant importance. To illustrate, the National Agency on Corruption Prevention (NACP) in Ukraine conducted a comprehensive analysis of the public procurement domain, ultimately identifying 25 typical corruption risks (National Agency on Corruption Prevention, n.d.). These risks have the potential to permeate across all entities involved in procuring goods, works, and services to fulfill the needs of the state and territorial communities. Notably, the NAPC highlights several common corruption risks, including the following:

- overstatement of the expected cost of the purchase, its volume;

- an artificial division of the subject of procurement in order to avoid competitive procedures;
- discriminatory conditions of tender documents and restriction of competition;
- unreasonable application of the negotiation procurement procedure;
- bias and partiality when considering a tender proposal;
- extortion of paper documents as part of a tender offer and samples of goods (products);
- unreasonable amendments to the procurement contract through the conclusion of additional agreements;
- shortage of goods (works/services), acceptance of products not meeting the terms of the contract.

These instances are in line with the manifestations mentioned above, which are categorized as per the bidding process and serve as mere illustrations of the inherent corruption risks prevailing within public procurement.

According to R. Tosko (2017) observations, the exploration and characterization of corruption risks in public procurement in modern Ukrainian science remains insufficiently researched and uncertain. Hence, they propose a novel categorization of corruption risks within the public procurement system through the application of Cluster Analysis, taking into account distinctive classification attributes and various types of risks associated with public procurement. The categorization also repels from the international practice of identifying corruption risks according to the sphere of state administration in which corruption occurs.

The classification developed by R. Tosko is presented in Table 1.2 of this thesis, providing a breakdown of the identified corruption risks in public procurement. The table serves as a valuable reference point, systematically organizing the various types of risks according to their specific classification attributes, also aiming to understand interrelationships among the identified risks, thereby contributing to the knowledge

and discourse surrounding effective strategies and measures to address and mitigate these risks in public procurement practices.

Table 1.2

Classification of corruption risks in public procurement

Classification Attributes		Types of Risks in Public Procurement
By element of public procurement		▪ Procurement risks of public procurement entities ▪ Procurement risks of objects of public procurement ▪ Purchasing risks of the subject of procurement ▪ Procurement risks of authorized persons of public procurement entities
By participants (interest groups) of public procurement		▪ Procurement risks of the Customer ▪ Procurement risks of the Participant ▪ Procurement risks of state supervision, control and coordination bodies ▪ Procurement risks of public supervision, control and coordination bodies ▪ Procurement risks authorized by the Customer
By main factors (from the point of view of the customer and the bidder)		▪ Legal risk ▪ Production (technical) risk ▪ Commercial risk ▪ Financial risk ▪ Risk control ▪ Personnel risk ▪ Organizational (corruption) risk
According to the principles defined by the Law of Ukraine “On Puclic Procurement”		▪ Fair competition among participants ▪ Savings, efficiency and proportionality ▪ Openness and transparency at all stages ▪ Non-discrimination and equal treatment of participants ▪ Objective and impartial determination of the winner of the procurement/ simplified procurement procedure ▪ Prevention of corrupt practices and abuses
By causes of occurrence (system approach)	According to the "Society-Procurement" system	▪ Inadequate satisfaction of public needs ▪ Unavailability of complete information on the directed public resources ▪ The phenomenon of distrust between the state apparatus and public groups
	According to the "State-Procurement" system	▪ Mega Magnetic Sphere for Corruption ▪ Blurred personalization of responsibility ▪ Weak positive motivation for conscientious work Lack of knowledge and skills
	According to the "Business Procurement" system	▪ Artificial narrowing of competition ▪ Participation in corruption ▪ Artificial appeals ▪ Bad faith in the execution of contracts
By procurement history		▪ With a positive history (image)

	▪ With a neutral history (image) ▪ With a negative history (image)
By procurement procedure	▪ Risk of open trading ▪ Risk of competitive dialogue ▪ Negotiated Procurement Risk
By the level of financial losses	▪ Tolerable Risk ▪ Critical Risk ▪ Catastrophic risk
By the nature of manifestation in time	▪ Constant risk ▪ Temporary risk
By the possibility of prediction	▪ Predicted risk ▪ Unforeseen risk

Note. Retrieved from R. Tosko (2017)

As observed, it becomes apparent that the attainment of a thorough evaluation of corruption risks within public procurement necessitates the systematic distribution and categorization of these risks according to their respective classification attributes. By employing such an approach, a more nuanced and comprehensive understanding of the diverse facets and dimensions of corruption risks in public procurement can be attained. Furthermore, this methodological framework enables a structured and organized assessment, allowing for a more in-depth exploration of each risk category and its associated characteristics.

Consequently, through the systematic classification of corruption risks, policymakers can obtain valuable insights into the specific areas and contexts where these risks manifest, thereby facilitating the development of targeted strategies and interventions or updating the legislation in accordance with particular risks occurring in the procurement environment ensuring to mitigate and address them effectively.

1.2. Consequences, impact, and cost of corruption in the pharmaceutical public procurement process.

Corruption in the healthcare industry can have severe repercussions on the overall health of the population, wellbeing of individuals, and the global economies. Good governance is fundamentally undermined by corruption, where corrupt practices

also weaken health systems and also violate human rights. (Vian, 2020). Countries that have a higher incidence of corruption tend to allocate a smaller proportion of their gross domestic product towards healthcare spending (Glynn, 2022). This, consequently, could imply corruption having a detrimental effect on the availability of public health resources.

Transparency International stated in their report (The Ignored Pandemic, 2019) that globally, over 7% of healthcare expenditure is lost to corruption with a considerable amount of annual global health expenditures now exceeding US$7.5 trillion. This suggests that far over US$500 billion in health resources are lost worldwide every year as a result of corrupt activities, which is a lot more than would be required to achieve a universal health coverage. Estimates from the European Healthcare Fraud and Corruption Network calculate an approximate €56 billion annual loss to Europe as a result of corruption (Sommersguter-Reichmann et al., 2018). Hence, this highlights the significant financial impact that corruption can have on the healthcare sector worldwide.

In the meantime, acknowledging undisputed value of data reflecting the cost of the corruption problem, a note of caution should still be applied to the credibility of some corruption statistics, when applying the estimates. This is important in view of the scope of corruption in healthcare, which is vast and complex, making it difficult to obtain an accurate assessment. One illustrative example could be a study published in a 2011 academic article (Hanf et al., 2011), where according to the results it was determined that approximately 1.6% of annual deaths of children under 5 years of age (over 140,000 deaths per year) are due in part to corruption. While it has been mentioned in a joint publication from the World Health Organization and UK Aid (World Health Organization, 2019), it has also been cited by some civil society organizations, including Transparency International (The Ignored Pandemic, 2019). Nevertheless, the Chr. Michelsen Institute (CMI), an independent centre for research on international development and policy, assigned a ‘problematic’ grade for this statement following their internal assessment (U4 Anti-Corruotion Resource Centre,

2021). This was explained by the clear difficulties with the extrapolations that the authors use to generate the estimate of 140,000 excess child deaths attributable to corruption. Therefore, while the data outlining impact of corruption provide valuable insights, it is still crucial to take into account the limitations and potential biases in the data used to arrive at these estimates.

When it comes to the public procurement topic, the one affects all aspects of people's lives and assumes a large share of government budgets (Transparency International, 2010). Consequently, any instance of corrupt practices can have a profound and negative impact.

While it is important to evaluate the consequences of corruption in the public procurement process, it should be highlighted that providing a comprehensive description and evaluation of the healthcare procurement outcomes remains being limited and challenging, particularly due to the unique and specific nature of the field.

Nonetheless, the detrimental effects of corruption in public procurement of pharmaceuticals can potentially extended even beyond the healthcare system, affecting the wider community with long-term negative impact. The severity of consequences can be also explained by a range of potential effects that may manifest in a variety of ways limiting timely availability and accessibility of treatment for patients.

With respect to the financial implications of corruption in public procurement specifically, it is essential to note that despite the importance of this issue, there is a scarcity of information available regarding the costs of corruption in public procurement as a whole. Therefore, further research and investigation is necessary to gain a more comprehensive understanding of the topic in the current context. A thorough and detailed examination of the financial consequences of corruption in pharmaceutical procurement would result in a wider understanding of the issue, thus opening the door for the development of effective measures designed to address the problem in a more targeted manner.

Transparency International (2010) states that the cost of corruption in procurement is difficult to measure quantitatively, if at all, due to the clandestine

environment in which it takes place, even though, highlighting that corruption in procurement has an immense impact on the effectiveness of government investments.

According to Transparency International (2006b) estimate, the damage from corruption is usually assessed to range from 10% to 25% of the contract value. However, in certain instances, it can reach as high as 40% to 50%. Therefore, taking into consideration the estimate presented, it can be inferred that corruption has a significant impact on the overall value of contracts, potentially leading to a considerable loss of funds.

The misallocation of resources in pharmaceutical procurement due to corruption and operational shortcomings has broader implications for the entire health system, resulting in reduced efficiency and equity (Kohler & Dimancesco, 2020). Corruption in public procurement has severe consequences beyond great financial losses, where it can lead to drug shortages, inflated prices, and counterfeit medicines (U4 Anti-Corruption Resource Centre, 2020).

Counterfeit medicine is defined by European Medicines Agency as a medicine made by someone other than the genuine manufacturer, by copying or imitating an original product without authority or rights. According to (Batyrgareieva, 2019), lack of appropriate drugs and the spread of counterfeit drugs that do not meet accepted standards or are completely counterfeit is flagged as one of the consequences occurring as a result of corruption spread in Ukraine. This has been identified as a major consequence of corruption in the country. When quality control regulations are inadequate, or if they are not being implemented or enforced, it can lead to various health and economic consequences. At an extreme, unsafe substandard or counterfeit medicines can result in poor health outcomes and in the worst case scenario, death (Kohler et al., 2007). Nevertheless, it is important to note that the problem of counterfeit drugs is not unique and limited to Ukraine only. Rather, it is a global problem that impacts a broad range of nations, both developed and developing, across various regions of the world.

Apart from the outlined consequences of corruption on public procurement, such as the proliferation of counterfeit products, financial losses, or inflated prices, corruption also has its impact on public health and wellbeing. Demchenko (2019), in his article, explores a correlation between corruption and the domain of public health. Within this context, one of the proposed theses posits that countries characterized by high levels of corruption may exhibit a weakened defence mechanism against potential outbreaks and the rapid dissemination of epidemic diseases. To illustrate this point, Demchenko highlights the crucial role of vaccination coverage in the population, emphasizing its connection to the procurement of vaccines and the effective implementation of relevant measures by both state and local entities. Thus, taking into account the crucial role of the procurement process in the supply of medications, and more specifically, vaccines, it can be contended that the presence of corruption risks at any stage of procurement has the potential to disrupt timely supply and subsequent vaccination efforts. Consequently, this can have a substantial influence on public health and jeopardize the overall safety and well-being of the general population.

Finally, corruption can also profoundly affect the social contract between the government and its citizens. When outlining corruption consequences, Kohler and Dimancesco (2020) point out that apart from the direct impacts of corruption, such as financial losses, the social contract between the government and the public can also be affected. Hence, when corruption occurs, it undermines the social contract by eroding citizens' trust in the government to uphold its responsibilities and obligations. This can result in a deterioration of the relationship between the government and its citizens, causing other negative impacts on social cohesion and the overall effectiveness of government institutions.

As such, with the aforementioned in mind, it can be inferred that the consequences of corruption impact world economies with extend beyond just financial losses and can significantly affect the functioning of democratic institutions and the well-being of society as a whole.

Conclusions to CHAPTER I

Definitely, the issue of corruption in public procurement is a widespread and persistent problem that is experienced worldwide by even developed economies with advanced infrastructure. The apparent complexity of the procurement cycle and multiple parties' involvement along with the size and magnitude of procurement activities creates an environment that further contributes to the risk of corruption.

Different forms of corruption exist at various stages of procurement, making it challenging to effectively intervene and prevent corruption. Another obstacle for policymakers is measuring the cost of corruption, which to some extent, limits a broader picture understanding of procurement corruption impact.

It remains clear that corruption can have significant financial, economic, and social consequences, including undermining public trust, spreading counterfeit products, and explicit risks to patient safety and well-being.

To mitigate these risks, it is crucially important to establish a comprehensive framework with appropriate and effective measures to monitor, prevent, detect, and respond to corruption violations at every procurement stage.

Implementing such measures will ensure that public funds are used transparently and effectively and ultimately enhance the quality of healthcare service delivery. It is, therefore, necessary for governments, regulatory bodies, stakeholders, and policymakers to make concerted efforts to create and sustain a healthy procurement market that upholds the principles of transparency, fairness, and equitable competition.

CHAPTER II
RESPONSE TO CORRUPTION IN THE PROCUREMENT OF PHARMACEUTICALS

According to WHO, effective procurement involves establishing a healthy market where high-quality products are readily available at the right time, at affordable prices, and in the right quantity (World Health Organization, 2016). However, the integrity of this objective can be certainly compromised by the prevalence of corrupt practices within the healthcare systems.

The aim of conducting the literature review in this chapter was to gain a deeper understanding of the practical scenario surrounding corruption in public procurement as illustrated by the European Union and Ukraine. The primary objective was to scrutinize the procurement market in Ukraine and analyse its evolution over the past decade, including the measures that have been taken to address corruption and the reasons behind their implementation. Furthermore, the review aimed to examine the anti-corruption strategy adopted by the country to combat the risks associated with corruption in the procurement process.

In addition to this, it was deemed important to gain an understanding of the underlying factors and circumstances specific to the context of EU Member States that confront corruption in the pharmaceutical procurement industry. In this regard, acquiring a comprehension about the background and variations of the EU problematics would prove beneficial in the development and execution of successful interventions in Ukraine, taking into account the European Union's examples and best practices.

Overall, the chapter aimed to provide valuable insights into the practical context of corruption in public procurement and enhance understanding of the complex issues related to this phenomenon. This knowledge could help in the development of effective strategies and interventions to tackle the issue of corruption in public procurement in

Ukraine and potentially serve as a reference for other countries facing similar challenges.

