



Strategic Role of E-Public Procurements in the Formation of Sustainable and Inclusive Economy

Nataliia Tkachenko* 

*Corresponding Author, Department of Banking and Financial Technologies, University of Banking, Lviv, Ukraine. E-mail: tkachenko_nb@ukr.net

Yuliia Kovalenko 

Department of Financial Markets, University of the State Fiscal Service of Ukraine, Kyiv, Ukraine. E-mail: kovalenko0202@ukr.net

Olga Kalaman 

Department of management and logistic, International Humanitarian University, Odessa, Ukraine. E-mail: kalaman.olga@gmail.com

Larysa Rodchenko 

Department of Management, Donbass State Engineering Academy, Kramatorsk, Ukraine. Email: larysa.rodchenko@gmail.com

Igor Rodchenko 

Department of Public Administration, Interregional Academy of Personnel Management, Kyiv, Ukraine. E-mail: rodchenko.igory@gmail.com

Serhii Didukh 

Department of industrial economics, Odesa National Academy of Food Technologies, Odesa Ukraine. E-mail: didukhsm@i.ua

Abstract

The purpose of this study is to develop proposals for the introduction of ecological, digital, professional, innovation and social public procurements in the national strategy on E-Public Procurement Reform and the strategy of procurements on the company-customer level. The relevance of this study is due to the need to ensure the development of “smart”, sustainable, inclusive economy, which will help reduce unemployment, poverty, facilitate access for people with disabilities to work, create opportunities for the education of young people and adults, stimulate innovations, meet expectations of citizens, solve environmental problems, carry out digital transformations taking into consideration the best world practices. The share

of public procurements in expenditures of the state budget and gross domestic product of Ukraine, the dynamics of the procurement's participants in the B2G segment is evaluated. In Ukraine, the largest share of expenditures falls on security and social protection, however, the prosperity index in these categories is critical ("red" zone). In order to form The E-Public Procurement Strategy, the best world practices of introducing innovative, environmental and social procurement criteria should be considered. Strategic directions of public procurement, namely – ecological, digital, professional, innovation and social, which provide sustainable and inclusive development of economy, are proposed.

Keywords: E-Public Procurement; Public Procurement Strategy; Digital Procurement; Government Expenditures; Sustainable; Inclusive Economy.

Journal of Information Technology Management, 2023, Vol. 15, Issue 1, pp. 113-123

Published by University of Tehran, Faculty of Management

doi: <https://doi.org/10.22059/jitm.2023.90728>

Article Type: Research Paper

© Authors

Received: September 19, 2021

Received in revised form: October 02, 2022

Accepted: December 23, 2022

Published online: January 21, 2023



Introduction

Public procurement is carried out in the interests and at the expense of taxpayers. Controlling the procurement activities of managers and recipients of budget funds is carried out exclusively in compliance with the procedures of regulations, which, in our opinion, reduces the effectiveness and efficiency of procurement in the whole. The main purpose of public procurement is timely satisfaction of public needs for goods of high quality, works and services needed to address social and economic issues of the state through the competitive mechanism and public communications. All customers' efforts are aimed at expanding and stimulating the participation of suppliers in procurements; competition advocacy; promoting taxpayers' trust in their funds spending by ensuring the procurement openness. However, world experience shows that strategically public procurements influence solving ecological problems. Economic impact of public procurement is not limited to costs savings, but to measuring the impact on sustainable and inclusive economy.

Literature Review

In classic economic theory, the role of public (government) procurement as part of total government expenditures is related to the impact on economic growth, which is measured by real GDP growth. Scientific literature presents the results of empirical studies of the causal relationship of public expenditures (part of which are public (government) expenditures), and economic growth is determined by four types of views (Nyasha and Odhiambo, 2019):

- 1) maintaining the Keynesian school, according to which the amount of public spending stimulates the real sector of economy;
- 2) economic growth leads to the increase in public spending (confirmation of Wagner's Law);
- 3) the size of public expenditures and economic growth are interdependent;
- 4) the size of public expenditures and economic growth are not interdependent.

Another view is that the strategic role of public procurement in ensuring the country's prosperity and sustainable economic growth is considered and is measured by four types of capital –natural, human, social and economic (Public Procurement in Germany, OECD, 2019).

