

УДК 338.2:004.056]:351.862.4(477)
JEL Classification F52, H56, M38, O19, O52
DOI 10.33111/sedu.2022.50.094.105

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DIGITAL COMMUNICATION TOOLS IN A PUBLIC SECTOR: UKRAINE CASE-STUDY OF NATIONAL SECURITY PROVIDING

Abstract. The article is focused on actual experience of using specific digital instruments to communicate with civil society in part of providing sustainable national security. We aggregated the data about efficiency of using digital communication tools in actual reality of a full-scale war of Russia against Ukraine, and compare experience of the EU countries in digital communication in context of Ukraine's European association. One of the most important fields of usage of specific digital communication tools to provide national security is the transparency and the public information access with supplying effective feedback. The usage of digital communication tools is gaining great importance in case of Ukraine, including and considering sustainable cyber, civil, economic, military and national security in realities of a full-scale war and safety threats. Finally, the other challenge is the need to utilize mobile applications for providing administrative services, which also rising considerable security concerns due to involvement of an extensive number of civil users. As a result of these processes, there is a need to transform and rethink the current usage of digital communication tools to provide proper balance between security and efficiency and economy of public services delivered via digital tools.

Keywords: communications; national security; public sector; Ukraine; European association; digital tools.

Introduction. The phenomenon of digital communication has been investigated both by scholars as well as by international organisations, such as the OECD, the UN, the World Bank and the European Commission (including through funding H2020 research projects on e-government and related fields such as for instance [1]). Digital government transformation has been broadly defined as the process of implementing ICT-enabled government innovations while transforming the organisational structures, documents and the way services are provided [2]. E-governance relies on the use and reuse of data and analytics to simplify transactions for the citizens, businesses, as well as government agencies. It creates information from data to support and enhance the decision making; it fosters the creation of new, collaborative and more efficient service delivery models [3]. It may foster effectiveness and efficiency, and lead to outcomes, such as transparency and openness, cost savings, better governance and, eventually, better quality of life for citizens [3]. Nevertheless, as a research field, digital

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communication tools is in constant evolution [4]. The terms such as digital transformation, innovation, e-government have been used in a variety of ways and have evolved over time.

In the late 1990s and early 2000s, a lot of research focused on “e-government”, characterised by the provision of online services and setting up of government websites and IT systems within public administrations. It is also sometimes referred to as e-government 1.0—the initial applications of World Wide Web technology in the public sector replacing paper transactions. It aimed at internal process innovation to create a government which works effectively and efficiently. To achieve this, public organisations started investing into ICTs, but the mode of operation itself remained mostly the same; only the medium changed. In the second half of the 2000s, the discourse shifted to e-government 2.0, also sometimes referred to as “open” government, also covered under the concept of “e-governance”. It went hand in hand with Web 2.0 collaborative technologies and aimed at creating an open-source platform in which government, citizens, and innovative companies could interact. It was mostly an external process (governance) innovation, aimed at increasing participation, collaboration and transparency in two-sided exchanges between governments and the public. The government opened-up for bilateral interaction and gained a new role as a provider of open data, web services, and platforms as an infrastructure [5].

Methods. The research is focused on comparing ways of usage of the different digital communication tools, such as mobile apps, web-platforms, etc. in e-governance in Ukraine and the EU-countries. The uniqueness of this paper consists in describing digital communication tools which exist in Ukraine and the EU with headlining benefits and drawbacks of specific e-governance tools. Also, this paper gives basic theoretical issues on usage digital communication tools, like mobile apps or chat-bots in performing of e-governance in realities of full-scale war in context civil, cyber and national security providing.

Public sector reform has been driven by the need to increase the efficiency and effectiveness of public administration. This can be achieved, in part, through the wider use of new communicational tools and apps. Experience shows that the public sector, due to bureaucratic obstacles, does not keep pace with rapid changes and changes in service standards in the digital age [6]; [7]. Therefore, starting in 2011, governments around the world began to introduce specialized digital communication tools, introduce information technology to provide digital services and a broader digital transformation of public sector [8]. Researchers have noted the main shortcomings of IT services in the public sector [9]; [10].

