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Секцію «Дослідження, гранти та проекти» утворено спеціально для розміщення інформацію про гранти, дослідження та результати роботи проектів Програми міжнародного співробітництва UK-Ukraine twinning grants scheme між університетами Національний університет «Одеська Політехніка» та Університет Портсмуту.

С Е К Ц І Я 7

ДОСЛІДЖЕННЯ, ГРАНТИ ТА ПРОЄКТИ

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Визнання

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CURRENT FOOD LOSS AND WASTE SITUATION IN UKRAINE

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One of the significant challenges faced by society is food loss and waste (FLW). FLW has negative social (food security), environmental (GHG emissions, land degradation), and financial implications (FLW costs). UN developed a 2030 Agenda for Sustainable Development, which addresses FLW problem (SG 12) and calls for substantial waste reduction through prevention, reduction, recycling and reuse (SG 12.5) and adoption of sustainable practices(SG 12.6) .

The Ukrainian Government recognises the issue and adopted the National Waste Strategy until 2030 aiming to build a comprehensive waste management system. Currently, Ukraine’s FW is sent to landfill. On average a Ukrainian generates 250-300kg of FW/year (FAO, 2021).

The Government works on developing biofuel energy system to reduce GHG emissions and importantly to improve energy security. 3.4% of total primary energy supply in 2018 was biofuel, which is predicted to increase in future. Most of the biomass is plant residues and energy crops (UABIO, 2018), rather than FW. Although FW would be an obvious choice for biofuel, there might be better solutions for sustainability through preventing, reduction, recycling and reuse of FW.

The project “Evaluation of opportunities for prevention, reduction, recycling and reuse of FLW in Ukraine” addresses the “priority vertical” identified by the Ukrainian Government, Food tech/Agtech, particularly FW management, to help Ukraine economy to be more socially, environmentally and financially sustainable. The project should be implemented by the end of August 2023.

Reducing food loss and waste is important in a world where the number of people suffering from hunger is slowly increasing, especially since 2014, when numerous tons of food are lost and/or consumed every day.

Wasted food poses a danger to the environment through the release of carbon dioxide, which amplifies the global greenhouse effect. Food waste also contributes to excessive consumption of freshwater and fossil fuels, which, together with methane emissions from food decomposition, has an undeniable impact on global climate change. In addition, social risks may arise, as food shortages provoke hunger, and economic danger, as businesses incur financial losses or lost profits, which in turn negatively affects the country's economy.

Unfortunately, in Ukraine, food is lost at all stages of the consumer chain: from agricultural production to final consumption by households. In economically developed regions, food is mostly lost at the consumption stage, i.e. food is thrown away, even if it is still fit for consumption. In depressed regions, a greater part of food is lost at the stages of production, storage and processing, mainly due to two reasons: worse production technologies and underdeveloped warehouse infrastructure for food storage.

This project aims to evaluate opportunities for FLW prevention, reduction, recycling and reuse. The study will seek to answer to the following questions:

- What are the drivers of FLW in Ukraine?
- What food is the most lost or wasted?
- At what point food is lost or wasted?
- What businesses currently exist to deal with FW?
- How do Ukrainian companies manage their FW?

Objectives to undertake:

- 1) Systematic literature review of academic and professional evidence on FLW in developing context, and particularly in Ukraine.
- 2) To develop primary data collection instruments, like survey.
- 3) Conduct survey of micro-enterprises in Ukraine.
- 4) Analysis of primary and secondary data.

In addition, force majeure events should be taken into account, the negative consequences of which the entire Ukrainian economy has been experiencing for the past three years, especially agricultural producers and food retailers. These force majeure events include the global COVID-19 pandemic, the Russian invasion of Ukraine and, as a result, the introduction of martial law, the loss of full control over some territories. All these factors have significantly changed the already existing problem on an even larger scale.

It is important to distinguish between the factors of force majeure and the human factor in the handling of food losses and waste, as not all of them are counteracted - some of them can be used as experience and adapted for use, for example, in peacetime. This will allow the application of Ukrainian practice of prevention, reduction, recycling and reuse of food losses and waste on a global scale.

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ONLINE LEARNING DURING THE STATE OF WAR IN UKRAINE

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For children who are living through war, schooling provides a sense of normalcy and a safe place to be children, as well as continuing their academic progress. Schools should also focus on the wellbeing of teachers in times of crisis so that they can support their students (Save the Children, 2006). Specifically, education in conflict should provide a positive and nurturing environment where children are protected from violence, feel cared for, and experience predictability amidst the chaos and crisis happening outside of the classroom (IRC, 2018).

Teachers should feel they have a meaningful social role, have positive social relations, feel protected, and have access to quality support (Falk, Varni, Finder Johna, & Frisoli, 2019). In Ukraine, the war resulting from Russian aggression has disrupted education for than 5 million children who are living in their homes, as internally displaced people, or as refugees outside of Ukraine. Currently 1.9 million Ukrainian children are accessing online schooling with another 1.3 million enrolled in a combination of online and in-person schooling (UNICEF, 2023). This use of online schooling during a violent conflict is unprecedented (and only since 2020 with the Covid-19 pandemic has wide-scale online schooling been utilised), and much needs to be learned about how to support teachers and their students in the content of online learning during war to ensure they are safe, and their wellbeing is supported. However, Plan International (2023) suggests that online learning cannot support teachers and students wellbeing as well as in-person schools can.

Teacher wellbeing: Teachers are confident in their abilities to teach and support their students, feel supported by their colleagues, respected by students, and to have a sense of purpose in society. Education in emergency context – teacher wellbeing frameworks used to develop questionnaires (Fig. 1).

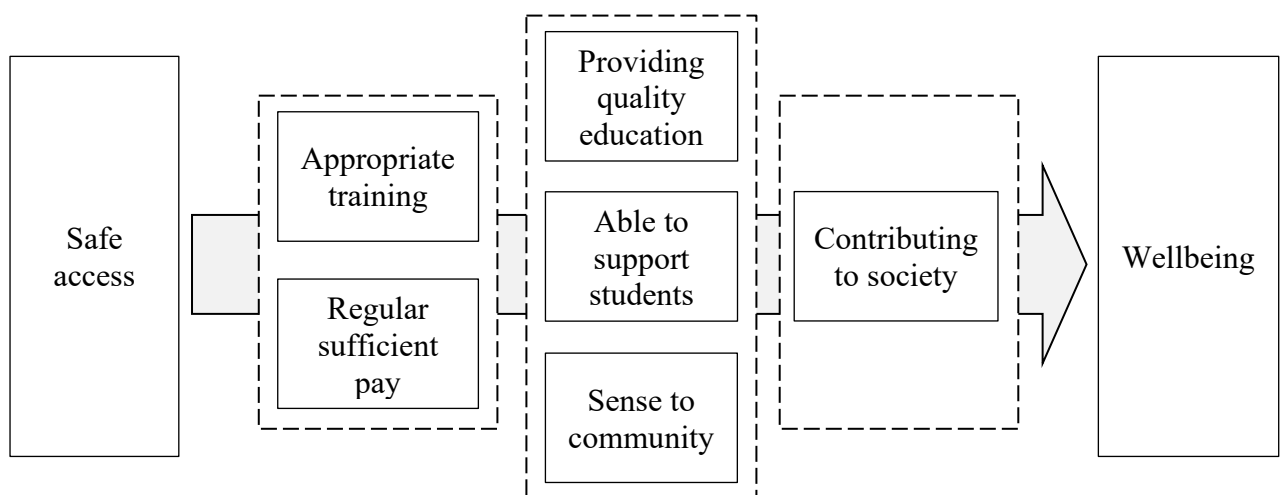


Figure 1 – Framework for teacher wellbeing

For students, online education often means missing out on peer relationships and a safe place to simply be a child. It also notes that teachers are at a high risk of burn-out from the burden of working in unstable and unsafe conditions. Because of the increased responsibilities of home and

family care following men's conscription into the armed forces, a particular burden is placed on women, who constitute over 80% of Ukrainian teachers. Therefore, micro-level research which engages teachers and students to understand their experiences and needs is essential to address the needs of them, who are engaged with online schooling.

Student Wellbeing: Children are able to learn, focus, cooperate, engage in positive peer and adult relationships, and have a sense of hope for their future lives. Education in emergency context – student wellbeing frameworks used to develop questionnaires (Fig. 2)

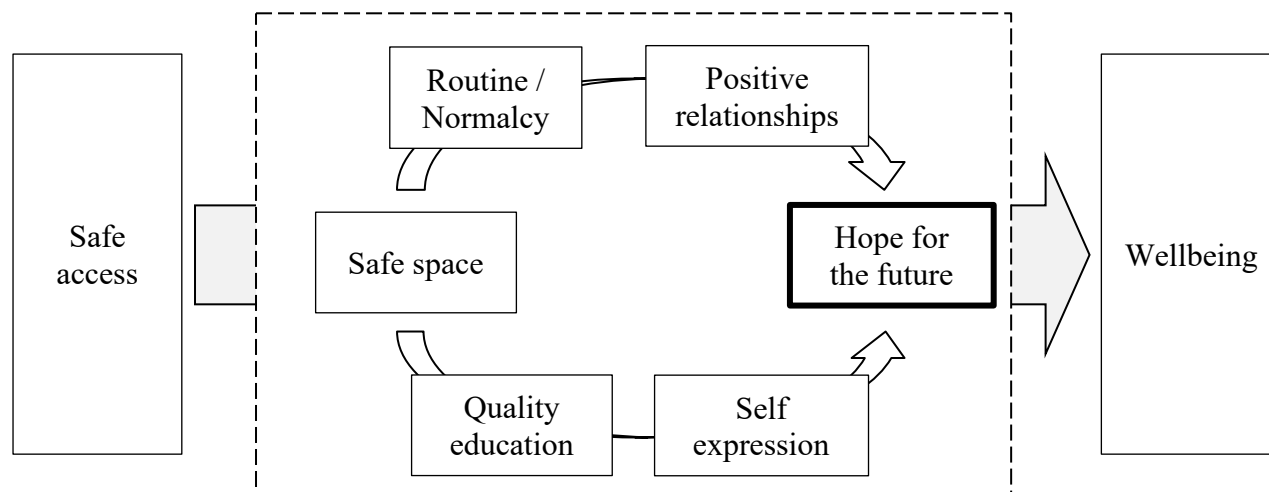


Figure 2 – Framework for student wellbeing

Fig 1&2 includes the frameworks of the factors that contribute to wellbeing of teachers and students in schools. The frameworks are developed based on the existing best practices and are used to guide the survey questions. Additionally, survey questions align with other tools used to measure wellbeing in conflict and other emergency contexts, which have been designed to protect the wellbeing of participants.

Our current research explores how and to what extent online schooling for Ukrainian secondary school students provides the benefits usually associated with schooling in conflict affected contexts for secondary school students and their teachers (Save the Children, 2006). Our participants will be teachers and students aged 12-18 from Odessa Oblast who are living in Odessa, living elsewhere in Ukraine as internally displaced people, and who are living outside of Ukraine as refugees. This research will look to these teachers and students themselves to share their experiences and needs, and is intended to inform education policy in line with Ukraine's Ministry of Education and Science's Concept Plan on the Functioning of the Education System (2022). The objective is to support Ukraine in ensuring that teachers and students are supported now and facilitate their contribution to a strong economic future for Ukraine when peace is restored.

Specifically, this research will address:

- How and to what extent does online Ukrainian secondary schooling provide predictable/cooperative environments designed for students' learning and development?
- How and to what extent are the social and emotional development and mental health needs of both teachers and students addressed?
- What support do teachers need to ensure that they and their students are able to carry on with learning?
- To what extent are students maintaining academic learning to support a viable future after peace is restored?

The COVID-19 pandemic and the ongoing war in Ukraine have forced educational institutions across the country to transition to online learning. This has presented a number of challenges, but it has also opened up new possibilities. Prior to the pandemic, online education in Ukraine was not widely adopted. However, the pandemic led to a rapid increase in the use of remote learning

technologies. This was due in part to the fact that many educational institutions were already equipped with the necessary infrastructure.

The war has further accelerated the shift to online education in Ukraine. As a result of the conflict, many schools and universities have been damaged or destroyed. In addition, the safety of students and teachers is a major concern. As a result, online learning is now the only viable option for many educational institutions. There are a number of challenges associated with online education. These include ensuring that all students have access to the necessary technology, providing adequate support to teachers and students, and ensuring that the quality of education is maintained.

However, there are also a number of benefits to online education. These include the flexibility it offers students and teachers, the ability to reach a wider audience, and the potential to reduce costs. Overall, the shift to online education in Ukraine is a new reality that presents both challenges and opportunities. As the country moves forward, it will be important to address the challenges and maximize the opportunities.

Some of the specific challenges that need to be addressed include:

- The lack of access to technology for some students.
- The need for teachers and students to develop new skills in order to use remote learning technologies effectively.

- The need to ensure that the quality of education is maintained.

- Specific opportunities

Some of the specific opportunities that can be leveraged include:

- The flexibility of online learning, which can allow students to learn at their own pace and from anywhere.

- The ability to reach a wider audience, including students who live in rural areas or who have disabilities.

- The potential to reduce costs, as online learning can eliminate the need for physical classrooms and transportation.

The shift to online education in Ukraine is a major challenge, but it also presents a number of opportunities. By addressing the challenges and leveraging the opportunities, Ukraine can ensure that its students continue to receive a high-quality education, even in the midst of a crisis.

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PROJECT "INCLUSIVE SOCIAL RESPONSIBILITY FORMATION IN THE INNOVATION PROCESS": SPECIFICS OF RESEARCH METHODOLOGY

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The project research goal [1,2] is to help politicians and companies to overcome the gap between the risks (social and environmental externalities) generated by the innovation process and the social responsibility of innovation stakeholders and beneficiaries.