2.1. Ukraine: overview of the historical context, problematics and measures implemented to fight the corruption in public procurement

The procurement of pharmaceuticals in Ukraine has been impacted by corruption for a long period of time with numerous corruption schemes being implemented. The lack of compliance with the transparency and accountability principles in the process itself has always been a significant factor contributing to the problem. The procurement of high-quality and necessary medicines in Ukraine is dependent on the actions of state-owned enterprises, which have been established for this purpose, and Ukrainian patients are to some extend reliant and depend on these enterprises to fulfil their treatment access needs. Therefore, it is crucial to eliminate the barriers corruption creates to access medications in the country. Public officials who are responsible for procurement have significant authority in the selection of suppliers. This discretionary power creates opportunities for corrupt practices such as bribery and other forms of corruption. The possibility of the potential for personal gain or external influences can make these officials vulnerable to engaging in unlawful activities. Furthermore, the lack of effective enforcement of regulations governing procurement further exacerbates the issue of the corruption.

In consideration of the tough context, a set of efforts and measures have been implemented to tackle corruption in pharmaceutical procurement in Ukraine. Nevertheless, these efforts have been hindered by the absence of sufficient political will and resources, leading to a slow pace of progress (Sinichkina, 2020). Despite the reforms aimed at increasing transparency and accountability, the lack of strong commitment has limited the effectiveness of these measures, resulting in a limited impact on reducing illegal practices. Corruption continues to be a significant issue with wide-ranging consequences for the healthcare system and numerous groups of patients requiring immediate medication availability in Ukraine.

According to Sinichkina (2020), after the Revolution of Dignity, realizing that a total change of power at all branches and levels is the right time for the destruction of corruption schemes in medicine, a group of activists including representatives of patient, anti-corruption public organizations, lawyers, economists, deputies and representatives of the executive power have developed a concept and a series of laws, which deprived the Ministry of Health of Ukraine of the function of "purchaser", which is not inherent to it, and transferred the procurement of medicines to specialized international organizations. Since the market was monopolized by local distributors at that time, the draft laws were developed in a way allowing possibility of direct participation in public procurement of foreign manufacturers; in addition to that drafts aimed to implement a simplified registration of medicines, exemption of imported medicines from excessive duplicative quality control and from VAT. The comprehensive approach of the reform destroyed corruption schemes not only during procurement but also during the registration and import of medicines to Ukraine (Sinichkina, 2020).

Prior to 2015, corruption in public procurement posed a significant issue; as per the information provided by the Security Service of Ukraine, as much as 40% of the budgetary allocation intended for pharmaceutical procurement was excessively spent and embezzled (Ministry of Health of Ukraine, 2018). Since 2015, Ukraine has adopted a practice of procuring through specialized agencies. During that period nearly 60% of the function of state medicines procurements were handed over from MOH (Piniazhko et al., 2018). The Ministry of Health procurement activities before this were deemed ineffective and corrupt, and as a result, the state temporarily transferred these responsibilities to international organizations overseeing public procurement until March 31, 2019 (Transparency International Ukraine, 2017). Such organizations included the United Nations Development Programme (UNDP), the United Nations Children's Fund (UNICEF), and the British purchasing agency Crown Agents. The stated agencies are highly proficient in the field of medical procurement and have received official endorsement through legislation passed by the Ukrainian Parliament

(Ministry of Health of Ukraine, 2018). According to the Ministry of Health of Ukraine, this has reportedly resulted in significant savings of the budgetary funds, with the Accounts Chamber (decision of the Accounts Chamber dated 22.08.2017) estimating that those savings were nearly 39%. In certain cases, the procurement of drugs has been even accomplished at a cost 67 times lower, resulting in a substantial increase in the amount of drugs obtained under specific programs, up to 70% (Ministry of Health of Ukraine, 2018). Additionally, it is important to mention that the medications procured by the aforementioned international organizations have undergone quality verification based on global standards and demonstrated efficacy as per international treatment protocols (Zlahoda et al., 2022).

In the interim, despite the beneficial outcomes resulting from the engagement of specialized procurement agencies, it is worth noting that this was a temporary solution. The government required time to create its professional procurement capacities, exempted from corruption, which resulted in establishing in 2018 of the national agency “Medical Procurement of Ukraine” to implement the concept of reforming the medical procurement system approved by the Cabinet of Ministers (Sinichkina, 2020). However, it was not enough to create a specialized state-owned enterprise, it was also necessary to introduce and adapt procurement tools, that have been utilized by international organizations since 2015. Thus, a new phase of the reform commenced in 2019, which involved shifting the procurement function from international organizations to a newly established state-owned enterprise. This enterprise is now fully functioning as the national procurement operator in the medical field.

When it comes to corruption matters, in line with internationally recognized practices, the State Enterprise “Medical Procurement of Ukraine” (SE MPU) has formulated its own anti-corruption program and Code of Conduct (COC), which are publicly available on the agency’s website. Both COC and anti-corruption program appear to be in compliance with international anti-corruption guidelines. It is worth emphasizing that developing and complying with an anti-corruption program is an urgent need in the field of public procurement in the pharmaceutical sector (Dziuba,

2019). Therefore, it is of utmost importance that the employees responsible for overseeing the procurement process, both internally and when dealing with external stakeholders, strictly adhere to the anti-corruption program of the agency. The agency should provide regular training to its staff to build their competencies in the areas of anti-corruption and compliance. Furthermore, it is essential to underscore that SE MPU, while adhering to high anti-corruption measures, ethical practices and promoting robust business culture standards, has established a specialized unit known as the Compliance Control Service. This service enables individuals to express concerns or report instances of non-compliance through the agency's designated website. All information submitted through this platform undergoes thorough assessment by SE MPU's Compliance Control Service, ensuring compliance with the applicable laws of Ukraine and the internal policies and procedures of SE MPU. Subsequently, appropriate actions will be taken in response to the reported concerns. In the event that any legal elements indicative of criminal activity are identified, the pertinent information will be promptly shared with the appropriate law enforcement authorities.

Other than that, in 2022, the “Medical Procurement of Ukraine” were able to acquire a certification for Anti-Bribery Management Systems according to the international standard ISO 37001:2016 (State Enterprise “Medical Procurement of Ukraine”, 2022). The International Organization for Standardization (ISO) has developed ISO 37001 to guide companies and organizations in establishing an efficient management system to combat corruption. This standard is designed to aid companies in preventing, detecting, and addressing any corrupt practices that may arise when executing the businesses. The incorporation of the ISO 37001 standard is especially important for companies that intend to cooperate with government agencies or demonstrate to partners or potential customers their commitment to the fair business. Implementing this standard can help create a culture of integrity and ethical behavior while guiding how to effectively manage bribery risks and ensure compliance with anti-corruption laws and regulations. Overall, ISO 37001 serves as a valuable resource for companies seeking to establish and maintain a robust anti-corruption program. This

accreditation acts as a demonstration of the “Medical Procurement of Ukraine” commitment to compliance with internationally recognized anti-bribery regulations and their dedication to preventing corrupt practices within their operations. Finally, as part of anti-corruption activities and plans, they also announced the intention to enhance the use of digital technology in anti-corruption efforts, improve the feedback mechanism with partners and suppliers to tackle corruption, strengthen cooperation with key anti-corruption institutions, conduct regular thematic training for staff and enhance their skills in the area of anti-corruption and compliance (State Enterprise “Medical Procurement of Ukraine”, n.d.). The aforementioned points hold significant strategic importance as they aim to ensure the far-reaching sustainability of the enterprise and establish a robust defence against potential corruption risks. By adopting and implementing these practices along with obtaining the relevant anti-bribery and compliance certifications, the enterprise not only safeguards its operations and decreases reputational risks, but also enhances its ability to withstand and combat corruption effectively.

2.2. Public Procurement in Ukraine: An Overview of the Legal Framework

An institutional mechanism of adaptation of the legislation of Ukraine to the legislation of the EU is relevant, where the process of bringing the laws of Ukraine and other legal acts in line with the acquis communautaire is being implemented. Acquis communautaire is the legal system of the European Union, which includes, but is not limited to, the acts of legislation adopted under the three pillars of the EU. The three pillars of the EU are the European Community, the Common Foreign and Security Policy and the Justice and Home Affairs Cooperation. When it comes to the Law of Ukraine "On Public Procurement», it is also intended to adapt the legislation of Ukraine acquis of the European Union in pursuance of the Association Agreement between Ukraine, on the one hand, and the European Union, the European Atomic Energy

Community and their Member States, on the other hand (Law of Ukraine “On public Procurement”).

Consequently, a significant amount of effort has been dedicated by civil society, the business sector, and governmental institutions to align Ukraine's practices with European standards and regulations outlined in the 2014 Association Agreement. This extensive endeavor aims to ensure the effective implementation of European principles throughout the country. In line with the "Report on implementation of the Association Agreement between Ukraine and the European Union for 2022," considerable advancements have been achieved in the implementation of the Association Agreement, with an overall progress rate escalating from 63% in 2021 to 72% in 2022, reflecting a noteworthy increase of 9%. Notably, the public procurement domain has emerged as a frontrunner among the 24 sectors evaluated, demonstrating remarkable progress at 88% (+2% in 2022). This commendable achievement exceeds the overall development rate by 16%, highlighting the sector's significant growth and advancement. According to the report, Resolution No. 1178 was approved by the Ukrainian Cabinet of Ministers in 2022. This resolution pertains to the particularities of public procurement during martial law and the 90-day period following the termination or cancellation of martial law. The resolution includes the following provisions:

- Prohibition on procurement from Russian Federation/Belarus: Customers cannot procure from entities of Russian Federation/Belarus origin, except for repairs and maintenance of previously procured goods.
- Reporting requirements: Customers must publish reports on non-electronic procurement contracts within 90 days after the termination or cancellation of martial law.
- Completion of pre-existing procurement: Ongoing procurement procedures will continue under previous regulations.

Furthermore, as stated in the report, a draft law has been developed to amend the Law of Ukraine on Public Procurement in line with European integration obligations.

The proposed amendments aim to improve public procurement practices by introducing the measures such as open bidding for reserved contracts, the use of dynamic procurement systems, opportunities for innovation procurement through the Innovation Partnership Procedure, and the regulation of procurement negotiations based on project tender results. Ultimately, during the October 2022 Seventh EU-Ukraine Association Committee in Trade Configuration, the European Union acknowledged Ukraine's positive progress in implementing Stages I and II of the Public Procurement Chapter annexes within the Association Agreement.

Therefore, the European Commission's evaluation of Ukraine's application for EU membership highlighted notable observations that Ukraine has successfully implemented large-scale reforms to prevent corruption and protect the state budget. Ukraine's commendable progress was recognized in several sectors and, in particular, in the field of public procurement (Chaprak, 2022).

Currently, the regulation of public procurement in Ukraine is governed by the existing legislation known as the Law of Ukraine “On Public Procurement”. This would also encompass the procurement of pharmaceuticals, ensuring adherence to the outlined regulations.

The Law of Ukraine “On Public Procurement” serves as a legal framework that governs the procurement process and plays a crucial role in establishing relevant guidelines and procedures. This includes the selection of suppliers, tendering processes, evaluation criteria, and contract awarding mechanisms. The objective of this legislation is to establish effective and transparent procurement practices, foster a competitive atmosphere within the field of public procurement, mitigate instances of corruption in this domain, and promote equitable competition.

According to the analysis conducted by Shatkovsky (2016), the Law "On Public Procurement" in Ukraine has three main objectives. Firstly, it facilitates transitioning from "paper" to "electronic" procurement procedures, minimizing direct communication between customers and participants. Secondly, it strengthens anti-corruption measures through automated electronic evaluation of tender proposals and

electronic auctions, enhancing transparency and information accessibility. Lastly, the Law aims to align national procurement legislation with international best practices, as recognized by the EU Member States, promoting modernization and ensuring compliance with global standards. By pursuing these objectives, the Law aims to modernize procurement practices, combat corruption, and harmonize Ukraine's procurement system with international benchmarks.

When it comes to the principles of the public procurement process, Part One of Article 5 in the Law of Ukraine "On Public Procurement" stipulates that the procurement process should be conducted in accordance with the following principles:

1. fair competition among participants;
2. maximum savings, efficiency and proportionality;
3. openness and transparency at all stages of procurement;
4. non-discrimination of participants and equal treatment of them;
5. objective and impartial determination of the winner of the procurement/ simplified procurement procedure;
6. prevention of corrupt practices and abuses.

As such, the aforementioned principles align with the fundamental values of anti-corruption, transparency, and accountability. Several scholarly publications in Ukraine undertake a separate analysis of each principle to explore the essence and comprehensiveness of their implementation in Ukrainian public procurement, as well as to compare different approaches to their definition. Therefore, it was deemed imperative to elucidate the distinctive characteristics of these principles within the context of this thesis. Thereby, a comprehensive understanding of the principles of public procurement in Ukraine can be attained, enabling a thorough examination of their application and effectiveness.

When describing the “*fair competition among participants*” principle, Zdyrko N. highlights that fair competition means the absence of collusion between the customer and the participant, which is regarded as anti-competitive actions and is unacceptable in the procurement process, and also emphasizes that global practices

demonstrate that the presence of a competitive procurement market is the most effective approach to ensuring adherence to the principles of public procurement (Zdyrko, 2020). T. Karabin (2021) highlights that understanding of the fair competition principle in public procurement is based on the Law "On Protection from Unfair Competition," which defines it as actions violating fair trade practices and ethical norms. In her paper, she mentions that fair competition involves behavior aligning with these principles, and the bidding process aims to create a fair competitive environment.

The principle of "*maximum savings, efficiency and proportionality*" means results in the execution of procurements with minimal costs and the attainment of optimal outcomes in the procedures. The effectiveness of procurement is demonstrated by the complete fulfillment of public needs and the efficient utilization of budgetary resources through the successful execution of such orders (Shatkovsky, 2016).

With regards to "*openness and transparency at all stages of procurement*" principle, it can be defined as the one which implies the publication of procurement-related documents on the designated web portal, granting unrestricted accessibility to interested parties. This principle holds significance throughout all stages of the procurement process, fostering a conducive atmosphere for competition and guarantee the acquisition of goods, works, and services of the highest quality at the most favorable price (Zdyrko, 2020).

The principle of "*non-discrimination of participants and equal treatment of them*" shall mean that both domestic and foreign participants, regardless of their ownership or organizational and legal forms, engage in procurement procedures under equal conditions. Customers ensure unrestricted access to purchase-related information for all participants. Additionally, the legislation explicitly prohibits the imposition of discriminatory requirements on participants (Kobylnik, 2019).

