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Scholarly Publisher
RS Global Sp. z O.O.
ISNI: 0000 0004 8495 2390

Dolna 17, Warsaw, Poland 00-773
Tel: +48 226 0 227 03
Email: editorial_office@rsglobal.pl

JOURNAL	International Journal of Innovative Technologies in Economy
p-ISSN	2412-8368
e-ISSN	2414-1305
PUBLISHER	RS Global Sp. z O.O., Poland
ARTICLE TITLE	BIG DATA SUPPORT FOR PROJECT MANAGEMENT IN THE CONDITIONS OF WAR: THE EXPERIENCE OF UKRAINE
AUTHOR(S)	Horobets Olena, Motuzka Olena
ARTICLE INFO	Horobets Olena, Motuzka Olena. (2023) Big Data Support for Project Management in the Conditions of War: The Experience of Ukraine. <i>International Journal of Innovative Technologies in Economy</i> . 2(42). doi: 10.31435/rsglobal_ijite/30062023/7991
DOI	https://doi.org/10.31435/rsglobal_ijite/30062023/7991
RECEIVED	27 April 2023
ACCEPTED	30 May 2023
PUBLISHED	03 June 2023
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BIG DATA SUPPORT FOR PROJECT MANAGEMENT IN THE CONDITIONS OF WAR: THE EXPERIENCE OF UKRAINE

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DOI: https://doi.org/10.31435/rsglobal_ijite/30062023/7991

ARTICLE INFO

Received 27 April 2023

Accepted 30 May 2023

Published 03 June 2023

KEYWORDS

Project Management, Public Projects, Ukrainian Government, Big Data, War.

ABSTRACT

The article contains a review of the unique Ukrainian experience of launched and implemented projects in the conditions of a global risk, i. e. the war. It is highlighted that the large-scale invasion of the Russian Federation on the Ukrainian territory caused global threats and risks for public and business organizations and the Ukrainian society as a whole. The emphasis is made on top innovative projects of Ukraine launched and implemented (or being rapidly developed) due to the intensive use of digitalized processes.

The authors presented a review of global reforms in the areas of strategic importance for Ukraine: development of road infrastructures in Ukraine, modernization of health protection sector, reduction of Ukraine's dependence on energy imports (especially on Russia), development of digitalized processes, improvement of the education quality and bringing the domestic education system in conformity with European standards. These reforms involved the development of megaprojects that could be successfully implemented several years before the beginning of the war and continue to be extensively used in daily activities of Ukrainian citizens.

The issue of big data implementation as a useful ground for the successful accomplishment of projects in the conditions of war and the future postwar period is elaborated on.

Citation: Horobets Olena, Motuzka Olena. (2023) Big Data Support for Project Management in the Conditions of War: The Experience of Ukraine. *International Journal of Innovative Technologies in Economy*. 2(42). doi: 10.31435/rsglobal_ijite/30062023/7991

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Introduction.

Ukraine has been undergoing the second deep socio-economic crisis over the latest three years. But these crises have absolutely different sources: while the crisis of 2020 was provoked by the global pandemic of coronavirus, the crisis of 2022 occurred as a consequence of the war broken out on February, 24, 2022 by the Russian Federation against Ukraine. During the year of the large-scale aggression, Ukraine could repel the terrorist country and return a major part of its territories. However, the Ukrainian territory still remains under shelling, with heavy losses caused to civilians and infrastructures.

The war has become a global risk for some business segments and the whole country.

Meanwhile, the war drew attention of partner countries to Ukraine, not confined to issues of military or humanitarian assistance: potential investors also showed the interest. It was because Ukraine, in spite of the war, continues to elaborate public and private projects supported by technological developments and active implementation of big data in the operation of business and public sector, in particular on line of cooperation of the Ministry of Digital Transformation of Ukraine with the Armed Forces of Ukraine and the Chief Intelligence Department. These projects have gained the popularity in many countries and become a visit card of Ukraine.

Today Ukraine may well become an experimental ground with a potential of simulating and testing a new technological reality, new approaches to interactions and a new rationality where new civilizational trends will occur. With respect of the postwar investment attractiveness, Ukraine appears as a cost-effective, interesting and promising location due to its convenient geographic location, rapid development of digitalized and technological processes and the available workforce.

Given the abovementioned, the study is focused on issues of project management in Ukraine in the current period, with the war being a key threat. The authors believe as appropriate to clearly outline the role and significance of big data in project management as an important area in times of war and a priority one in the postwar period on the Ukraine's way to the global digitalization.