Achieving the goal of the research in the project necessitates solving the following *tasks*:

a) Development of a theoretical base that provides a new architecture of the innovation process with boundary conditions that will contribute to the prevention of social instability, social alienation and violations of national security;

b) Development of tools and policies for systematic harmonization of interests of interested parties through mechanisms contributing to the coordination of inclusive social responsibility with innovative development;

c) On the possibility of additionally drawing up a map of stakeholders involved in innovation processes in Ukraine and determining possible features of the formation of inclusive social responsibility in the innovation-risk-generating economy of Ukraine after the war.

The project research object is the process and mechanisms of the formation of inclusive social responsibility of stakeholders and subjects of the innovation process, which harmonizes their interests in the direction of strengthening national security, ensuring the protection and safety of people in the context of the determinants of sustainable development in the conditions of martial law and the post-war period.

Taking into account the specifics of the modern stage of the concept of sustainable development, the study provides for the introduction of a harmonization approach in the mechanism of formation of inclusive social responsibility, designed to harmonize the interests of the subjects of the innovation process at the level of the goals of sustainable development, the challenges of the risky innovative economy and the needs of national security [3].

The implementation of mechanisms of social responsibility in the activities of all subjects of the innovation process and its stakeholders will contribute to the harmonization of the innovation process with the needs of the country and human security, the imperatives of sustainable development, the challenges of the risky innovative economy in the conditions of martial law and the post-war period.

Justification of feasibility and content of the study: Realizing the negative social and environmental consequences of unlimited innovation and uncontrolled entrepreneurship, developed countries began to implement the principles of sustainable development, most research [3] is moving towards the recognition of inclusive social responsibility as the next stage of corporate social responsibility and responsible innovation. Ukraine must also ensure the transition to a new level of social development, an integral part of which are the principles of social responsibility of socio-economic relations and the innovation process. A better understanding of how the concept of inclusive

social responsibility can create a basis for solving socio-economic problems associated with accelerated technological development and the unpredictability of its results.

This is especially relevant in wartime, when industrial potential shifts as a result of hostilities. In this context, Ukraine reoriented almost all scientific priorities to national security in order to intensify innovative research in this area. Remaining the main motive of entrepreneurship, profit maximization directs its business activity to the continuous creation of the latest technologies, goods, and services.

As a result, the time to find and launch innovations has significantly decreased, the probability of innovation risks has increased and the importance of transforming traditional social responsibility into inclusive social responsibility to prevent the marginalization of disadvantaged sectors. The gap between the innovation process and the social responsibility of its subjects is growing:

- the consequence of the exponential growth of the volume of innovations in recent times is the unpredictability of the results of the innovation process, the increase in the risks of man-made crises, a kind of innovative chaos. As a result, producers mostly do not study and predict their possible negative consequences for society and the environment, and consumers do not act as equal subjects of social responsibility;

- constant technological acceleration shortens the life cycle of goods, causing innovators to ignore the possible negative consequences of innovations: the occurrence of man-made emergencies, the deterioration of the socio-economic development of the country, the physical and mental health of society, ecology, which should be the focus of the social responsibility of the stakeholders of the innovation process and a component human and country security.

Therefore, the country needs preventive research that will create an opportunity to reduce the growing gap between the risks of innovation processes and the social responsibility of its stakeholders and subjects. This is especially relevant in wartime, when industrial potential is displaced as a result of hostilities.

The demand for research by society proves its compliance with clauses 1, 5, 70 Topics of scientific research and scientific and technical (experimental) development of the Ministry of Education and Science of Ukraine for 2022-2026.

Accordingly, the research of the project is aimed at solving the problem of overcoming the gap between the innovation process and the social responsibility of its subjects and stakeholders (business structures, state bodies, educational and public institutions and innovators), which causes innovative chaos and creates threats to national security.

The peculiarity of the research process in the project lies in the development of a methodology for the formation of inclusive social responsibility in the risk-generating innovation economy, which involves the transition from the corporate to the general societal level and allows considering inclusive social responsibility as the next stage of corporate social responsibility and responsible innovation.

All this allows us to understand how the concept of inclusive social responsibility can create the basis for solving socio-economic problems associated with accelerated technological development and the unpredictability of its results.

Research in the project is aimed at the formation of *new knowledge in terms of the development of the concept of social responsibility in the innovative development of society* in the conditions of martial law and the post-war period, taking into account the fact that the time for finding and launching innovations will be significantly reduced, increasing the probability of innovative risks. This indicates the importance of transforming corporate social responsibility into inclusive social responsibility, which involves subordinating it to the principles of activity not only of business structures, but also of state authorities, educational and public institutions, which will prevent the marginalization of disadvantaged sectors and strengthen the national security of the country in conditions martial law and the post-war period.

The special attention of the study is focused on the fact that *the fundamental methodical basis* in the implementation of social responsibility is determined by the concept of coordination of the interests of interested parties – stakeholders, for which the institute of international standards and

reporting of business organizations on the results of socially responsible economic behavior has become widely used.

The conceptual vision and content of the inclusivity of modern socio-economic relations in the process of corporate social responsibility is proposed to be considered according to two main aspects:

- a) Communicative involvement of all social subjects in economic processes and the corresponding interdependence of their results and consequences (*inclusive communication*);
- b) Awareness and implementation to the institutional field, the principles of social justice, greening and responsibility, for which the main emphasis is on *inclusive growth* and *inclusive well-being*.

The acquisition of the indicated signs of inclusiveness by the social dynamics determines the need for a transformational expansion of the scope of the regulatory influence of the institution of social responsibility, especially in the conditions of martial law and the post-war period, when the challenges of today actualize the implementation of social projects and charitable initiatives.

The methodological basis of the concept of inclusive social responsibility provides for its coordination with paradigmatic changes in socio-economic relations, which are formed under the influence of interrelated processes of permanent growth of the technological efficiency of the economy under the influence of informatization and digitalization, further global economic integration, strengthening of the influence of the financial sector in national economies, transformation of information and knowledge on the main productive force, socialization of development and further actualization of social responsibility of business, attracting its resources to solve urgent problems for society (financial aid, humanitarian support, media support and participation in informational resistance) and ensuring sustainable development, especially in conditions of martial law and the post-war period.

The methodological basis of the model for the formation of inclusive social responsibility are the provisions of the theory of sustainable development, within which an organizational mechanism for achieving the stability of the socio-economic system is built in relation to the inevitable threats of the riskogenic innovative economy, which are produced within the dialectical space of economic interests against the background of technology-accelerated, crisis-wave dynamics. The stability of the socio-economic system is ensured under conditions of reasonable growth based on new knowledge and innovations in combination with the institutionalization of sustainable goals and principles of inclusive development.

The model for the formation of inclusive social responsibility involves the complex integration of the principles of inclusive development and the goals of the concept of sustainable development into the target and role field of all stakeholders of the innovation process and the establishment of socially responsible functional dynamic interaction within the full process of production and implementation of innovations.

The research methodology in the project involves a combination of literature review, theory development and modeling.

The literature review is related to the study of modern issues of inclusive social responsibility in the innovation process, which will allow to determine: theoretical foundations, empirical support, influencing factors on the transformation of social responsibility into inclusive social responsibility and gaps in knowledge.

The construction of the theory will involve extrapolating theories of social responsibility in the innovation economy to the field of management.

The harmonization approach will apply to all actors who are currently involved in innovation processes and potential subjects who should be actively involved in order to improve social integration and increase the potential of innovations to solve social problems of Ukrainian society. This will include research into innovative support for sustainable small entrepreneurship initiated by ATO participants, temporarily displaced persons, refugees and asylum seekers.

Theory development will include:

a) Identifying the prerequisites, obstacles, driving forces, incentives and tools for the formation of inclusive social responsibility in the innovation process of stakeholders, including those caused by war;

b) Identifying the international standards for the implementation of social responsibility in the context of the innovation process and ensuring national security, with an emphasis on Great Britain;

c) Conceptual description of the structure and functionality of the social responsibility of the stakeholders of the innovation process in modern and post-war processes of socio-economic development and ensuring national security;

d) Identifying the carriers of innovative business ideas as subjects of sustainable development of entrepreneurship based on qualitative analysis of their business plans in the context of social responsibility, innovativeness of business ideas and usefulness for the post-war economy of Ukraine and quantitative analysis of indicators of innovativeness of their grant applications;

e) Compiling a map of stakeholders involved in innovation processes in Ukraine and identifying the specifics of the formation of inclusive social responsibility in the innovative risk-generating economy of Ukraine after the war (if possible).

The modeling process will include the collection and processing of project research data.

Data collection will include desk research and fieldwork involving:

a) Open online questionnaire for up to 100 participants involved in innovation processes (politics, business, science, education). An anonymous questionnaire is built on the Google Forms resource [4];

b) A collection of grant applications for entrepreneurs among temporarily displaced persons, refugees and asylum seekers in Ukraine. The data is provided by the partner – the Charity Fund "Caritas Odesa UGCC" in accordance with the Agreement with the Odessa Polytechnic National University on free information exchange;

c) Survey of up to 150 entrepreneurs and potential entrepreneurs from among temporarily displaced persons, refugees and asylum seekers [5]. The survey is conducted online by direct contact with the consent of the respondent, with the recording of his answer on paper or immediately in Excel tables in Google Docs to ensure the preservation of information;

d) Focus groups (up to 6, 6-10 participants each) with the selection of respondents based on their consent, interviewed according to: a) the scheme of Twinning grants Great Britain and Ukraine and c). Work in focus groups is recorded by a photo report with the consent of the participants.

The size of the sample of respondents is recommended to be carried out according to the panel survey method [6]. This method is based on the study of real information about the reasons for the selected type of organizational behavior of survey participants and/or about the causes of problem situations. The method is focused on external participants, so its effectiveness is directly proportional to the class of the expert and the number of participants.

The sample of respondents will be: 25% of people who wanted to engage in entrepreneurial activities for the sake of sustainable development in 2018-2021 in the Odesa and Mykolaiv regions. They were taught the basics of business and were competitively selected to finance the start of their business ideas. For the online questionnaire, the sample will be formed according to the criteria of focus of the topic, openness and addressability of access.

It should be noted that the information letters and the consent form will be part of the online survey of potential respondents to inform them about the research and the time spent on the survey.

Consents will be obtained from the Caritas Odesa UGCC, Odesa Oblast Council. Respondents may withdraw from the study at any time before the end of data analysis on 30 July 2023, and this will be indicated in both the information letter and the consent forms in the appendices. After this date, they will not be able to withdraw their data from the study.

The data will be anonymous. The survey will not require personal data, except for the description: business idea, business sector (type of business), work experience in this sector, age, gender, education, the respondent's needs for business recovery, etc. However, survey consent forms inevitably contain some personal data, as well as an offer to participate in repeated studies. To

preserve anonymity, consent forms and others will be stored in a separate folder on the university's corporate Google Drive. The folder will be password protected.

Project data analysis will include:

- a) Quantitative analysis (regressions and modeling of structural equations);
- b) Qualitative analysis (theorization of the process based on comparison of patterns and thematic analysis).

Quantitative analysis will allow testing the hypothesis based on the literature review about the boundaries of the stages of the innovation process. This, in turn, will allow the development of a theoretical framework that provides a new architecture of the innovation process with boundary conditions that will contribute to the prevention of social instability, social alienation and violations of national security.

Qualitative analysis will help to develop and confirm proposals for mechanisms to strengthen the harmonization of interests of stakeholders. These proposals will contribute to the development of tools and policies to systematically harmonize the interests of stakeholders through mechanisms that facilitate the coordination of inclusive social responsibility with innovative development.

The survey results will be analyzed using Microsoft Office (Excel) or SPSS through regression analysis.

Conclusions. *The scientific novelty* of the research in the project will lie in the development of theoretical and methodological principles and practical recommendations for the formation of inclusive social responsibility in the innovative risk-generating economy, which harmonizes the interests of the subjects of the innovation process at the level of the imperatives of sustainable development, the challenges of the innovative economy and the needs of national security, protection, and safety of individuals and society in conditions of martial law and the post-war period.

Accordingly, the novelty of the methodology consists in taking into account the synergistic interrelation of the results of the activities of all subjects of the innovation process to ensure national security, sustainable development of society, protection and safety of people in the conditions of martial law and the post-war period.

Methods of research and processing of the obtained results allow to explore a new subject area of application, which reflects the structure of questionnaires for business, education, science and politics.

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INTERNATIONAL RESEARCH IN THE FIELD OF ARTIFICIAL INTELLIGENCE: FUZZY EXPERT SYSTEMS WITH APPLICATIONS

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Scientific research in the field of artificial intelligence is one of the most innovative and sought-after in the world today. The development of this area is closely related to the development of its symbolic direction, within the framework of which expert systems are created – systems based on knowledge.

The application of expert systems today is practically unlimited: finance, accounting, engineering, marketing, auditing, law, procurement and contracting, project management, risk assessment, information management, information retrieval, crisis management, stock trading, strategic management, network management, telecommunications, space education, intelligent front ends, intelligent database management systems, medicine, chemistry, human resources management, human capital, business, production management, archaeology, economics, energy, and defense [1-4].

One of the most popular areas is the development of expert systems based on fuzzy logic [5-7]. They ensure decision-making in the face of incomplete/unclear information. This is especially true for the functioning of objects/processes in environments with a high degree of entropy.

This study is devoted to fuzzy expert systems and their applications.

Project Title – Forecasting Development Trends of Ukraine’s IT Industry and Its Components Using a Fuzzy Expert System.