Implementing "*objective and impartial determination of the winner of the procurement/ simplified procurement procedure*" principle would entail the careful and comprehensive examination of procurement participants' proposals in accordance with legislative requirements, with the procedure for evaluating tender proposals designed

to eliminate the possibility of arbitrarily rejecting a participant's proposal based on subjective reasons not related to the procurement's execution (Karabin, 2021).

Finally, the most critically important principle of "*prevention of corrupt practices and abuses*" primarily encompasses ensuring transparency and accessibility of procurement-related information, alongside promoting accountability and oversight in the procurement domain. To achieve this, several measures are envisaged, including the electronic publication of a comprehensive range of procurement-related documents, the preparation of reports, holding officials accountable for any violations of procurement laws, and prohibiting the participation of business entities involved in corruption or other unlawful activities from participating in auctions (Shatkovsky, 2016).

Nonetheless, T. Karabin acknowledges that the public procurement procedure is not immune to potential corruption risks. Specifically, the presence of discretionary powers in procurement planning, tender document preparation, and evaluation of proposals can provide opportunities for corrupt practices. This is attributed to the customer's ability to exert significant influence by determining specific procurement needs, specifying technical and qualitative requirements, setting supplier criteria, and establishing contract terms (Karabin, 2021). As such discretionary powers can create an environment conducive to corruption, this requires careful oversight and preventive measures to mitigate the risks.

Nonetheless, although there was a set of measures put in place for corruption monitoring in Ukraine along with the outlined legislation, the Ministry of Defense has encountered clear instances of corruption due to the unique circumstances surrounding procurement during martial law. An investigation published by ZN.UA on January 21, 2023 (Nikolov, 2023), suggests that the Ministry of Defense has been purchasing food for military personnel at prices two to three times higher than necessary. By comparing the purchase prices of military products with current market prices and pre-war prices adjusted for inflation, significantly inflated purchase prices were discovered. While the contract for the soldiers' food in 2021 was available to ZN.UA and openly published

on Prozorro, the government has decided to conceal information regarding all military purchases, including those made in previous years, since the onset of the Russian invasion. Consequently, this current situation, with martial law limitations and temporary legal frameowrk change, introduces new corruption risks, and it can be assumed that such risks are also highly relevant in the procurement of medicines under the present conditions.

2.3. Anti-Corruption reform and Anti-Corruption Strategy in Ukraine

The issue of systemic corruption has been identified as a significant barrier to sustainable reform in Ukraine, leading the European Union (EU) to urge Ukraine to enhance its efforts in combating corruption and establish a legislative and policy framework that ensures effectiveness in this regard (Králiková, 2021). During the period between 2015 and 2017, considerable attention was given by Ukraine's reformers and international partners to the establishment of new formal structures and procedures aimed at uncovering, investigating, and prosecuting high-level perpetrators of corruption (The Royal Institute of International Affairs, Chatham House, 2018). Within the contractual agreements between the EU and Ukraine, the fight against corruption has been recognized as a crucial prerequisite for the consolidation of the rule of law, particularly in fostering cooperation in areas related to justice, freedom, and security (Králiková, 2021). The necessity to establish specialized anti-corruption authorities arose when the existing bodies demonstrated structural or organizational limitations that hindered their ability to effectively carry out both preventive and repressive functions in combating corruption. In response, the Ukrainian legislator examined international experiences in creating institutions specifically designed to enhance the fight against corruption, incorporating elements of both prevention and repression (Bondarenko et al., 2021).

To support the reforming process for corruption in Ukraine at a country level, three specially authorized anti-corruption institutions have been established in 2015

including the National Anti-corruption Bureau of Ukraine, the National Agency for the Prevention of Corruption, and the Specialized Anti-Corruption Prosecutor's Office. The management of these institutions being selected under the open competition process. In 2019 the High Anti-Corruption Court was established. The activities of the institutions are aimed at both active countermeasures and prevention of corruption and any of its manifestations is one of the ways to combat corruption in world practice (Bondarenko et al., 2021). The state institutions representing the system of anti-corruption authorities in Ukraine is schematically outlined in Figure 2.1.

Note. Retrieved from Bondarenko et al. (2021)

Figure 2.1. Structure of anti-corruption institutions of Ukraine.

The National Anti-Corruption Bureau of Ukraine was created to address one of the key requirements set by the EU as part of the implementation of the Visa Liberalization Action Plan and Ukraine's subsequent membership in the EU (47).

NABU operates under the Law of Ukraine "On the National Anti-Corruption Bureau of Ukraine" passed on October 14, 2014. NABU's main functions would be to

prevent, detect, terminate, and investigate corruption and other criminal offenses and crimes (FAQ. NABU Official Website, n.d.).

The National Agency on Corruption Prevention was established in accordance with the Law of Ukraine on Prevention of Corruption with a diverse scope of functions including analysing the situation regarding corruption in the country, developing the relevant Anti-Corruption Strategy and State Program for its implementation, governmental anti-corruption policies, the verification of declarations, and the monitoring of compliance with legislations and restrictions (NACP's Powers. National Agency on Corruption Prevention, 2020).

As outlined in the Order on the Approval of the Regulations on the Specialized Anti-Corruption Prosecutor's Office of the Prosecutor General's Office from March 2020, the Specialized Anti-Corruption Prosecutor's Office is an independent structural unit of the Office of the Prosecutor General and has a variety of responsibilities including but not limited to the procedural oversight of criminal investigations conducted by NABU detectives and public prosecution in court, maintaining a public prosecution in court in criminal proceedings investigated by NABU, implementing functions of international cooperation, etc.

The High Anti-Corruption Court of Ukraine is one of the newest anti-corruption authorities in Ukraine (Bondarenko et al., 2021). The High Anti-Corruption Court has the function of a court of first instance and appellate instance in criminal proceedings of crimes assigned to its jurisdiction and to adjudicate NABU and SAPO cases. The primary responsibilities of the High Anti-Corruption Court can be outlined as follows: firstly, it is entrusted with the role of administering justice in accordance with established legal principles and procedures, aiming to safeguard individuals, society, and the state from corruption and associated criminal offenses, as well as exercising judicial oversight over the pre-trial investigation of such offenses. Secondly, the court is tasked with upholding the rights, freedoms, and interests of individuals involved in criminal proceedings. Lastly, it plays a crucial role in addressing the matter of

identifying unjustifiable assets and their subsequent recovery into state revenue, specifically in cases stipulated by law and within the framework of civil proceedings.

Nevertheless, regarding the collaboration among anti-corruption bodies in Ukraine, (Bondarenko et al., 2021) highlighted that the establishment of a comprehensive framework of specialized anti-corruption authorities has encountered implementation challenges and raised doubts about their viability. There is still uncertainty regarding the rationale behind certain authorities solely focusing on corruption prevention, while others exclusively engage in combating corruption. As stated by Králiková (2021), although the anti-corruption reform in Ukraine was predominantly successful due to domestic pressure and the influence of the EU and international partners, its actual implementation was constrained by the impact it posed on entrenched power dynamics and established practices within the affected political circles. The analysis shows limitations in the cooperation among specialized anti-corruption authorities: lack of complexity in interaction, absence of detailed provisions, no mechanisms for assessing productivity, and insufficient coordination in combating corruption offenses (Bondarenko et al., 2021).

Reforming in public procurement domain is also a big part of the anti-corruption reform and efforts implemented over the last several years. The anti-corruption reform in public procurement has made significant progress with the introduction of ProZorro, an electronic procurement platform that has curbed blatant tendering schemes and enhanced competitiveness (The Royal Institute of International Affairs, Chatham House, 2018).

ProZorro provides early support for the dual role of medicines e-procurement systems in both improving cost-savings and reducing corruption by creating more fair and competitive processes through a centralized system (Mackey & Cuomo, 2020).

ProZorro is based on three principles: a hybrid open-source electronic system; ‘Everyone can see everything;’ and a Golden Triangle partnership, where the latter refers to a collaboration whereby the government establishes the rules and protects informa- tion, the private sector provides the platform interfaces for contracting

authorities and suppliers and civil society monitors the procurement process to ensure it is in line with the law (Kohler & Dimancesco, 2020).

However, limitations exist when it comes to regional health budgets. This means ProZorro may not be able to provide sufficient protection (The Royal Institute of International Affairs, Chatham House, 2018). Also, the difficulty of detecting collusion increases with the complexity of the service being procured, which explains why ProZorro's impact on reducing prices could be diminished for transactions for complex goods (Mackey & Cuomo, 2020).

As for the strategic potential of Ukraine in the fight against corruption, the previous anti-corruption strategy in Ukraine (2014-2017) and its implementation program were high-quality documents with substantial prospects to combat corruption (Anti-Corruption Strategy for 2021-2025, n.d.). However, due to the lengthy process of establishing anti-corruption institutions between 2014 and 2019, this potential could not be fully realized.

Consequently, a new anti-corruption strategy for 2021-2025 was developed, aiming to make significant progress in preventing and combating corruption while ensuring coordinated and systematic efforts across all government bodies and local authorities.

The strategy comprises multiple blocks, with each block addressing specific issues and outlining anticipated strategic outcomes. One significant area within the strategy is the public procurement of pharmaceuticals, falling under the category of "Healthcare, education, science, and social protection." The document highlights the problem of patients and doctors experiencing delays and shortages in receiving necessary medicines and medical products. This issue is primarily attributed to the incomplete transition to a new system for organizing and monitoring medical purchases and inadequate regulations concerning the determination and tracking of medication needs.

To address these concerns within the context of public procurement, the strategy identifies the following key strategic outcomes:

1. Professional and transparent procurement processes for medicinal and medical products, financed by state and local budgets, conducted by centralized purchasing organizations. These processes will be based on objective needs, quality, and proven effectiveness of the products. If necessary, specialized international organizations may be involved in centralized procurement. This particular measure aligns with the principle of transparency as mandated by the Ukrainian law "On Public Procurement" and emphasized in multiple publications that outline strategies to combat corruption.

2. Implementation of specific procurement procedures for medicines and medical products during the pandemic or related situations designed to mitigate corruption risks. This outcome holds significant importance, particularly in addressing specific scenarios that may require tailored measures to be implemented on an ad-hoc basis. However, it should also be customized to reflect the martial law market environment. Although the strategy was developed before the outbreak of the 2022 full-scale invasion of Ukraine, it is crucial to ensure that the provisions are adaptable to encompass the potential risks associated with the imposition of the war to respond to such circumstances effectively.

3. Establishment of independent supervisory boards for Ukrainian procurement organizations responsible for acquiring medicines and medical devices. This outcome is crucial and reflects worldwide recognized practices, however the establishment of an independent supervisory board for SE MPU has not been implemented at present. It was officially planned and enshrined in the respective regulation and may have been postponed due to the prevailing martial law situation in the country. The Ministry of Health of Ukraine, as the governing body of the State Enterprise "Medical Procurement of Ukraine", launched the process of creating the Supervisory Board of the State Enterprise by Order No. 1781 dated August 04, 2020 "On the Formation and Principles of Forming the Supervisory Board of the State Enterprise "Medical Procurement of Ukraine". The regulation on the Supervisory Board was approved by order of the Ministry of Health of Ukraine dated September 28, 2020 No. 2211.

4. Utilization of standardized catalogs and product requirements for healthcare sector purchases during procurement activities.

5. Implementation of an electronic accounting system for medicines and medical devices across all state and communal healthcare institutions. This system will facilitate transparent and detailed calculations of procurement needs for all areas. In addition, integrating this accounting system into the electronic healthcare system will provide additional mechanisms for data verification and information derived from the system will be published in an open data format.

6. Establishment of clear rules and procedures for identifying and resolving conflicts of interest among participants in working and expert groups, particularly those involved in medical product procurement from the state budget and determining the lists of products to be purchased. Strict adherence to these rules will be enforced.

7. Definition of ethical guidelines for interactions between pharmaceutical companies and healthcare professionals, ensuring that prescriptions and patient care are not subject to abuse. Legal consequences for violating these rules will be enforced.

By incorporating these strategic outcomes, the strategy aims to improve public procurement's efficiency, transparency, and accountability in the healthcare sector, ultimately enhancing the timely availability of medicines and medical products while minimizing corruption risks and promoting ethical practices.

2.4. EU: overview of corruption challenges in public procurement and legal framework

Corruption in the healthcare sector is a significant challenge faced by many countries, including EU member states. The WHO report on challenges and opportunities in improving access to medicines through efficient public procurement in the WHO European Region (2016) flags that many countries are facing issues involving corruption at different levels of the procurement cycle.

Based on the Updated Study on Corruption in the Healthcare Sector (2017), it has been identified that healthcare corruption exists in all EU Member States, with various types and levels of corruption present in different regions. Furthermore, it has been noted that there is no single policy that can effectively combat corruption in the healthcare sector across all EU countries, outlining that the effectiveness of a policy or practice in one country may not translate to success in another country due to variations in contextual factors.

Numerous research studies have been carried out to investigate the problem of corruption in healthcare within the European Union, with the aim of identifying the factors that contribute to the existence of corrupt practices in this sector.

Referring to corruption types and complexity, different forms of corrupt practices in the procurement process can occur within the European Union, impacting the health of the EU's economy and society. Tessa Huis in ’t Veld (2018), in the empirical analysis states that within the EU, the healthcare sector has appeared to be the most vulnerable to petty corruption in public procurement, which is caused by risk-prone conditions in the healthcare sector of European Member states, where incentives to give unofficial payments differentiated treatment persist.

According to 2014 EU Anti-Corruption Report, referring to the results of Eurobarometer surveys on corruption, the most common corruption practices occurring in public procurement practices are: “tailor-made criteria for specific companies (57%), conflict of interest in bid evaluation (54%), collusive bidding (52%), unclear selection or evaluation criteria (51%), involvement of bidders in the design of specifications (48 %), abuse of negotiated procedures (47 %), abuse of emergency grounds to justify the use of non- competitive or fast-track procedure (46 %), amendments to the contract terms after conclusion of the contract (44 %). More than half of all companies say that corruption in public procurement managed by national (56%) or regional/local authorities (60%) is widespread.