Methods.

The theoretical and methodological framework of this article builds on the system approach to analysis of project management and big data issues. Other methods used by the authors include general scientific and special methods scientific research, such as abstracting, induction, deduction, analysis and synthesis, abstraction and formal logic.

I. Review. General statements.

General approaches to project management studies.

Project management is an integral component of management, be it in a period of change, in developing new products, in penetrating new markets or, vice versa, in declining activities, because "project management takes a key role in product development projects since it coordinates the required decisions regarding project goals, planning, and team" (Kaufmann & Kock, 2022).

It was at the end of the 20th century that Belassi W. & Tukel O. (1996) highlighted the reasons behind the birth of project management and stressed that "project management emerged to provide basic structuring and scheduling techniques and today includes a variety of managerial practices to maximize projects' outcomes".

Later, when the "rising" era of project management was coming, Turner R. J. et al (2013) argued that "project management is a developing field of academic study in management, of considerable diversity and richness, which can make a valuable contribution to the development of management knowledge, as well as being of considerable economic importance".

However, Asad Mir F. A. & Pinnington A. H. (2014) in their analysis of issues concerning the project management values argued that "...The literature on Project Management (PM) shows that, in spite of advancement in PM processes, tools and systems, project success has not significantly improved".

A mention of Wang Z. et al (2023) should also be made in this context, which emphasized that "changes in the external environment are the driving force for organizational evolution, whereas a flexible organizational strategy is critical in promoting this evolution".

As far as practical dimensions of project management are concerned, it should be noted that it was in 1999 that Atkinson R. proposed to measure the project success by the so called Iron Triangle which tangles were value, time and quality.

Soon after that, Bryde D. J. (2003) recommended to use the so called model for assessment of project management efficiency in management, which "proposes six criteria for assessing PM performance: project management leadership; project management staff; project management policy and strategy; project management partnerships and resources; project life cycle management processes; and project management key performance indicators". Later on Musawir ul A. et al (2017) come to the conclusion in their analysis that "project governance improves project success both directly and through an enhanced benefit management process. Additionally, the most effective project governance and benefit management practices for improving project success are identified, such as the development and monitoring of a high quality project business case".

When the focus is made on the performance and popularity of project management nowadays, it should be noted that present-day researchers draw attention to megaprojects (Nuno, 2023; Sam McLeod S., 2023; de Jon G. et al., 2019; Ninan J. et al., 2021, Horobets O., Motuzka O., 2023), which are complex projects which impact millions of people, involve public and private stakeholders, and present challenges related to decision making and performance (Daniel E. & Daniel P. A., 2019); project sustainability (Piperca S. & Floricel S., 2023; Baba S. et., 2021) and engagement of the public in project-related activities (Chow V. and Leiringer R., 2020).

Summing it up, the project management process, being a strategic tool for the development of social and cultural sphere, involves elaboration, implementation and improvements of projects in ever changing environment.

II. Global public projects in Ukraine.

It was several years before the war that the Ukrainian government launched several global reforms with a series of public megaprojects as their part. The reforms were aimed at several areas with strategic importance for Ukraine:

1. Developing road infrastructures in Ukraine.
2. Modernizing the health protection sector.
3. Decreasing the dependence of Ukraine on imports of energy resources, Russian ones in particular.
4. Developing digitalization processes.
5. Enhancing the quality of education and bringing the domestic education system in conformity with European standards.

Below we are going to elaborate on each reform and analyze the megaprojects that have been implemented or continue to be developed and improved even in the conditions of war.

1.1. As part of the road infrastructures reform in Ukraine, President V. Zelenskyi launched the development of a special project program “Great Construction” (Program of the President of Ukraine) aimed at the massive construction of high quality infrastructures in Ukraine. Apart from improvements of educational, social and sport infrastructures, this Program focused on the transport one, involving improvements and construction of roads, highways and bridges in the country. The Ukrainian government has invested billions of dollars in the construction and reconstruction of roads and in the introduction of new systems for organization of road traffic. In 2021, on line of this Program there were built and reconstructed 68 schools, 47 kindergartens, 33 hospitals, 132 emergency rooms, 237 ambulatories in the rural area, 258 bridges and overpasses on the roads of local and national significance; 2190 km of local roads and 5098 km of national roads were built and repaired. Besides that, 22 swimming pools, 15 sport complexes, 28 stadiums, 466 sports grounds, 13 sports schools for youth, and 596 active parks were built or renovated. The project “Great Construction” proved to be real success, as apart from the considerable improvement of infrastructures, it could create more than 100,000 jobs.