This project was made possible through the UK-Ukraine twinning grants scheme, funded by Research England with the support of Universities UK International and UK Research and Innovation. Our team is composed of researchers from Odessa National Polytechnic University and Portsmouth University. Together, we bring expertise in statistical analysis, fuzzy logic, and AI-tools to this project [8-13]. Our goal is to use our collective knowledge to make meaningful contributions to the field of IT industry development forecasting. The basic mathematical apparatus of research is the original author’s development – a fuzzy expert system FuzzyKIDE [8].

The architecture of the expert system is shown in Fig. 1

The purpose of the project is to use the artificial intelligence apparatus – a fuzzy expert system (FuzzyKIDE) – in the processes of monitoring and forecasting trends in the development of the IT industry in Ukraine, as well as in carrying out a comparative analysis of trends in the development of IT industries in different countries [14-18].

The subject of the investigation is intelligent information technologies using fuzzy logic.

Tasks of the project are:

- to identify key factors influencing the state and dynamics of development of the product and outsourcing components of the IT industry based on an analysis of current trends in the IT industry;
- to determine the conceptual framework for the use of a fuzzy expert system as a research software platform, in particular, to propose the structure of the knowledge base;
- to test the technology of using a fuzzy expert system to predict the state and development trends of the product and outsourcing components of the IT industry in Ukraine;
- implementation of a comparative analysis of trends in the development of IT industries in different countries based on the use of a fuzzy expert system.

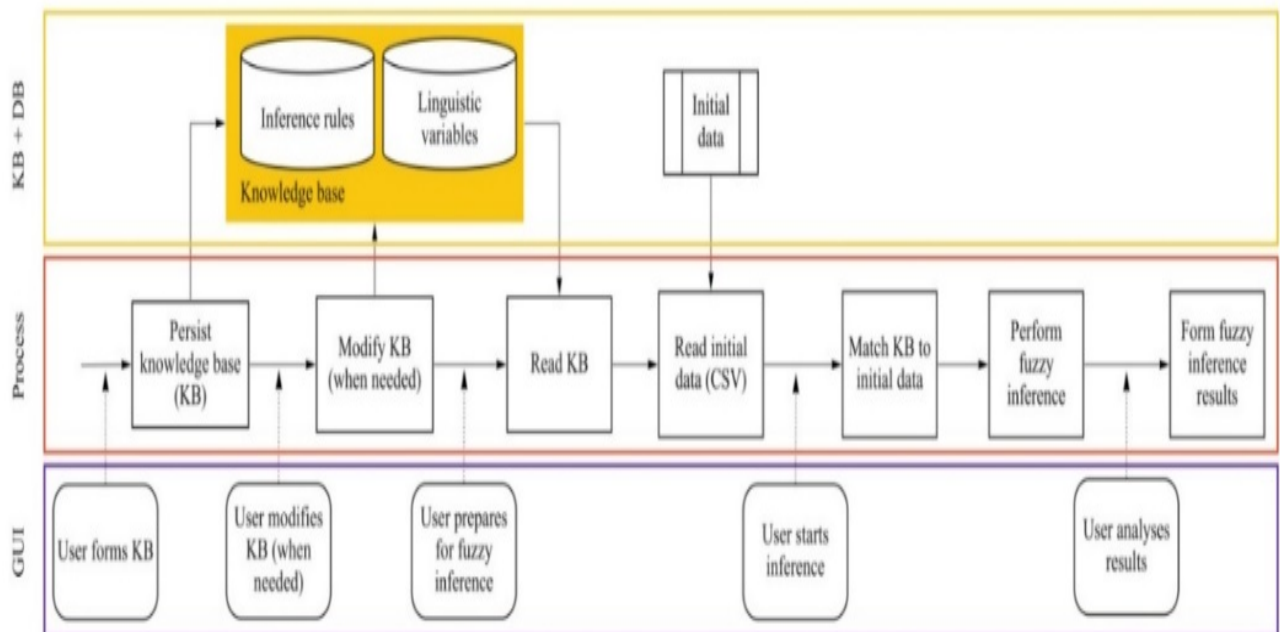


Figure 1 – The architecture of FuzzyKIDE

To achieve the objectives of the project, several activities were conducted. Firstly, a thorough analysis of current trends in the IT industry was performed to identify the key factors influencing the development of the product and outsourcing components. This analysis formed the conceptual framework for the utilization of a fuzzy expert system. The project outcomes contribute to the field of IT industry forecasting and decision support systems by providing valuable insights into the application of fuzzy logic and fuzzy expert systems. The methodology developed in this project offers a basis for early response to crisis phenomena and non-standard situations in IT industry operations, facilitating informed and relevant management decisions.

Research reasons are:

- the IT industry occupies a significant place in the world's economy and continues to increase its influence.
- the rapid digitalization and the environment's increased functioning entropy highlight the importance of stable IT industry functioning.
- crises and military conflicts contribute to the need for effective forecasting and predicting the dynamics of the IT industry.

Research targets are Ukraine and Indian.

Key notes about Ukrainian IT industry:

- by the end of 2021, it accounted for 37% of Ukrainian service exports, generating 6.8 billion USD in revenues.
- the IT industry engaged 285,000 IT specialists and contributed USD 800 million in tax revenue in early 2022.
- the impact of the Russian-Ukrainian war led to a decline in IT exports in March 2022, losing 35% of the volume compared to the previous month.
- the war also resulted in emigration among IT specialists, with approximately 100-150 thousand leaving the country.

For comparison, India has a dynamically developing IT sector, claiming first places in the global market of IT products/services.

The main factors influencing the development of the IT industry are presented in Fig. 2

The generalized results of predictive experiments conducted on the basis of the FuzzyRIDE expert system are presented in Tables 1 and 2.

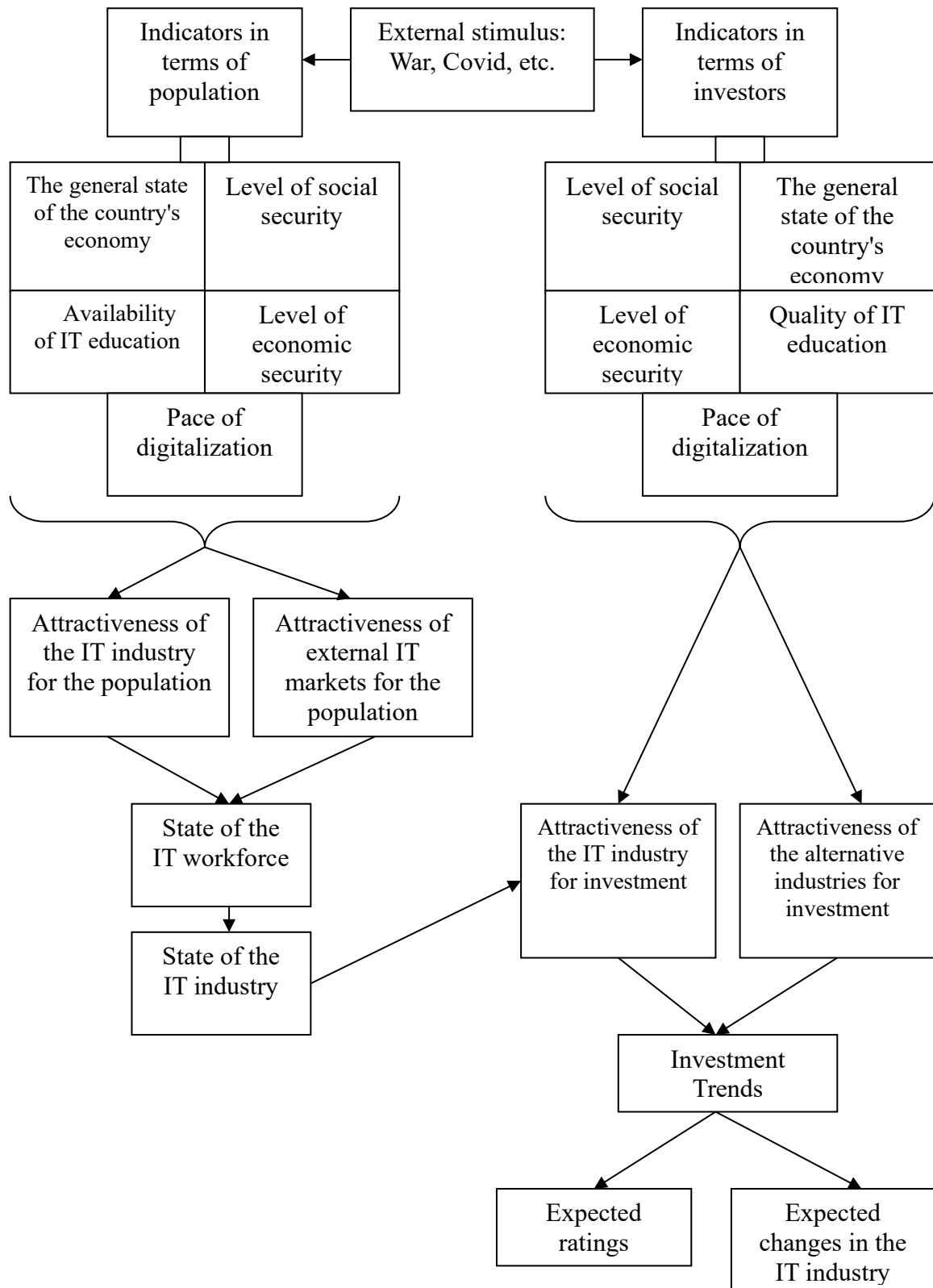


Figure 2 – External and internal factors influence graph

- A set of initial data for three different scenarios was compiled for Ukrainian IT industry:
- forecasting of IT industry performance for the end of 2021.
 - forecasting of IT industry performance for the end of 2022 considering the impact of Russo-Ukrainian war in 2022.
 - forecasting of IT industry performance for 6 months of 2023 in the context of foreign events.

Table 1. Experiment results for Ukraine IT industry

Indicator	Result analysis		
	Obtained result	Statistical data	Clarification
General population and IT specialists' emigration trend	2021: BELOW MODERATE	5% emigration rate	DSS forecasts no change in emigration trend, which is support by statistical data available by the end of 2021
	2022: MODERATE	13% emigration rate	DSS predicts increasing emigration trend of IT specialists due to the worsening economic situation in a war-torn country, despite the industry's growing popularity compared to other sectors
	2023 (6 months): MODERATE	9% emigration rate	DSS still forecasts an increase in the emigration of IT professionals, although the growth rate is gradually decreasing
IT industry subindustry shares	2021: NO CHANGE	51% - outsourcing companies; 49% - product and start-up companies	DSS forecasts no changes in the companies' shares, which is supported by statistical data indicating a lack of stimuli for any significant shifts.
	2022: SHIFT TO PRODUCT	41% - outsourcing companies; 59% - product and start-up companies	DSS predicts an increasing share of product companies due to preference for more financially stable workplaces. Statistical data supports this trend as outsource IT companies become less popular.
	2023 (6 months): SHIFT TO PRODUCT	36% - outsourcing companies; 64% - product and start-up companies	DSS predicts the development of a trend towards an increase in the share of product companies, which is confirmed by statistical data
IT industry investments trend	2021: FAST GROWTH	35% private investments growth	DSS forecasts continued fast growth of private investments into Ukraine IT industry. Growing size of IT industry and relatively cheap and highly educated IT workforce keep it attractive for investments.
	2022: DECLINE	50% drop in private investments	DSS predicts a decline in Ukraine's IT industry private investments, which is supported by statistical data available by the end of 2022
	2023 (6 months): DECLINE	59% drop in private investments	DSS predicts a trend of further decline in investment, which is confirmed by statistical data

Table 2 shows the partial results from the conducted experiment, which aims to predict the behavior of the Indian IT industry by the end of 2022 and compare those results with already available historical statistical data of Indian IT industry performance by the end of 2022.

The results show a reasonable level of correlation between the fuzzy inference results and actual statistical data.

Research conclusions are:

- Global IT market experiencing high growth with long-term potential.
- Heterogeneity, crises, and uncertainties require effective IT industry management.
- Fuzzy Expert System is an effective tool in uncertain conditions.

Looking ahead, it is planned to expand research cooperation in the field of fuzzy logic. With its ability to handle uncertainty and incomplete data, offers immense potential for addressing complex real-world problems in various domains.

Therefore, the project team aims to investigate further applications of fuzzy logic in areas such as decision support systems and risk analysis.

Table 2. Experiment results for Indian IT industry (for 2022 forecast)

Indicator	Result analysis		
	Obtained result	Statistical data	Clarification
General population and IT specialists emigration trend	BELOW MODERATE	6% emigration rate	Based on the available statistical data from the end of 2022, FuzzyKIDE predicts a consistent emigration trend with no significant change.
IT workforce growth trend	MODERATE GROWTH	10% of IT workforce growth	FuzzyKIDE predicts a continued growth in the IT workforce. This projection is attributed to the increasing popularity of IT as a career choice, facilitated by the widespread availability of IT education opportunities and the persistent wage disparities compared to other industries.
IT industry subindustry shares	NO CHANGE	60% outsourcing companies; 40% product and start-up companies	ES forecasts a static outlook for the companies' shares, which aligns with the statistical data suggesting the absence of stimuli that would lead to substantial shifts.
IT industry investments trend	RAPID GROWTH	record private investments growth	ES predicts a sustained rapid growth of private investments in the Indian IT industry. The industry's expanding size, coupled with its cost-effective IT workforce, maintains its attractiveness for investment opportunities.
IT industry ratings	GROWTH	40th place globally	FuzzyKIDE predicts ongoing growth in ratings for the Indian IT industry. This forecast is substantiated by statistical data that demonstrates the industry's significant progress, as it advanced from the 46th to the 40th position within a span of one year.

Additionally, there will be increased cooperation in the realm of the realm of computational modelling, particularly in the context of imitational modelling. The ability to simulate and predict the behavior of complex systems can significantly contribute to understanding and decision-making processes across various disciplines.