When it comes to the regulatory aspect, in the article that focuses on public procurement corruption in the European Union, Ada-Iuliana Popescu (Popescu, 2014)

highlights that although government purchasing legislation has existed for over four decades, it was not until 2012 that anti-corruption provisions were added to these regulations. It was stated that the process of adding such anti-corruption provisions is challenging because it necessitates the assessment of compliance costs, administrative burdens, and their effects on competition. The article also discussed a challenge regarding the lack of a reliable method to measure corruption, which was also highlighted by Dr. Jens Andvig (2011), mentioning that while other areas of policy are being evaluated using various measurement indicators, corruption assessment still remains an unreliable domain. It was specified in the paper that to overcome this and allow anti-corruption to become as evidence based as other EU policies, the EU should develop its own facility for measuring corruption.

The European Union has a legal framework established to govern and enforce the public procurement process. Popescu (Popescu, 2014) states that although the EU member states' have similar public procurement laws and this legal framework seeks to ensure integrity, transparency, accountability, fair competition and professionalism, more efforts are required to address the shortcomings. It is also mentioned that public procurement legislation in the European Union has improved in recent years, inspired by encouragement and standard offered by the UN, the OECD, the WTO, and the World Bank. Several directives specifically address the public procurement process.

In relation to the legal regulations and implementation for public procurement in the EU, medicinal products can be the subject-matter of public contracts that are governed by national laws on public procurement, which adhere to the European directives on procurement procedures. Prior to 2016, this was covered by either Directive 2004/17/EC of 31 March 2004, which coordinated procurement procedures for entities operating in the water, energy, transport, and postal services sectors, or Directive 2004/18/EC of 31 March 2004, which coordinated procedures for awarding public service contracts, public supply contracts, and public works contracts.

The aforementioned directives were effective until April 18, 2016, when new directives that replaced them were incorporated into the national legislation of Member States.

The legal framework regarding public procurement after 18 April 2016 is defined by the following directives: Directive 2014/24/EU on public procurement; Directive 2014/25/EU on procurement by entities operating in the water, energy, transport and postal services sectors; Directive 2014/23/EU on the award of concession contracts.

In the meantime, although the new set of European directives on public procurement introduces some noteworthy modifications in procedural aspects, they do not substantially alter the material scope of the public procurement regulations (Bird & Bird, n.d.).

The current EU directives on public procurement focus on tenders exceeding a certain value and aim to establish a procurement market that is competitive, transparent, and well-managed. The core principles of these directives include equal treatment, open competition, and sound procedural management, which are crucial for ensuring the proper use of public funds (EU Commission, Legal Rules and Implementation, n.d.). The section on legal rules, implementation and enforcement covers current public procurement rules, the monitoring and enforcement of rules, as well as the EU network of review bodies, which ensures EU companies have access to rapid and effective review, guaranteeing the effective enforcement of public procurement rules at national level (EU Commission, Legal Rules and Implementation, n.d.).

As per (Popescu, 2014), the new rules are stricter for subcontracting and abnormally low bids, red flagging and alert systems are also created to prevent and detect corruption, where Directives 2014/24/EU and Directive 2014/25/EU are meant to put a tighter filter on public procurement corruption using more flexible rules but without sacrificing strictness. Additionally, the Tenders Electronic Daily (TED) database offers transparency and publicity by providing a detailed list of tenders

throughout Europe. Nevertheless, despite having the appropriate legislation, the EU's challenge is the proper enforcement of it, therefore, the European Commission oversees the implementation and enforcement of EU public procurement rules to ensure compliance (Popescu, 2014).

Almici (2015), in their research conducted an assessment of EU anti-corruption regulations, with a specific focus on public procurement. Their analysis categorized the measures outlined in various regulations into two groups: non-healthcare-specific regulations and healthcare-specific regulations. Each measure was assigned a feasibility rating of high, medium, or low. Among the legally binding measures analyzed, 4 out of 6 pertaining to procurement were deemed highly feasible for the European Union. These measures included transparency throughout the procurement cycle, maximizing transparency in competitive tendering, taking precautionary measures to enhance integrity, establishing clear chains of responsibility, and addressing complaints. In addition, measures aligned with the United Nations Convention against Corruption (UNCAC), such as timely disclosure of procurement procedures and contract information, establishing participation conditions in advance, implementing objective decision-making criteria, providing an effective domestic review system with an appeals process, and regulating procurement personnel, were rated highly feasible. Finally, the prevention of misconduct, compliance, and monitoring measures, which encompassed prevention strategies, fostering cooperation between the public and private sectors, detecting misconduct and risks, and applying sanctions, also received a high feasibility rating.

The implementation of a network of central procurement bodies is one of the measures that has been adopted across the European Union to mitigate corruption risks. However, further studies and research are still being conducted on this topic. In 2012, Ecorys conducted a study (SCH1) on corruption in the healthcare sector (Updated Study on Corruption in the Healthcare Sector, 2017), which drew 13 general conclusions, two of which related to corruption in procurement. A more recent Updated Study on Corruption in the Healthcare Sector was conducted by Ecorys to analyse

developments since the publication of SCH1 and to provide an in-depth analysis of privileged access to medical services, improper marketing, and potential risks involving double practice. The study covered all EU-28 Member States, with a focus on Greece, Croatia, Hungary, Lithuania, Poland, and Romania. The analysis involved desk research, an online survey sent to stakeholders across the EU, thematic interviews with various healthcare organizations, and fact-finding missions, providing more detailed analysis and examples with regard to the six selected countries. During this study, stakeholders were asked about the relevance of the conclusions drawn in SCH1. The conclusions were included as statements in the survey and interviewees were asked their opinion during fact-finding missions. The conclusions were also discussed during EU-level interviews whenever relevant.

With regards to the procurement topic, the majority of stakeholders responding to the survey agreed with the conclusion drawn in SCH1 that centralisation of procurement is a method to lower the risks of corruption, with 65% indicating that they agreed, at least to some extent, with this statement. However, another conclusion was stating that central procurement systems can become vulnerable as targets for lobbyists and politically inspired types of corruption, where in the updated study more than 70% of the survey respondents agree that central procurement systems can become vulnerable to lobbyists and around 10% were of the opinion that central procurement systems are not vulnerable at all. This study also revealed regional discrepancies in the responses of stakeholders during the survey. The findings suggested that the risks of lobbying and political inspired types of corruption are perceived to be higher in the Mediterranean and Eastern Europe area compared to North West Europe. Therefore, it can be highlighted that addressing corruption in the healthcare sector of the European Union requires a tailored approach that considers the specific context and environment of each particular country.

The European Union has indeed established itself as a leader in formulating and implementing well-designed and practical regulations, particularly in public procurement. This has positioned the EU as an exemplar for developing countries

looking for guidance and best practices in this domain. However, the EU has not been exempt from encountering challenges in this area, including limitations in the feasibility of certain proposed measures and the necessity for customization to account for the diverse characteristics and needs of its member states.

Nevertheless, despite these challenges, the EU's commitment to effective enforcement and the positive outcomes achieved through its regulations underscore the critical importance for Ukraine to persist in aligning with EU requirements. By doing so, Ukraine can continue to make strides towards deeper integration with the European Union and reap the associated benefits and opportunities.

Conclusions to CHAPTER II

Both the European Union and Ukraine have made significant efforts in addressing corruptio.

The EU, as a pioneering force in the development and enforcement of regulations, faces the challenge of adapting these measures to suit the diverse local environments of its member states. It remains being not always feasible to implement a unified approach across the entire union due to specificities in each region, hence local customization does require further input to achieve efficiency in maintaining transparency and integrity of the procurement process.

Ukraine has undergone extensive transformations in its public procurement system and implemented anti-corruption reforms, establishing key institutions to actively combat corruption. Despite these measures, there still remains a persistent risk of corruption that can impact the procurement cycle, especially under unstable circumstances linked to the full scale invasion of the country.

For Ukraine, it is crucial to continue the progress made and support the well-deserved achievements in combating corruption. This entails meeting the requirements and criteria set forth by the EU as Ukraine aims to become a candidate for EU membership. By maintaining the momentum and aligning with EU standards, Ukraine

can further strengthen its anti-corruption efforts and advance its integration into the European Union.

CHAPTER III
EXPLORING STRATEGIES AND APPROACHES TO FIGHT THE CORRUPTION IN THE PROCUREMENT OF PHARMACEUTICALS

Undoubtedly, the procurement process plays a central role in ensuring the efficient and timely supply of essential products, thereby guaranteeing that patients receive the appropriate medication when they need it most. This highlights the importance of the right solutions to combat the corruption probability in public procurement in a timely manner. However, as a primary step, it is imperative to anticipate and identify corruption risks. This task that indeed continues to present considerable challenges, as more often than not, the verification of corruption is rather challenging since it tends to remain concealed (Kohler & Dimancesco, 2020).

In light of the overview of corruption's impact and consequences described in this thesis, it becomes increasingly evident that the identification of efficient and practical approaches to combat corruption in the public procurement domain is of utmost importance. This assertion holds particularly true for Ukraine, where as outlined in the thesis, significant efforts have been dedicated towards transforming the pharmaceutical procurement practices and undertaking a complete overhaul of a deeply entrenched corrupt system that has persisted over time.

In the modern world, digitalization and e-procurement systems have emerged as critical solutions for enhancing existing mechanisms. However, it is crucial to acknowledge that despite these advancements, specific vulnerabilities to corrupt practices still exist. The complexity of modern digital systems applied for procurement creates additional potential for corruption risks. Consequently, a crucial step towards combating corruption lies in the integration of traditional processes with contemporary digital approaches. By adopting this, the risks associated with corruption can be minimized.

It is imperative to emphasize that a one-size-fits-all solution is not sufficient for public procurement corruption, given the diverse contexts in which such type of

corruption manifests. Instead, each strategy shall be thoroughly explored and adjusted to meet the specific circumstances of the country under consideration. Consequently, such tailored approaches are expected to yield positive outcomes by effectively reducing corruption risks.

It becomes evident that addressing corruption in public procurement necessitates a comprehensive and context-specific approach. The case of Ukraine serves as a pertinent example, highlighting the fighting journey against corruption in the procurement domain. To achieve tangible progress, it is imperative to synergize established practices with cutting-edge digital advancements, thereby significantly mitigating corruption risks and establishing a more transparent and efficient procurement system. Ultimately, the primary objective remains ensuring that patients have access to the proper pharmaceutical product at the right time.

This chapter outlines several key areas and concepts relevant to the combat against corruption with a focus on digital technologies. However, a broad research is required to offer an exhaustive examination of all existing methodologies for reducing corruption risks due to the complex and wide-ranging nature of corruption in public procurement.

3.1. General overview of principles and best practices preventing corruption in public procurement

In the context of addressing corruption within healthcare systems, it is crucial to define best practices, essential concepts, and principles constituting the anti-corruption framework. To prevent corruption in the drug procurement process, it is imperative to establish transparent procurement rules that increase the likelihood of detecting and sanctioning corrupt practices while also implementing guidelines to minimize discretionary powers in areas vulnerable to abuse (Transparency International, 2009).

Various publications offer diverse perspectives on this matter, with particular attention drawn to the ACTA, which refers to considerations of anti-corruption,

transparency, and accountability measures. Furthermore, significant attention is dedicated to the principles of integrity, professionalism, monitoring, and fairness, recognizing their importance in ensuring ethical conduct and effective oversight within the context under consideration.

As per Kohler & Dimancesco, (2020), the integration of ACTA measures into pharmaceutical procurement practices is not merely important but rather essential in order to guarantee improved accessibility of essential medicines to the population.

As delineated in this thesis, public procurement corruption can manifest in multiple typologies, necessitating the customization of principles to align with the targeted category. Therefore, when formulating and designing ACTA mechanisms, it is critical to identify the category of corruption that is being addressed (Kohler & Dimancesco, 2020).

Such principles and considerations are described in this chapter, encompassing the recommended measures and vision to be implemented in adherence to these principles.

Transparency. Transparency represents a fundamental principle within the realm of public procurement, and as previously outlined, this principle is also embedded in the Law of Ukraine "On Public Procurement". However, it is worth noting that the practical implementation of the transparency principle is not explicitly described in the aforementioned law. Many international anti-corruption conventions urge state parties to establish a legal and institutional framework making public procurement transparent and accountable (Transparency International, 2013). Transparency International's Practical Guide for Curbing Corruption in Public Procurement (Transparency International, 2020a) defines the Transparency principle as the characteristic of governments, companies, organizations, and individuals to openly disclose information, rules, plans, processes, and actions. In the context of public procurement, this entails ensuring that laws, regulations, institutions, processes, plans, and decisions are accessible to all potential bidders and the general public. In addition, the guide emphasizes that Transparency should be pervasive throughout

every stage of the procurement cycle, starting from the initial decisions on needs assessments and the development of a procurement plan and budget allocation to the evaluation of bids, contract implementation, and performance auditing.

Governments employ various strategies to mitigate the involvement of state officials and private sector entities' involvement in grand corruption, enhancing Transparency throughout the procurement cycle, implementing open contracting practices, establishing integrity and accountability mechanisms, and encouraging stakeholder participation in monitoring government contracts (Transparency International, 2013).

The OECD regards Transparency as a pivotal tool for fostering good governance in the public sector. The importance of Transparency throughout all stages of procurement, as also metioned in other sources, is consistently emphasized by the OECD. It is emphasized that, as a minimum, adequate and timely information should be be made available regarding upcoming contracts, as well as contract notices and updates on the progress of ongoing procurement processes (OECD, 2016).

Transparency International's minimum standards (Transparency International, 2020a) for promoting Transparency in public procurement include several key aspects. Firstly, there is a requirement for public disclosure of information, with the exception of legally protected data, such as national security or confidential information. Secondly, the information should be accessible through a centralized web portal or alternative media platforms in cases where web portals are not widely utilized. Thirdly, digital information should be published in formats that are widely used, non-proprietary, searchable, sortable, and machine-readable. Additionally, stakeholders involved in major procurement processes must be adequately informed and consulted on relevant project aspects.

To enhance the flow of information, public comments should be sought on needs assessments and budget plans. Finally, it is crucial to adhere to transparent and comprehensive bookkeeping practices, while explicitly prohibiting the use of "off-the-books" accounts. These standards collectively emphasize the importance of

Transparency, stakeholder involvement, and robust financial practices in public procurement processes. Consequently, it becomes essential to recognize the inherent importance and value of the transparency principle within the context under consideration.

