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Digitalisation of public procurement: The case study of Ukraine

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Abstract

Theoretical background: There is an ongoing global acceleration of automation and digitalisation in financial processes, which points to significant changes in public spending policies. After an analysis of several scientific studies, fundamental approaches have been elaborated to understand public consumption

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and the system of state purchases. The basic hypothesis for this research was to study the possible impact of the electronic procurement market ProZorro on state purchases in Ukraine. Possible directions are: increasing competitiveness, optimising state expenditures and saving the budget funds of public services based on innovative digital technology.

Purpose of the article: The main goal is to investigate the impact of the electronic public procurement system ProZorro on corruption and bureaucracy in the public sector of Ukraine. The study object is an analysis of the volume and structure of the public procurement market, the number of procedures and participants in a bidding process, and the savings amounts in ProZorro's public purchases during the study period in Ukraine.

Research methods: The following methods were used during the research of the Ukrainian electronic procurement system: dialectical method; analysis and synthesis method – for a comparison of certain types of public procurement; subthreshold and suprathreshold statistical methods – for analysing the dynamics of indicators of the domestic system of public procurement during the period under research for a comparison of the indicators of public consumption of certain ministries and departments, different regions and territorial entities; structural and logical analysis – for generalising the theoretical and methodological principles of building a public consumption system in Ukraine. The main source of data was the data and analytical base of the ProZorro electronic public procurement system.

Main findings: Effects of the innovative digital paradigm on the transparency and efficiency of public procurement are determined. Considerable attention is paid to the implementation of the electronic public procurement system ProZorro in Ukraine. The expediency is substantiated for its implementation in the national practice of budget expenditures, and the principles and procedures of implementation are analysed. The practice and dynamics of the public procurement market in Ukraine are summarised. The conclusions of the advantages of electronic system are provided, including transparency and impartiality, stimulation of competition and non-discrimination of bidding participants, reduction of corruption and the effect of reducing the savings of budget funds. Potential risks, threats and disadvantages of the ProZorro system in Ukraine are highlighted. Among them are: a high proportion of non-competitive procedures; possible latent conflict regarding the participants' interests; unreasonable time spent on individual procedures; the justification of the procurement procedure to one participant due to a dubious "urgent need"; unreasonable application of the procurement procedure to one participant due to the falsification of conditions or the division of the procurement subject; the existence of discriminatory requirements in the documentation of competitive bidding; and a lack of efficiency in the complaints handling mechanism.

Introduction

The government regulation instrument of today's economy is not only taxation. An important link in the fiscal space to stimulate national production, economic growth and public consumption is government expenses and services, including the public procurement system.

In developed countries, public procurement covers a significant share of the gross domestic product: from 8% to 21%. The effective functioning of this sector and the rational expenditure of public funds on public purposes is a strategic task for modern Ukraine and the globe. Corruption, lobbyism and a lack of transparency in the field of public consumption causes the vulnerability of state institutions, impedes socio-economic development and distorts the competitive business environment. If government expenses remain a low-grade tool for government intervention, then budgets can demonstrate deficiency at any level of tax revenues.

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The era of information technology, and especially its modern manifestation – digitalisation or digitisation – not only brings new digital objects into society, but transforms this society into network interactions and transforms the structure and format of labour, business and entrepreneurship. Under the conditions of globalisation, it is precisely the digitalisation of fisc that implicates innovative opportunities and tools for implementing public expenditure policies at a qualitatively new level.

In this article, the possibilities of applying and monitoring the electronic government procurement system are analysed as a separate fiscal policy tool. In particular, the directions of the influence of digitalisation on the transparency and efficiency of the policy of state expenditures were considered, and the development of ProZorro's state-owned e-procurement system in Ukraine under the conditions of an innovative digital trend was explored.

Literature review

Until recently, in the economic literature, the research has been primarily dominated by the field of state revenue and taxation. Government expenses and services were not of particular importance and practically no scientific research was performed in the field of public and state procurement until the beginning of the 21st century. Among the domestic and foreign scholars who actualised the problems of public expenditures and consumption, the following should be distinguished: Arrowsmith (2005), Arrowsmith, Faustino, and Heuninckx (2011), Shah (2005), Gupta, Keen, Shah, and Verdier (2017), Drucker (1985), Fisher (1997), Starzyńska (2018), Andrushchenko (2003), Yurii, Dem'anyshyn, and Kyrylenko (2013), Shmeleva and Pirozhenko (2013), and Krysovatiy (2018).