The introduction of information technology required special government equipment, the development of appropriate technological solutions, especially to create a coherent government in a decentralized environment [11]. The problem of most governments was fragmentation. Instead of creating an integrated government, often with budget funds to solve local problems, services for specific projects and departments were purchased on a one-time basis. In most cases, purchasing IT systems for a specific government unit meant downsizing. Transactions were duplicated, systems were purchased several times to perform the same actions (for example, support customer

transactions), but under different contracts, from different suppliers. It was costly for the country's budget. The lack of a digital infrastructure and database, which is the basis of public services and political work, has hampered the implementation of programs and political work in various government departments. The Government of Canada announced the creation of the Canadian Digital Service in its 2017 budget, the Ontario Digital Service was formed. In Ukraine, the concept of information society development was approved [12], the Implementation Plan and the Concept of e-government development in Ukraine [13], the Methodology for forming information society development indicators was approved [14]. The European Digital Strategy aims to introduce technologies that significantly affect people's daily lives, contribute to the development of a strong and competitive economy that learns and shapes technologies in a way that respects European values. To assess the results of digitization of world economies, The European Commission has been publishing the Digital Economy and Society Index [15] since 2014. DESI consists of five sub-indices that measure the development of: (1) high-speed Internet connectivity infrastructure; (2) ultrastructures of human capital development; (3) use of the Internet; (4) integration of digital technologies into business; (5) digital coverage of the public sector. According to the report [15], digitization has increased in the last year in all EU member states. The leaders are: Finland, Sweden and Denmark. It noted that the number of people who used e-government services increased from 58 % to 67 %.

Thus, the introduction of e-government is intensifying. And such patterns will inevitably lead to digital transformation in the public sector [16]; [17]. The digital transformation of public administration creates the conditions for the development of the latest ecosystem of the IT state, which transfers civil service services to a new platform [18]. The implementation of innovation in the public sector aims to achieve better results, such as: better use of public resources, a more open and trusting society, as well as strengthening justice and care for citizens from all walks of life [19]. The transition of public administration to a platform mechanism provides an opportunity to implement strategic management in the public administration system.

Implementation of the digital communication tools in the system of public administration – the introduction of the state-platform – is a transition to promising management methods [20]. That is, the system of public administration and civil service transformed into an advanced IT corporation [21].

Technological bases of digital transformation are:

- big data – the growth of data storage and processing capabilities in all types of computer systems, as the basis of artificial intelligence;
- socialization and personalization – the need to attract a large number of users with their personal data to perform various roles;
- mobility – the availability of information from anywhere, using different devices (mobile phones, gadgets, laptops, etc.);
- cloud technologies, as a way and location of data storage, with the possibility of access from different places.

The digital transformation is associated with the advanced development of the services sector, including in the public sector. For the formation of integrity in the

public sector, this is a key component for establishing effective and efficient interaction of all structural units and bodies of public services.

Thus, based on a literature review of the problem under study, we can draw the following conclusions:

1. Transformation processes in the public sector, first of all, affect changes in people, their general level of culture and behaviour.

2. The transformation of public administration based on process and service approaches, which already sufficiently developed in business (there are standards and methods) that can be used to change public administration.

3. Theoretical and methodological basis for the transformation of public administration under the influence of digitalization is the concept of superservice, which leads to a paradigm shift in work on state services.

4. In order to ensure and implement platform solutions, it is necessary to expand the opportunities for participation of non-state actors, including consulting organizations, as carriers of the intellectual and personnel component of providing the state's superservice.

The basic concepts about e-government and e-democracy, which was used, became theories about eight different types of partnership in an e-government system (as G2G, C2G, G2B and others) and how to realize participation stages with digital communication tools. The analysis is also grounded upon the classification of functions of e-government that performance can benefit or can be enhanced through the usage of mobile apps, web-platforms, chatbots.