It should be emphasized that in time of the war this project was suspended for only several months, and soon after its implementation was continued whenever possible, given the permanent shelling of the Ukrainian territory¹.

2.1. The reform in the health protection sector aims to modernize the health protection system in Ukraine through enhancing the quality of medical services and making medical services more accessible for all the citizens. The health protection reform in Ukraine launched several key projects focused on modernization of the domestic health protection system, quality enhancement and better accessibility of medical services.

The reform resulted in either partial or full accomplishment of several projects: a scheme for the mandatory medical insurance was introduced, by which the persons contributing funds to the

¹After a year of the large-scale Russian aggression, the total amount of documented losses of residential and non-residential buildings, other infrastructures exceeded \$143,800,000,000. The total direct losses from ruining and damage of objects in the public sector (social objects and offices, education, research and health care institutions, cultural buildings, sport objects, administrative buildings, etc.) make nearly \$13,690,000,000 (by replacement value). It is estimated that the warfare has caused ruining of 25,100,000 km of roads and 344 bridges and bridge passes of national, local and communal significance (here and below the data in footnotes are taken from KSE Institute).

National Health Protection Service were provided access to a package of medical services; the National Health Protection Service was created as a public body responsible for management and financing of health protection services in Ukraine.

The National Health Protection Service operates by the principles of transparency, accountability and cost-effectiveness and aims to provide high quality medical services to all the citizens; the implementation of a new model for health protection financing aims to reduce corruption and enhance the efficiency of the health protection sector. In conformity with this model, suppliers of medical services are paid on the basis of the number of provided services rather than the number of patients getting medical treatment. Modernization of medical infrastructures, i. e. building or reconstruction of hospitals, clinics and other medical establishments², and introduction of electronic medical records increased the quality and efficiency of medical services, thus allowing medical services suppliers to have access to patient records in the real time mode, which is supposed to reduce medical errors and make medical aid better coordinated.

A well-known project developed by joint effort of the Ukrainian government and business is eHealth.

eHealth is a Ukrainian information and telecommunication system designed to support computerized recording of medical services and medical information control. It consists of the central database and medical information system with computerized data exchange via open software interface (eHealth). This system is operated by the National Health Service of Ukraine, and the project could be successfully implemented due to support from international agencies. eHealth is administered by the public enterprise “Electronic Health” created specifically for this purpose.

The following registers were operated in the central database in 2020: Register of patients, Register of declarations on the choice of doctor, Register of business entities in the health protection sector, Register of medical specialists, Register of medical workers, Register of contracts on medical service of the population, Register of contracts on reimbursement, Register of medical records and Register of medical conclusions.

3.1. Bearing in mind that the energy independence of Ukraine is a component of the energy security in Europe and key to the effective cooperation with other strategic partners of the country³ (Government Portal, 2019 a), the project “Energy Independence of Ukraine” was developed by the Ukrainian government as part of the energy reform. The reforms involves a series of projects aimed at developing renewable energy, enhancing energy efficiency (the Ukrainian government implements a series of measures enhancing energy efficiency in various sectors, including buildings, transport and industry, which requires norms introduction of energy efficient construction, modernization of public buildings and public transport systems), diversifying energy supplies. Also, it was envisaged to develop a smart network and systems for energy accumulation for better management and optimization of energy demand and supply. The Law of Ukraine “Amendments to Some Laws of Ukraine on the Development of Energy Accumulation Systems” was enforced, to regulate the energy accumulation activities and clearly define the status of energy accumulation systems and their operator.

4.1. By the results of annual research Global Skill Report 2022 provided by the education platform Coursera, Ukraine ranked 21th in the category of leading countries among 100 surveyed countries⁴. In the rating of technological competencies Ukraine ranked eighth, giving evidence of the Ukrainians’ leadership in operating computer networks, databases, operational systems, security engineering, software engineering, computer engineering, cloud computations, web design, design of mobile applications, etc. The most successful digitalization project that could become a visiting card of Ukraine in the world is the project “Diia” announced by President V.O. Zelenskyi as part of his election campaign and successfully implemented later on.