In the Ukrainian scientific discourse, public expenditures were considered through the prism of their composition and structure, along with the division into current and capital (investment) components, and the application of the program-target method of their formation stressed the need for special procedures for administrative control over budget expenditures, etc. (Yurii et al., 2013; Krysovatiy, 2018, pp. 339–345). Shah (2005) and Gupta et al. (2017) stipulate the need for the implementation of public consumption in terms of the postulates of the social welfare theory. Arrowsmith (2005, 2011) emphasised European Union legislation and experience in public procurement: approaches, directives, principles, practices, regulations, etc. Drucker (1985) explored general rules and approaches of business effectiveness that could also be applied to public consumption.

In the broad sense, the implementation of public expenditures is conditioned by the need to provide public services and, therefore, defined as the provision of certain goods and services by the state to its citizens to promote economic, social and environmental stability (Shmeleva & Pirozhenko, 2013, p. 8). Such goods and services include, in particular, electricity and water supply, education, emergency

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services, environmental protection, financial services, healthcare, postal services, public security, transport and infrastructure, social security, etc.

Providing citizens with a certain range of public services is generally associated with the so-called public consensus by which these services should be accessible to all members of the community, regardless of their income level. These services can be directly provided by the public sector of the economy or by private service providers, but at budget expense. Even if public services are not directly provided and not funded by the state, they are subject to control and regulation by state institutions (Andrushchenko, 2003, pp. 64–66, 116–117).

In our opinion, the concept of "public procurement" in comparison with the concept of "state procurement" is wider as it extends the circle of institutions that, through procurement activity, provide the needs of the state or a territorial community. Public procurement includes the purchase of both goods, works and services by governments and state-owned enterprises.

For Europe, public procurement is a central tool of demand-side politics to boost sustainable development. They are regulated by European directives in the area of public procurement (2014/23/EU, 2014/24/EU, and 2014/25/EU). According to statistical data by the OECD (2015, 2016, 2017), the share of state procurement in the gross domestic product of developed economies falls in the range from 8% (Switzerland) to 20% (the Netherlands). In Ukraine, this indicator is 15% and in Poland – 8%. Such large volumes show that state procurement can significantly affect the expenses and consumption of society, and stimulate innovation and new technologies (Starzyńska, 2018, p. 104). For some sectors of the economy – healthcare, education, and defence industries – state procurement is the most important or only possible source of sales.

Modern research by Fischer (1997) confirms the existence of a positive correlation between state public services and the level of economic development of the country. Moreover, the highest level of correlation with economic growth is demonstrated by infrastructure services, education services and public safety services, transport, etc. However, their quantity, quality, coverage level and depth of geographical penetration vary considerably between countries, including information asymmetries, high transaction expenses and weak institutions of governance (Gupta, 2017, pp. 201–202).

At the end of the 20th century, with increasing globalisation arose the innovative digital paradigm or the "gig" economy, in which information dominated (Negroponte, 1995). The processes of globalisation and digitalisation intensify and radicalise, thereby, provoking the transformation of the structure and the format of labour, business, and employment as a consequence of the expansion of network structures due to technological innovations. Fiscal policy, public revenues and expenditures also do not stay away from digital changes. The main consequence of the first phase of digitalisation in the financial sector is the creation of powerful databases for the income and expenses of business entities. Consequently, government institutions gain access to this enormous and ever-larger body of information.

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Thus, the spread of mobile communication and smartphone technology creates the potential for increasing access to public and private information by citizens, improving coordination between citizens and social groups, facilitating data collection for a better distribution of public goods and facilitating access to financial services. It is important that such technology is already available even for rural households, residents of remote and underdeveloped territories in Ukraine. Simultaneously, the possibilities of optimising state expenditures in the field of public services on the basis of innovative digital-technologies, reducing corruption, ensuring transparency, efficiency and competitiveness require in-depth scientific research.

Research methods

During the research on the Ukrainian electronic procurement system, the following methods were used: the dialectical method; the analysis and synthesis method – for a comparison of certain types of public procurement; subthreshold and suprathreshold statistical methods – for analysing the dynamics of indicators of the domestic system of public procurement during the period under research for a comparison of the indicators of public consumption of certain ministries and departments, different regions and territorial entities; structural and logical analysis – for generalising the theoretical and methodological principles of building a public consumption system in Ukraine.