The European Commission's Strategy on Public Procurement in Europe for Europe is focused on six directions:

- 1) introduction of innovation and "green" purchase;
- 2) professional approach to public customers;
- 3) expanding access to the procurement market;
- 4) increasing the public procurement transparency;
- 5) digital transformation of public procurement; 6) use of consolidated procurement. Choi (2010) identifies a strategic role of public procurement in five areas, including leadership in the civil service.

The study conducted by the consulting company McKinsey & Company (McKinsey Center for Government, 2017) shows that governments can save \$ 3,3 trillion in 2021 if public procurement is effective if practices of the countries with better governance are taken into consideration. For example, in the health sector, with the governance improvement among 42 countries, which generate 80% of the world's GDP, life expectancy will increase by 1,4 years without increasing public expenditures per capita. In the strategy "Europe – 2020", the objectives, to which public procurement was aimed, were set, namely: 75% of the employed population aged 20 to 64; investment of 3% of GDP in R&D; reduction of greenhouse gas emissions for 20%; increasing energy efficiency for 20%; obtaining higher education by at least 40 % of people aged 30–34; reduction of population for 20 million living below the poverty line.

In the report "Strategic Use of Public Procurement to Achieve Broader Results of the Organization for Economic Cooperation and Development" (Reforming Public Procurement, OECD, 2015), the results of the assessment of the Strategies availability on the central level and by individual procurement organizations are presented. According to the Report, there is a positive trend in the Strategy availability in the OECD countries: environmental procurement – 90%; purchases of innovative goods and services – up to 70%; support for small and medium-sized businesses – up to 75%, by social criteria – up to 50%. Therefore,

the role of public procurement is not limited to ensuring the taxpayers; savings taking into consideration economic growth.

Ambe (2018) relates the role of public procurement to the professional sphere. Following the example of the Republic of South Africa, the government has recognized the strategic role of public procurement in inclusive social and economic environment. However, the Strategy implementation is not carried out properly, the lack of professionalism and non-compliance with ethical norms and proper management is observed. Grandia, Meehan (2017) in their research note that public procurement largely pursues strategic goals to address more social issues, however, there is a lack of results in accessing their impact due to insufficient strategic maturity of public procurement. Bleda, Chicot (2020) consider the strategic role of public procurement in the context of stimulating business innovation by supporting the formation of markets for new products, technologies, and services. Empirical studies on strategic importance of public procurement in the formation of innovation assessments are considered by Caravella, Crespi (2020) and it is demonstrated that efficiency increases when innovation tools from the state and business are used together. Flynn (2018) examines the strategic role of public procurement in promoting small and medium-sized businesses. Thus, the literature review of recent research emphasizes the strategic role of public procurement in shaping sustainable and inclusive economic growth.

Methodology

National public procurement strategies of different countries, including the OECD countries and the results of empirical studies of the public procurement impact on GDP, economic growth and prosperity are studied. Within the article, the method of economic and statistical analysis in order to study the main indicators of public procurement in Ukraine are applied. Directions of the strategic role implementation of public procurement are offered, namely; environmental, digital, professional, innovation and social procurement.

Results

There is a differentiation between Smart economic growth, Sustainable economic growth and Inclusive economic growth. Smart economic growth characterized by global demand for innovation, information and communication technologies. Public procurement contributes to the development of digital region/city through financing of smart city projects and the regional replication of smart city solutions, which can ensure security and resilience of the city to environmental, economic and demographic changes and involve citizens in the city life (Kuznetsov et al., 2019; Vovk et al., 2020). The digital model of the utilities management; digital modeling and urban planning; intelligent waste management services; smart parking, etc. are examples of the digital regions creation. The priority is innovation public procurement of digital technologies to create economic and social benefits of digital society. Sustainable economic growth contributes to more efficient use of resources and environmental friendliness. Traditional linear economy involves the extraction of resources, their processing,

use and conversion into waste. Inefficient use of resources and lack of waste control globally have a negative impact on the environmental footprint. The ecological debt of the planet in 2020 fell in August 22, which means that humanity has exhausted environmental resources before its restoration, and humanity consumes 50% more than the biosphere is able to recover. An alternative to linear economy is circular economy, which provides waste prevention that saves money. Public procurement, which will contribute to the goals of circular economy, can stimulate demand for environmentally friendly goods. For example, successful practices are considering non-price “green” criteria for the purchase of computers, monitors, laptops, and smartphones. These criteria include the extension of service life and warranty of the product; less energy consumption; fewer hazardous substances. Another example is the use of “green” specification recommended by The European Commission for the purchase of food and catering, which can significantly reduce the environmental impact: expanding the offer of plant food menus; increasing the share of organic products; refusal to use disposal items; reduction of energy consumption of cooking equipment; reduction of water consumption, etc. In addition to the “green” criteria consideration, the procurement authority may select the following models of circular public procurement:

- 1) the customer buys goods that were previously in use (for example, construction materials);
- 2) after using the procurement subject, the supplier buys it from the customer to be converted into new resources;
- 3) the customer sells goods after their use to third parties;
- 4) the customer buys the service instead of the product.

An alternative is economy of joint participation. For example, the customers use the services of car-sharing companies to use a car.

Inclusive economic growth contributes to the employment increase. Public procurement contributes to the unemployment reduction, increasing women’s employment, working life expectancy. For example, The Scottish Public Procurement Strategy for 2021-2023 provides for the reservation of contracts for companies where at least 30% of the employees are disabled or disadvantaged. However, it should be noted that such contracts are reserved for procurement with sufficient competition level of these companies. As another example, in OECD countries, the share of procurements reserved to support women’s business has increased to 20%. If we consider the strategic impact of public procurement as support for social enterprises, we can identify the following options:

- 1) submitting preferences for social enterprises. 2) establishing special qualification requirements. For example, at least 10 % of the employees at the enterprise are elderly;
- 3) reservation of low-cost public procurement, in which only social enterprises can act as the participants;

Social procurement should be based on the results related to public values and the possibility of procurement not only for small and medium-sized enterprises, but also for social enterprises should be opened.

Ukraine. In Ukraine public procurement make from 16 to 31 % of public expenditures and to 30% of gross domestic product considering public funds, funds of the state, municipal enterprises (Table 1).

Table 1. Share of public procurement in expenditures of the state budget and GDP of Ukraine

Expenditures	2016	2017	2018	2019	2020
Expenditures of the state budget, UAH million	684743,4	839243,7	985842,0	1072891,5	1288016,7
Using of services and goods, %	14,00	14,55	15,98	16,97	23,42
Capital expenditures, %	2,20	2,20	3,31	2,88	7,36
Share of public procurement in GDP, %	9,9	12,8	20,0	25,1	28,3

Source: formed by the authors on the basis of data from the Ministry of Finance of Ukraine, 2020

As assessed by the OECD Index, the prosperity of Ukraine has critically low indicators in 2020 in the category of social protection, for which public spending is the largest. In the areas of health care and environmental protection, the expenditures are extremely low (Table 3).

Table 3. Functional structure of public expenditures in Ukraine, 2020

Functional structure of total public expenditures	Share of public expenditures, %	Prosperity index, position among other countries
General state functions	12,72	73
Defense	9,35	144
Security judiciary	12,24	
Economic activity	13,11	91
Environment protection	0,52	110
Utilities	0,01	77
Health care	9,70	116
Spiritual and physical development	0,76	69
Education	4,10	38
Social protection	25,06	147

Source: formed by the authors on the basis of data from the Ministry of Finance of Ukraine, The Legatum Prosperity Index, 2020

Managers of budget funds on the basis of the program-target method (PTM) and within budget resources develop, approve and implement budget programs aimed at promoting the implementation of state reforms in the medium term period. Based on the budget programs, managers and recipients of budget funds form a budget request for the planned year, after which approval the annual public procurement plan is formed. Electronic procurement plans, which encourages business, especially small and medium-sized ones to participate in procurement, are publicly available.

However, the number of business entities participating in public procurement (large, medium, small, micro, individual entrepreneurs) is growing at a slow pace and is up to 10% of the total number of business entities in Ukraine (Table 2); the share of foreign companies participating in procurement does not exceed 1 %.