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KEY ASPECTS OF INCLUSIVE AND FRUGAL INNOVATIVE SYSTEM RESEARCH FOR MILITARY TECHNOLOGIES AND NEEDS IN UKRAINE

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According to the Strategy for the Development of the Defense-Industrial Complex of Ukraine, approved by the Decree of the President of Ukraine dated 20.08.2021 No. 372/2021, one of the main directions of the state military-industrial policy is to economically stimulate the use of the latest technologies related to energy saving and energy supply and implementation of CALS technologies and the "lean production" system. At the same time, it is emphasized to ensure the access of business entities of all forms of ownership to participate in projects on the creation and production of defense products, implementation of public-private partnerships, promotion of the development of the internal and external investment market, promotion of the development of small and medium-sized enterprises of all forms of ownership in in the field of development and creation of innovative technologies and production of high-tech products for military, special, dual and civilian purposes. The full-scale military invasion of the territory of Ukraine in February 2022, on the one hand, added even greater urgency to these directions of the implementation of the state military-industrial policy, increased the need for innovations for military needs, but on the other hand, reduced the availability of all types of resources, which is due to the increase the number of occupied territories, destruction of strategic infrastructure, migration of qualified personnel abroad, etc. Therefore, meeting military needs within limited resources becomes important. In this case, the focus should be on the development and implementation of frugal innovations. Thrift and saving resources is a certain philosophy of the modern world, which is faced with scarcity of resources, wars, earthquakes and other natural disasters, negative weather phenomena and corresponding financial crises.

Over the decade, many businesses and individuals from developing countries have implemented frugal innovations [1]. In the scientific literature, frugal innovations are usually associated with products created under conditions of limited resources and, above all, with low-income consumers in mind to achieve affordable production [2]. Frugal innovation involves developing products and services that are simple, affordable, and scalable, focused on meeting the needs of underserved markets. And inclusive innovation systems involve the participation of various stakeholders in the innovation process, including government, academia, industry, and civil society.

Therefore, research has the potential to contribute to the economic development and welfare of the country in several ways:

- first, the research is aimed at strengthening the innovative capabilities of the Ukrainian army, which will allow the country to develop new technologies and solutions to meet defense needs. This can help Ukraine meet its national security needs and ultimately stabilize its economy;
- secondly, research can lead to more economical and efficient use of resources;
- thirdly, the developed structure can be transferred to other innovative conditions and used for the post-war recovery of Ukraine and the development of its innovative activities.

The purpose of this study was to create a new model of inclusive and frugal innovations for military technologies in Ukraine.

The main tasks of the research:

- 1) Identify key challenges and opportunities for inclusive innovation systems and frugal innovation for military technologies and needs in Ukraine.
- 2) Develop a conceptual framework for the creation of inclusive innovation systems and frugal innovations specific to the military context in Ukraine.
- 3) Illustrate the applicability of the developed models and frameworks in selected areas of various military technologies and needs using a case study approach.
- 4) Propose to the relevant interested party's recommendations on the further use of the relevant structure.

The research uses a mixed-methods approach that includes a literature review, stakeholder interviews and case studies.

A search for documents in the Scopus database using the keywords "Frugal Innovation" allowed to get the following results: a total of 641 documents were found in the database at the time of the request (March 12, 2023). Analysis of the dynamics of scientific publications over the years (Fig. 1) confirms the fact that active research on frugal innovations began about 10 years ago (23 articles in 2013) and since then there has been a gradual increase in the number of scientific publications on this topic.

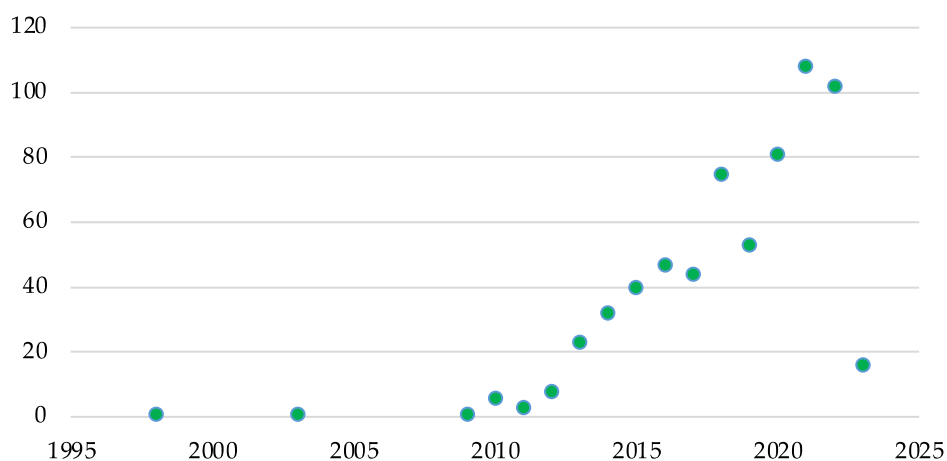


Figure 1 – Dynamics of scientific publications on Frugal innovation in the Scopus database by years

An analysis of publications in the Scopus database on frugal innovation by authors (Table 1) revealed that some scholars have been researching the phenomenon for more than a decade and have up to 16 relevant publications. In addition, the geography of scientists by affiliation is quite extensive: Germany, India, the USA, France, Qatar, Saudi Arabia, Sweden, the UK, the Netherlands, China, Australia, Greece, etc., which indicates the interest of scientists in researching this topic in different parts of the world. The first gap we discovered during the literature review is the absence of Ukrainian authors in the general list of scientists who study frugal innovation, as well as examples of their application in Ukraine. Therefore, in our research, we consider Ukrainian cases of frugal innovations.

Analyzing the fields of knowledge and research areas of publications on the study of frugal innovation, we did not find anything related to military needs or technologies, which we consider to be the second gap in the analyzed literature. Considering the advantages of previous studies, as well as considering the gaps in the literature, the study is aimed at strengthening the innovative potential of the Ukrainian army and stimulating the development of new technologies that can meet the country's defense needs based on recently introduced inclusive and frugal innovation systems.

The researchers prepared questions (generated in Google form) and conducted 11 online interviews with representatives of academia, industry (including enterprises producing products for the defense industry) and civil society (including voluntary associations) and obtained information about the main challenges and opportunities of frugal innovation for military technologies and needs in Ukraine, the frugal innovation process and the main factors affecting it are considered.

Table 1. TOP-10 authors by the number of scientific publications on Frugal Innovation in the Scopus database

Author	Number of publications	Publication period	Co-authors
Brem A.	16	2012-2022	Moitra D., Agarwal N., Horn C., Wolfram P., Agarwal N., Grottke M., Mishra S., Dwivedi S., Wimschneider C., Miesler T., Meinel L., de Aguiar Dutra A.R., Vieira Cubas A.L., Oehler J., Ebolor A., Nylund P.A., Probst C.
Maussion P.	15	2017-2022	Dung P.Q., Chi L.T., Dagues B., Le T.-C., Carlier A., Phan Q.-D., Kim B., Pietrzak-David M., Bun L., Dinh T.B.H., Phan Q.-D., Azzaro-Pantel C., Chrin P., Nguyen M.T., Mohsin M., Picot A., Cassan L., Dellinger G., Dellinger N., Castellanos, D.G.
Hossain M.	14	2015-2022	Simula H., Halme M., Levänen J., Lyytinen T., Numminen S., Sarkar S., Wierenga M., Agarwal N., Bhatti Y.
Agarwal N.	13	2012-2022	Brem A., Grottke M., Mishra S., Rosca E., Agarwal N., Schlegel J., Dwivedi S., Wimschneider C., Oehler J., Ebolor A., Hossain M., Bhatti Y., Levänen J., Nylund P.A., Probst C., Park S.
Bhatti Y.	8	2013-2022	Khilji S.E., Basu R., Prime M., Harris M., Taylor A., Darzi A.W., Udayakumar K., Barron D., Ventresca M.J., Attaelmanan I., Imbuldeniya A., Darzi, A., Prabhu, J., Buckley J., Sharma D., Agarwal N., Levänen J.
Jagtap S.	8	2016-2022	Aranda-Jan C.B., Moultrie J., Larsson T.
Harris M.	7	2016-2022	Weisberger E., Silver D., Dadwal V., Macinko J., Bhatti, Y.A., Prime, M., Parston G., Darzi A., Taylor A., Udayakumar K., Attaelmanan I., Imbuldeniya A., Buckley J., Sharma D., Dallera G., Battersby C., Barlow J.
Mourtzis D.	7	2016-2019	Colledani M., Silipo L., Yemane A., Bernard A., Belkadi F., Vlachou E., Boli N., Gravias L., Giannoulis C., Siganakis E., Zogopoulos V., Kaya M., Bayrak I.T., Kumar-Gupta R., Büyükdığın B.G., Tekin Bayrak I.
Belkadi F.	6	2016-2018	Colledani M., Silipo L., Yemane A., Bernard, A., Buergin J., Gupta R.K., Urgo M., Lafleur M., Terkaj W., Vlachou E., Mourtis D., Borzi G., Ascheri A., Büyükdığın B.G., Tekin Bayrak I.
Bernard A.	6	2016-2018	Colledani M., Silipo L., Yemane A., Belkadi F., Buergin J., Gupta R.K., Urgo M., Lafleur M., Terkaj W., Mourtis D., Borzi G., Ascheri A., Büyükdığın B.G., Tekin Bayrak I.

At the same time, the researchers created 10 cases of frugal innovations, from open information. Moreover, each case illustrates a separate type of frugal innovation for military needs in Ukraine (for example, trench candles, homemade chemical heaters for the military, parts for military equipment and drones printed on a 3D printer, homemade chargers from used electronic cigarettes, portable medical devices for hearing improvement, disposable shower for the military, etc.). The processing of the received primary and secondary data is still ongoing. Data analysis is performed based on NVivo software. The research has the potential to strengthen the innovative capabilities of the Ukrainian army and stimulate the development of new technologies that can meet the country's defense needs. The development of inclusive innovation systems and frugal innovation for military technologies will also facilitate the participation of diverse stakeholders in the innovation process, promoting a more collaborative and inclusive approach to innovation.

In addition to its military benefits, the research may also have broader applications after the war. The approach of inclusive and frugal innovation can potentially be useful in other sectors or industries in Ukraine, as it facilitates the participation of diverse stakeholders and encourages creative, cost-effective solutions. The conceptual framework and guidelines developed in this project can serve as a valuable resource for other organizations seeking to adopt similar approaches to innovation. In addition, case studies conducted within the project can provide valuable information and best practices for implementing inclusive and frugal innovation in other contexts.

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SOCIAL MEDIA INTELLIGENCE: USING COMMUNICATION STRATEGIES TO ENGAGE STAKEHOLDERS

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Social media has revolutionized the way companies, organizations and governments interact with their stakeholders. This article explores the concept of social media intelligence and its role in stakeholder engagement. It examines the applying of stakeholder theory, which focuses on considering the interests of all stakeholders, in the context of social media. It also examines research on the effectiveness of communication strategies in a variety of areas, including business, crisis management, and military operations. It also highlights the ethical and moral implications of stakeholder management in the information warfare era. Overall, this research provides insight into the importance of communication strategies and social media analysis in managing stakeholder relationships and achieving organizational goals.

In today's digital age, social media has become an integral part of communication and interaction. It has changed the way individuals, companies, organizations and governments interact with their stakeholders. Social media platforms such as Twitter, Facebook, and Instagram provide unique opportunities for direct and personal communication, allowing stakeholders to share their opinions, concerns, and feedback in real time. This research exploring the concept of social media intelligence and its role in stakeholder engagement. The publication discusses the application of stakeholder theory in the context of social media and reviews research on the effectiveness of communication strategies in various fields.

Stakeholder theory is a widely accepted concept that focuses on considering the interests of all stakeholders in a business or organization. It recognizes that businesses do not exist in isolation but operate in a wider social context. Stakeholder theory promotes long-term sustainability, stakeholder trust, and responsible activities. It provides organizations with a framework for identifying and analyzing stakeholders, understanding their interests and needs, and developing strategies to manage their interactions. Social media provides businesses with the ability to communicate with stakeholders in a more direct and personal way, leading to increased brand loyalty and customer satisfaction.

In this context, it is also worth considering the application of stakeholder theory in social media engagement. Stakeholder theory has been applied in a variety of contexts, including the use of social media by companies to engage with their stakeholders. Studies have shown that companies that actively engage with customers and react to their feedback on social media tend to have better reputations and higher customer loyalty. Similarly, stakeholder theory has been applied to engage citizens in the use of open government data through gamification, which makes data more accessible and understandable. However, the use of information warfare raises ethical concerns as it can be used to spread false or misleading information. Organizations need to develop communication strategies that actively engage stakeholders to build trust and credibility.

Effective communication strategies play a major role in a variety of fields, including business, marketing, politics, social media, healthcare, and education. They help organizations reach their target audiences, build relationships, and achieve their goals. For example, in business, communication strategies facilitate effective communication with employees, customers, and stakeholders, leading to increased sales, customer loyalty, and a positive brand image. In marketing, communication strategies promote products or services, leading to increased sales and brand loyalty.

In the context of social media, effective communication strategies are essential to engage stakeholders and achieve organizational goals. Organizations can use a variety of tactics to increase

interest and engagement on social media platforms (fig. 1) [1-9].