The main source of data was the ProZorro electronic public procurement system (ProZorro Information System). As of the beginning of 2019, the system covers the procurement process of the eight types of procurements described in the Law of Ukraine "On Public Procurement" (2016). The electronic system connects the main portal with the network of private trading platforms. The data received while interacting with the system, which is stored in the central database, is publicly available and used for monitoring purposes.

Actually, the digitalisation (or digitisation) of public expenditure procedures and the creation of special trading platforms for this purpose, in our opinion, provides an exceptional opportunity to reduce corruption risks and transaction expenses as a result of scaling operations and stimulating fair competition by increasing the number and quality of participants on both sides, etc. The basic working hypothesis for the research was the study of the possible impacts of the ProZorro system of electronic procurement in Ukraine on the business environment for increasing competitiveness, optimising state expenditures and saving budget funds in the field of public services based on innovative digital technologies.

The main shortcoming of the research is the short-lived period of existence of the electronic procurement system in Ukraine – a little more than three years. As of 1 April 2016, with the enactment of the Law of Ukraine "On Public Procurement", the procedure and format of tender procurement by an introduction of the ProZorro

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electronic system has been changed. From 1 August 2016, the application of ProZorro became obligatory for all entities in the public procurement sector.

It is important that the use of the electronic system in accordance with the Law of Ukraine is only mandatory for so-called superthreshold purchases (goods and services over UAH 200,000; works – more than UAH 1.5 million). Regarding the procurement of goods, works and services for less than UAH 50,000, the report on concluded contracts in the system of electronic procurements is not subject to mandatory promulgation in the ProZorro system. The new principles of public tendering procedures have become: fair competition between participants, the prevention of corruption, economy and efficiency, openness and transparency at all stages, non-discrimination of participants, objective and impartial proposals.

Results

Procurements are an important part of the activities of institutions, organisations and state sector enterprises for the creation of public goods. The public procurement process in Ukraine includes the definition of need, planning, market analysis, tender documentation preparation, holding a tender, the process of determining the selection/qualification of suppliers, negotiation of contracts, preparation and signing of contracts, and control over their execution. The analytical estimation of public procurements in Ukraine in the ProZorro system is presented in Table 1.

Table 1. Descriptive statistics of the public procurement (PP) market in Ukraine in 2016 – first quarter of 2019

Descriptive measures	Period			
	2016	2017	2018	first quarter of 2019
Volume of PP (in UAH bn)	273.31	777.9	1010	272.2
Dynamics (previous period = 100)	117.0	284.6	129.8	119.8
Number of contracts (ths)	408.45	1,030	1,250	350.04
Dynamics (previous period = 100)	411.1	252.2	121.4	112.6
Average volume per one PP (in UAH)	669.14	755.24	808.00	777.63

Source: Authors' own study based on information from the ProZorro Information System.

During the operation of the system from 1 April 2016 to 1 April 2019, over 3 million tenders (2.55 million are complete) were held with a total expected value of UAH 2.35 trillion (Table 1). The sharp increase in the number of tenders during 2016–2017 is due to the mandatory inclusion of subthreshold procurement from 1 August 2016 and the increase in the number of superthreshold procurement.

The public procurement sector is growing dynamically over the analysed period, and for market volumes, the growth rates ranged from 117.0% to a record 284.62% in 2017. If in 2015, the entire public procurement market of Ukraine amounted to 211 and UAH 2 billion (USD 8.8 billion), then in 2018, the market exceeded UAH

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1 trillion (approximately USD 36.5 billion). The unprecedented increase in public procurement volumes by 4–5 times for the three incomplete years is to a large extent due to the establishment of ProZorro.

As a comparison, according to the Polish Public Procurement Office, the Polish public procurement market was estimated at PLN 116.3 billion in 2015 and PLN 107.4 billion in 2016 (Starzyńska, 2018, p. 105), which is USD 29.08 and USD 26.85 billion, respectively.