Integrity. Integrity stands as another key principle in combating corruption within the field of public procurement. According to Transparency International (Transparency International, 2020a), the principle of integrity encompasses behaviors and actions aligned with a set of moral or ethical principles and standards embraced by individuals as well as institutions that create a barrier to corruption. In the context of public procurement, integrity applies to both the procurement process itself and its participants, necessitating adherence to relevant laws and regulations.

As part of this principle implementation, it is important to set measures for potential conflicts of interest that may arise if a public procurement official has a vested economic interest in a bidding company or receives future employment offers from such entities (Transparency International, 2013). Addressing conflicts of interest typically involves regulations derived from broader conflict of interest legislation, civil service laws, procurement regulations, or codes of conduct, where to establish clear guidelines, a COC should outline specific rules regarding gifts, entertainment, favors, political donations, and nepotism (Transparency International, 2013).

Recognizing the significance of integrity in fostering trust and ensuring good governance, countries implement national integrity standards for all public officials, often through civil service regulations or a comprehensive code of conduct that delineates expectations for ethical behavior (OECD, 2016).

The OECD offers a generic code of conduct adaptable to local contexts, focusing on three key areas to safeguard the integrity and prevent conflicts of interest in public procurement: defining roles and positions of procurement officials, declaring and registering interests, and specifying actions to be taken in the event of a conflict of interest (Transparency International, 2013).

Ethics or integrity training programs tailored for public officials, including procurement officials, play a crucial role in raising awareness, enhancing knowledge, promoting commitment, and fostering an organizational culture of integrity (OECD, 2016).

It is ideal for bid evaluation and award decisions to involve multiple individuals or a group rather than a sole individual, adhering to the "four-eye rule." Furthermore, regular staff rotation can contribute to minimizing corruption opportunities within public procurement (Transparency International, 2006b). Apart from overarching standards applicable to the entire public service, specialized standards tailored to procurement officials can help mitigate risks specific to the complex and distinctive nature of the procurement process (OECD, 2016).

Other than that, Transparency International has created an integrity pact tool as a preventive measure against corruption in public contracting. This tool, for example, has been successfully utilized by Germany and Austria. The implementation of integrity pacts, including during the pre-bidding phase, has effectively deterred corruption in public procurement at the local level (A. I. Popescu, 2016).

Transparency International's (2020a) minimum standards for promoting integrity in public procurement include: strict adherence and compliance with established rules with limited discretionary decision-making; implementation of a code of conduct with a strong anti-corruption policy for government employees; codes of conduct for private sector bidders addressing integrity and ethical behavior; eligibility for tender participation based on a code of conduct and clear ownership structure; contractual obligations to comply with anti-corruption policies; separation of staff in different procurement phases with oversight by a designated official; collaborative decision-making, and regular staff rotation in sensitive positions. These standards aim to ensure transparency, and accountability, and reduce corruption risks in public procurement.

Accountability, monitoring and oversight. Accountability, as defined by Transparency International (Transparency International, 2020a), entails the

responsibility of governments, individual officials, companies, and their executives to be accountable for their duties, decisions, and actions within their respective areas of responsibility. Accountability is intertwined with effective monitoring and oversight, where corruption risks should be detected first and an accountable party defined thereafter with a set of measures and actions implemented in relation to this party. Public procurement systems should be equipped with internal and external control structures, including mechanisms for internal and external audits, as well as comprehensive protection for whistle-blowers, and it is crucial to subject public procurement processes to scrutiny by various stakeholders, such as civil society, the media, and the public, through social control mechanisms (Transparency International, 2013). Accurate documentation of procurement activities is a fundamental requirement for transparent monitoring and governments should establish procedures to maintain well-documented records that justify and substantiate procurement decisions (Transparency International, 2013).

Other than that, OECD (2016) highlights that conducting risk analysis serves as the foundation for implementing an effective oversight and control system within the government process. In addition, they specify that the findings derived from oversight and control endeavors can provide valuable information on emerging risks or indicators of potential red flags, facilitating continuous improvement and enhancement. Furthermore, it is mentioned that implementing appropriate sanctions in proportion to the severity of illicit conduct detected through oversight and control activities can serve as a powerful deterrent against engaging in corrupt practices.

To enhance the detection of bid rigging and identify potential governance, conflicts of interest, and corruption issues in the award of government contracts, the OECD (Transparency International, 2013) has developed guidelines for procurement officials. Internal control structures can be strengthened through inspections and the enforcement of administrative or criminal sanctions. Procurement professionals often utilize red flags, checklists, or indicators as tools to identify potential problems throughout the procurement cycle. Such listings or checklists are developed by various

organizations to support parties involved in the procurement process. For instance, the World Bank, in collaboration with Transparency International's Handbook, has compiled a list of red flags for this purpose (Transparency International, 2013). In the context of Ukraine, it would be crucial to establish a robust red-flag detection mechanism to safeguard against corruption. Transparency International (2020a) outlines that to ensure accountability and deter corruption in public procurement, effective sanctions should be imposed on fraud, bribery, and collusion. Corporations must be held responsible for their employees' corrupt acts. Independent audits and monitoring bodies should assess financial data and procurement performance. Civil society organizations should participate as independent monitors. High-level approval should be required for significant contract changes. Robust, effective, and accessible appeals processes should be in place for aggrieved bidders. The establishment of accountability mechanisms has the potential to mitigate corruption and other forms of misconduct, promote compliance with the established procedures, and foster performance improvement and institutional learning (Dikmen & Çiçek, 2022).

In line with the principles mentioned above and the integration of best practices in public procurement, it is essential to outline the solution as per the bidding stage within the overall public procurement process. This is particularly important due to the diverse range of corruption instances that can occur at various stages of public procurement, as described in the first chapter of the thesis.

To provide a visual representation of this, the table below has been developed to outline specific strategies and approaches that are tailored to the bidding phase, as well as general solutions that promote proper conduct throughout the entire procurement process. By presenting this information in a tabular format, it was aimed to highlight the relevance of implementing targeted measures during the bidding phase while emphasizing the importance of maintaining ethical practices across all stages of procurement (Table 3.1).

Table 3.1

Interventions to minimize corruption risks in pharmaceutical procurement

Stage	Solution
Pre-bidding	▪ Pre-bidding consultations for the development of unbiased tender requirements ▪ Giving all eligible bidders the opportunity to participate ▪ Publicizing tender criteria ▪ Putting in place integrity pacts ▪ Clear and transparent policies and procedures issued by the procurement agency and made publicly available ▪ Training of procurement officers on policies and procedures as well as how to detect potential corruption within the procurement process ▪ Regular checks on procurement processes and outcomes by outside watch-dog agency ▪ High-level approval for significant contract changes ▪ Risk Assessment
Bidding	▪ Ensuring transparent and open bidding process through mechanisms such as electronic bidding ▪ Creating conflict of interest policies with appropriate measures to manage them ▪ Introduction of a formal appeals process ▪ Monitoring and oversight of procurement rules compliance by procuring entities
Post-bidding	▪ Clear and transparent limits for contract changes ▪ Online centralized reporting to increase transparency and accountability (qualitative and quantitative information on the procurement status) ▪ Publicizing information about bid chosen and rationale ▪ Disclosing bids that did not win ▪ Evaluating companies/agencies performance ▪ Citizen/ civil society organizations monitoring of contract execution ▪ Conducting formal independent audits to identify non-compliance, assess financial data and procurement performance
All (applies to the entire process)	▪ Whistleblowing systems with comprehensive protection of whistle-blowers ▪ Developing robust complaint systems ▪ Checklists to identify red flags and avoid any collusion or dishonest arrangements ▪ Free access to bidding information allowed for all stakeholders ▪ Bidding information centralized at a national level and accessible through the web-portal/ platform ▪ Public disclosure of the information ▪ Comprehensive Code of Conduct for involved stakeholders ▪ Regular staff rotation to minimize opportunities for corruption ▪ Collaborative decision making ▪ Separation of staff in different procurement phases with oversight by a designated official

Note. Adapted as per Kohler & Dimancesco (2020), Transparency International, (2013), Transparency International, (2020a), OECD (2016), A. I. Popescu (2016)

Ensuring transparency, accountability, and integrity considerations in public procurement of pharmaceuticals is vital in combating and decreasing the risk of corruption.

Transparency enables open disclosure of information, promoting fair competition and preventing hidden deals. Accountability holds all stakeholders responsible for their actions, with effective oversight and sanctions deterring fraudulent practices. Embracing integrity encompasses creating barriers to corruption and promoting ethical conduct. These approaches are crucial in the pharmaceutical sector, and when properly defined and implemented by local procurement officials, they safeguard the system, ensuring resources are allocated efficiently, and procurement outcome meets the expectation of society.

3.2. Corruption risk-assessment: mapping corruption risks in public procurement process

Risk assessment assumes a significant role in the development and implementation of compliance and anti-corruption programs, regardless of whether they are designed for private-sector entities or public-sector organizations. It holds significant importance in the context of combating corruption risks in public procurement, particularly in the pharmaceutical sector. This thesis offers an examination of the methodology behind risk assessment, with specific emphasis on its application within public procurement. By providing an overview, the paper aims to enhance understanding and facilitate the effective utilization of risk assessment as a vital tool in mitigating corruption risks in the procurement process.

Corruption risk assessment is part of the Corruption Risk Management (CRM) cycle and serves as a valuable diagnostic tool that aims to identify vulnerabilities within a system that could potentially facilitate instances of corruption. It assists in detecting areas of weakness that may create favorable conditions for corrupt activities to take

place (Corruption Risk Assessment. Transparency International, n.d.). Risk assessment facilitates the identification of appropriate risks, enabling the identification of suitable mitigation strategies and concrete interventions. By conducting a thorough analysis of potential risks, organizations, and procurement officials can select the appropriate measures to mitigate those risks.

A significant portion of the literature examining corruption and public procurement centers around the identification of indicators that serve as markers for potential corruption. These indicators can be utilized to construct a risk assessment framework that relies on indicators to assess the likelihood of corruption occurring in the procurement process (Ferwerda et al., 2017).

Corruption Risk Management can be implemented at both institutional and procedural levels, surrounding an evaluation of the potential for corruption within the organizational structure as well as within specific processes and activities. When describing the Corruption Risk Management cycle, it would involve the steps of risk identification, evaluating risk levels, and implementing risk mitigation measures, (if any risk beyond the pre-defined threshold is identified) (Fig. 3.2).

Note. Retrieved from: Corruption Risk Management, U4 Anti-Corruption Resource Centre, n.d.

Figure 3.2. Corruption Risk Management Cycle

Typically, the objective of a corruption risk assessment is to enhance the existing knowledge of actual or perceived corruption within a specific context. This information is utilized to guide the development of anti-corruption strategies, policies, or advocacy efforts (Corruption Risk Assessment. Transparency International, n.d.).

According to Corruption Risk Assessment Methodology (2019), published by Ministry of Justice of Georgia, the process of risk assessment encompasses several stages. It begins with gathering information from internal and external sources to establish the context. Next, risks and risk factors are identified and assessed, followed by an examination of corruption risk control mechanisms and an evaluation of the corruption risks themselves. This analysis aims to determine whether the identified risks are effectively controlled, partially controlled, or beyond control. Additional indicators, such as the likelihood and impact of corruption risks, may also be incorporated. The level of risk is subsequently defined as low, medium, high, or, in some cases, very high. The same rating classification would apply to the risk impact.

Analytical Department of the Ministry of Justice of Georgia (2019) also offers a likelihood and impact matrix, where the level of risk will depend on the rating assigned to the former or the latter consideration ranging from low to high risk. They also provide a valuable classification for determining corruption risk dispersion areas. According to this categorization, the risks can be categorized as either organizational, sectoral, or countrywide in nature. This categorization enables a clear understanding of the magnitude and impact of the risk, facilitating the formulation of appropriate mitigation strategies.

The U4 Anti-Corruption Resource Center outlines four main approaches for mitigating risks in public procurement in their “Corruption risk Management” guidance. These include risk treatment, where actions and procedures are implemented to reduce the likelihood and impact of risks. Risk tolerance involves monitoring significant residual risks despite preventive measures. Risk transfer entails shifting the responsibility for risk management to another entity. Lastly, risk termination is chosen when risks are deemed too high to be managed effectively. This option is pursued when risks cannot be transferred, treated, or tolerated by existing anti-corruption controls.

In relation to procurement, the French publication on Managing Corruption Risk in the Public Procurement Cycle, (2020) presents a systematic approach to mapping corruption risks within this area. The publication places emphasis on evaluating the

level of vulnerability of the entity, which is a crucial factor to consider when addressing risks.

The evaluation process involves determining the "gross risk score" utilizing the suggested rating matrix. Prior to this, it is essential to identify the inherent risks associated with the entity's activities, which may require conducting interviews and implementing other appropriate measures to uncover corruption risks. The publication emphasizes the importance of interviewing individuals with in-depth knowledge of the organization, its roles, and a comprehensive understanding of its processes to develop an accurate risk map. Subsequently, the gross risk exposure can be identified by assessing the objective vulnerability to each corruption risk identified in the previous stage. This assessment involves the use of two familiar indicators from the previously mentioned publication, namely the impact (severity) score and likelihood (frequency) score. The gross risk score is calculated by multiplying these two indicators together:

Gross risk score = impact (severity) score x likelihood (frequency) score (3.1)

Finally, the net risk exposure is determined by assessing the effectiveness of the entity's risk management measures. After calculating and prioritizing the net risks, the entity can evaluate their acceptability and determine the necessary steps to address them. This marks the beginning of the action plan phase, where the entity will formulate a plan of action accordingly. The plan will include predetermined corrective actions, anticipated benefits, timelines, and accountable stakeholders. This approach is generally applicable to both private and public entities/sectors as a standard practice.

In the realm of internationally acknowledged standards, ISO provides its own set of principles and guidelines pertaining to risk assessment. ISO 31000:2018 is an internationally recognized standard that addresses risk management in various domains, including corruption in procurement.

The standard emphasizes the importance of effectively managing risks associated with corruption in the procurement process. Essentially, this mirrors a

similar structured approach outlined in other reviewed publications, although with minor variations in terminology: risk identification, risk analysis, risk evaluation, and risk treatment. ISO defines 'risk management' as the coordinated efforts undertaken to guide and oversee an organization in relation to risk (ISO 31000:2018(En) Risk Management — Guidelines, n.d.).

