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**Igor Oliychenko**, Doctor of Public Administration, professor Chernihiv National University of Technology, Chernigov, Ukraine

## PROCUREMENT AUTOMATION AS A MECHANISM TO SUPPORT THE PARTICIPATION OF ENTERPRISES IN OPEN BIDDING IN CONDITIONS OF INCREASED COMPETITION

**І.М. Олійченко**, д.держ.упр., професор Чернігівський національний технологічний університет, м. Чернігів, Україна

## АВТОМАТИЗАЦІЯ ЗАКУПІВЕЛЬ ЯК МЕХАНІЗМ ПІДТРИМКИ УЧАСТІ ПІДПРИЄМСТВ У ВІДКРИТИХ ТОРГАХ В УМОВАХ ПОСИЛЕННЯ КОНКУРЕНЦІЇ

The article examines the features of procurement automation as a mechanism for improving the enterprise's activities, considers the work of the electronic procurement system ProZorro as a tool to increase accountability and transparency, reduce corruption and improve the business climate in Ukrainian enterprises. The ProZorro system operates on the basis of a hybrid cloud. The central ProZorro web portal contains an e-auction module and a central database hosted on a cloud server. Access to the eauction system is through electronic platforms. New opportunities are being added to the e-procurement system: through the introduction of monitoring and analytics, training and sales modules. It is potentially possible to develop services in the system because it is flexible and allows you to increase or decrease the needs of the services provided. The procurement process from the customer, in addition to placing the announcement on the electronic platform and conducting the tender, determining the winner and concluding the contract, consists of many stages - planning, justifying the need to purchase, including it in the financial plan, requirements for tender documents. In order to coordinate work in this direction, the enterprise should develop procurement regulations, identifying those responsible for the preparation of a particular area of procurement, means of communication between these persons, identify priority areas and schedule when and what will be purchased. The author identified the shortcomings of the ProZorro system, considered the prospects for its improvement, explored the legal framework for e-procurement and important steps towards harmonization of Ukrainian legislation with European standards. Qualitative planning of the procurement process from the customer will contribute to the improvement of procurement. This will effectively distribute responsibilities among employees, establish links between departments, structure paperwork, optimize the process of drawing up and approving a procurement plan, justify procurement needs, help to correctly determine its subject and facilitate timely and correct preparation of tender documents at the enterprise. The proposed changes are aimed at improving the electronic procurement system and increasing liability for violations of applicable law.

Keywords: public procurement, electronic system, harmonization of legislation, monitoring, accountability, transparency, reduction of corruption, tender, open bidding.

У статті досліджуються особливості автоматизації закупівель як механізму удосконалення діяльності підприємства, розглядається робота системи електронних закупівель ProZorro як інструменту підвишення підзвітності та прозорості, зменшення рівня корупції та поліпшення бізнес-клімату у підприємствах України,. Система "ProZorro' функціонує на основі гібридної хмари. Центральний портал "ProZorro" містить модуль електронного аукціону та центральну базу даних, розміщену на хмарному сервері. Доступ до системи електронних аукціонів здійснюється через електронні майданчики. До системи електронних закупівель додаються нові можливості: завдяки впровадженню модулів моніторингу та аналітики, навчання та продажів. Потенційно в системі можливо розвивати послуги, оскільки вона  $\epsilon$ еластичною та дає змогу збільшувати або зменшувати за потреби послуги, що надаються. Закупівельний процес у замовника, крім безпосередньо розміщення ним оголошення на електронному майданчику та проведення тендеру, визначення переможця та укладання договору, складається ще з багатьох етапів – планування, обтрунтування необхідності закупівлі, включення її до фінансового плану, складання вимог до тендерної документації. Для того, щоб скоординувати роботу в цьому напрямку, підприємство має розробити регламент проведення закупівель, визначивши відповідальних осіб за підготовку того чи іншого напрямку здійснення закупівель, засоби комунікації між цими особами, виділити пріоритетні напрямки та розписати коли і що буде купуватися. Автором виявлено недоліки системи ProZorro, розглянуто перспективи її поліпшення, досліджено нормативно-правове забезпечення електронних закупівель та вагомі кроки до гармонізації законодавства України з європейськими стандартами. Удосконаленню проведення закупівель сприятиме якісне планування закупівельного процесу у замовника. Це дозволить ефективно розподілити обов'язки серед співробітників, налагодить зв'язки між підрозділами, структурує документообіг, оптимізує процес складання та затвердження плану закупівель, обірунтує потреби в закупівлі, допоможе правильно визначити її предмет і сприятиме вчасній і правильній підготовці тендерної документації на підприємстві. Запропоновані зміни спрямовані на вдосконалення електронної системи закупівель та збільшення відповідальності за порушення чинного законодавства.