Table 2. Dynamics of the participants' activity in procurements in the B2G segment

Years	Number of business entities in Ukraine, thous. units	Number of procurement participants, thous. persons	Number of procurement participants related to the number of business entities in Ukraine, %
2016	1865,6	65,84	3,53
2017	1805,1	127,61	7,07
2018	1839,7	148,10	8,05
2019	1941,7	159,97	8,24

Source: developed by the authors based on data from the State Statistics Service of Ukraine and Prozorro, 2019

The National Legal Act approved the Public Procurement Reform Strategy (“road map” for 2015-2022), the expected results of which are: ensuring a stable and efficient system of electronic public procurement; bringing legislation in line with the European directives; reducing the level of corruption; increasing the level of trust of business and society to public procurement; cost optimization through centralization, application of framework agreements, professionalization of public procurement. Within the National Strategy, the directions of ecological, social and innovation development are not defined, but according to the Association Agreement between Ukraine and the EU the national task “to reduce the negative impact of pollutants, including on the urban environment, in particular through the use of innovation technologies” was fulfilled. In fact, the volume of air pollutant emissions in 2019 decreased by 4.4 % in comparison with 2017.

The Law of Ukraine “On Public Procurement” establishes an exhaustive list of qualification requirements for procurement participants. These are the availability of:

- Equipment and material-technical base;
- Employees of relevant qualification who have requires knowledge and experience;
- Documentary proved experience of fulfilling the similar agreement;
- Availability of financial capacity.

The Law does not provide for the possibility of establishing other qualification criteria, so the establishment of environmental, innovation and social requirements for procurement procedure is possible only in low-cost sub-threshold procurement. The Law provides for the possibility to take into account the costs of environmental protection when accessing the value of life cycle. However, in Ukraine there is no procurement practice at the cost of life cycle (Baranovsky et al., 2020; Babenko et al., 2020; Kuznetsov et al., 2020). Contracting authorities may refer in tender documents to the requirements of national and international standards, which set environmental criteria for the procurement subject, such as energy efficiency, toxicity, waste biodegradation, etc. However, there is a risk of increase of insufficient competition between suppliers in such tenders, which will lead to the cancellation of procurement. In tender documentation, the Customer may specify that the characteristics of

the procurement subject should include the application of environment protection measures in the form of a declaration of a declarative nature. Participants guarantee that product is made of environmentally friendly materials, and environment protection measures are applied.

A successful decision to implement the strategic function of public procurement is to overcome the barriers for the entry of small and medium-sized businesses in the public procurement market through the participation in low-cost, simplified procurement, multi-lot procurement and procurement by electronic catalogs. However, the average competition level remains low, the average number of participants is 2 (Baranovsky et al., 2020).

Social procurement is provided in the implementation of the requirement to the winner of the tender – the contract is not signed with the winning bidder if it has committed an offense related to the use of child labor or any form of human trafficking. In 2004-2005, preferences were applied in Ukraine for the participants of organizations for the disabled and the organizations of the penitentiary service in 10 and 15 %. However, the mechanism proved ineffective due to the inequality of the bids' terms of other participants in procurement and essentially did not address the strategic goal of supporting them.

We made interviews (September-December 2020) of the customers to determine the presence/absence of the procurement strategy in the organization. The survey was attended by 48 people who underwent advanced training in public procurement during this period. The survey results showed that 98 % do not have a strategy and believe that the main purpose of their procurement activities is to achieve savings, to promote competition and to establish communication with suppliers; to timely purchase in full; to implement the procurement plan. These interview results suggest a more administrative role for public procurement than a strategic one.

We have elaborated the main directions of public procurement taking into consideration the world experience in order to implement the strategic role of public procurement (Table 4).

Table 4. Strategic directions of public procurement

Directions of the strategic function implementation	Task
Ecologic procurement	Expanding the use of electric vehicles and the corresponding network structure. Decreasing the negative impact of pollutants. Reduction of waste generation. Transition to electronic document management.
Social procurement	Improving the quality of medical care. Improvement of medical equipment. Creating modern learning conditions at schools. Reserving the contracts for social enterprises.
Digital procurement	Forecast of the demand for products from government customers. Electronic invoicing and downloading of data at open electronic portals. Automated bots' processing of the contractual prices.
Professional procurement	Academic acquisition by public procurement specialists of knowledge and skills of the introduction of ecological, social and innovation procurements. Introduction of procurement with life cycling cost.
Innovation procurement	Modernization of public services. Development of SMART regions and territories.