The below Figure 3.3 visually represents the risk-management cycle according to ISO 31000:2018.

Note. Retrieved from: ISO 31000:2018(En) Risk Management — Guidelines, n.d.

Figure 3.3. Risk Management Cycle – ISO 31000:2018

By following the risk management cycle outlined in ISO 31000:2018, organizations can enhance their ability to identify and address corruption risks effectively. The standard aims to establish a proactive approach to risk management, helping companies and organizations develop robust strategies and controls to prevent corruption and ensure transparent and accountable procurement processes.

Implementing the standard can support organizations involved in procurement to build resilience against corruption and strengthen their overall risk management framework.

In the context of risk assessment, it is important to highlight a Corruption Risk Index (CRI) that serves to identify instances of corruption, both in a direct and indirect manner, throughout the various stages of the procurement process (INGP, 2021). As outlined, the CRI focuses on specific components within public procurement that are aligned with each stage of the process. These components encompass factors such as the presence of abbreviated bidding periods, a limited number of participating bidders, a low proportion of contracts awarded through competitive procedures, a high frequency of contract amendments, and significant disparities between the initially awarded value and the final amount specified in the contract. By incorporating the CRI into risk assessment practices, it becomes possible to enhance the effectiveness of detecting and addressing corruption risks within public procurement.

With the above-outlined examination of risk assessment considerations, particularly in the case of Ukraine, taking into account a strong digital health potential and its significant prospects, it is advisable to establish a dedicated information technology system at the national level to facilitate risk assessment in public procurement. This entails conducting additional research to ensure the system's practicality and effectiveness in identifying corruption indicators and red flags. By implementing such a system, procurement officials can promptly respond with appropriate measures to mitigate corruption risks and safeguard the integrity of the procurement process.

Overall, risk assessment plays a key role in the selection of appropriate internal control measures because it consists of identifying potential risks, analyzing their causes and consequences, and evaluating their impact (OECD, 2019). Through conscientiously carrying out these essential procedures, organizations are empowered to prioritize and execute focused control strategies aimed at alleviating the identified risks, thereby fostering improved risk management and maintaining operational resilience.

3.3. Overview of modern digital technologies to enhance anti-corruption compliance in public procurement

To promote a robust compliance framework throughout the entirety of public procurement processes, the integration of emerging technologies has become an invaluable asset. Novel digital solutions not only hold the potential to enhance transparency and accountability but also serve as a crucial aid in the identification of risk indicators and red flags at various stages of procurement. Within the scope of this chapter, these technologies will be examined, exploring their practical application within the realm of public procurement. This is particularly relevant to the context of Ukraine, where the successful implementation of an e-procurement system has garnered attention.

It is essential to acknowledge that the complex nature of information technology systems inherently introduces additional risks and dangers. Consequently, the imperative arises to develop an innovative tool capable of effectively detecting and notifying relevant stakeholders about these risks, thereby strengthening the overall integrity and efficacy of the system. To address concerns about corruption and fraud in pharmaceutical procurement, advances in information systems, telecommunication networks, web and cloud-based platforms, and big data and machine learning, have given rise to new ‘digital’ solutions that can improve transparency and accountability in medicines procurement and supply chain management (Mackey & Cuomo, 2020).

By embracing these technological advancements, public procurement processes can be fortified with boosted efficiency and an intensified adherence to compliance standards.

Within the variety of high-tech solutions available on the market, this thesis specifically centers its focus on the domain of data science, covering artificial intelligence (AI) and, more specifically, machine learning as a subset of AI.

Furthermore, this work explores the potential and applications of blockchain technology, recognizing its significance in the context of the subject matter.

In economies that have undergone significant digitization and have established a certain level of e-government infrastructure, technology is increasingly entering various aspects of governments. This includes the use of automated decision systems, which, despite their contentious nature, are being employed in diverse domains such as social security programs, the legal sector, law enforcement, insurance, and security (Aarvik, 2019).

The application of algorithms and AI-based tools in combating corruption has yielded various methodologies and specific projects that offer promising potential for leveraging local public procurement data (INGP, 2021).

Artificial intelligence (AI) has appeared as the next frontier in the fight against corruption, according to Oxford Insights (Aarvik, 2019).

Technology is affecting more and more parts of life in sufficiently digitized economies with a certain level of e-government, where transactions or interactions with authorities, to a large extent, are digital. Automated decision systems are controversial but still deployed in social security programs, within the legal sector, in policing, insurance, and security (Aarvik, 2019).

AI-based anti-corruption tools (AI-ACT) are particularly appealing for addressing public corruption, as outlined by (Köbis et al., 2022). The publication also emphasizes three key advantages of AI compared to traditional anti-corruption efforts. Firstly, AI systems, including machine learning, possess autonomous learning capabilities, enabling them to perform tasks independently, unlike static information communication technology. Secondly, the increasing computing power of AI enables the analysis of vast datasets, which is crucial for uncovering complex corruption schemes that may arise. Thirdly, AI is inherently impartial, unlike human decision-makers who may be influenced by conflicts of interest. According to (Köbis et al., 2022), behavioral science research has shown that humans are prone to bending moral rules, especially when faced with financial temptations or time constraints. Hence,

these advantages highlight the transformative potential of AI in combating corruption and promoting more effective anti-corruption measures.

AI and machine learning are also applied to uncover or detect money laundering. Tax authorities use AI to predict risk for tax evasion or to monitor and identify suspicious tenders or bids in public procurement (Aarvik, 2019).

However, as specified by (Köbis et al., 2022), the utilization of AI as a tool for addressing corruption risks comes with certain challenges. The first challenge pertains to data, as obtaining accurate and reliable data to establish a ground truth in corruption cases poses a complex obstacle. Extensive research has focused on determining valid indicators and developing measurement methods for assessing corruption phenomena. The second challenge lies in algorithmic decision-making, wherein the choices made by intelligent algorithms can have significant implications, particularly in the context of corruption. Classification algorithms used in AI systems face a trade-off between false-positive and false-negative errors when categorizing cases as "corrupt" or "innocent." False-positive errors, which wrongly label individuals as "corrupt," carry a strong stigma. The third challenge is of human nature, as implementing AI-ACT involves considering the socio-institutional context in which algorithms operate. Striking the right balance between granting autonomy to algorithms and maintaining human control poses an ethical dilemma.

Furthermore, (Köbis et al., 2022) suggests that coupling AI-ACT with other digital technologies can mitigate some of AI's limitations in terms of transparency and privacy. The same publication states that while AI-ACT relies on accessing or publishing private data, ensuring data transparency can potentially compromise individual privacy, such as through unmasked data leaks. Distributed ledger technologies (DLT) like blockchain offer a solution by alleviating this tension. Thus, considering the challenges and exploring synergies with complementary technologies can enhance the effectiveness and ethical implications of AI-ACT in combating corruption.

Ryabtsev, (2023) in his article argues that building tendering platforms on blockchain technology is an effective way to tackle the above-mentioned challenges and decrease corruption in public procurement by strengthening transparency and thereby improving public officials' accountability. Indeed, due to its technological architecture, blockchain is a very transparent, trustworthy, and easily auditable system that can record and store all the data during the tendering process. Furthermore, blockchain can promote equality among tender participants by ensuring that all of them have access to the same type and amount of information.

To start with, it should be noted that blockchain is a distributed ledger technology that allows all its members to engage in peer-to-peer transactions online. These transactions are then stored in a timestamped chain of blocks: a blockchain, where through cryptography, the records are immutable and cannot be tampered with by malicious actors (Köbis et al., 2022).

According to Ryabtsev (2023), it is important to note that blockchains can be classified into different categories based on the permission model they adopt. This model determines the type of users who can participate in the network and engage in its activities. There are three primary categories of blockchain permission models: (1) permissionless blockchain, (2) permissioned blockchain, and (3) private blockchain. It was emphasized that the scope of the mentioned paper was limited to the permissioned blockchain as it aligns best with the technological characteristics required for public procurement. In a permissioned blockchain, while anyone can join the ecosystem, there is a prerequisite identity verification process in place.

Mackey & Cuomo (2020) mentions that in the context of medicines procurement, the implementation of a blockchain-enabled e-procurement system could incorporate a permissions structure that ensures certain data is accessible to all participants within the blockchain network, thereby enhancing transparency. Additionally, this system could validate the participants allowed to engage in the process, leading to the creation of an unchangeable and verifiable record of the supply chain transaction history. This would greatly contribute to improving audit procedures

and facilitating procurement decisions to ensure compliance. Furthermore, the utilization of smart contracts within the blockchain framework can streamline supply chain processes, resulting in increased efficiency. Moreover, the integration of other anti-corruption technologies can further enhance the effectiveness of the overall system.

Importantly, the utilization of blockchain cryptographic keys would prevent any party involved in public procurement from accessing confidential information pertaining to tender applicants without obtaining their explicit consent (Ryabtsev, 2023). Consequently, blockchain technology ensures the utmost confidentiality and security of the documents uploaded into the e-procurement system.

However, it is important to note that solutions employing blockchain technology to combat corruption, fraud, and abuse in the pharmaceutical supply chain are still in their nascent stages and lack substantial evidence of their effectiveness (Mackey & Cuomo, 2020).

Nevertheless, the Köbis et al. paper (2022) reached the conclusion that the utilization of AI technologies to combat corruption, although still at an early stage, already lauded as the next frontier in anti-corruption. As a result, the initial decisions made regarding the implementation of AI-ACT will significantly influence its impact on future societies. The paper emphasizes the importance of AI developers collaborating with the anti-corruption community to explore the possibilities of enhancing existing grassroots initiatives through the capabilities of AI technology.

When delving more into the artificial intelligence topic, it is important to distinguish Machine Learning (ML) as a distinct field within AI. ML operates under the broader AI umbrella and focuses on creating applications that can autonomously learn and improve their performance through experience. In the context of analyzing auction information, ML empowers systems to uncover meaningful patterns and draw informed inferences, even when confronted with limited data, such as bid values and the winning bidder's identity for each auction (Rodriguez et al., 2022).

In their study, Rodriguez et al. (2022) explore several common ML algorithms widely used in engineering applications, including the construction sector and public procurement. They analyze six datasets from five different countries, employing eleven ML algorithms to detect collusion. The research reveals that no single algorithm consistently outperforms others, emphasizing the importance of customizing algorithms to suit specific datasets. However, the best-performing algorithms achieve a high level of accuracy, surpassing 80%. Additionally, the study highlights that the availability of more data per auction positively correlates with improved collusion detection accuracy across most ML algorithms. While empirical-based detection models have limitations, the growing accessibility of public procurement information and advancements in ML techniques facilitate the development of alternative models to identify collusion. Once trained, these algorithms can be automatically updated with new auctions, minimizing the need for extensive user supervision (Rodriguez et al., 2022).

In Ukraine, efforts have been made to incorporate AI methodologies, particularly machine learning, in the fight against corruption. Transparency International Ukraine has developed its own software called 'Dozorro,' which utilizes machine learning to identify high-risk tender processes. The software is unique in that it is not limited by predefined indicators or formulas. It has the ability to adapt and evolve as new deceptive tactics emerge, ensuring ongoing effectiveness (Aarvik, 2019). A new version of the system was introduced in June 2018. However, despite its implementation, there is currently a lack of comprehensive assessments and studies to evaluate the system's efficiency and effectiveness. Furthermore, there is a need to thoroughly understand how the system operates and how the identified risks will be addressed in practice.

In their study, Rabuzin & Modrušan (2019) utilized machine-learning methods and text-mining techniques to identify potential corruption indicators in public procurement. While there is a lack of specific research on text mining in public procurement tendering documents, text mining has been successfully used in other

domains, such as insurance, finance, and medicine, to predict target variables. The model developed in this study was trained and tested on comprehensive data, employing different data mining techniques and approaches. The results were generally satisfactory, although they varied depending on the group of public words and the procurement type. However, the study highlighted the limited availability of data for dependent target variables, resulting in relatively low predictive power. Future work should focus on incorporating additional indicators, as well as exploring neural networks, deep learning, and other machine-learning algorithms to improve model accuracy.

Inter-American Network of Government Procurement (INGP) (2021) focuses on implementing an alert system for managing corruption risks in public procurement. This system encompasses various elements, including organizational, procedural, and technological components, to fulfill the agency's mandate and comply with national regulations. The system integrates business rules directly into the platform, preventing tampering with configurable red flags. For instance, it ensures the timely publication of tender documents online for the required duration and enforces the correct submission of process information by suppliers. However, integrating information from external databases poses challenges. The use of machine learning algorithms and big data analysis allows for the identification of common patterns and the development of more sophisticated indicators. The selection and prioritization of red flags and risks depend on the specific system and context, considering the local legislation and country-specific indicators. An effective early warning system should provide timely and high-quality information, align with local regulations and internal processes, and offer actionable alternatives for the agency to address irregularities.

In their research focused on the public procurement market in Brazil, (Velasco et al., 2021) utilized previously untapped public datasets to develop data mining algorithms that automatically extract corruption risk patterns for each public contractor. Their goal was to create a Decision Support System (DSS) to aid in decision-making processes. The researchers successfully combined operations

research methods (such as mathematical modeling, graph theory, and network analysis) with data science tools (such as data mining, clustering algorithms, anomaly detection, and risk ranking) to develop the DSS for law enforcement agencies. This technology enabled the detection of risk patterns and has the potential to be adapted and transferred to other countries, given the availability of similar public data sources used in their work.

With the aforementioned in mind and despite the availability of various data science tools, it is crucial to conduct a comprehensive assessment to ensure the correct interpretation of each identified risk, pattern, or red flag (Ash et al., 2020). This necessitates additional data analysis before making any decisions in order to accurately apply the insights derived from the data and ensure effective enforcement measures.

Also, according to (Aarvik, 2019), as AI technologies continue to evolve rapidly, it is crucial for researchers, human rights organizations, and workers' unions to shift their attention towards the ethical implications and potential side effects of applying AI in emerging fields. Foresight methodologies should be developed to identify ethical risks and opportunities, aiming to prevent undesirable outcomes. Additionally, there is a need to explore the potential for international harmonization of data, enabling AI tools to provide deeper analysis and faster recognition of common risks across regions or multiple countries.