Ключові слова: публічні закупівлі, електронна система, гармонізація законодавства, моніторинг, підзвітність, прозорість, зменшення рівня корупції, тендер, відкриті торги.

**Problem statement.** The effectiveness of the institution of public procurement is largely determined by the prospects for economic growth in the state and the performance of commercial enterprises. The formation of the public procurement system in different countries of the world did not occur simultaneously and depended significantly on the development of the private and public sectors of the economy and the legal framework. In most developed countries of the world, the institution of public procurement has been formed and has a long history of evolutionary development.

Applying competitive methods of determining suppliers, the enterprise seeks to make the most rational choice of profitable offers, both in terms of price and other technical and commercial conditions. The use of these tools in bulk purchases makes it possible to achieve several solutions to reduce the cost of the products required by the customer, to ensure a higher level of transparency and controllability of the purchase and sale process, and ultimately to resist corruption.

The system of public electronic procurement was introduced in Ukraine in 2016 with the entry into force of Law № 922 of Ukraine "On Public Procurement" dated 25.12.2015. The system ensured the transfer of all tenders to the electronic procurement system "ProZorro", transparency of the procurement process and contributed to the reduction of corruption risks. For more than three years, the system has shown significant results in saving public funds, reduced the possibility of corruption in public procurement, simplified paperwork and ensured openness of procurement for all participants, availability and clarity of information about the announced competition, provided open information about the winner. However, there are still issues of both regulatory and technical nature that need to be finalized for the successful implementation of public procurement reform.

Analysis of recent research and publications. The development of the public procurement system has been studied by a large number of domestic and foreign scientists, including Afanasieva R., Ovramets Yu., Sevostyanova G., Kvach V., Tsymbalenko J., Melnikov O., Smyrychynsky V., Tkachenko N., Umantsiv Yu., Shatkovsky O. and others. Theoretical bases of procurement were investigated by Germanchuk P., Galushchak M., Mytsyk O., Pinkas G., Shatkovsky, Khramkin A. The practical aspects of public procurement were investigated by Kaidash T., O. Ovsyanyuk O., Melnikov O., Smyrychynsky V., Tkachenko N., and others. Problems of improving the public procurement system were studied by Alexandrov V., Vorona O., Dyshkant O., Minyailo O., Basantsov I., and others.

Allocation of the unsolved earlier parts of the overall problem. Despite a large number of studies of the procurement system, especially from the standpoint of public administration, where this system is seen as an important tool for public policy, a significant number of problems of application of this system by enterprises using modern information technology. This issue is still insufficiently studied.

The aim of the paper is to analyze the procurement system, identify problems of its development and find ways to modernize it according to the needs of enterprises through the use of information and communication technologies that ensure openness and transparency in conditions of increased competition.

The main results of the study. The e-procurement system is considered a tool that increases accountability and transparency in the management of an organization, reduces corruption in procurement and improves the business climate in the country. In Ukraine, the transition to the electronic system ProZorro was made in 2016 with the assistance of the public organization "Transparency International Ukraine". Initially, it was launched as a pilot project, and after successful testing on August 1, 2016, the system became mandatory for all government agencies [1].

The electronic procurement system has been reformed to achieve five main goals: reducing corruption, increasing the transparency and accessibility of the procurement system, ensuring system reliability, cost-effectiveness and resilience [14].

There are three stages in the procurement process:

- 1. determining the customer's needs for goods, works or services (procurement planning);
- the process of placing an announcement for the purchase of relevant goods, works or services, qualification of the supplier (including an auction for competitive procedures) and signing the contract;
- 3. direct execution of the signed contract.

The electronic procurement system means an information and telecommunication system that provides for procurement procedures, creation, placement, publication and exchange of information and documents in electronic form, which includes a web portal of the Authorized Body, authorized electronic platforms, between which the automatic exchange of information and documents [7].

Electronic procurement in the system ProZorro begins with the stage of announcing the procurement and continues until the signing of documentation with the winner after the tender. The preliminary stage of planning the procurement activities of the participants in the process, determining the subject of procurement, its characteristics, quality requirements and further implementation of the contract is outside the cycle of electronic procurement [3].