“Diia” is a mobile application, a web portal and a brand of the digital state in Ukraine, developed by the Ministry of Digital Transformation of Ukraine. This application allows one to keep

² The direct documented losses caused by ruining of health protection buildings after the Russian invasion make \$1,800,000,000. In overall, at least 1216 health protection institutions have been damaged or destroyed since the beginning of the war.

³ Generation and transmission of electricity is the most severely affected segment in the energy supply industry. As of February 24, 2023, the direct estimated losses of the Ukrainian energy infrastructure were \$8,100,000. A heavy amount of losses is accounted for by large objects of power generation.

⁴ The war inflicted losses to not less than 726 providers of electronic communications with fixed Internet access. The total direct estimated losses of telecommunication providers are \$566,000,000.

driver permit, internal and external passport and other documents in a smartphone, and to present their copies in time of bank or post services; to receive public services, including the complex service in child birth; to register business online, pay taxes, submit statements, sign documents of any kind by use of digital electronic signature, or change the place of registration (Diia. Derzhavni posluhy onlayn). The Ministry of Digital Transformation of Ukraine expects 100 percent of public services to be rendered via “Diia” by 2024.

Along with “building” a digital state, the Ministry of Digital Transformation of Ukraine made its best to help Ukrainians develop digital skills. To achieve this goal, the Ministry of Digital Transformation of Ukraine launched a large-scale project: the portal “Diia. Tsifrovaosvita”. This portal opened a training opportunity for more than 1,200,000 Ukrainians in 2022, with displaying more than 70 freely accessible educational serials on digital literacy for everybody; national tests on digital literacy were developed, more than 6000 hubs of digital education created and opened across Ukraine (Diia. Derzhavni posluhy onlayn).

A large-scale national project on the development of entrepreneurship and exports, “Diia. Business”, designed for setting up government-business interactions, was initiated by the Ministry of Digital Transformation of Ukraine in February 2020 (Diia. Business). The project has been implemented since May 2021 by the Ministry of Digital Transformation of Ukraine jointly with the Office for the Development of Entrepreneurship and Exports, a public institution responsible for the development and support of the Ukrainian entrepreneurship on domestic and external markets. The Network of Centers for Support of Entrepreneurs “Diia. Business”, created as part of this project, offers a space where Ukrainians can obtain free consultations, visit educational events for entrepreneurs, rent halls for events or test a product on a special pop-up location.

It should be noted that the digitalization progress in Ukraine calls for improvements in important related processes, such as the development of IT industry as key to building up a high performing technological sector, which requires creating techno parks, granting tax privileges for technological companies and launching training programs for IT specialists; cybersecurity and protection from cyberthreats, which includes elaboration of policies and normative acts on cybersecurity, creating a national center for cybersecurity and organizing training programs for cybersecurity specialists; building up digital infrastructures through attracting investment, in particular for extending the access to broadband Internet and introducing 5G technologies.

5.1. The education reform in Ukraine was launched in view of the critical importance of human capital in gaining economic benefits in form of the sustainable growth and economic competitiveness, and, hence, the social and individual welfare, future prosperity and high quality of life in Ukraine. As part of this reform, the Ukrainian government started an ambitious program involving the project “Reform of Education in Ukraine”. It is a comprehensive initiative aimed at modernization of the domestic education system (Government Portal, 2019 b). The priority directions of this project are accessible and good preschool education, new Ukrainian school, advanced professional education, excellent higher education and development of adult education, development of science and innovation. In view of the importance of distant learning⁵, strong emphasis in Ukraine is put on the development of digital education, including the use of electronic education platforms and technological facilities in the classroom. It means that schools need to be supplied with computers, iPads and elaborated online resources for training purposes. Great attention is paid to the performance of professional-technical education, which includes creating professional technical colleges, elaborating training programs jointly with industry and providing financial stimuli for recruitment of college graduates.

⁵The education sector is most severely affected one by number of ruined, damaged and lost infrastructure objects. The direct documented losses caused by ruining of education facilities are \$8,940,000,000. In overall, the warfare caused ruining of at least 915 and damaging of 2165 objects of the educational infrastructure.

III. Global projects of Ukrainian business

The war failed to stop the development of Ukrainian business⁶. This fact can be proved by data (Centre for Innovations Development) on registered enterprises: throughout six months of the large-scale war, the registration of new business continued to have a positive dynamics of the recovery that had begun in April. The number of newly registered business entities was growing every month from 15,000 in April to reach more than 23,000 in August. In overall, the rate of new businesses registration in the conditions of the large-scale war was 114% against the same period in August 2020 and 71% against the same period of 2021. The most popular business sectors became computer software and retail trade.