Table 2. The structure of the number of procedures and participants in a ProZorro bidding process in Ukraine in 2016 – first quarter of 2019

Descriptive measures	For the entire period	Including			
	2016 – first quarter of 2019	2016	2017	2018	first quarter of 2019
Number of organisers, subjects	36,030	20,120	27,070	28,340	22,420
Dynamics (previous period = 100)	–	153.00	134.54	104.69	107.34
Number of participants, units	221,250	65,510	127,610	148,100	73,190
Dynamics (previous period = 100)	–	–	194.79	116.57	115.55
Number of tenders, thousand units	3,090	408.45	1,030	1,250	350.04
Including the subthreshold, thousand units	2,560	355.5	852.6	1,020	274
The ratio of the number of the subthreshold procurement to the total number of tenders	82.8%	87.0%	82.8%	81.6%	78.3%
Superthreshold, thousand units	530	52.95	177.4	230	76.04
The ratio of the number of superthreshold procurement to the total number of tenders	17.2%	13.0%	17.2%	18.4%	21.7%

Source: Author's own study based on information from the ProZorro Information System.

Over the entire period of the electronic system, the number of tender organisers was 36,030 entities, and the total number of participants in a bidding process exceeded 221,000 units (Table 2). Accordingly, the increase in the number of participants in a bidding process and the number of tenders in the system are due to a large extent to the increase in subthreshold procurement. In confirmation of this, the ratio of the number of superthreshold procurement to the total in the 2016 base year is only 13%, although it gradually increases to 21.7% in the first quarter of 2019 (Table 2).

Thus, the reasonability and rationality of the established law limits for the subthreshold procurement was gradually escalated. In particular, there are cases of deliberate understatement by the bidding organisers of the volume of procurement, splitting them into several lots within UAH 200,000. Simultaneously, one can only speculate what volume of purchases up to UAH 50,000 remains hidden outside the system.

According to various estimates, the saving of public funds for the entire period of the reform amounts to UAH 50 to 100 billion, and in particular, according to the data directly from the ProZorro site, UAH 78.53 billion (Table 3). In our opinion,

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this discrepancy in the estimates indicates the urgent need for the development of a scientifically sound methodology for calculating budget savings at all levels of public administration as the basic indicator of the effectiveness of tender procedures.

Table 3. Analysis of savings amounts in ProZorro's public purchases in Ukraine in 2016 – first quarter of 2019

Indicator	For the whole period	Period			
		2016	2017	2018	first quarter of 2019
Number of tenders, thousand units	3,090	408.45	1,030	1,250	350.04
Including superthreshold, thousand units	530	52.95	177.4	230	76.04
The ratio of the number of superthreshold procurement to the total number of tenders	17.2%	13.0%	17.2%	18.4%	21.7%
Budget savings, billion UAH	78.53	12.32	27.62	32.31	5.7
Including superthreshold procurement, billion UAH	55.07	5.28	20.91	22.53	4.58
The ratio of savings of superthreshold procurement to overall savings	70.1%	42.9%	75.7%	69.7%	80.4%
Expected cost of procurement, billion UAH	2350	273.31	777.9	1010	272.2

Source: Author's own study based on information from the ProZorro Information System.

The volume of savings proportionally increases with the size of procurement due to the scale effect. Extremely demonstrative are the data regarding the savings of superthreshold procurement, which indicate the effect of scale or the growth of saved funds with an increase in order volumes. Therefore, if in 2016, the savings of superthreshold procurement amounted to only 42.9% of the total budget savings, then in the first quarter of 2019, 21.7% of suprathreshold procurement created 80% of the total savings or UAH 4.58 billion.

To establish changes in the level of competition between participants in a bidding process, we compared the number and structure of suppliers in 2018 with the data for 2015. The share of legal entities in the total number of suppliers decreased from 76% to 58% (more individuals-entrepreneurs enter the market). Simultaneously, the number of suppliers – legal entities has increased several times and the main increase was due to subthreshold procurement. Consequently, public bidding provides more opportunities for business, including small regional (local) companies and private entrepreneurs. Fair competition gives them a chance to obtain additional income from participating in state tenders, which stimulates the support and development of domestic business. In addition, procurements in ProZorro increase the level of public confidence due to the clarity and transparency of procedures.

The organisers of the tenders of the highest level of the structural hierarchy in public procurement are: Kyiv City State Administration, Ministry of Education of Ukraine, Ministry of Infrastructure of Ukraine, Dnipropetrovsk Regional State

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Administration, Ministry of Energy and Coal Industry of Ukraine and the Ministry of Internal Affairs of Ukraine (ProZorro Information System).