The practical part of research basis on analysis of digital tools of communication in Ukraine, like mobile apps "Diia", "Kyiv tsyfrovyi", national portal of state services of Ukraine "iGov", Telegram chatbots "Ye-voroh", etc..

Results. The implementation of digital communication tools in public sector was a natural sequence of integration processes of ICT into modern life. The emergence of the concept of e-government has become a decisive breakthrough in public administration in Ukraine in recent years, especially in realities of a full-scale war. The basic objective of using digital communication tools, such as mobile apps and chatbots, is to cut the government costs for public services, as well as to increase transparency, increase cyber and data safety with providing the accessibility of civil services with sustainable feedback. Of course, digitalization has numerous other positive effects, e.g. saving natural resources fostering sustainable development and green economy which has positive effect on customers loyalty [22]. It is also warmly welcomed by new generations [23] simplifying access to state services for Millennials and GenZers.

Evidently, these are not the only benefits that ICT could provide. After all, it is not only about municipal sites and the provision of public services online. It's related to the level of trust of civil society to governmental actions.

Let us analyze some digital tools, which are used nowadays in Ukraine:

1. DIIA. The Cabinet of Ministers of Ukraine approved the launch of a pilot project that would make it possible to use electronic drivers' licenses, obliged to be carried with a person, i.e. in a smartphone. This is not an analogue of a driver's license –

it is its digital version, which is fully consistent with the information that is registered in the system of the Ministry of Internal Affairs. In addition, the drivers licence could be used as identification for air and railway passengers. Since the corresponding decision of the governments has already been put on a plan, the next issue is a technical implementation [24].

Nevertheless, at this stage, the application “State and I” (DIIA) is already available to citizens, which has made it possible to implement this project. This mobile application was launched for the trial period on December 16, 2019 (“State and I”).

At this Stage, a unified web-portal of electronic services and mobile application has already been created, reorganization and simplification of access to electronic services is underway. On the official web-portal, services, such as registration of personal entrepreneurial services and an electronic user account are available. In this 2022, registration of PLC (Private limited company) and the registration of a child (Yemaliatko) becomes available. And in the application, not only drivers licence available, but also a digital passport.

Of course, there is a question about the protection of personal data. This is not only a technical issue, but also a legislative one. As of March 2020, a draft law of Ukraine on amendments to the law of Ukraine on the protection of information in information and telecommunication systems (regarding the compliance of the information system with information protection requirements) has already been submitted [25].

The goal of the Ukrainian state in the future is to provide a 100 percent inclusion of public services in electronic form. It will be the united system of all government departments, which allow citizens to quickly and conveniently receive administrative services [26]. This is an extremely important step for Ukraine, since digitalization is the way to eradicate corruption and save time. In the future, it is planned to expand the range of services that can be implemented using this mobile application (G2B and G2C). In addition, the government considers that the country is at the boundary between the generations, one of which is distrustful to emerging technological implementations.

2. IGOV. The web-portal iGov.org.ua was founded by a group of volunteers in 2015, the project began work in the Dnipropetrovsk region. It is gradually expanding the geography and list of public services that can be obtained electronically. The portal usually announces news about connected services on its Facebook page. Dmytro Dubilet, former CIO of PryvatBank, co-founder of the ICT Competence Center and project manager at iGov, also writes about the next stages of the project’s development. In 2015, he stated that the project was being developed by Ukrainian activists on a free basis. Then the initiative was supported by the Presidential Administration, and at a joint press conference the portal was presented together with Dubilet by Deputy Head of the Presidential Administration of Ukraine Dmytro Shymkiv.