The web portal of the Authorized Body for Procurement is an information and telecommunication system, which includes an electronic auction module and a database. This module is a part of the electronic procurement system and provides creation, storage and publication of all information on procurement, electronic auction, automatic exchange of information and documents and use of services with automatic exchange of information, which is accessed via the Internet. Ensuring the functioning of the web portal of the Authorized Body is carried out, inter alia, by providing authorized electronic platforms with paid access to the electronic auction module and database. The procedure for granting access and the amount of the fee shall be established by the Cabinet of Ministers of Ukraine [13].

The ProZorro system operates on the basis of a hybrid cloud approach. There is a central ProZorro procurement web portal with an e-auction module and a central database hosted on a cloud server. Access to the centralized system of electronic auctions is carried out through electronic platforms (there are currently 22 authorized electronic platforms) [17]. The technical core of the system consists of OpenProcurement tools: Central database and API. OpenProcurement is a toolkit for open source e-procurement NOSCHL. It was first used for ProZorro using the OpenContractingData Standard [4]. Participants can choose any electronic platform - all sites provide registration of customers and participants in procurement, automatic placement, receipt and transmission of information and documents during procurement procedures. Customers and participants in the field of public procurement can change information and documents on procurement only through authorized electronic platforms [14].

Purchases can be tracked across any element of the system, as information is published simultaneously on both platforms and a central web portal. This tracking allows viewing the same procurement publications at any level of the system [16]. Monitoring of the public procurement system became possible due to the introduction of the module of visualization and data aggregation (BI) based on QlikView software [4].

For users' needs, there are two versions of the modules - a public analytics module and a professional (closed) module, which requires prior licensing. The content of the modules is quite similar and presents all the information in the form of visualized data of the central database, which is easy to view. However, the generation of new data samples is possible only in a closed professional analytics module [18].

A public analytics module is a unique tool that allows you to control the public procurement system on the basis of systematic data: by types of tendering procedures, in terms of information about organizers and participants, to analyze tenders, requirements and complaints. According to the public analytics module, 3.37 million tenders have been concluded with the help of the electronic procurement system in Ukraine since 2015, which has saved the state UAH 93.52 billion. The module contains information on purchases in ProZorro since 2015, which allows government agencies to track their purchases or purchases of subordinate institutions, find problem areas and ways to solve them. Bidders or potential bidders can evaluate the market, customers, competitors to make more effective decisions in the future. The closed module is focused on the internal use of the system by government agencies, law enforcement agencies, NGOs and journalists - it allows you to build on all the data of the system to build user-defined graphs, tables or even indicators.

The DoZorro monitoring portal is also an effective tool. This is a platform on which each participant in the procurement process has the opportunity to file a complaint to the supervisory authority, analyze the procurement of a particular institution, evaluate a specific procurement. The portal houses the offices of customers and monitoring organizations, it provides instructions and templates for appeals, has a number of analytical tools.

The DoZorro website presents an interactive tool for finding additional deals in Prozorro, which helps to detect overpricing of the tender after the bidder's victory; a tool for monitoring prices; schemes of the procurement process in "Prozorro" and the methodology of creating tender documentation, which aim to help users and participants in procurement in understanding the algorithm of public procurement. In addition to the above-mentioned web tools, data from the public e-procurement system are indirectly used by a number of public anti-corruption initiatives - a comprehensive analytical portal "Anti-Corruption Monitor", research of funds through "E-data", research of participants through "Opendatabot", search and analytical system "007" and analytical system "YouControl" [5].

Due to the huge amount of funds associated with government procurement of goods, works and services, this important area of activity creates fertile ground for corruption offenses and abuses. In many cases, it is difficult to prove that there was a deliberate violation of the law, although procurement results indicate signs of a conspiracy. Sometimes legislation is violated without malice due to insufficient qualifications of members of competitive bidding committees, poor knowledge of legislation, lack of time for procurement, and so on. Corruption offenses in the field of public procurement take place both by managers of public funds and by bidders [11].

According to the Ministry of Economic Development, Trade and Agriculture of Ukraine [12], the most common abuses are the intentions of customers to purchase goods from a certain predetermined manufacturer. In turn, this result can be achieved both by avoiding competitive procurement procedures and by giving an illegal advantage to one of the bidders [9].