In 2018, ProZorro announced the first tender for projects through the World Bank, which, in our opinion, confirms the high evaluation of the system's activities by international institutions. In the same year, the ProZorro system began to be used for the realisation of small privatisation objects, rights of lease of land plots and other state/communal assets. The total amount that the State Property Fund of Ukraine planned to gain from the sale of almost 660 enterprises included in the list of small privatisation amounted to UAH 1.7 billion. In 2018 and January–April 2019, the actual revenue from small privatisation amounted to over UAH 1.0 billion, and this success is due to the use of the ProZorro system.

Discussions

According to the collected data, tenders in the system of electronic ProZorro purchases are, first, the optimisation and savings of state and local budgets. Statistical data indicate that the average price of goods, works or services is reduced by 8% to 10% of the expected contract value in procurement (ProZorro Information System).

The ProZorro electronic state procurement system in Ukraine generally shows good results. The World Bank gave a positive conclusion on the ProZorro application (World Bank, 2017, pp. 218–219). The 2017 report provides a comparative evaluation of legal and regulatory environments in 180 economies. Thus, the system of public procurement in Ukraine scored 86 out of 100 points for the indicator "Bid opening, evaluation, and contract award phase", according to the World Bank assessment, ahead of even OECD member countries with high income, such as Norway, the United Kingdom, Switzerland, Finland, Luxembourg, Sweden, the Czech Republic, Portugal, Slovakia and Greece, and low-income countries, such as Lithuania, Latvia, Croatia, Serbia, Uzbekistan, San Marino, Armenia, Azerbaijan, Montenegro, Belarus, etc.

It is important to emphasise that information technology itself cannot transform the existing system of state expenditures. Digital changes require simultaneous "analog" changes. It is about the changes in the current legislation and normative legal acts. An example of such "analog" changes is the adoption of the Laws of Ukraine "On Public Procurement", "On E-Commerce", amendments to the Budget Code of Ukraine, along with regulatory and legal documents.

In our study, we also found that a positive aspect of e-public procurement is time-shifting procedures for budget control over the state expenditure policy. If previously heavy, often corrupt, public financial inspections did not cope with the audit of public expenditures and enterprises, in the era of digital technology, state control shifted from the stage of post-audit to ongoing control, with the simultaneous reduction of the cost of its conduct. The role and importance of controlling civil society

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(publicity in the press, public criticism, investigation by activists and the media, etc.) is increasing, as a result of which, budget tenders have repeatedly been cancelled at the announcement stage. Therefore, state and municipal finances were not wasted on suspicious objects and the inappropriate expenditures of funds were reduced precisely because of the transparency and openness of the e-procurement system.

It is clear that ProZorro's platform is not ideal and needs daily analysis, refinement and troubleshooting. In public procurement, there is also the problem of incompetence, lack of skills and experience in implementing the tender procedure by employees of ministries and departments, bodies of local self-government: village councils and just formed united territorial communities (UTC). Other risks of ProZorro are: high proportion of non-competitive procedures (on average only 2.33 offers per one procurement or bidding), possible latent conflict of interests of participants, unreasonable stretching in time of individual procedures, justification of procurement procedure to one participant to the dubious "urgent need", unreasonable application of the procurement procedure to one participant due to the falsification of conditions or division of the procurement subject, the existence of discriminatory requirements in the documentation of competitive bidding, ineffectiveness of the complaints handling mechanism, etc.

Conclusions

The global trend in the digitalisation of fiscal policy and space, and the rapid development of the information technology (IT) sector reaffirms the existing public consensus in the field of public needs and services, and has reformatted the established budgetary procedures, with the simultaneous implication of non-standard contradictions and risks.

Our analysis proved that the priorities of public procurement in Ukraine are digitalisation, the creation of communication platforms and platforms for the intensification of processes, exchange of tender information between the participants. Therefore, society ends up reducing corruption and bureaucracy in public procurement, increasing the efficiency, predictability and transparency of government, improving the use of public resources, saving budget funds, and creative expansion of the participants in a bidding process through the incorporation of innovative digital methods and technologies.

Subsequent studies could include the analysis and assessment of the impact of digital business and the total digital environment on the quality and quantity of public expenditure policy, along with public services and state procurement. Another important area is the analysis of the risks and traps that arise due to the digitalisation of fisc.

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