It is possible to apply for a passport through iGov. Both an ordinary citizen and a business representative can order documents on iGov. Users can do this in three ways: with the help of digital signature; through account in one of the banks (PryvatBank, A-Bank, Bank Pivdenny, Concord and Oschadbank are connected); using ID-card data (if user have a new, plastic passport). Thus, user confirm identity for the system and

will be able to use the portal not only as a reference book, but also as a terminal for ordering the necessary certificates, certificates and forms.

iGov portal helps instead of searching for information about the necessary certificates on the websites of different ministries, get it in one place. Each of the services works so far only in certain regions of Ukraine. To find out if user can order the right document or make an appointment through iGov, user need to select the required service and check in the list if your area is connected. Connected regions are marked in green in the list. For example, submitting documents for issuing a passport in eight regions: Dnipro, Zaporizhzhia, Lviv, Odesa, Poltava, Ternopil, Kharkiv, Khmelnytsky, as well as in the city of Kyiv. For other regions, this service is not yet available. If users region is on the list, then after authorization user fill in the required fields: e-mail, phone, date and time when it is convenient to come to the State Migration Service (GMSU) and send the application. A letter will be sent to the e-mail address user specified with a list of documents that will need to bring with you to the appointment for issuing a passport, data on the amount of the fee and details for paying it, a link to a sample application, as well as information on how to cancel the application if you have plans for that day and time will change. With all the documents from the list at the selected time, user need to come to the division of the State Migration Service (GMSU) that he/she indicated in application (not necessarily at the place of registration, this can be done in any city).

After submitting the documents, user can check the status of the application on the GMSU website, and when the passport is ready, pick up the finished document in the same unit where he/she applied for. To do this, it is better to immediately find out when submitting documents on what days and hours ready-made passports are issued.

A document for traveling abroad for a child was issued using the iGov portal, four times fewer people – about 10 thousand. Moreover, in Kharkiv and Khmelnytsky regions, where this service is connected, only five people signed up for an appointment via an electronic form.

What other documents can be ordered through iGov? User can pre-register for a child's birth certificate. So far, this service is available only in Dnipro and a number of cities in the Dnipropetrovsk region. When filling out the application, user need to upload a copy of the medical certificate of birth, marriage certificate (if the parents are spouses) and copies of their passports. Reviews about this service on the portal are different: for some, the whole procedure took 10 minutes, but there are also those who complain that the database was not working in the registration service and they had to make all copies of documents on the spot again. A total of 150 people used the service. Registration for a death certificate is available in Dnipro and two cities in the Lviv region.

The service of ordering an exchange of a passport in connection with a change of surname, name or patronymic is also available. This service is connected in Dnipro, Zaporizhzhia, Lviv, Poltava, Ternopil, Kharkiv, Khmelnytsky and Ivano-Frankivsk regions, as well as in the capital. A little more than 2,000 people did this through the electronic system.

There is also an electronic submission of documents for obtaining a certificate of a disabled person, registration of an individual entrepreneur (2031 people used it) and a

legal entity (263 applications), making changes to registration data, issuing subsidies and other services. The project team stated that 257 services are already connected, about 300 more are under development or will be available soon.

3. KYIV TSYFROVYI. Kyiv Tsyfrovyyi (Kyiv Digital) is a mobile application created in 2021 by the Kyiv Municipal Enterprise “Main Information and Computing Center” (KP HIOC) to replace the Kyiv Smart City application.

The application allows the user to top up a transport card from a smartphone, buy QR-tickets, pay for parking, return an evacuated car, receive notifications about housing and communal services, vote for city improvement projects. Registration in the application is by phone number, Kyiv Digital allows you to automatically download payment card data and information about cars from Kyiv Smart City, if the user’s phone number in the application is the same as in the Masterpass wallet.

Functional:

For drivers “Kyiv Tsyfrovyyi” allows to return the evacuated car from the penalty area without queues. If the car is evacuated, the driver will receive a notification with the address of the penalty area and instructions for returning the vehicle. All necessary documents can be downloaded to the application. Kyiv Digital also cooperates with municipal parking lots. From your smartphone you can pay for an hourly parking or buy a parking pass. You can also determine the parking place by geolocation and check the validity of the parking ticket. In the future, it is planned to add a parking map and a timer with a reminder of parking time.