Source: formed by the authors

The proposed directions are in line with the current Public Procurement Reform Strategy. It is obvious that the regulator will develop a new Strategy for 2022-2025, which will correspond to the directions of the state policy. However, the global trend of the strategic role of public procurement is the introduction and expansion of environmental, digital, professional, innovation and social procurement.

Conclusion

The study identified the main strategic directions of public procurement, namely: environmental digital, professional, innovation and social. Based on the analysis, the following provisions were identified: focusing on the global trend of transforming the strategic role of public procurement, which already goes beyond the fight against corruption. Economically developed countries set ambitious strategic goals for public procurement – to influence the reduction of unemployment and poverty reduction, to facilitate the access of people with disabilities to working places, to create opportunities for training of the youth and adults, to solve environmental problems, to create and reproduce SMART areas. Strategic directions of public procurement developed by the authors are focused on the introduction and expansion of environmental, digital, professional, innovation and social procurement in ways to expand the use of electric transport and the relevant infrastructure network; the reduction of waste generation; transition to electronic document management; improving the quality of medical care and medical equipment; creation of modern learning facilities at educational institutions; reservation of contracts for social enterprises; modernization of public services; development of SMART regions and territories. It is established that one of the conditions for the implementation of the strategic role of e-public procurement is the need for academic acquisition of specialists' knowledge and skills by the implementation of environmental, social and innovation procurement.

Practical implementation of the proposed strategic directions of public procurement will contribute to efficient spending taxpayers' funds, the prosperity of the state in general. Scientific novelty of the study is the development of theoretical and methodological foundations of public procurement impact on sustainable and inclusive sectorial development of the national economy. Theoretical significance of the study results involves the development of provisions of the theory of public finance, practical-the introduction into the management of managers and recipients of budget funds of effective and efficient public procurement. Prospects for further research are to expand the tasks of implementing the strategic goals of public procurement.

Conflict of interest

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely witnessed by the authors.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

- Alhola, K. & Nissinen, A. (2018). Integrating cleantech into innovative public procurement process—evidence and success factors. *Journal of Public Procurement*.
- Ambe, I. (2019). The role of public procurement to socio-economic development. *International Journal of Procurement Management*, 12(6), 652-668. doi:10.1504/IJPM.2019.102934.
- Babenko, V.O., Yatsenko, R.M., Migunov, P.D. & Salem, A.-B.M. (2020). MarkHub Cloud Online Editor as a modern web-based book creation tool. *CEUR Workshop Proceedings*. 2643, 174–184. URL: <http://ceur-ws.org/Vol-2643/paper09.pdf>
- Baranovsky, A., Tkachenko, N., Glonti, V., Levchenko, V., Bogatyrova, K., Beridze, Z. & Zelenitsa, I. (2020). Non-Price Criteria for the Evaluation of the Tender Offers in Public Procurement of Ukraine. *International Journal of Financial Studies*, 8 (3), 44.
- Bleda, M. & Chicot, J. (2020). The role of public procurement in the formation of markets for innovation. *Journal of Business Research*, 107, 186-196.
- Bondarenko, S., Halachenko, O., Shmorgun, L., Volokhova, I., Khomutenko, A. & Krainov, V. (2021). The Effectiveness of Network Systems in Providing Project Maturity of Public Management. *TEM Journal*, 10(1), 358-367.
- Caravella, S. & Crespi, F. (2020). The role of public procurement as innovation lever: evidence from Italian manufacturing firms. *Economics of Innovation and New Technology*, 1-22.
- Changalima, I., Mushi, G. & Mwaiseje, S. (2020). Procurement planning as a strategic tool for public procurement effectiveness: Experience from selected public procuring entities in Dodoma city, Tanzania. *Journal of Public Procurement*.
- Choi, J. (2010). A study of the role of public procurement—can public procurement make society better. In *The International Public Procurement Conference, Seoul, South Korea*. <http://www.ipppa.org/images/PROCEEDINGS/IPPC4/13ProcurementPreferences/Paper13-4.pdf>
- Flynn, A. (2018). Investigating the implementation of SME-friendly policy in public procurement. *Policy Studies*, 39(4), 422-443. 2018.
- Grandia, J, Meehan, J. (2017). Public procurement as a policy tool: using procurement to reach desired outcomes in society. *International Journal of Public Sector Management* 30, (4): 302–309.
- Harland, C., Telgen, J., Callender, G., Grimm, R. & Patrucco, A. (2019). Implementing government policy in supply chains: An international coproduction study of public procurement. *Journal of supply chain management*, 55(2), 6-25.
- Kholiavko, N., Zhavoronok, A., Marych, M., Viknianska, A., Kozlovskiy, S. & Herasymiuk, K. (2020). Countries disposition in the global scientific and educational area: management and clustering. *International Journal of Management*, 11(5), 400-415. http://www.iaeme.com/MasterAdmin/Journal_uploads/IJM/VOLUME_11_ISSUE_5/IJM_11_05_039.pdf
- Kuznetsov, A., Shekhanin, K., Kolhatin, A., Kovalchuk, D., Babenko, V. & Perevozova, I. (2019). Performance of Hash Algorithms on GPUs for Use in Blockchain. 2019 IEEE International Conference on Advanced Trends in Information Theory, ATIT 2019 – Proceedings Kyiv, Ukraine, pp. 166-170. <https://doi.org/10.1109/atit49449.2019.9030442>