As shown by the results of an interview (Advanter Group) with businessmen, 45.5% of the respondent enterprises expected a business growth in 2023 compared with 2022, of which 8% reported on a large business growth. At the same time, 24.1% of the respondents expected nearly the same business result as in 2022, with 28.8% reporting about business decline.

As soon as the war began, the Ukrainian government, realizing the important role of business, supported businessmen in form of interest-free loans. It was in March 2022 when the Ukrainian government approved the resolution on the launch of interest-free loans for business (Unian) for the time of war (as part of the strategy for business-government interactions, see above). According to the resolution, the interest rate for business loans would be equal to 0% throughout the period of martial law and one month following its cancellation, with the interest on these loans to be paid by the Ukrainian government. Once the martial law is cancelled, the interest rate on line of this program will not be higher than 5%. Also, it was in April 2022 that Ukraine launched a free platform for the assistance in business relocation. The applications to it could be submitted by both the enterprises requiring relocations and the companies willing to grant premises or other assets for relocation purposes.

There is a series of exemplary business projects in Ukraine, developed by businessmen in logistics, infrastructures, etc.

A logistics company “Nova Poshta” has already gained recognition in Europe. It is an international Ukrainian group of logistics companies, the leader of express delivery by scopes of delivered parcels in Ukraine, founded in 2001 in Ukraine (Nova Poshta). “Nova Poshta” leads in Ukraine by the delivery speed: 24 hours or less between large cities and 48 hours or less between district centers. In August 2022, this company had the largest network in Ukraine, consisting of 8,500 offices and 13,600 automated parcel terminals across Ukraine.

“Nova Poshta” is represented in a mobile application allowing one to order or redirect a parcel, create an express invoice with the return delivery of money transfer on a bank card and receive a bonus discount in time of a parcel shipment; to view locations of company offices on the map with indicated main orientations for quick search; to estimate the price and terms of delivery; to send an application for calling a courier on the address. “Nova Poshta” offices, already operating in Poland and Lithuania, are expected to appear in Germany and Sweden.

“Nova Poshta”, positioning itself as a socially responsible company, is implementing a series of sustainable development projects: “Humanitarian Post Office of Ukraine”, Rehabilitation of ATO [Antiterrorist Operation] Participants”, “Business School Nova Poshta” and others.

The project “Humanitarian Post Office of Ukraine” was launched in time of COVID-19 pandemic, when “Nova Poshta” supplied necessary equipment to medical establishments. But after February 24, 2022 “Humanitarian Post Office of Ukraine” transformed into a separate operative area, given the essentially increased scopes of cargoes. While before the beginning of the large-scale invasion of Russia in Ukraine, nearly 20,000 tons of humanitarian cargoes had been delivered

⁶The total estimated direct losses of business enterprises are \$11,300,000,000. In overall, at least 426 large and medium private enterprises and public enterprises have been ruined since the beginning of the war, plus tens of thousands of small private enterprises. The real figure is likely to be higher, because the available data do not include the temporarily occupied areas. The total direct losses of retail trade enterprises reach \$2,190,000,000 (not including retail trade objects owned by physical persons-entrepreneurs).

throughout eight years, from February 24, 2022 and on “Nova Poshta” has been transporting nearly 1,500 tons of cargoes every month for military units and civilians of Ukraine. In 2016, “Nova Poshta” had launched a long-term program for cooperation with medical establishments engaged in rehabilitation of Ukrainian military men. As part of this cooperation, in 2018 “Nova Poshta” purchased for Shalimov National Institute of Surgery and Transplantology an advanced electrocoagulator, medical laser, clinical analyzer etc., helping in this way to enhance the quality of medical treatment and rehabilitation of Ukrainian military men.

A well-known project in the energy sector is Pokrovsk solar power station built in 2019, the second solar power station in Europe by capacity, which became electricity supplier for more than 210,000 Ukrainian households. The project accomplished in six months costs 192,000,000 euro.

A well-known project in the health protection sector is the innovative production of blood plasma. The innovative production of medications from blood plasma was launched for the first time in “Biopharma” factory in Kyiv region. Now “Biopharma” is a supplier of medications to patients with blood diseases, injured and wounded ones. The possibility of self-sufficiency for blood medications required for domestic needs of Ukraine is an important component of the national security. It should be noted that “Biopharma” company is one of the ten largest Ukrainian manufacturers of medical drugs, with one third of the company’s sales, or \$15,500,000, exported to 36 countries (Liga.net).