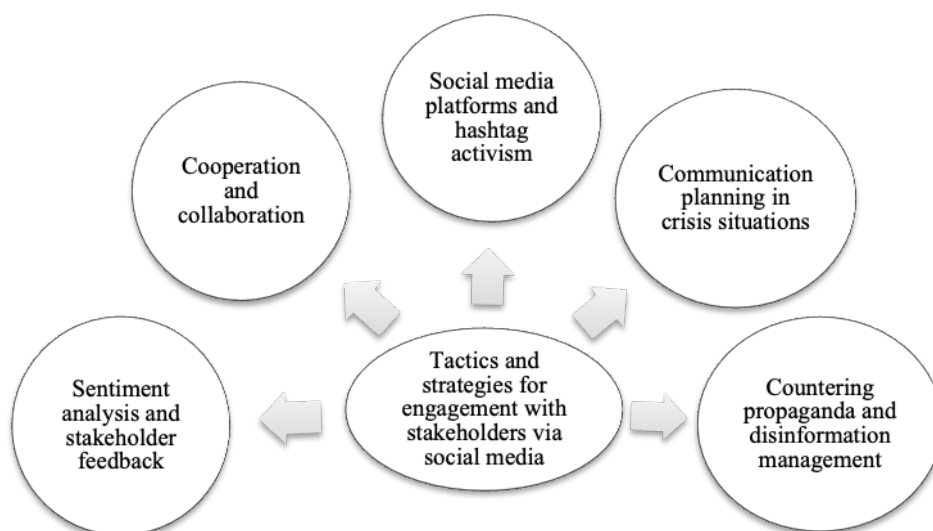


Figure 1 – Interaction tactics and strategies for engaging with stakeholders through social media

Social media platforms provide organizations with a powerful environment to interact directly with their stakeholders. Using platforms such as Twitter, Facebook, and Instagram, organizations can share updates, respond to comments and messages, and maintain meaningful conversations. In addition, hashtag activity has become a popular strategy for raising awareness and engaging stakeholders on social and environmental issues. By creating and promoting relevant hashtags, organizations can engage stakeholders in discussions and share their opinions, thereby increasing their reach and impact.

During a crisis or emergency situations, effective communication becomes even more important. Organizations should have well-defined crisis communications plans that include strategies for distributing relevant and accurate information to stakeholders through social media. Quickly resolving issues, providing updates and demonstrating empathy can help organizations maintain trust and effectively manage a crisis.

The prevalence of disinformation and propaganda on social media creates serious challenges for organizations. In response, communication strategies should include proactive measures to counter false narratives and provide accurate information. Organizations can bust myths, address misconceptions, and facilitate transparency to counter disinformation and maintain trust among stakeholders.

Monitoring sentiment analysis and collecting stakeholder feedback are key components of effective communication strategies. By analyzing the sentiment of conversations on social media, organizations can gauge stakeholder perceptions and identify areas for improvement. Proactively seeking and responding to stakeholder feedback demonstrates a willingness to listen and address their concerns, ultimately fostering stronger relationships.

Social media platforms offer opportunities for collaboration and co-creation with stakeholders. Organizations can engage stakeholders in product development, decision-making processes and social initiatives through crowdsourcing and participatory approaches. By directly engaging stakeholders, organizations can build trust, increase stakeholder satisfaction, and create innovative solutions.

While social media intelligence and communication strategies provide valuable tools for stakeholder engagement, ethical considerations should be a priority. Organizations must adhere to ethical guidelines and principles, ensuring transparency, privacy protection, and responsible use of data. In addition, the risk of undesirable consequences, such as unintentional polarization or amplification of harmful content, must be carefully assessed and mitigated.

Areas for future research and conclusions. The field of social media analysis and stakeholder engagement continues to evolve rapidly. Future research should focus on exploring new technologies such as artificial intelligence and machine learning to improve communication strategies and stakeholder analysis. In addition, understanding the impact of social media communication and intelligence strategies in the context of war and geopolitical conflict is an area that requires further research.

In summary, effective communication strategies and social media intelligence are vital to successful stakeholder engagement. By leveraging social media platforms, adopting proactive communication strategies, and considering ethical implications, organizations can foster stronger relationships, enhance brand reputation, effectively manage crises, and achieve their organizational goals. Harnessing the power of social media intelligence can open up new opportunities for stakeholder engagement in the digital age.

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PUBLIC SECTOR INNOVATION IN UKRAINE: A PROMISING LANDSCAPE FOR POST-WAR RECOVERY

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PUBLIC SECTOR INNOVATION. PSI is a process through which new ideas, objects and practices are created, developed or reinvented, and which are new for the unit of adoption. A dynamic process through which problems and challenges are defined, new and creative ideas are developed, and new solutions are selected and implemented.

PROJECT AIM. The project will study the landscape of successful collaborative innovation in government and public services in Ukraine and Eastern Europe & Baltic Region from a comparative perspective. The aim is to understand the content, collaborative management, process dynamics and public value outcomes of collaborative innovation adoption in public services before the war period in Ukraine and compare it with the innovations from Eastern European and Baltic regions (Poland, Estonia, Latvia, Lithuania).

RQs.

1. To what extent can collaboration with NGOs, citizens, and the private sector contribute to public sector innovation?
2. What are the barriers to collaborative public sector innovation, and how can they be overcome through coping strategies?
3. What are the key success factors for producing public value through collaborative public sector innovation?
4. How does the national context influence the content, management, and outcomes collaborative of public sector innovation?
5. To what extent innovations can be transferred nationally and internationally?

PROJECT MODULES. A systematic literature review of public sector innovation and reform in Ukraine. Objective : To uncover national context elements leading to innovation and reform in Ukraine. Methodology: Systematic review and Content Analysis. A systematic literature review of public sector innovation and reform in Ukraine. Search Terms: ((innov*) OR "New Public Management" OR "NPM" OR "reform" OR "governance" OR "co-creation" OR "modernis*" OR "e-government" OR "smart cit*" OR "artificial intelligence" OR "AI" OR "big data")) AND (municipal* OR "public administrat*" OR "public organization*" OR "public management" OR government* OR "public service" OR "local government*" OR "e-govern*" OR governance OR "public sphere" OR "public sector" OR administrative*) AND (Ukraine).

INCLUSION CRITERIA. Language: Articles in English. Year span: 1990-2023. Journals: International peer-review journals. Theme: The article should discuss a national context element and innovation or reform activity. Web of Science search- 994 academic articles. After Abstract and title screening- 273 included. After Full article reading- 70 included.

CASE: PROZORRO.

1. PROZORRO E-PROCUREMENT. PROZORRO SALE. DOZORRO.AUTOMATED RISK PREDICTION ON PROZORRO.

Conditions leading to innovation-Initiation.

“In March 2014, soon after the Revolution of Dignity began, a team of volunteer civil society advocates and experts began working on the design of a new and more robust procurement system for Ukraine”. “A group of volunteers, supported by business and the government, came up with the idea to create a pilot system of electronic procurement with a unique hybrid model ..Business representatives (electronic platforms), who were future participants of the system, donated USD 35,000 to develop the MVP {minimum viable product – a prototype which can be already put into service}, and mere three months later, on February 12, 2015, the pilot system ProZorro (Ukrainian play on words for “transparently”) was officially presented.” To develop the project fast, the decision was made to develop the system beyond governmental bureaucracy. Transparency International Ukraine was the organization that, from the very beginning, supported development of not simply a new electronic procurement system, but an entire ecosystem with multiple components. That is why TI Ukraine was the organization which agreed to host development, administration, legal support and many other components of the idea with active support of activists, business and, later on, of the government.

Innovation

“The ProZorro team created a hybrid electronic system that is built on open source. The hybrid system is an interaction between of a state-owned central database and commercial areas, where all the information in the CDB is duplicated to the platforms. The code system is completely open and freely available for download and use.” The main principle of eProcurement system: “Everyone can see everything”. After the auction end in the electronic system, everyone can see all the information about the submitted proposals from all participants, decisions of the tender commission, all qualification documents etc.

Challenges

“In the beginning of 2015, the main challenge was whether a functionality of eProcurement system would be effective and supported by government authorities that purchase. Deputy head of the presidential administration offered to test the software on so-called ‘below-the-threshold’ procedures – procurement(s) for small amounts and opinion leaders in the government pushed for the reform in this period.” “Another issue is lack of financing from the State Budget. The problem was solved by involving private commercial marketplaces that already provided e-procurement services for commercial sector and supported first financing - 35 000 \$. The biggest financial support was made by international organizations (WNISEF, GIZ, IBRD).”

Outcomes

“In two years of operation of ProZorro, all the government authorities in Ukraine make purchases through eProcurement system and saved \$1.9 billion of budget funds. “ “E-system ProZorro with its Business Intelligent module is a single point of access to machine-readable data, which is built on the Open Contracting Data Standards providing one of the most advanced and effective analytical tools for procurement data in the world.” “ ProZorro is able to control procurement and track whether public agencies are using taxpayer money efficiently and transparently through the openness of government data.” “Rated #1 by World Procurement Awards 2016 in the Public sector nomination and Rated #1 by Open Government Awards 2016”

Conditions for Success

“Readiness and motivation of civil society to fight with corruption and to create reforms in the country. We chose to do a “bottom-up” approach that entails a group of activists taking the lead on developing an eProcurement system for below-the-threshold purchases.” “Support of the government made the start-up on public procurement become legal.” “ New employees come from leading IT companies and business to Ministry of Economic Development and Trade and to SOE ProZorro to continue development of eProcurement system. “ “Openness of government data on public procurement gave rise to numerous projects.” “Also, important part is international organizations (donors) belief and support in eProcurement system development and effectiveness.”

2. PROZORRO.SALE-2016

Conditions leading to innovation-Initiation

“Drawing on the successful experience from ProZorro public e-procurement system, the team of civil activists initiated to implement the ProZorro.Sale system to handle the state assets sales process.”

“In 2015-2017, the issue of nonperforming loans increased dramatically. Due to devaluation of the national currency, economic decline, occupation of a part of Ukraine’s territory, and increase in the share of insolvent debtors, the government executed the bank cleansing and the nationalization of Privatbank. This resolved a number of systemic problems. However, the cleansing brought about long-term challenges. The state became the owner of about half the assets of the banking system, 62% of the population’s deposits, and four out of the top ten banks. The government had assets from more than 80 bankrupt banks to sell — everything from loans to real estate and furniture — with a staggering balance sheet value of US\$20 billion, equal to 20% of Ukraine’s gross domestic product”

Innovation

“ProZorro.Sale is the only e-auction state assets sales system of its kind in Ukraine. ProZorro.Sale is a “hybrid model” e-auction system, which means the information is stored in one central database, but bidders and sellers can access the data from a number of different platforms, choosing the one that best serves their needs. Using an API, these interfaces are connected to the central database.” “The main principle of eProcurement system: “Everyone can see everything”. After the auction end in the electronic system, everyone can see all the information about the submitted proposals from all participants, decisions of the tender commission, all qualification documents etc.” “Developed and implemented by Transparency International Ukraine and transferred to the state enterprise: Prozorro”.

Challenges

“To establish the state enterprise and reach sustainability, the Project needs to develop all necessary legal documents package, and financial independence, and set the full set of business processes.” “The scale of Electronic Trading System – the continuous launching of new streams requires considerable increase of the system capacities. Additionally, the system needs constant technical enhancement and scaling.”

Outcomes

“The Project has launched a very important nation-wide process – the small-scale privatization electronic auctions. As well as about to launch land-lease rights, carriages leasing rights of Ukrainian Railway, fossils extraction rights and forest. All these streams have significant economic and social effect as it allows to significantly eliminate corruption.” “As of the end of August 2018, the system generated revenue of UAH 10 billion or USD 384 million with an average price increase of 13% per auction. The number of participants surpasses 7400. The number of auctions reached 184 800, which could be seen and tracked via business intelligence module.” “Prozorro.Sale won the prize of the best anti-corruption start-up by Citi Tech for Integrity Challenge in 2017 and C5 Accelerate & USA Institute of Peace in 2018.”

Conditions for Success

“To successfully replicate the system the appropriate legal environment should be lobbied for.” “The system is fully open source that allows to easily scale up”.

3. DOZORRO – Watchdog-2017

Conditions leading to innovation-Initiation

“Three years after the digitalization of contracting, the e-procurement system (Prozorro) allowed to narrow the bottlenecks for corruption and saved about USD 2,5 billion for the national economy in 3 years. Rapid digital transformation and improvements introduced brought transparency and made public information on public contacting - operation worth 15% of the country GDP - accessible to anyone. However, the sector remained largely corrupted and given its volume - 4500 tenders per day - required close oversight to ensure compliance, equal access to the market and fair competition principles are being adhered. To give voice to those, whose rights are being violated, be it a taxpayer or discriminated business, Transparency International Ukraine launched DOZORRO - end-to-end feedback platform to accumulate and react to these violations.”

Innovation

“The online platform allows business whose rights are violated to leave the structured feedback on the tender, buyer, another bidder etc. and the party to which the complaint is addressed to respond and eliminate the violation once confirmed. In case no reaction follows, the case could be forwarded to one of the experts to investigate the case. If the violation is validated, the appeal to the controlling bodies is submitted. The complainant has the opportunity also to rate the quality of responses from 1 to 5, and the tenders in which no response to the complain followed or where the satisfaction rate was below 3 are marked as risky and highlighted on the platform. Those tenders are prioritised for the review by civil society organisations monitoring procurement.” We provide relevant expertise and deploy technical solutions enabling anyone – the supplier, the procuring entity, the controlling agency or any citizen - to identify, react to and report wrongdoings in public spending. Users of the portal are mostly local activists, investigative journalists, businesses already active or planning to compete for public tenders.”

Challenges

“The biggest challenge in the deployment of the technology intense innovation was rooted in ensuring the usability of the portal for main beneficiaries and uniting the all-country community around monitoring activity. The deployment of the technology required constant knowledge update. Another challenge was linked with communication of the complex topic of the public contracting to the local activists engaged in handling the cases of violations submitted online at the beginning. The latter was addressed with the number of active communication channels online and offline with regular knowledge exchange sessions. In addition, TI Ukraine had an unwrapped network of activists well-familiar with procurement monitoring and loopholes. The usability of the portal is constantly being improved given capacity as a result of the feedback sessions with users.”