Public transport. In the application you can top up your transport card, buy a ticket for the month, as well as use one-time QR-tickets. The configured notification system will remind you of the expiration of the ticket or tell you when the QR-ticket expires (valid for 15 days).

Housing and communal services. If the user adds a residence address, Kyiv Tsyfrovyyi will notify about the beginning and end of planned or emergency repairs in the house. The application will have access to notifications about electricity, water, gas and heating services. The feedback system allows you to confirm or deny the veracity of information about the provision of certain services.

During the war As of April 2022, in addition to citywide information, a number of functionalities related to hostilities on the territory of Ukraine appeared in the appendix.

Among the innovations:

- shelter map;
- map of a running business;
- volunteer help of the army;
- volunteer assistance to Kyiv residents;
- links to official sources of information;
- alarm message in the app.

4. STOP RUSSIAN WAR / YE-VOROH. On March 10th 2022, the Ministry of Digital Transformation created a chatbot in the Telegram Ye-voroh. The Secret service of Ukraine (SBU) also said that it had expanded the channels for obtaining information from citizens about the war crimes of the Russian occupiers in Ukraine. In addition to the chatbot, Telegram also added hotlines, e-mail and other messengers.

Through chatbots the Ukrainian can inform the Ukrainian military about:

- accumulation of equipment;
- moving columns of equipment;
- transportation of equipment by rail;
- fuel trucks; ammunition depots; radar stations; artillery positions; field airfields

for propellers.

More than 313 thousand Ukrainians have already joined the chatbot Ye-voroh [27]. Thanks to the official chatbot, about 500 units of enemy equipment were destroyed [28]. Comparison of different digital communication tool, which used in public sector of Ukraine is shown in Table 1.

Table 1

COMPARISON OF DIGITAL COMMUNICATION TOOLS
IN PUBLIC SECTOR OF UKRAINE

Signs of comparison	DIIA ^[29]	IGOV ^[30]	KYIV TSYFROVYI ^[31]	STOP RUSSIAN WAR ^[32] / YE-VOROH ^[33]
Developer	Ministry of Digital Transformation of Ukraine, 2020	Volunteer`s project, 2015	Kyiv municipal enterprise “Main Information and Computing Centre”, 2020	State secret service of Ukraine / Ministry for Digital Transformation of Ukraine, 2022
Type of digital tool	State service (via app and web-portal)	State web-portal	Municipal app	Chatbots in Telegram messenger
Main services	<ul style="list-style-type: none"> • E-signature • E-versions of documents (passport, driver`s license, individual tax identification number, Covid-certificate, etc) • LLC opening 	All civil services via administrative service centers for civils and business	<ul style="list-style-type: none"> • Transport tickets • Parking payments 	Specific feedback about enemies actions, location, etc.
Scope of services	77	200+	21	1(specific)
Pros and cons	+ usability + access to many state registers – data security	+ the largest list of services – unavailability of certain services in specific regions	+ usability – not including all needed services (like transport route map)	+ direct feedback – specific usage

Source: by authors.

As we can see, there are enough diverse digital communication tools, which is used in communication between civil society and public sector authorities. These tools are unique instruments for e-governance and providing sustainable feedback in accordance to national security. Some tools are common, some specific use, but it ensures fulfilment of that tasks for which they were created.

Conclusions. Digital communication tools in public sector of Ukraine are the main driver of e-government's transformation process. Existing practices of digital communication tools are highly effective in context of providing sustainable national security. In realities of a full-scale war of Russia against Ukraine, new digital instruments, such as chatbots, have been developed rapidly.

The new wave of digitalisation has begun in Ukraine from implementation of administrative service centres (TSNAP's) in 2015. These centres provide all possible services for civils and businesses.