Conducting open bidding by the customer organization is also not a guarantee of fair competition between suppliers of goods, works and services. Abuses in the conduct of competitive bidding begin from the moment of providing information about the bidding and preparation of tender documents. The most common of these are [11]:

- establishment of vague or too strict qualification requirements for participants in the tender documentation;
- the fuzzy, vague definition of the subject of the procurement, which does not always allow to make a correct idea of the consumer characteristics of the goods (services, works) purchased;
- artificial narrowing of the subject of procurement with an indication of the set of such technical or other consumer characteristics of the goods (services, works), which corresponds to only one manufacturer.

Another category of violations by the contracting authority is procedural violations in the process of their conduct and during the evaluation of proposals, namely:

- unreasonable rejection of bids of some of the bidders;
- illegal determination of the winner of the procurement procedure;
- providing incomplete, intentionally vague explanations on the subject and conditions of procurement in response to inquiries from interested parties;
- disclosure to a particular bidder of information on the number and identity of bids received;
- admission to the evaluation of competitive bidding proposals of those participants who do not meet the requirements of the competitive bidding documentation;
- admission to the bidding of participants who are fictitious (one-day) firms;
- falsification of documentation on competitive bidding, etc.

Significant offenses in public procurement also occur among bidders. The most common of these is a conspiracy between bidders to gain an advantage over one of them. The essence of such conspiracies is that competitors agree before bidding on who will present the "best" offer to obtain a contract. Sometimes potential bidders refrain from submitting bids at all, but more often they submit bids with deliberately inflated prices or underestimated quality indicators. The winner of the bidding determined in this way is then settled with the participants of the conspiracy by the share of the received profit indirect (cash) or indirect (subcontracts, mutual settlements) form [2].

According to the Ministry of Economic Development, Trade and Agriculture of Ukraine for 2018, the dynamics of changes in the average rate of participation in procurement and their success rate was still unsatisfactory [9]. The Ministry has developed proposals for amendments to Law № 922 in terms of harmonization of legislation with EU standards, as well as the introduction of procurement of goods using electronic catalogs [8].

Unfortunately, the transition to a new e-procurement system has not automatically led to increased transparency and competition in this area. The ProZorro system itself cannot prevent systemic violations during public procurement. There are also questions about the system itself. According to the results of surveys of system users who actively use procurement services, there are also problems with mailings and notifications of interested parties about open tenders. Ideally, thanks to the hybrid cloud approach, participants should not care about which site to work with, as they will receive the same information everywhere, but this is not entirely true [10]. In practice, the mailing list does not contain a complete shopping list, although sites are required to notify the categories of rates that users choose when registering on the site. Therefore, potential bidders are forced to register on several sites in order to receive more complete and comprehensive information in accordance with the announced purchase. This situation arises, first of all, due to the lack of legal regulation in the field of customer support of procurement and requirements for the form and organization of filling sites, which can potentially lead to corrupt practices. And since the issues of support of procurement participants by accredited sites are not regulated by law, it is possible that the information may not be sent to all users of the sites or it may not be sent in full. Also due to unregulated frequency of mailings, their filling the site manager may not be able to cope with all mailings, especially provided that several thousand applications are registered per day [4].

However, self-tracking of tenders by companies participating in tenders on accredited sites does not always solve the problem of finding procurement, because not all ads can be highlighted during filtering. The filter system is not the same for sites, and search results differ when using different electronic systems. A comparison of the number of keyword-filtered procurement advertisements on the central database and on selected authorized electronic platforms shows that none of the keywords match the search results. The study did not analyze the relevance of filtered procurement ads and did not perform additional filtering (by cost or region). What else is worth noting, having an e-procurement ID number, it can be easily found at any of the authorized sites.

However, such a number cannot always be obtained by potential tenderers, given the current system of filtering and sending procurement notices [14].

One of the problems that can lead to violations in the field of procurement is also the discrepancy between the requirements of the law and the functionality of the software platform interface. Yes, it is the ability of the customer to upload the contract without waiting for the necessary deadlines for appeals, or the ability to upload documents to the system even after the deadline for submission of tender documents.