Outcomes

As a result of the DOZORRO work, one-third of the cases reviewed by the community of experts, are resolved either before the award of the tender - preventing violation - or afterwards ensuring liability of parties abusing competition. As of March 2019, more than 930 000 unique users have visited DOZORRO platform, with more than 84 000 feedback inputs recorded on the website. Being a successful civic approach, the methodology spilled over to the government sector - DOZORRO advocated the use of the risk-based monitoring as obligatory for controlling body within the Law on Public Procurement. Recently, DOZORRO was listed in top 12 projects worldwide for engaging citizens as a corruption watchdog. Further advance of AI technology for risk flagging is planned in 2019.”

Conditions for Success

“Based on our experience we recognise collaboration, added value and timeliness of innovation among the crucial criteria. Engagement of the stakeholders coming from diverse background allowed to manage risks along the way timely and effectively. As well as unwrapping community of the activists ready to promote the use of the platform and disseminate the knowledge on how to use it was crucial for the innovation success. In addition, focus on the added value for the users of the technology proved to be key and is the reputation as a most trustworthy resource for looking into when suspecting wrongdoing became the main asset allowing to interact with the beneficiaries and improve the service further. Technology is key, but the competent community enable to verify the quality of innovations is king.”

4. DIGITAL TOOLS TO MONITOR AND PREDICT RISKS IN AUDITING-2018

Conditions leading to innovation-Initiation

First, European Bank for Reconstruction and Development (EBRD) led a collaboration of government, civil society and businesses in building a cutting-edge digital system called Prozorro, which means “transparency” in Ukrainian. During a successful pilot phase, the system saw excellent uptake and generated vast amounts of data. When processed effectively in real time, these data enable auditors to proactively anticipate risks, react quickly when abuses or abnormalities are detected, and flag gaps and inefficiencies in the system for future improvement. Initially, it was assumed that civil society would process this data, but it was soon obvious they lacked the resources, skills or capacity. Data that could be fed back into the system to flag risks and make it more efficient and transparent

was not being processed, which significantly hampered its effectiveness. So, the EBRD team behind Prozorro again worked with the Ukrainian government to first develop the legal basis for a system of indicators to flag these risks early and mitigate them. They then developed tools that could deliver this, combining cutting edge business intelligence technologies with real-time risk analysis techniques.

Innovation

“The Prozorro system is unique in drawing information from existing commercial platforms into a single central repository. So, the auditing system needs to be able to plug data from lots of different platforms into a singular system and detect and flag risks across a constantly changing data set.” “EBRD developed a set of algorithms that analyse open data from procurement processes submitted online and automatically flag risks to the enforcement agencies as soon as they occur.” “The ex-ante monitoring system has 27 unique algorithms and 35 automated risk indicators, which allows officials to track and monitor procurement transactions in real time e.g. if tender documentation has been uploaded incorrectly, or deadlines have been missed, the system flags this up for potential investigation.”

Challenges

“The project involved designing something that has not been done before, anywhere in the world. Furthermore, the whole Prozorro system which this tool is designed to monitor is still very new in Ukraine. This meant challenges appeared and evolved fast.” “At the beginning the system flagged credible risks which had no precedent under the old manual system. So patterns identified in the data were used to show that these were genuine risks and push for them to be included in the development of new laws.”

Outcomes

“15% of transactions are flagged as risky each week, while 9% are reported to officials as requiring immediate attention. This makes the monitoring process quicker and more effective in stopping abuses.” “EBRD is also helping policy development and proposed monitoring methodology informed the development of Ukraine government’s new law on public procurement monitoring passed in 2017.”

Conditions for Success

The integrity of the system relies on auditors having a shared understanding and approach to risk management. It is therefore essential that all officials are trained to the same standard and are attuned to risk. The effectiveness of the Prozorro system as a whole needs to be regularly assessed, to enable the monitoring tool to detect new and emerging risks. The government should introduce policy to make this happen. The quality of the open data that the tool uses is critical to the functioning of the whole system. Ukraine needs to keep investing in supporting officials and companies to ensure they know how to enter quality data into the system.

Preliminary contributions

The technological capacity in the private sector plays a role in public sector innovation in developing countries that supports our team (2023) findings. The political context had a significant influence as our team (2023) suggested for developing countries. Revolution of Dignity 2014 constitutes the conditions leading to innovation, which illustrates the role of temporal context.

DIGITIZED EDUCATIONAL PRACTICES: HYBRID AND CONNECTED LEARNING MODELS FOR UKRAINIAN HIGHER EDUCATION INSTITUTIONS AT THE TIMES OF CONFLICT

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In Ukraine, the war has become the main obstacle to normal education. Since the beginning of the Russian invasion, the only choice between institutions and students has been distance learning, so higher education institutions seek to modify teaching / education models to improve their effectiveness.

With the development of digital technologies, universities have had some experience in distance education. The active use of information technologies in the educational process was widely developed during the pandemic and the introduced quarantine due to COVID-19, but with the beginning of the military aggression of the Russian Federation in Ukraine, distance education became the only possible type of education, since the war forced Ukrainians to study remotely / online.

The project "Digitized Educational Practices: Hybrid and Connected Learning Models for Ukrainian Higher Education Institutions at the Times of Conflict", which will support Ukrainian higher education institutions in defining and creating new educational models for hybrid and connected learning, became possible thanks to the bilateral grant scheme between Great Britain and Ukraine within the UK-Ukraine Twining projects in the field of research and development, funded by Research England with the support of Universities UK International and UK Research and Innovation.

This project aims to support Ukrainian higher education institutions in identifying and creating new educational models for hybrid and connected learning in times of conflict. Through technology-based hybrid learning models for students and industry professionals, this project will help universities develop new online/hybrid education models, improve student welfare and support, and stimulate economic activity for institutions.

The main goals and tasks of this project are: solving the existing problem of blended learning; identification of existing methods of blended learning; development of a complex structure (hybrid and connected learning) to eliminate the shortcomings of existing methods of mixed learning; verification and application of the newly created structure in practice.

The results of the project will enable institutions to identify the strengths and weaknesses of hybrid and connected learning, as well as concerns about its adaptability and readiness. The results of the project will be training and development recommendations for the use of certain methods of online / hybrid training in Ukraine during wartime and peacetime. The findings of this project will also help education policy makers integrate new technologies for future technology-sustainable education models.

The analysis methods are based on the use of the conceptual model of the Unified Theory of Acceptance and Use of Technologies (UTAUT 3) [1] and Resource-Based View (RBV) [2]. These technologies are used in this context to study the model of hybrid and connected learning (HCL) used in Ukraine.

The Hybrid and Connected Learning (HCL) model combines traditional face-to-face learning with digital technologies to facilitate distance learning, building resilience and adaptability in the face of conflict-induced challenges. Educators and policy makers in Ukraine have sought to improve student engagement and learning outcomes in this challenging environment using the UTAUT 3 framework, which focuses on user acceptance and use of technology.

UTAUT 3 assumes that the adoption and use of technology in educational institutions are influenced by: expected performance, expected duration of effort, social influence and favorable conditions. The integration of various digital tools and platforms, such as learning management systems, video conferencing and online collaboration tools, has contributed to the implementation of the hybrid and connected learning model in Ukraine. By providing students with access to high-quality educational resources and interactive learning opportunities, this strategy meets the expected success rate.

The ongoing military conflict in Ukraine has created significant challenges for the educational sector, disrupting traditional learning models and requiring innovative approaches to ensure that students continue to receive an education, as well as to support the economic performance of the national education sector as a whole. The full-scale war unleashed by the Russian Federation against Ukraine on February 24, 2022 directly affected all Ukrainian institutions of higher education, regardless of their location, which initially stopped the educational process, but from mid-March they began to restore it already in distance or mixed formats.

Distance learning, as a supplement to traditional forms, in higher education institutions was previously used in the educational process in Ukraine. Even in the early 90s, distance learning was one of the main ways of informatization and automation of education and the use of the latest technologies in education, which contributed to increasing the effectiveness of education. The purpose of distance learning, as determined by the Order of the Ministry of Education and Sciences of Ukraine No. 466 of 2013, is the provision of educational services through the use of modern information and communication technologies in education, at certain educational or educational qualification levels, in accordance with state education standards.

As a type of distance learning, the American Interactive Learning Center introduced the term "Blended Learning" in 1999, and over time the interpretation of this concept changed. Analysis of the approaches of scientists to determine the essence of the varieties of distance learning, such as: Rashevskaya N.V., Smirnova-Trybulska E.M., J. Munen, Koval M.V., Shunovich B.I., Tryus Yu.V., Gerasimenko Yu.V., - showed that along with the term "blended learning", the following terms are widely used in the literature: "hybrid learning", "flexible learning", "combined learning" [3]. The blended learning model, as determined by some scientists, is built on the basis of an optimal combination of "face-to-face" and online (distance) learning technologies and provides a holistic view of the content, internal structure, relationship and interdependence of the elements of the learning process [4].

Hybrid training is: a combination of new, advanced, using the capabilities of IT technology, - with old technology; formation of a new approach (innovation) - taking into account the known capabilities of the old technology. Hybrid learning takes place both online and in the classroom. This may involve phased learning or group learning, where one group of students is in auditorium and the other is online. Online learning can be both synchronous and asynchronous.

Defined by the connections between everything and everyone, connected learning relies on the active participation of students, faculty, administration and university staff, offering the opportunity to connect courses, people and resources to develop unique, personalized learning pathways. This vision of education is of particular interest to those interested in collaborative success. Connected learning is changing the complementary model of hybrid learning in higher education, which requires not only the acquisition of knowledge, but also the understanding of how to use connections to increase opportunities and develop competencies.

Connected learning also presupposes: personalized learning, inclusion of social media tools, focus on the learner, his relationships with peers and his interests, including national-patriotic position, professional interests, relevant subcultures. Its key innovation is that it focuses on creating

social, cultural and technological connections that will enable the student to connect, integrate and adapt their interests through academic, civic and career elements. This allows the student to see how his interests can be relevant not only for academic success, but also for participation in public life, political and professional spheres. Connected learning shares a common emphasis with the connectivist approach [5], with the "personal learning network" approaches [6]. The network of personal learning involves the total number of desired connections to various people, technological devices, services and information resources that a person uses for educational activities in various fields of learning [7]. A personal learning network (PLN) refers to the total number of desired connections with various people, technological devices, services, and information resources that an individual uses for learning activities in various fields of study [6].

The experience of implementing the model of hybrid and connected education, based on the use of information and communication technologies in the learning process, which was accumulated during the quarantine restrictions, was expanded with the beginning of military operations, which made education safe and accessible for the participants of the educational process. The use of hybrid and connected training allows in extreme conditions to take into account the current situation and individual capabilities of each student, to give preference to different training formats [6]. Therefore, institutions of higher education were forced to adapt their educational process to the distance format, which required changes in lesson formats, evaluation criteria, types of tasks, schedules, etc.

In the formation of a hybrid and connected model of education, an important role belongs to the application of information technologies, various digital platforms and tools used for online learning, such as video classes, online courses, e-learning platforms. Such online platforms as Zoom, MS Teams, Google Meet, Google classroom and Moodle have found wide use in higher education institutions and universities. Digital educational platforms (for example, learning management systems) provide training, exchange of educational resources and materials, synchronous real-time communication between teachers and students. They provide both synchronous and asynchronous learning modes, which significantly expands the interaction between the participants of the educational process [8]. An important element of hybrid learning is the use of various technological tools: personal computers, laptops, smartphones, virtual environments and electronic media.

HCL has advantages related to the use of computer and telecommunication tools in education, which expands the possibilities of varying the material, the information fund that can be used by the student in the educational process, makes the teacher's response to the nature of the student's mistakes and difficulties more flexible and prompt. Means specific for distance learning expand the boundaries of the student's information field, the number of study options offered to him, strengthen feedback [9]. The advantages of implementing HCL are: saving time on arrival at the place of study; availability of educational materials and the possibility for the teacher to use various visual and audio sources during the lecture, the possibility to participate in the educational process from any place with access to the Internet; mobility of participants in the educational process; psychological comfort during the performances of the winners; the emergence of unlimited opportunities for self-education [10].

The implementation of the model of hybrid and connected learning, as the most promising in extreme conditions, revealed a number of main problematic issues, which can be attributed to: the lack of methodological principles for the use of distance technologies in accordance with the existing directions of training and specialization; lack of officially approved educational and methodological materials, time norms for the development of electronic educational publications (distance learning courses); financing the development of remote technologies, updating computer equipment and material base, ensuring corporate access to the Internet network of teachers and students, insufficient qualifications of teachers, the need for the development of information technologies by untrained teachers; the problem of training and retraining (psychological unpreparedness of scientific and pedagogical workers; inertness to innovations; low motivational level for developing distance courses and working with distance technologies) [11]. In addition, the stratification between Ukrainian educational institutions has significantly increased, depending on the capabilities and level of perception of changes, which can be traced in the level of digitization of processes and the availability

of equipment, as well as stratification within institutions - among structural divisions and departments [12].

Also, the negative manifestations of distance education, which depend on the availability of higher education for the participants of the process and ensuring its quality, include: the need for modern technical means of communication between the student and the teacher; problems with establishing the level of independence of control and other tasks performed by the student; low self-motivation of students [10]. Unsolved issues of mixed and distance learning also remain issues of guaranteeing the security of student and teacher data [13].