Conclusions to CHAPTER III

In order to effectively combat corruption and ensure the development and implementation of a functional approach, it is essential to recognize the significant potential of digital systems.

It is acknowledged that current approaches are still in the early stages of development, it is crucial to emphasize the transformative role that digital technologies can play in anti-corruption efforts.

To achieve the desired outcomes, a thorough assessment must be conducted to ensure proper implementation and alignment with expectations.

Future interventions should seek to integrate traditional approaches rooted in anti-corruption, transparency, accountability, and integrity principles with advanced digital solutions, such as AI, ML, and blockchain. These digital solutions have the capacity to proactively detect and mitigate corrupt risks based on predefined indicators, thus enhancing the effectiveness of anti-corruption measures.

A central tool in this process is the digitalization of risk assessment, enabling the analysis of large datasets and the identification of risk trends in a timely and accurate manner. It is imperative to approach the exploration of modern digital technologies from an interdisciplinary perspective, fully embracing their potential and adapting them accordingly to the specific context of combating corruption in public procurement. This requires collaboration among policymakers, experts in digital technologies, anti-corruption specialists, and relevant stakeholders to develop robust strategies and guidelines.

Implementing best practices in Ukraine is of utmost importance in this endeavor. This entails leveraging the experiences and lessons learned from other countries while also tailoring approaches to suit the unique challenges and opportunities present in the Ukrainian context.

By embracing digital advancements and integrating them with established anti-corruption principles, Ukraine can fortify its efforts to combat corruption in public procurement and pave the way for a more transparent, accountable, and efficient procurement system.

CONCLUSIONS

The rapidly evolving and dynamic landscape of public procurement in the pharmaceutical sector necessitates the attention of policymakers and stakeholders to ensure compliance with emerging requirements. Additionally, the emergence of new corruption risks has significant implications for the sustainability of the pharmaceutical supply chain and accessibility to medicines. In response to these challenges, leveraging the potential of digital systems has become increasingly popular as a means to address corrupt practices effectively.

The primary objective of this research was to provide a rationale for the integration, application, and utilization of modern anti-corruption approaches and strategies within the context of Ukraine. To achieve this objective, a comprehensive analysis of publications covering the domains of public procurement, anti-corruption, and digital technologies was conducted. The aim was to contribute valuable insights that can inform the enhancement and development of anti-corruption measures in Ukraine's public procurement practices.

Throughout the master's thesis, the defined tasks were accordingly accomplished. These tasks encompassed a thorough examination of the corruption extent, risks, and typologies associated with pharmaceutical procurement, as well as an exploration of the consequences, impact, and costs of corruption within the procurement process. Furthermore, the research entailed an overview of the historical context, problematics, and measures implemented to combat corruption in Ukraine's public procurement sphere, including an examination of the country's anti-corruption reform and strategy. Lastly, the study provided an overview of the key principles, best practices, and risk assessment techniques aimed at preventing corruption in public procurement, with a specific focus on the potential offered by modern digital technologies.

By fulfilling these tasks, this research aims to contribute meaningful perspectives that can drive improvements in anti-corruption approaches and practices

within Ukraine's public procurement of pharmaceuticals. The findings and recommendations presented in this thesis can serve as guidance for stakeholders involved in ensuring transparent, accountable, and corruption-free procurement processes are developed and properly applied.

The tasks of the master thesis were managed to be implemented, as indicated below:

1. Following the comprehensive exploration of the corruption phenomenon within the public procurement of pharmaceuticals, it was duly noted that the apparent complexity of the procurement cycle, coupled with the involvement of multiple parties and the wide magnitude of procurement activities, creates a conducive environment that exacerbates the risk of corruption. This observation further highlights the diverse manifestations of corruption at different stages of the procurement process, thereby complicating the efficacy of interventions and preventive measures applied by governments. Furthermore, the measurement of the financial costs associated with corruption in procurement poses a formidable challenge, impeding a comprehensive understanding of its far-reaching impact. It is crucial to acknowledge that corruption in procurement can have significant consequences of a financial, economic, and social nature. These repercussions include the erosion of public trust, the proliferation of counterfeit products, and the potential endangerment of patient safety and public health.

2. The response of Ukraine to the pervasive issue of corruption has been substantial and noteworthy. This is evident at the governmental level through the implementation of comprehensive anti-corruption reform and the establishment of key anti-corruption institutions. With regard to the public procurement domain, Ukraine has undergone a significant transformation since 2014, spurred by the Revolution of Dignity. This transformation involved the conceptualization and enactment of a series of laws that reshaped the procurement landscape, particularly in the healthcare sector. Notably, the Ministry of Health was deprived of its role as the purchaser, and the responsibility for procurement was transferred to specialized international

organizations. Subsequently, the independent National Agency "Medical Procurement of Ukraine" emerged as the primary overseeing body for procurement activities within the healthcare industry. The agency adheres to globally recognized anti-corruption practices and standards. Furthermore, the introduction of the ProZorro system has been instrumental in ensuring transparency and fairness throughout the procurement process. Nonetheless, despite the implementation of comprehensive measures, the risk of corruption remains persistent, particularly in light of the unstable circumstances associated with the ongoing war in Ukraine, resulted martial law and special legal conditions.

3. According to the performed research, this thesis summarizes several crucial aspects that are instrumental in minimizing corruption risks in the procurement of pharmaceuticals. The implementation of high transparency standards throughout the procurement cycle emerges as a vital factor, encompassing the principles of transparency, integrity, accountability, monitoring, and oversight. These principles serve as foundational pillars within any all-around anti-corruption strategy. To ensure effective implementation, it is imperative to clearly define these principles at a country government level and adapt corresponding measures that align with the specific context of the country's procurement cycle.

4. Detecting and preventing corrupt practices at all levels of public procurement represents a primary focus area, and the utilization of modern digital technologies can play a pivotal role in this regard. Systematic Risk Assessment continues to hold importance and can be enhanced through digitalization in conjunction with a Decision Support System (DSS), fostering the creation of a unified ecosystem. This would involve the assessment of identified risks and enable public officials to make informed decisions pertaining to individuals or companies involved in corrupt practices, which may be possible through DSS undertaking.

5. The emphasis on Data Science is paramount, as it can advance corruption monitoring in public procurement. Emerging technologies such as Artificial Intelligence, Machine Learning, and Blockchain exhibit significant potential in

developing a robust risk monitoring system. While some of these technologies may be already in the planning or early implementation stages with some functionality in Ukraine, there is still a lack of comprehensive assessments to evaluate the effectiveness and desired outcomes of the algorithms and models applied through these technologies.

6. Therefore, conducting independent analysis and assessment becomes imperative to assess these modern digital technologies and ensure that usage and implementation in Ukraine are aligned with their full potential and accuracy. By incorporating these observations and recommendations into the procurement process, Ukraine can enhance its anti-corruption efforts in the pharmaceutical sector and foster a more transparent and accountable environment. It is essential for policymakers and relevant stakeholders to actively evaluate and adapt digital technologies, ensuring their alignment with the goals of reducing corruption risks, anti-corruption strategy, and achieving the intended purpose in the procurement of pharmaceuticals.

REFERENCES

1. Aidt, T. S. (2003). Economic Analysis of Corruption: A Survey. *The Economic Journal*, *113*(491), F632–F652. https://doi.org/10.1046/j.0013-0133.2003.00171.x

2. Almici, A. (2015). *Does EU Anti-Corruption Regulation Work? The Case of Pharmaceutical Industry*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2886339

3. Andvig, J. (2011). *ANTI-CORRUPTION IN PUBLIC PROCUREMENT. BALANCING THE POLICIES. CENTER FOR THE STUDY OF DEMOCRACY. https://csd.bg/fileadmin/user_upload/publications_library/files/2011/2011_11_Anti-Corruption_in_Public.pdf*

4. Aarvik, P. (2019). *Artificial Intelligence – a promising anti-corruption tool in development settings? U4 Anti-Corruption Resource Centre. https://www.u4.no/publications/artificial-intelligence-a-promising-anti-corruption-tool-in-development-settings*

5. Ash, E., Galletta, S., & Giommoni, T. (2020). A Machine Learning Approach to Analyzing Corruption in Local Public Finances. *ETH Zurich*. https://doi.org/10.3929/ethz-b-000414608

6. Bondarenko, O. V., Utkina, M. S., Dumchikov, M., Prokofieva-Yanchylenko, D., & Yanishevska, K. D. (2021). Review of the state anti-corruption institutions effectiveness in Ukraine. *Revista Amazonía Investiga*, *10*(38), 219–233. https://doi.org/10.34069/ai/2021.38.02.22

7. Batyrgareieva, V. (2019). Corruption in medical sphere of Ukraine: current situation and ways of prevention. PubMed. https://pubmed.ncbi.nlm.nih.gov/31622272/

8. *Corruption Risk Assessment Methodology*. (2019, December). Secretariat of the National Anti-Corruption Council, Analytical Department of the Ministry of

Justice of Georgia. https://archive.justice.gov.ge/Multimedia%2FFiles%2Ftamar-tomaradze%2FCorruption%20Risk%20Assessment%20Methodology..pdf

9. *Corruption Risk Assessment. Topic Guide*. (n.d.). Transparency International. https://knowledgehub.transparency.org/assets/uploads/kproducts/Corruption_Risk_Assessment_Topic_Guide.pdf

10. *Corruption risk management*. (n.d.). U4 Anti-Corruption Resource Centre. https://www.u4.no/topics/corruption-risk-management/basics

11. Dikmen, S., & Çiçek, H. G. (2022). Fighting against Corruption and Bribery in Public Procurements during the Covid-19 Pandemic. *ResearchGate*. https://doi.org/10.13140/RG.2.2.25064.75520

12. Ema. (n.d.). *Counterfeit medicine*. European Medicines Agency. https://www.ema.europa.eu/en/glossary/counterfeit-medicine

13. *Examples of procurement compliance checklists*. (n.d.). U4 Anti-Corruption Resource Centre. https://www.u4.no/publications/examples-of-procurement-compliance-checklists

14. *FAQ| NABU official website*. (n.d.). https://nabu.gov.ua/en/about-the-bureau/zasadi-roboti/zapytannya-vidpovidi/

15. Ferwerda, J., Deleanu, I., & Unger, B. (2017). Corruption in Public Procurement: Finding the Right Indicators. *European Journal on Criminal Policy and Research, 23*(2), 245–267. https://doi.org/10.1007/s10610-016-9312-3

16. Glynn, E. H. (2022). Corruption in the health sector: A problem in need of a systems-thinking approach. *Frontiers in Public Health, 10*. https://doi.org/10.3389/fpubh.2022.910073

17. *Guide to identify corruption risks in public procurement using data science*. (2021, December 9). INTER-AMERICAN NETWORK OF GOVERNMENT PROCUREMENT. http://ricg.org/wp-content/uploads/2023/01/Guide-to-identify-corruptions-risks-in-public-procurement-using-data-science.pdf

18. Hanf, M., Van-Melle, A., Fraisse, F., Roger, A., Carme, B., & Nacher, M. (2011). Corruption Kills: Estimating the Global Impact of Corruption on Children Deaths. *PLOS ONE*, *6*(11), e26990. https://doi.org/10.1371/journal.pone.0026990

19. *Health sector corruption. Practical recommendations for donors.* (2020). U4 Anti-Corruption Resource Centre. https://www.u4.no/publications/health-sector-corruption

20. *ISO 31000:2018(en) Risk management — Guidelines*. (n.d.). ISO. https://www.iso.org/obp/ui/#iso:std:iso:31000:ed-2:v1:en

21. Ministry of Health of Ukraine. (2018, May 24). Відповіді на поширені питання про міжнародні закупівлі. https://www.kmu.gov.ua/news/vidpovidi-na-poshireni-pitannya-pro-mizhnarodni-zakupivli

22. Köbis, N. C., Starke, C., & Rahwan, I. (2022). The promise and perils of using artificial intelligence to fight corruption. *Nature Machine Intelligence*, *4*(5), 418–424. https://doi.org/10.1038/s42256-022-00489-1

23. Kobylnik, D. A. (2019). Legal regulation of public procurement in Ukraine. *Pravo Ta Ìnnovacìjne Suspìl'stvo*, *2 (13)*. https://doi.org/10.37772/2309-9275-2019-2(13)-11

24. Kohler, J. C., & Dimancesco, D. (2020). The risk of corruption in public pharmaceutical procurement: how anti-corruption, transparency and accountability measures may reduce this risk. *Global Health Action*, *13*(sup1), 1694745. https://doi.org/10.1080/16549716.2019.1694745

25. Kohler, J. C., Mrazek, M., & Hawkins, L. (2007). Corruption and Pharmaceuticals, Strengthening Good Governance to Improve Access. *ResearchGate*. https://www.researchgate.net/publication/265066655_Corruption_and_Pharmaceuticals_Strengthening_Good_Governance_to_Improve_Access?enrichId=rgreq-23bbdb83a5ae6e48025a264ff9831224-XXX&enrichSource=Y292ZXJQYWdlOzI2NTA2NjY1NTtBUzoyNjMzNjUxNzYwNjYwNDhAMTQzOTgwMjU1OTc5Mg%3D%3D&el=1_x_3&_esc=publicationCoverPdf

26. Králiková, M. (2021). Importing EU norms: the case of anti-corruption reform in Ukraine. *Journal of European Integration*, *44*(2), 245–260. https://doi.org/10.1080/07036337.2021.1872559

27. *Legal rules and implementation*. (n.d.). Internal Market, Industry, Entrepreneurship and SMEs. https://single-market-economy.ec.europa.eu/single-market/public-procurement/legal-rules-and-implementation_en

28. Mackey, T. K., & Cuomo, R. E. (2020). An interdisciplinary review of digital technologies to facilitate anti-corruption, transparency and accountability in medicines procurement. *Global Health Action*, *13*(sup1), 1695241. https://doi.org/10.1080/16549716.2019.1695241

29. *MANAGING CORRUPTION RISK IN THE PUBLIC PROCUREMENT CYCLE*. (2020, June). French Anti-Corruption Agency. https://www.economie.gouv.fr/files/files/directions_services/dae/doc/Guide_Risque_Corruption-English.pdf