- Kuznetsov, A., Smirnov, O., Gorbacheva, L. & Babenko, V. (2020). Hiding data in images using a pseudo-random sequence. *CEUR Workshop Proceedings*, 2608, 646-660.
- Marhasova, V., Kovalenko, Yu., Bereslavskaya O., Muravskiy, O., Fedyshyn, M. & Kolesnik, O. (2020). Instruments of Monetary-and Credit Policy in Terms of Economic Instability. *International Journal of Management*, 2020, 11 (5), 43–53.
- Martunyk, O., Vitvitskaya, O., Lagodiienko, V. & Krupitsa, I. (2019). Formation of an innovative concept of management on the basis of reconstruction of genetic algorithm of management technology. *Periodicals of Engineering and Natural Sciences*, 7(2), 487-499. DOI: <http://dx.doi.org/10.21533/pen.v7i2>
- MCG. (2017). Government Productivity: Unlocking the \$3.5 Trillion Opportunity. *Discussion Paper, McKinsey Center for Government*, April. <https://www.mckinsey.com/~media/McKinsey/Industries/Public%20and%20Social%20Sector/Our%20Insights/The%20opportunity%20in%20government%20productivity/Government-Productivity-Unlocking-the-3-5-Trillion-Opportunity-Full-report.pdf>
- Mélon, L. (2020). More than a nudge? Arguments and tools for mandating green public procurement in the EU. *Sustainability*, 12 (3), 988.
- Nyasha, S. & Odhiambo, N. (2019). The impact of public expenditure on economic growth: a review of international literature. *Folia Oeconomica Stetinensia*, 19 (2), 81-101.
- Podgorna, I., Babenko, V., Honcharenko, N., Sáez-Fernández, F., Fernández, J. & Yakubovskiy, S. (2020). Modelling and analysis of socio-economic development of the European Union countries through DP2 method. *WSEAS Transactions on Business and Economics*, 17 (44), 454-466. <https://doi.org/10.37394/23207.2020.17.44>
- Public Procurement in Germany Strategic Dimensions for Well-being and Growth. (2019). *OECD*. <https://doi.org/10.1787/1db30826-en>
- Reforming Public Procurement. Progress in Implementing the 2015. (2015). *OECD Recommendation*. <https://www.oecd-ilibrary.org/sites/1de41738-en/index.html?itemId=/content/publication/1de41738-en>
- Vovk, V., Zhezherun, Y., Bilovodska, O., Babenko, V. & Biriukova, A. (2020). Financial Monitoring in the Bank as a Market Instrument in the Conditions of Innovative Development and Digitalization of Economy: Management and Legal Aspects of the Risk-Based Approach. *IJIEPR*. 31 (4), 559-570. <https://doi.org/10.22068/ijiepr.31.4.559>

Bibliographic information of this paper for citing:

Tkachenko, N.; Kovalenko, Y.; Kalaman, O.; Rodchenko, L.; Rodchenko, L. & Didukh, S. (2023). Strategic Role of E-Public Procurements in the Formation of Sustainable and Inclusive Economy. *Journal of Information Technology Management*, 15 (1), 113-123. <https://doi.org/10.22059/jitm.2023.90728>