Despite the existing shortcomings of distance education, it became an integral reality during the military conflict. To overcome the existing problems, it is necessary to: ensure uninterrupted work with electronic course materials, access to them by participants in the educational process, creation and support of electronic learning platforms. Technology platforms used in e-learning environments should be user-friendly and easy to use. In addition, it is necessary to ensure: adequate training of technical specialists, students and teachers, access to the use of cloud technologies and platforms, confidentiality and cyber security for participants in the educational process.

The implementation of HCL requires the provision of administrative support for training, the creation of a support structure for communication with the general environment of the university, in particular: the implementation of support for a public website, a digital library, a corporate portal, an information and analytical system for the management of the institution, etc. This allows for the flexibility of the educational process and affects its effectiveness as a whole.

A prerequisite for the effective operation of the HCL model is that teachers have an appropriate level of digital skills and competences, such as: digital competence, also known as digital literacy, which includes a range of basic digital skills covering the ability to work with information and data, online communication and interaction, creation of digital content, security; special digital skills for specific professions; digital skills for ICT professionals who need not only to use existing ICT, but also to experience its possibilities, propose innovations and create new solutions. Teachers need skills in creating relevant electronic course content and digital resources, using digital technologies for professional development, which significantly affects the development of HCL, increasing the effectiveness of teaching, ensuring its dynamism and student engagement.

In order to increase the intention to use HCL by students of higher education, it is necessary to improve such basic digital skills as: information literacy and working with data; communication and cooperation (interaction through various digital technologies); creation of digital content (editing of digital content in various formats, self-expression using digital means); security (protection of devices and digital content, understanding of risks and threats, confidentiality issues); problem solving (detection, troubleshooting).

To achieve better results in the system of hybrid and connected learning, the role of social interaction is increasing. Social support significantly affects the perception and effectiveness of using the HCL model, since, during the educational process, it ensures intensive interaction with teachers and classmates [14].

Further development of the hybrid and connected learning model depends on understanding how users perceive technology and how such technology affects learning effectiveness. The research is conducted by applying the UTAUT 3 model (Farooq et al., 2017) and the Resource-Based View (RBV) (Wade & Hulland, 2004) to study the hybrid and connected learning (HCL) model used by end users in higher education institutions in Ukraine during the conflict. The study identifies the main factors that influence the desire of end users of higher educational institutions of Ukraine, in the conditions of a military conflict, to use the HCL system and available resources. The study takes into account the following individual characteristics of HCL users: age, gender, employee position or student's level of education, specialty, etc. The research is conducted on the basis of a survey of teachers, students and support staff who are users of the HCL model of a higher educational institution in Ukraine.

The results of the study, based on the factors listed above, will provide an opportunity to determine the behavioral intentions of HCL users of higher education institutions in Ukraine in the

conditions of a military conflict. Ultimately, the results of this study can enrich the experience of higher education management by providing a tool for higher education institutions to better understand the factors that influence their ability to effectively use the HCL model. This research is an important step in helping higher education institutions achieve the best results from implementing the HCL model, focusing on end-user acceptance at the individual level.

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SOME ISSUES OF THE RESEARCH OF INCLUSIVE BUSINESS MODELS IN UKRAINE AND THE UK TO IMPROVE SOCIO-ECONOMIC SUPPORT AND REDUCE THE SOCIAL VULNERABILITY OF THE POPULATION

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Social entrepreneurship uses business models to achieve social change, whether it be providing employment opportunities for vulnerable groups of society [1; 2], developing innovative products or services that address social problems [3; 4], or using environmentally friendly projects and processes [5; 6].

Social entrepreneurship is important because it provides a special chance to address some of the most critical social and environmental issues facing the world significant. By offering goods and services that address social and environmental challenges while simultaneously earning profits, social companies can contribute to society.

These social needs become more apparent within complex institutional environments and areas faced with existential political and economic crises.

In line with this, social entrepreneurship offers a unique solution, offering a myriad of benefits with appositive impact on the economy, society, and environment.

Following the incessant rise of the conflict within Ukraine, the study adopts the geographical context to investigate the social entrepreneurship cases and the use of inclusive business models by small and medium-sized businesses within the region. During the war in Ukraine, the number of vulnerable groups of the population has sharply increased, these are both refugees and internally displaced persons whose houses were destroyed, or they cannot return to them, since these territories are occupied, these are war veterans, many of whom are now disabled, these are women with children who have lost their husbands or whose husbands are at the front.

Our research is directly and primarily relevant to the development challenges in Ukraine.

The research aims to provide insights into how the military conflict in Ukraine affected the readiness of SMEs in Ukraine to adopt social entrepreneurship and inclusive business models, based on the UK experience. These models focus on achieving a social and/or environmental mission, along with generating profit which can be beneficial for the socio-economic support of the development of human potential and reduction of the level of social vulnerability of the population.

Our research has the potential to develop new policies, training programs for SMEs, and strategies to support small businesses, create job opportunities, increase economic growth, and reduce social vulnerability, promoting a more sustainable and inclusive economy in both countries.

During the research, a review of the literature on the problems of social entrepreneurship and inclusive business was carried out. When using this method, it was decided to search for relevant literature in scientific databases Scopus and Web of Science. The stages and results of the literature review are presented in fig. 1.

The literature search was carried out using the search query: "Social entrepreneurship" or "Inclusive business".

In the found literature sample, sources were selected that correspond to the search query: "Inclusive business models". Found sources are uploaded to a specially created Google Drive for analysis and joint evaluation of research.

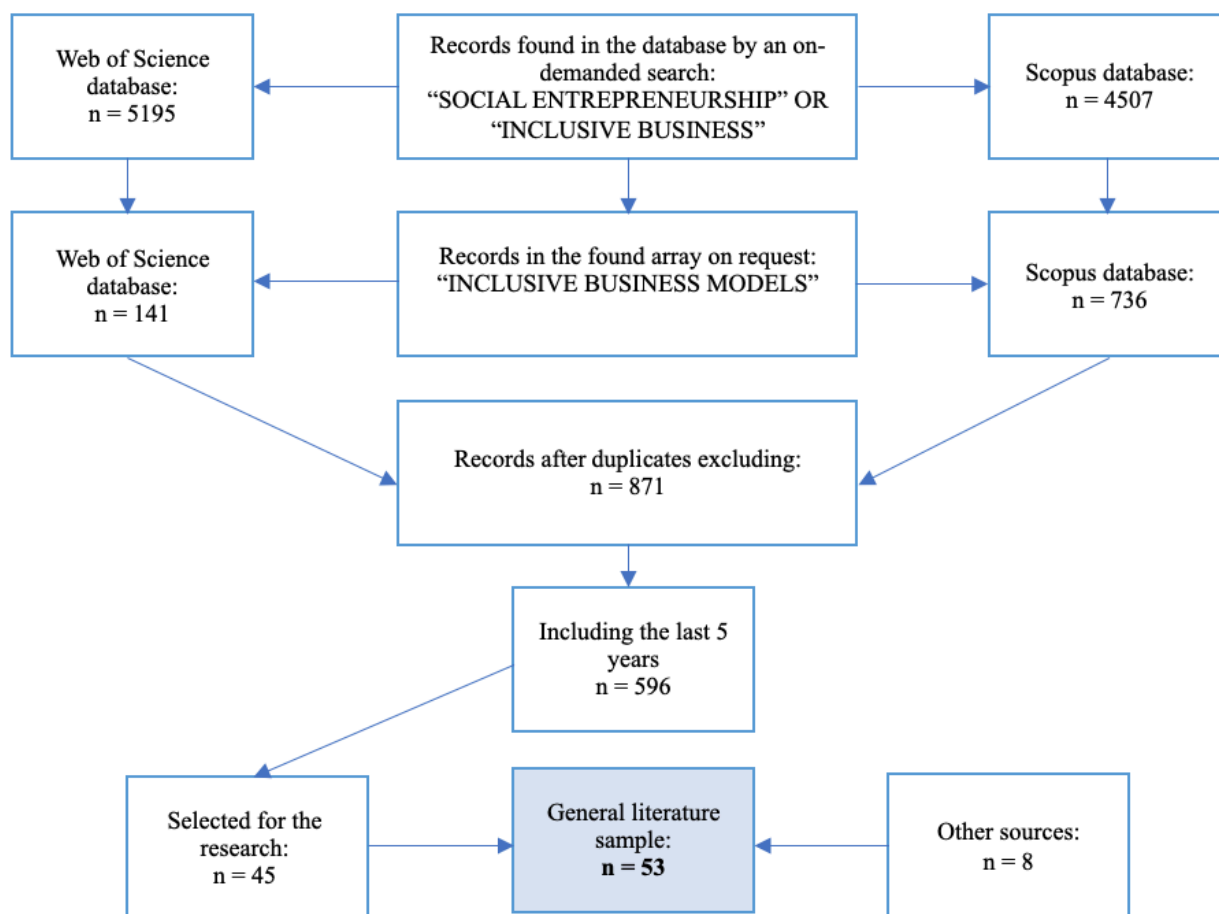


Figure 1 – Flowchart of the available literature on the research topic in the Scopus and Web of Science databases
(source: developed by the authors)

After eliminating duplicate sources of literature, a sample was created, which includes 871 sources for detailed analysis, including scientific publications over the past 5 years, which amounted to 596 titles.

After analysing the literature, 45 of the most relevant literature sources from the Scopus and Web of Science databases and 8 from other sources were selected for the study. The total literary sample was 53 titles of literary sources. Moreover, some sources on the topic of the circular economy were found through separate searches.

Social enterprise plays an increasingly important for vulnerable groups and geographies. United Kingdom, the USA, Italy, Slovenia, Scandinavian countries, the Republic of Korea, Malaysia, India, Bangladesh, and some African countries are considered leaders in the field of social entrepreneurship development.

So, according to the official website [7], there are more than 100,000 social enterprises in the United Kingdom (UK), which contribute to the economy of 60 billion pounds sterling and provide work for about two million people. For comparison, in Poland in 2019 there were 29,535 social enterprises with 428,700 employees, while in Serbia, as of 2015, social enterprises employed 4,273 workers (0.25% of the total number of workers in country) [8].

The UK offering 19% of social enterprises support vulnerable people, 18% address social exclusion, 17% aim to improve physical and mental well-being, and 13% support vulnerable youth people [8]. This is shared between beneficiaries of the business as well as the business owners, as it offers an opportunity for entrepreneurs from disadvantaged backgrounds to self-actualize.

In the Fig. 2 we have grouped the main groups of the vulnerable population, but it should be noted that this list is not exhaustive. This is due to newly emerging environmental, political,

economic, demographic, and other circumstances, the causes, and consequences of which are difficult to predict.

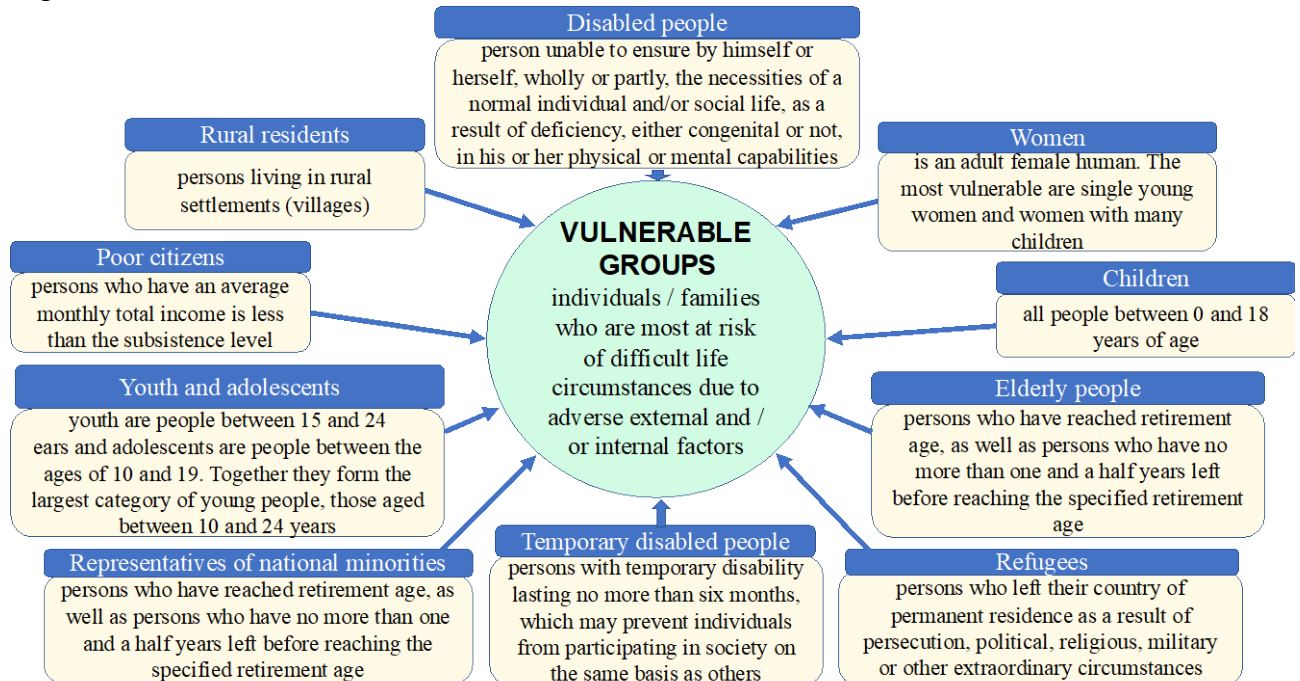


Figure 2 – Vulnerable groups of society
(source: developed by the authors)

According to UNHCR, the UN Refugee Agency [9], by the end of 2022, 103 million people worldwide were forced to leave their homes due to violence or persecution. As of November 2022, there were 231,597 refugees, 127,421 pending asylum cases and 5,483 stateless people in the UK. The war in Ukraine has significantly increased the number of refugees. In 2022, more than 70,000 people applied for asylum. So far, just over 23,000 have been granted the right to remain in the country [10].