30. *NACP's Powers | National Agency on Corruption Prevention*. (2020, November 9). National Agency on Corruption Prevention. https://nazk.gov.ua/en/about-nacp-2/nacp-s-powers/

31. OECD. (2019, December 20). Reforming ISSSTESON's Public Procurement for Sustainability. OECD iLibrary. https://doi.org/10.1787/a6ee30a8-en

32. Piniazhko, O., Zaliska, O., & Ilyk, R. (2018). Pharmaceutical system in Ukraine: Implementation of external reference pricing, reimbursement programs and. *ResearchGate*. https://www.researchgate.net/publication/327499093_Pharmaceutical_system_in_Ukraine_Implementation_of_external_reference_pricing_reimbursement_programs_and_health_technology_assessment

33. Popescu, A. (2014). *PUBLIC PROCUREMENT CORRUPTION IN THE EUROPEAN UNION*. Questa Soft. https://www.ceeol.com/search/article-detail?id=513534

34. Popescu, A. I. (2016). *An overview of European good practices in public procurement. Questa Soft.* https://www.ceeol.com/search/article-detail?id=511171

35. *Preventing Corruption in Public Procurement*. (2016). OECD. https://www.oecd.org/gov/ethics/Corruption-Public-Procurement-Brochure.pdf

36. *Public procurement of medicinal products. Common legislation but diverging implementation approaches throughout the EU*. (n.d.). Bird & Bird. https://www.twobirds.com/-/media/pdfs/white-papers/public-procurement-of-medicinal-products.pdf

37. Rabuzin, K., & Modrušan, N. (2019). *Prediction of Public Procurement Corruption Indices using Machine Learning Methods*. https://doi.org/10.5220/0008353603330340

38. *REPORT FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT. EU ANTI-CORRUPTION REPORT*. (n.d.). EUR-lex. https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A52014DC0038

39. *REPORT ON IMPLEMENTATION OF THE ASSOCIATION AGREEMENT BETWEEN UKRAINE AND THE EUROPEAN UNION*. (2022). Урядовий Портал. https://eu-ua.kmu.gov.ua/sites/default/files/inline/files/zvit_pro_vykonannya_ugody_pro_asociaciyu_za_2022_rik.pdf

40. *Compliance Control Service. (n.d.). State Enterprise "Medical Procurement of Ukraine." https://medzakupivli.ethics.help/web/en*

41. Rodriguez, M. J., Montequín, V. R., Ballesteros-Pérez, P., Love, P. E., & Signor, R. (2022). Collusion detection in public procurement auctions with machine learning algorithms. *Automation in Construction, 133*, 104047. https://doi.org/10.1016/j.autcon.2021.104047

42. Ryabtsev, K. (2023, January 9). *Blockchain in E-Tendering Systems: A New Anti-Corruption Technique or A False Hope*. Vrije Universiteit Amsterdam. https://research.vu.nl/en/publications/blockchain-in-e-tendering-systems-a-new-anti-corruption-technique

43. Sommersguter-Reichmann, M., Wild, C., Stepan, A., Reichmann, G., & Fried, A. (2018). Individual and Institutional Corruption in European and US Healthcare: Overview and Link of Various Corruption Typologies. *Applied Health Economics and Health Policy*, *16*(3), 289–302. https://doi.org/10.1007/s40258-018-0386-6

44. Tessa Huis in ’t Veld. (2018, June). *Corruption and Performance in the Healthcare Services of European Member States: An Empirical Analysis*. https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=0CAIQw7AJahcKEwjAnrOsr63_AhUAAAAAHQAAAAAQAw&url=https%3A%2F%2Fthesis.eur.nl%2Fpub%2F44877%2FHuis-in-t-Veld-Tessa.pdf&psig=AOvVaw1zF3Wx9k3xhcW9D6p3bwxF&ust=1686097109989014

45. *The credibility of corruption statistics*. (2021). U4 Anti-Corruption Resource Centre. https://www.u4.no/publications/the-credibility-of-corruption-statistics

46. *The Ignored Pandemic*. (2019). Transparency International UK. https://www.transparency.org.uk/publications/ignored-pandemic

47. The Royal Institute of International Affairs, Chatham House. (2018). *Are Ukraine’s Anti-corruption Reforms Working?* https://www.chathamhouse.org/2018/11/are-ukraines-anti-corruption-reforms-working

48. Transparency International. (2006a). *Global Corruption Report 2006: Corruption and health - Publications*. Transparency.org. https://www.transparency.org/en/publications/global-corruption-report-2006-corruption-and-health

49. Transparency International. (2006b). *Handbook for curbing corruption in public procurement - Publications*. Transparency.org. https://www.transparency.org/en/publications/handbook-for-curbing-corruption-in-public-procurement

50. Transparency International. (2009). *Approaches to corruption in drug management*. Anti-Corruption Resource Center. https://www.u4.no/publications/approaches-to-corruption-in-drug-management.pdf

51. Transparency International. (2010). *Working Paper 05/2010: Corruption and public procurement - Publications*. Transparency.org. https://www.transparency.org/en/publications/working-paper-05-2010-corruption-and-public-procurement

52. Transparency International. (2013). *Tools to reduce private sector engagement in grand corruption during the award of public contracts, concessions and licenses*. Anti-Corruption Resource Center. https://knowledgehub.transparency.org/assets/uploads/helpdesk/369_Tools_to_reduce_private_sector_engagement_in_grand_corruption.pdf

53. Transparency International. (2020a, April 2). *Curbing Corruption In Public Procurement: A Practical Guide - Publications*. Transparency.org. https://www.transparency.org/en/publications/curbing-corruption-in-public-procurement-a-practical-guide

54. Transparency International. (2020b, April 27). *Procuring for life - News*. Transparency.org. https://www.transparency.org/en/news/procuring-for-life

55. Ukraine, T. (2017, July 13). *"Медичні закупівлі в ProZorro: експрес обстеження" – дослідження ТІ Україна - Трансперенсі Інтернешнл Україна*. Трансперенсі Інтернешнл Україна - Знизити Рівень Корупції. https://ti-ukraine.org/news/medychni-zakupivli-v-prozorro-ekspres-obstezhennia-doslidzhennia-ti-ukraina/

56. *Updated Study on Corruption in the Healthcare Sector*. (2017). European Commission. https://home-affairs.ec.europa.eu/system/files/2020-09/20170928_study_on_healthcare_corruption_en.pdf

57. Chaprak, Y. V. (2022). Особливості публічних закупівель під час війни: кейс України. European Organization for Nuclear Research. https://doi.org/10.5281/zenodo.7489910

58. Velasco, R. B., Carpanese, I., Interian, R., Neto, O. B., & Ribeiro, C. C. (2021). A decision support system for fraud detection in public procurement. *International Transactions in Operational Research*, *28*(1), 27–47. https://doi.org/10.1111/itor.12811

59. Vian, T. (2020). Anti-corruption, transparency and accountability in health: concepts, frameworks, and approaches. *Global Health Action*, *13*(sup1), 1694744. https://doi.org/10.1080/16549716.2019.1694744

60. *World Bank Open Data*. (n.d.). World Bank Open Data. https://data.worldbank.org/indicator/SH.XPD.CHEX.GD.ZS

61. World Health Organization. (2019). *Reinforcing the focus on anti-corruption, transparency and accountability in national health policies, strategies and plans*. https://apps.who.int/iris/handle/10665/326229

62. World Health Organization. Regional Office for Europe. (2016). *Challenges and opportunities in improving access to medicines through efficient public procurement in the WHO European Region*. https://apps.who.int/iris/handle/10665/344000

63. Zdyrko, N. (2020). PRINCIPLES OF PUBLIC PROCUREMENT IN UKRAINE. *Včenì Zapiski Tavrìjs'kogo Nacìonal'nogo Unìversitetu Ìmenì V.Ì. Vernads'kogo*, *1*(70). https://doi.org/10.32838/2523-4803/70-1-39

64. *Anti-Corruption Strategy for 2021-2025. (n.d.). Національне Агенство З Питань Запобігання Корупції. https://nazk.gov.ua/wp-content/uploads/2022/08/Antykoruptsijna-strategiya-na-2021-2025-rr.pdf*

65. Білик, О. І. (2016). *ОБГРУНТУВАННЯ ШЛЯХІВ ПОДОЛАННЯ КОРУПЦІЇ У СФЕРІ ОХОРОНИ ЗДОРОВ'Я*. О І Білик | Державне Управління: Удосконалення Та Розвиток №10 2016. http://www.dy.nayka.com.ua/?op=1&z=1008

66. *ЗАКОН УКРАЇНИ Про публічні закупівлі*. (n.d.). LIGA 360. https://ips.ligazakon.net/document/T150922

67. Злагода, В. С., Германюк, Т. А., Бобрицька, Л. О., Шпичак, О. С., & Назаркіна, В. М. (2022). Analysis of centralized public procurement of medicines in Ukraine with the involvement of international organizations. *Farmatsevtychnyĭ Zhurnal*, *2*, 48–60. https://doi.org/10.32352/0367-3057.2.22.05

68. Karabin, T. (2021). *ПРИНЦИПИ ЗДІЙСНЕННЯ ПУБЛІЧНИХ ЗАКУПІВЕЛЬ*. https://dspace.uzhnu.edu.ua/jspui/handle/lib/39004

69. *Медзакупівлі України отримали міжнародний сертифікат за антикорупційним стандартом ISO 37001:2016. (2022, November 23). State Enterprise "Medical Procurement of Ukraine" https://medzakupivli.com/uk/pro-mzu/novini/28873-medzakupivli-ukrainy-otrymaly-mizhnarodnyi-sertyfikat-za-antykoruptsiinym-standartom-iso-370012016*

70. *Наказ МОЗ України від 04.08.2020 № 1781 "Про утворення та принципи формування наглядової ради державного підприємства «Медичні закупівлі України»."* (n.d.). Міністерство Охорони Здоров'я України. https://moz.gov.ua/article/ministry-mandates/nakaz-moz-ukraini-vid-04082020--1781-pro-utvorennja-ta-principi-formuvannja-nagljadovoi--radi-derzhavnogo-pidpriemstva--medichni-zakupivli-ukraini

71. *Наказ МОЗ України від 28.09.2020 № 2211" Про затвердження Положення про наглядову раду державного підприємства «Медичні закупівлі України»".* (n.d.). Міністерство Охорони Здоров'я України. https://moz.gov.ua/article/ministry-mandates/nakaz-moz-ukraini-vid-28092020--2211-pro-zatverdzhennja-polozhennja-pro--nagljadovu-radu-derzhavnogo-pidpriemstva-medichni-zakupivli-ukraini

72. Національне агенство з питань запобігання корупції. (n.d.). *ТИПОВІ КОРУПЦІЙНІ РИЗИКИ У ПУБЛІЧНИХ ЗАКУПІВЛЯХ. СТРАТЕГІЧНИЙ АНАЛІЗ КОРУПЦІЇ.* https://nazk.gov.ua/wp-content/uploads/2021/03/Typovi-koruptsijni-ryzyky-v-publichnyh-zakupivlyah-1.pdf

73. Nikolov, Y. (2023). Тилові пацюки Міноборони під час війни «пиляють» на харчах для ЗСУ більше, ніж за мирного життя. Дзеркало Тижня | Mirror Weekly. https://zn.ua/ukr/economic-security/tilovi-patsjuki-minoboroni-pid-chas-vijni-piljajut-na-kharchakh-dlja-zsu-bilshe-nizh-za-mirnoho-zhittja.html

74. *Плани роботи*. (n.d.). Державне Підприємство «Медичні Закупівлі України». https://medzakupivli.com/uk/antykoruptsiina-diialnist/plani-roboti

75. *Про затвердження Положення про Спеціалізовану антикорупційну прокуратуру Офісу Генерального прокурора*. (n.d.). LIGA 360. https://ips.ligazakon.net/document/GP20040

76. Demchenko, I. S. (2019, December 5). КОРУПЦІЯ ТА ГРОМАДСЬКЕ ЗДОРОВ'Я: ТОЧКИ ДОТИКУ ТА ПРАВОВЕ РЕГУЛЮВАННЯ. Науково-дослідний Інститут Вивчення Проблем Злочинності Імені Академіка В.В. Сташиса. https://ivpz.kh.ua/wp-content/uploads/2019/12/Круглий-стіл_Реформування_СОЗ_5.12.2019_3.pdf

77. *Dziuba, A. Y. (2019, December 5). УПРАВЛІННЯ КОРУПЦІЙНИМИ РИЗИКАМИ ЯК НЕВІД'ЄМНИЙ ЕЛЕМЕНТ ЗАПОБІГАННЯКОРУПЦІЇ У ФАРМАЦЕВТИЧНОМУ СЕКТОРІ. Науково-дослідний Інститут Вивчення Проблем Злочинності Імені Академіка В.В. Сташиса. https://ivpz.kh.ua/wp-content/uploads/2019/12/Круглий-стіл_Реформування_СОЗ_5.12.2019_3.pdf*

78. Sinichkina, L. (2020). Руйнування корупційних схем у медичних закупівлях: зробити неможливе. Юрист & Закон. https://uz.ligazakon.ua/ua/magazine_article/EA014262

79. Тосько, Р. Р. (2017). Кластерний аналіз корупційних ризиків публічних закупівель на макро-, мезо-, мікрорівнях для стабілізації економічної безпеки України. *Державно-управлінські Студії*. http://www.irbis-nbuv.gov.ua/cgi-bin/irbis_nbuv/cgiirbis_64.exe?I21DBN=LINK&P21DBN=UJRN&Z21ID=&S21REF=10&S21CNR=20&S21STN=1&S21FMT=ASP_meta&C21COM=S&2_S21P03=FILA=&2_S21STR=deruprs_2017_1_13

80. *УГОДА ПРО АСОЦІАЦІЮ між Україною, з однієї сторони, та Європейським Союзом, Європейським співтовариством з атомної енергії і їхніми державами-членами, з іншої сторони*. (n.d.). LIGA 360. https://ips.ligazakon.net/document/mu14097z?an=2

81. Shatkovsky, O. (2016, December). *КОМЕНТАРІ ДО ЗАКОНОДАВСТВА УКРАЇНИ ПРО ПУБЛІЧНІ ЗАКУПІВЛІ*. https://infobox.prozorro.org/upload/files/main/980/555/zvitkomentar-122016-final-2.pdf