Another successful project in the health protection, taking origin from a startup, is devoted to design of online service for search of medical doctors with the possibility of making an appointment with them. Today the service contains more than 320 clinics and offers a choice of the required doctor from among 2300 specialists from various fields of medicine (Doc.ua). The service operation involves a contract signed in advance with each clinic and thoroughly verified data about clinics and doctors alike.

A unique project focused on the bank sector aims to create the first neobank in Ukraine.

This neobank (Monobank) is operated by licenses of “Universal Bank”, a conventional Ukrainian bank. Its specifics is operation only on mobile devices in form of application. It issues credit cards for clients, offers deposit placement and other services (free money transfers, utility payments, etc.). Now Monobank has 6,500,000 clients. In 2023, Monobank opened “Stereo” bank in Poland analogous to the Ukrainian neobank. According to O. Horohovskyi, a co-owner of the bank (<https://www.ukrainianinpoland.pl/uk/monobank-may-appear-in-poland-soon-uk/>), “...first and foremost, the bank (StereoBank) is being opened for the benefit of the Ukrainians staying now on the territory of Poland. They are nearly three million in Poland now. So, in order to make a convenient corridor for money transfers between Poland and Ukraine, the decision was taken to open an office in Poland. But a bank card can also be opened by residents of Poland...” (Ukrainian and Poland, 2023).

Another series of projects gaining recognition both in Ukraine and beyond were launched on line of “Charitable Fund of Serhiy Prytula” created for support of the Armed Forces of Ukraine. Its two most popular projects of monetary donations were: the purchase of three drones Bayraktar TB2 for needs of the Armed Forces of Ukraine, initiated by the Fund and blogger I. Lachenkov (the project objective was to collect 500,000,000 UAH, to buy three Bayraktars, in seven days); collecting money “For Revenge” with participation of activist S. Sternenko (in one day Ukrainians could collect 352,000,000 UAH on the project line) (Serhiy Prytula Charitable Foundation).

Today, an active project of the Fund is “Center for Rehabilitation of Military Men and Civilians” aimed at purchasing a premise for creating a center for rehabilitation of military men and civilians who have suffered from the war.

IV. The role and significance of big data in project management.

The previous parts of this article demonstrate that public and private projects in Ukraine focus on developments in the digitalized environment, because it ensures convenient customer access to digital technologies in real time and from any spatial location. The intensive use of technologies cause uninterrupted generation of big scopes of data, which, if processed in a proper manner, help improve project activities and the overall country performance.

We agree with the observation of Kwon O. that “analytics of big data related with search in database, mining and analysis can be regarded as an innovative IT opportunity that is able to improve the firm efficiency” (Kwon O.et.al., 2014) and add that this innovative IT opportunity can improve the overall country efficiency.

Son M. and Han K. (2011) argue that “technology readiness (TR) refers to people’s propensity to embrace and use new technologies”. This statement and the narrative of Osaulenko O. & Horobets O. (2023) allows to admit that the Ukrainian society, in spite of the war, have the propensity to embrace the global digitalization process, including the implementation of big data in analytical activities of public organizations and business enterprises. However, Marinko Skare M. and Soriano D. R. (2021) draw attention on a visible defect in theoretical studies: “...We find there is a significant gap in the literature on globalization and technology adoption in other research on technology adoption”. Big data obviously being an integral component of the globalization system, the lack of theoretical research in this field may be a strong impediment for improvements in technologies for big data collection, processing and practical applications of the results of big data analysis.

Proceeding with the topic of project activities, it should be emphasized that big data can have a significant role in implementing public projects by laying the basis for decision-making; they are capable to help government institutions take more informed and data-driven decisions in the project planning and implementation.

Public institutions, analyzing big data, can define tendencies and patterns and provide more comprehensive information required for forecasting of probable project results, which is supposed to improve the project management and avoid by-side risks in course of the project implementation, share project resources and monitor the project budget. Also, big data can be useful when it is necessary to identify preferences or opinions regarding the project (for example, by use of intellectual analysis of the text) or the citizens’ behavior. This can help government institutions and businesses to better adapt their services and projects to public needs and expectations.