Currently, the evaluation of efficiency in the ProZorro system is still determined by finding savings, which is the difference between the expected (planned) cost of purchasing goods, works or services and the most cost-effective offer of suppliers, service providers and contractors. The expected amount to finance the procurement is determined by customers in the annual procurement plan. And since there may be a long period of time between procurement planning and actual implementation, and high-quality forecasting, even on an annual basis, is virtually impossible for Ukraine's unstable economy, many scientists and researchers have doubts about such savings. The doubtfulness of the calculation of savings in the system ProZorro is only exacerbated by the lack of a formal methodology for determining the expected value of the subject of the procurement, which allows for potential abuse of overstatement and understatement of such value. A significant number of errors in the system and ability of customers to enter into additional agreements with an increase in the purchase price after the announcement of the winner, do not allow to trust the amount of savings and cost-efficiency in ProZorro.

The study of the elasticity of the system involves measuring its operational capabilities by increasing the number of participating companies and adding new options. The volume and structure of the public procurement market are subject to analysis. It should be noted that in the Ukrainian e-procurement system the number of registered participants is growing, as is the number of authorized sites. If at the beginning of its introduction in the electronic public procurement system in Ukraine 65844 participating companies and 20144 organizing companies took part in procurement, today 256785 participants and 38178 procurement organizers are registered in the system [18].

New features are also being added to the e-procurement system. Modules for monitoring and analytics, training and sales have appeared here. It is potentially possible to further develop services in the system, as it is flexible and allows you to increase or decrease the needs of the services provided. At the same time, issues related to the integration of the ProZorro electronic procurement system with electronic services maintained by the Ministry of Finance of Ukraine, the State Treasury and the State Fiscal Service remain relevant. Duplication of reporting forms, information on concluded contracts, on their implementation takes a lot of time and effort of government officials. Addressing these issues takes more time, given the need for concerted action with central executive bodies and the resolution of technical issues [14].

The procurement process from the customer, in addition to placing the announcement on the electronic platform and conducting the tender, determining the winner and concluding the contract, consists of many stages - planning, justifying the need to purchase, including it in the financial plan, requirements for tender documents. All this takes a lot of time, requires the joint work of many employees from different departments of the enterprise. In order to coordinate work in this direction and to increase the efficiency of procurement, efficient use of budget funds, the enterprise should develop procurement regulations, identifying those responsible for the preparation of a particular area of procurement, means of communication between these persons, identify priorities.

Procurement planning is a complex process, the correctness of which depends on the effectiveness of tenders. Numerous changes in legislation, innovations in the electronic system ProZorro also require constant attention and timely response from the customer. Judicial practice

shows that one of the most common violations in the field of public procurement is the incorrect definition of the subject of procurement. The system of procurement in each organization is different, has its own characteristics, so it is necessary to identify all possible risks in the system of management decisions in the process of public procurement.

The tender committee of the customer (or a designated authorized person) is responsible for procurement planning. The committee in the process of work ensures the preparation, approval of the annual plan, organizes and conducts procurement procedures. However, in terms of planning, in addition to the tender committee (authorized person), other employees of the customer are involved in the work, who must provide the committee with information on which procurement items are needed in the next budget year. Only then will the tender committee be able to draw up an appropriate procurement plan.

Therefore, to optimize the procurement process, the customer should develop and approve Regulations on procurement planning, focusing on several points: describe the procedure for interaction between departments during planning and implementation of procurement; the procedure for drawing up and approving the annual procurement plan, to approve the form of documents that will reflect the need for a particular subject of the procurement; identify structural units and officials who will participate in planning, their responsibilities. It is also necessary to review the document flow schedule, make changes to orders and job descriptions to avoid duplication of responsibilities and to place responsibility for individual procedures on the relevant staff [15].

The structural subdivisions of the enterprise will provide information on the needs of certain goods, works, services - will make letters, reports, calculations to the estimate, applications for procurement in the annual procurement plan, applications for procurement, which will indicate the need (what, when, how much) and the expected value of the purchased items. And only then will the tender committee be able to draw up a draft annual procurement plan, which will identify the items of procurement and the procedure and when they will be purchased. These steps will help streamline planning processes and optimize procurement in the organization - efficiently, quickly, reasonably and efficiently.

The new version of the Law "On Public Procurement", which will come into force on 19.04.2020, introduces electronic catalogs, procurement under a simplified procedure, improvement of the appeal mechanism, strengthening liability for violations of procurement legislation.