The next stage of developing TSNAPS was creation of iGov web-portal service which provides administrative services in a digital form. This web-platform gained special development during Covid's pandemic in 2020, when physical access to administrative centres was limited.

At the same, 2020, the new digital tool was creating by Ministry for Digital Transformation of Ukraine (DIIA). It was pilot project of digital services and digital documents. From 2020 to 2021, this pilot project became complete web and mobile platform. In DIIA app users can open LLC, make digital signature for documents, create a digital version of passport (ID-card) or driver's license, etc. When full-scale war has begun, the DIIA became indispensable tool for providing emergency needed services for civils, especially on temporarily occupied territories. The DIIA demonstrated in practice the security of personal and state data stored in various registers, because it does not store data in the application itself but provides access to these state registers.

The next digital tool, which is used in e-governance is Kyiv Tsyfrovyi mobile app. This instrument provides main municipal services in city of Kyiv. It was originated in 2021. The difference between Kyiv Tsyfrovyi and other digital communication tools consist in municipal nature of app, otherwise to state-wide tools. In 2022, app added new features for war realities, like alarming about air alarm, shelter's map, etc.

Also in 2022 the special digital tools are originated. That tool are chatbots in Telegram messenger (Stop Russian war bot and Ye-Voroh), which created by Ministry for Digital transformation of Ukraine and Security service of Ukraine. That chatbots give opportunities for civils, who are living in temporarily occupied territories or in the front-line zone, to inform Armed Forces about location, numbers, types of enemies' forces.

On 23th of June 2022, Ukraine received the EU status candidate. It was a historical moment. Now, Ukraine with receiving of this status, needs to harmonise some legislative and other standards to the EU procedures and practices. This also applies to digital tools and e-governance system. The experience of the EU countries may come useful, so it should be researched and harmonised. The full adaptation of Ukraine's standard area is not necessary, because of uniqueness of Ukraine's experience.

The field of future research may be presented by study of different national e-governance systems, comparison of types of e-governance, which software are used, etc. The future study may be focused on the experience of the EU, UK, US and Canada, Japan, Korea and so on. The results of this article can be used in the next theoretical and practical research about e-governance and digital communication tools in public sector.

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ЦИФРОВІ ЗАСОБИ КОМУНІКАЦІЇ В ДЕРЖАВНОМУ СЕКТОРІ: ПРИКЛАД ЗАБЕЗПЕЧЕННЯ НАЦІОНАЛЬНОЇ БЕЗПЕКИ В УКРАЇНІ

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Анотація. Стаття присвячена актуальному досвіду використання конкретних цифрових інструментів комунікації з громадянським суспільством у частині забезпечення сталої національної безпеки. Ми агрегували дані про ефективність використання засобів цифрової комунікації в реальних умовах повномасштабної війни РФ проти України та порівняли досвід країн ЄС у цифровій комунікації в контексті євросоціації України. Однією з найважливіших сфер використання специфічних засобів цифрової комунікації для забезпечення національної безпеки є прозорість та доступ до публічної інформації із забезпеченням ефективного зворотного зв'язку. Використання цифрових комунікаційних інструментів набуває великого значення у випадку України, включаючи та враховуючи стаду кібернетичну, цивільну, економічну, військову та національну безпеку в умовах повномасштабної війни та загроз безпеці. Нарешті, іншою проблемою є необхідність використання мобільних додатків для надання адміністративних послуг, що також викликає значні проблеми безпеки через залучення великої кількості цивільних користувачів. У результаті цих процесів виникає необхідність трансформувати та переосмислити поточне використання цифрових засобів зв'язку, щоб забезпечити належний баланс між безпекою, ефективністю та економічністю державних послуг, що надаються за допомогою цифрових інструментів.

Ключові слова: комунікації; національна безпека; державний сектор; Україна; Європейська асоціація; цифрові засоби.

Стаття надійшла до редакції 23.05.2022