As far as big data advantages are concerned, Ukraine has gained good experiences in big data applications on line of a project devoted specifically to identification and search for Russian soldiers by use of artificial intelligence technologies. It is argued that the war in Ukraine has a heavy technological component. The authors agree with this statement considering that the Ukrainian army intensively uses drones, satellite data for purposes of intelligence technologies, tracing of geolocations and trouble-free high-speed Internet from Starlink, which finds further confirmations in the recognized experience of applications of technologies, artificial intellect and timely processing of big data:

It is a well-known fact that the occupation of the Kyiv region (towns of Bucha, Irpin, Hostomel and others) witnessed disgraceful actions of the Russian army (looting, raping, etc.) and atrocities (murders, tortures, etc.) towards civilians. In order to identify the Russian soldiers who rampaged on these areas of Ukraine, the Ministry of Digital Transformation of Ukraine used the data from sensors that had fixed the faces of military criminals (video cameras, digital registers of road traffic, censor of smart houses). These data (photo or video) were later used with artificial intelligence technologies in searching accounts of Russian soldiers and their families, to identify these war criminals or inform on their death. One of the best known search tools was Clear view AI, an American technology for face identification (which continues to be used now), capable to find Russian soldiers in the database containing ten billion of pictures (of which two billion could be found in the Russian social network VKontakte). The accuracy of face identification by this tool is 99.6%. Also, the Ministry of Digital Transformation of Ukraine has launched a special project for search of Russian invaders, the bot “Russian murderers”, allowing to collect photographic images from surveillance cameras and social networks. By April 4, 2022, this bot could identify more than 580 Russian occupants. This technology name has not been disclosed for security considerations (Antonyuk D., 2022).

The Ukrainian experience is truly specific, but it can be useful for learning at country and business level, as it allows one to prevent potential risks.

As regards predictions for the postwar period and analysis of previous experiences of Ukraine, it can be admitted that the strategy of postwar recovery of Ukraine will incorporate projects focused on social studies, development of infrastructures, health protection, education, etc., to be implemented with heavy reliance on domestic intellectual resources.

Conclusions.

This analysis gives evidence of the strong economic potentials of Ukraine: domestic business keeps expanding amidst the war, the projects launched before the war are being under way and new projects are being created, focused on humanitarian aid or support to the Armed Forces of Ukraine.

But many business enterprises hit by the Russian aggression will never recover and never demonstrate their projects and achievements to the world: among them is Mariupol metallurgical factory “Azovsttal” that used to export to more than 30 countries; the salt extraction company “Artemsil” which products had been demanded in both Ukraine and Western Europe; “Antonov” factory, one of the two domestic aircraft factories and the manufacturer of the global largest cargo airplane AH-225 «Mriia».

It is evident that agrarian companies suffered the severest blow: their business had been linked to a specific area, but field or farm works could not be suspended for an indefinite term or relocated. The market of basic metals has been hit heavily due to the dependence of exports on sea routes. The majority of metallurgical companies are concentrated in the South-East part of Ukraine where the active warfare is on.

The most sustainable economic activity proved to be IT industry. The quarantine imposed due to COVID-19 could prepare in a way the companies to the worst trial, the war.

Now it is high time for planning the necessary complementary change in the economic environment, to enhance the capacity of the Ukrainian economy to absorb financial resources coming as financial assistance in time of the reconstruction, which will increase the impact of recovery projects on the domestic economic and social development. This will lay the foundation for the sustainable development of Ukraine in the postwar period through creating a strong, socially responsible, advanced, open, competitive and inclusive economy that should be comfortable for human life, strategically and comprehensively integrated in the European and global economic community, capable of building up firm financial and economic capacities sufficient to repel any kind of military or economic aggression. Considering the sustainability of present-day Ukraine, it can be concluded that Ukraine has already been attractive for investors as a location of unique projects related with production of drones, IT developments, cultivating unique agricultural plants, etc.

Author Contributions.

Conceptualization, Horobets O. and Motuzka O.; resources, Horobets O.; data curation, Motuzka O.; writing-original draft preparation, Horobets O.; writing-review and editing, Horobets O. and Motuzka O.; project administration, Motuzka O. All authors have read and agreed to the published version of the manuscript.

Funding.

This research received no external funding.

Acknowledgements.

The authors express their gratitude to the Armed Forces of Ukraine for the possibility to live and be able of writing this article. Also, the authors are sincerely grateful to each country that has supported and helped Ukraine and Ukrainians.

Conflicts of Interest.

The authors declare no conflict of interest.

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