The law contains rules that should have a positive effect on increasing the number of successfully completed tenders and lead to increased competition, bring out of the shadows a large share of procurement, the main of which are [6]:

- 1. When conducting public procurement for goods, works, services from 50 thousand UAH. (currently, the threshold is UAH 200,000) ProZorro must be used in a new simplified procedure.
- 2. Payment for filing a complaint to the Antimonopoly Committee of Ukraine becomes differentiated depending on the value of the subject of procurement. It will be impossible to withdraw the complaint, which will reduce the number of unfounded appeals to delay the procurement process.
- 3. Automatic rejection of abnormally low bids, which differ by more than 40% from the average bid price at the initial stage of the auction, and/or 30% from the next. The customer will be able to additionally check with the supplier the validity of the lower price with supporting documents or calculations.
- 4. The bidder will be able to correct discrepancies in the documents identified after the opening of tender offers by the customer, within 24 hours.

- 5. In addition to the price, the concept of "life cycle cost" is introduced, which is widely used in procurement by EU countries, and helps customers to estimate the number of further costs in the operation of the subject of procurement.
- 6. There is a personal liability of officials (in particular, heads of bodies) in the form of fines from 2000 to 10000 tax-free minimum incomes) from 34000 to 170,000 UAH.
- 7. Centralized purchasing organizations are created for the purchase of standard goods in one procedure in order to reduce the cost due to a larger wholesale discount.
  - 8. Electronic catalogs of "online stores" (ProZorroMarket) are being introduced to save time. However, some provisions of the Law are not unambiguous.

The need for procurement below the lower threshold can lead to an increase in the number of complaints in the system and a significant load on the system and loss of time by customers. The economic effect of such purchases in the system due to their low cost is small. Also, the simplified procedure due to the reduction of procurement deadlines may cause the fact that not all interested suppliers will have time to respond to the announcement, simply not finding it in the system or not having time to prepare documents.

Eliminating abnormally low prices also carries dangers. For example, if three suppliers submit bids, two of which are colluding and offer higher prices than the third, the system will automatically determine the third supplier's price as abnormal. He will have a day to submit a justification, which the tender committee may accept or reject at its discretion, and since there is no legal definition of the term "validity of an anomalous price offer", it can be challenged in court. If the supplier has reduced the price due to the introduced innovative technological processes, inventions, then the justification of the price, in this case, will be the disclosure of a trade secret. The rule on the possibility for customers to correct "inconsistencies in information and/or documents" does not specify what is "inconsistency", and is contradictory.

Thus, despite the list of innovations that will certainly facilitate the work in the field of public procurement, the law does not contain real changes that would make it impossible for the customer to procure for a predetermined supplier or conspiracy between suppliers.

Transparency International Ukraine [19], after analyzing Law № 114, concluded that the amendments meet the requirements of the action plan provided for in the Association Agreement with the European Union and harmonize the domestic procurement legal framework with European Union standards and that it is generally aimed at to improve the electronic procurement system and increase liability for violations in this area. However, the real effect will become known only over time.

Conclusions. The introduction of the ProZorro system is a significant contribution to the process of improving e-procurement in Ukraine. The system has shown high results in saving public funds, reduced the possibility of corruption, simplified paperwork, ensured openness and accessibility of procurement for all participants, open information about the announced competition and the selection of the winner. The system also includes modules for monitoring and analytics, training and sales, which simplify its use by enterprises. It is possible to develop services in the system because it is flexible and allows you to increase or decrease the needs of the services provided.

At the same time, issues related to the integration of the ProZorro electronic procurement system with electronic services supported by the Ministry of Finance of Ukraine, the State Treasury and the State Fiscal Service remain unresolved. Copying reporting forms, information on concluded agreements, on their implementation requires a lot of time and effort of government officials.

The introduction of amendments to the Law on Public Procurement is a significant step towards the harmonization of Ukrainian legislation with European standards. In general, these changes are aimed at improving the electronic procurement system and increasing liability for violations.

However, at the same time, they do not solve all the problems that exist in the system. Some provisions of the Law still remain contradictory and ambiguous. Therefore, leaving room for their free interpretation, they will cause disputes between the participants in the procurement procedure, will be the cause of appeals and delays in tenders.

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Oliychenko Igor, Doctor of Public Administration, Professor, Professor of the Department of Management and Public Service, Chernihiv National University of Technology (95 Shevchenko Str., 14035 Chernihiv, Ukraine).

Олійченко Ігор Михайлович, доктор наук з державного управління, професор, професор кафедри менеджменту та державної служби, Чернігівський національний технологічний університет (вул. Шевчен ка, 95, м. Чернігів, 14035, Україна).

E-mail: oimd3@ukr.net ORCID: 0000-0001-8424-5432 Researcher ID: I-4025-2016