The studies [11] have shown that businesses founded by refugees have a great potential for stimulating the economy, creating jobs, and speeding up state governments. For example, an analysis of 30 years of data from Western Europe [11] showed that refugees typically contribute to the economy within five years of arrival, which refutes the popular belief that refugees represent a financial burden for host countries.

Such data is an additional impetus to study the phenomenon of refugee entrepreneurship in more detail.

In Ukraine, where hostilities are taking place, residents have to be moved internally from more dangerous (or occupied) regions to safer ones. Therefore, there is such a category of the population as internally displaced persons (internal refugees) - people who left their homes to escape danger but did not cross the international border but remained in their home country. According to the Ministry of Social Policy of Ukraine, the number of officially registered internally displaced persons in the country reaches 4.9 million people. And such persons belong to vulnerable groups of the population, but they can also be the founders of entrepreneurship in a new place. Since these people are close to the problems of internally displaced persons who are left without a home and without work, they often establish social businesses, in order, among other things, to be able to help other people.

Social entrepreneurship can be considered an effective tool for the integration of internally displaced persons into the life of communities where they now live. The current situation requires a reliable method that will help solve social problems and ensure the financial development of communities. For this, we plan to conduct a survey both in Ukraine and in the UK (as part of the UK-Ukraine R&I twinning grants scheme,) to understand the problems faced by social entrepreneurs and

to collect the best practices and the best inclusive business models that are their basis, with the aim of their further popularization.

To do this, we are conducting an online survey among representatives of social entrepreneurship in both Ukraine and Great Britain (as part of the UK-Ukrainian R&I grant scheme) to understand the challenges faced by social entrepreneurs and to collect best practices and best inclusive businesses -models, which are their basis, with the aim of their further popularization.

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INTERNET MARKETING FOR SMALL BUSINESSES

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Research rationale. Small business in Ukraine is one of the components of economic development. During the 12 months of war, about 114 thousand individual entrepreneurs (IE) were registered in Ukraine [1]. Given the current unemployment rate of 35% and the existing state programs for starting a business, the number of entrepreneurs will only grow [2].

The majority of entrepreneurs try to offer their products on the Internet and there are problems: entrepreneurs do not know how to start; they have a poor understanding of the efficiency of certain marketing tools on the Internet; there is no understanding of how to evaluate the effectiveness of their promotions in the Internet environment. The roadmap would greatly simplify efforts to promote the products of individual entrepreneurs in the online environment and would save time and money in this direction.

It is planned to develop a guide for small businesses, which includes two components: the basics of Internet marketing and ways to effectively use Internet marketing tools for small businesses. We consider it necessary to pay special attention to the cheapest or even free marketing tools in Internet promotion, such as promotion in TikTok and Telegram channels, creation of business collaborations of different market players, because often during the war there is a lack of funds for traditional sources of advertising. Therefore, Ukrainian SMEs need to have a broad understanding of internet/digital marketing to create brand awareness as well as online purchases for their companies.

There is a significant increase in CPA and CPC due to the growth of the currency exchange rate almost 2 times, so low-cost tools will be extremely useful.

The project corresponds to clause 5 of the Topics of scientific research and scientific and technical (experimental) developments of the Ministry of Education and Science of Ukraine for 2022-2026 - "Socio-economic support for the development of human potential and reducing the level of social vulnerability of the population."

SMEs have an important role in the economy of Ukraine. It provides people with job opportunities, entrepreneurship and innovation. Even though it has a promising impact, this economic unit faces a lot of challenges due to the war.

Recent survey (KPMG, 2022) shows that the war is causing a great deal of uncertainty in many companies, with 41 percent still unable to assess the impact on their business [2]. As a result of the war in Ukraine, 46 percent expect a drop in sales and 47 percent a drop in earnings. In addition, 80 percent assume that the Ukraine war will negatively impact their company for longer than a year. Forty percent fear negative effects lasting longer than three years.

Internet marketing has become one of the key strategies for SMEs to promote their brands and increase their sales at a low cost. Due to the war in Ukraine, it is currently difficult for SMEs to use traditional marketing efforts.

Ukrainian SMEs need to understand the implementation of internet marketing and how they can utilise these tools efficiently. We have the need and opportunity to explore the challenges and issues Ukrainian SMEs face with their use of internet marketing.

The results of the study will be unique as firstly it will allow us to identify these issues, and secondly make recommendations for Ukrainian SMEs to help with their efficient use of internet marketing. There will be a website created in Ukraine, which will include guidelines for the implementation of internet marketing.

Aim: To explore the impact of war on the use of internet marketing in Ukrainian SMEs and to build recommendations in order to achieve efficient use of internet marketing during and after the war.

Objectives: Identify the impact of war on the use of internet marketing in Ukrainian SMEs. Identify the impact institutional factors on the adoption of internet marketing in Ukrainian SMEs/ Make recommendations on the efficient use of internet marketing to SMEs in Ukraine

Methodology: First phase of data collection will be semi-structured interviews with the SMEs in Ukraine. Some of the questions will include their use, application and efficiency of internet marketing, and social media marketing. These questions will help to identify the challenges that SMEs face during/after the war in Ukraine.

Once these are identified, the second phase will be semi-structured interviews in the UK to explore the challenges SMEs face and their solutions to these challenges. This will allow researchers to make recommendations to Ukrainian SMEs on their use of internet marketing, and how they can use it effectively.

This study can only be the starting point for further research as it will allow researchers to identify and explore the current use of internet marketing in Ukraine. Further research can look at whether these recommendations increased sales, profit and performance by collecting further data (questionnaires) from Ukrainian SMEs.

The first stage of the research was conducted - semi-structured interviews with twenty representatives of SMEs from different regions of Ukraine, which were conducted face to face. Business strategies and Internet marketing strategies that enabled SMEs to survive and grow during the war are identified.

The stages of change in business strategies of SMEs from February 24, 2023 to June 2023, which are related to military and political events in the country, have been determined. At the first stage, the Ministry of Foreign Affairs, like the whole country, tried to save people's lives and help the army. In the second stage, the SME began to restore economic activity and continue helping the army and citizens, in the third stage, the SME began to look for ways of more effective activity in the new operating conditions. Business strategies and Internet marketing strategies are highlighted, according to which SMEs increased the pre-war indicators of economic activity.

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METHODOLOGY OF RESEARCHING THE IMPACT OF THE CONFLICT ON VULNERABLE CATEGORIES OF THE POPULATION OF UKRAINE

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Twelve million people, or roughly a quarter of Ukraine's population, were displaced following Russia's invasion of Ukraine (United Nations, 2022), causing the largest war-related mass migration since the Balkan wars of the 1990s. Many of these civilians, who are vulnerable groups such as women and children, have not left the country and are in urgent need of protection and support due to reports of gender-based violence, including sexual exploitation and sexual violence related to military conflict. Women's and children's access to basic services, including health and social care and information, is severely disrupted during military conflict. Gender-based violence is common and many cases are unknown or under-reported. Children, especially young people and infants, are among the most at-risk groups for the negative effects of conflict, and they constitute a significant proportion of those who suffer the devastating long-term effects of disasters, including this current war with Russia.

The consequences of this problem will be long-lasting, as after the end of the conflict there will be a large number of refugees, displaced citizens and victims of physical and psychological trauma who will need urgent assistance, including financial and psychosocial support. Determining how the conflict continues to affect these vulnerable groups (primarily women and children) and strategies and interventions to protect their health, well-being and human rights will enable them to live free from harm and abuse and thus contribute to sustainable development and welfare of Ukraine.

Under these conditions, it becomes relevant to research the impact of the current conflict on affected women and children, as well as to determine the current strategies implemented by organizations that protect and work with these groups. That is why recently Odesa Polytechnic University (Ukraine) together with the University of Portsmouth (Great Britain) have been carrying out the international project "Suffering in hope for the future: the status of vulnerable women and children in Ukraine and the determination of post-conflict solutions to support their reintegration and resocialization", *which became possible thanks to the UK-Ukraine Twinning grant scheme funded by Research England with the support of UK International Universities and UK Research and Innovation.*

This project is consistent with the Research Priorities of the Ministry of Education and Science of Ukraine (2022-2026) in the part of "researching issues related to social inequality, tensions and conflicts, with the aim of determining socio-economic support for the development of human potential and reducing the level of social protection of the population. Vulnerability".

The research is conducted to determine the general impact of the current conflict with Russia on women and children of Ukraine, as well as to assess the current level of support and services provided to these vulnerable groups by specialized governmental and non-governmental organizations. For this purpose, the authors developed and applied a structural and logical scheme of research, which provides for the achievement of two aspects of one goal in relation to one subject of research (Fig. 1).

This research of the impact of the conflict on vulnerable categories of the population of Ukraine solves the following *tasks*:

- assess the degree and impact of trauma on women and children of the conflict;
- identify types of vulnerable groups;

- determine the degree and scale of the intervention, including any barriers and facilitators, the readiness of the environment and society to "accept" new vulnerable population groups;
- identify post-conflict strategies and solutions to support the reintegration and resocialization of women and children back into society.

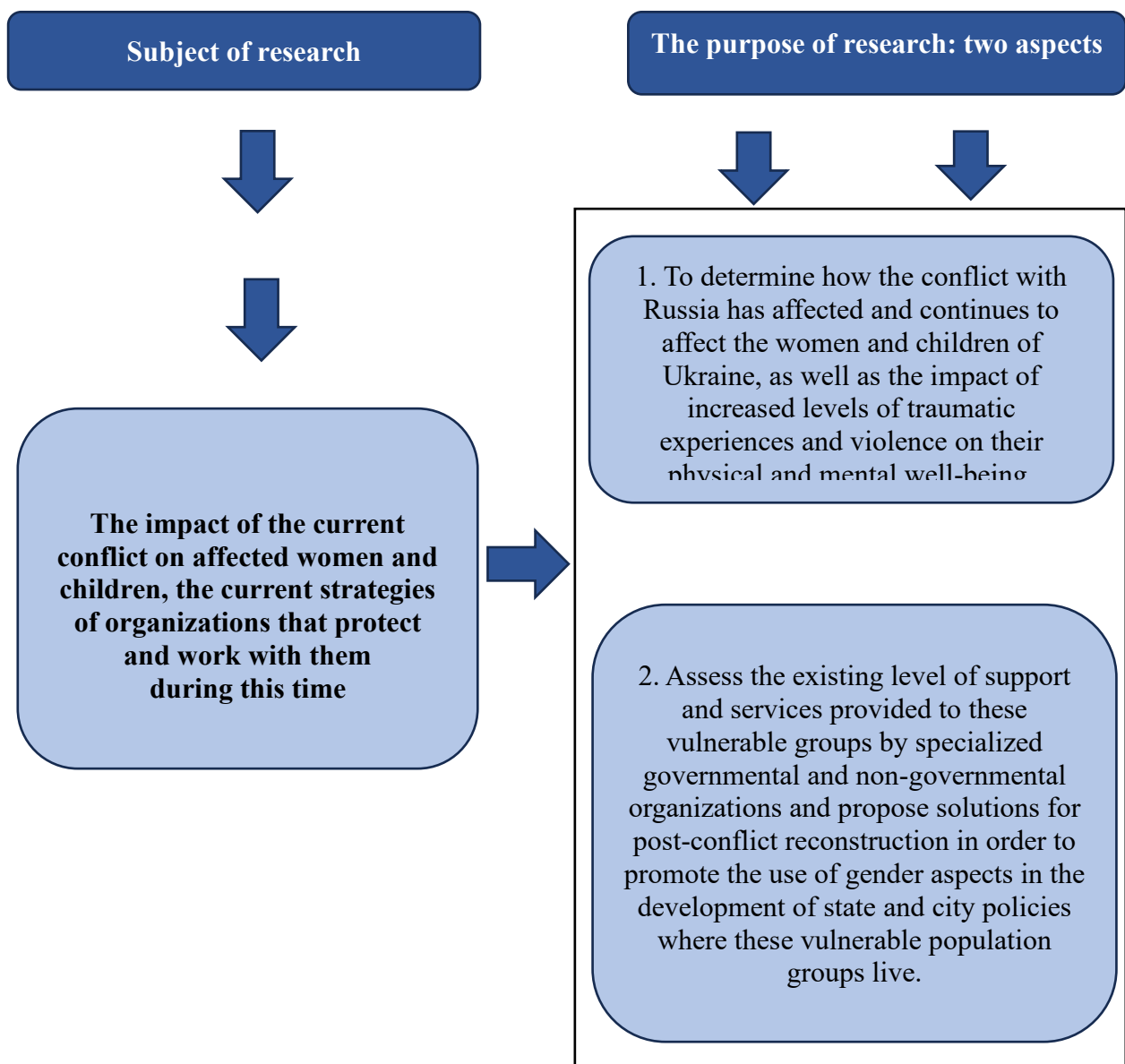


Figure 1 – The subject and purpose of the research of the project "Suffering in hope for the future": the status of vulnerable women and children in Ukraine and the determination of post-conflict solutions to support their reintegration and resocialization"

The research methodology is based on a combination of a review of domestic and foreign literary sources, fieldwork and analysis. The project uses a mixed method of quantitative and qualitative data collection and analysis, in which Odesa Polytechnic researchers conduct fieldwork, which includes the formation of focus groups (appropriate groups for data collection), online surveys and interviews (Fig. 2).

Therefore, the research methodology provides for the following blocks of pre-project, search and analytical works:

- development of two online questionnaires for surveying: 1) vulnerable categories of the population during the conflict (affected women and children); 2) professionals from social services, non-governmental organizations, charitable foundations and volunteer organizations, individual volunteers who work with vulnerable women and children from displaced persons;

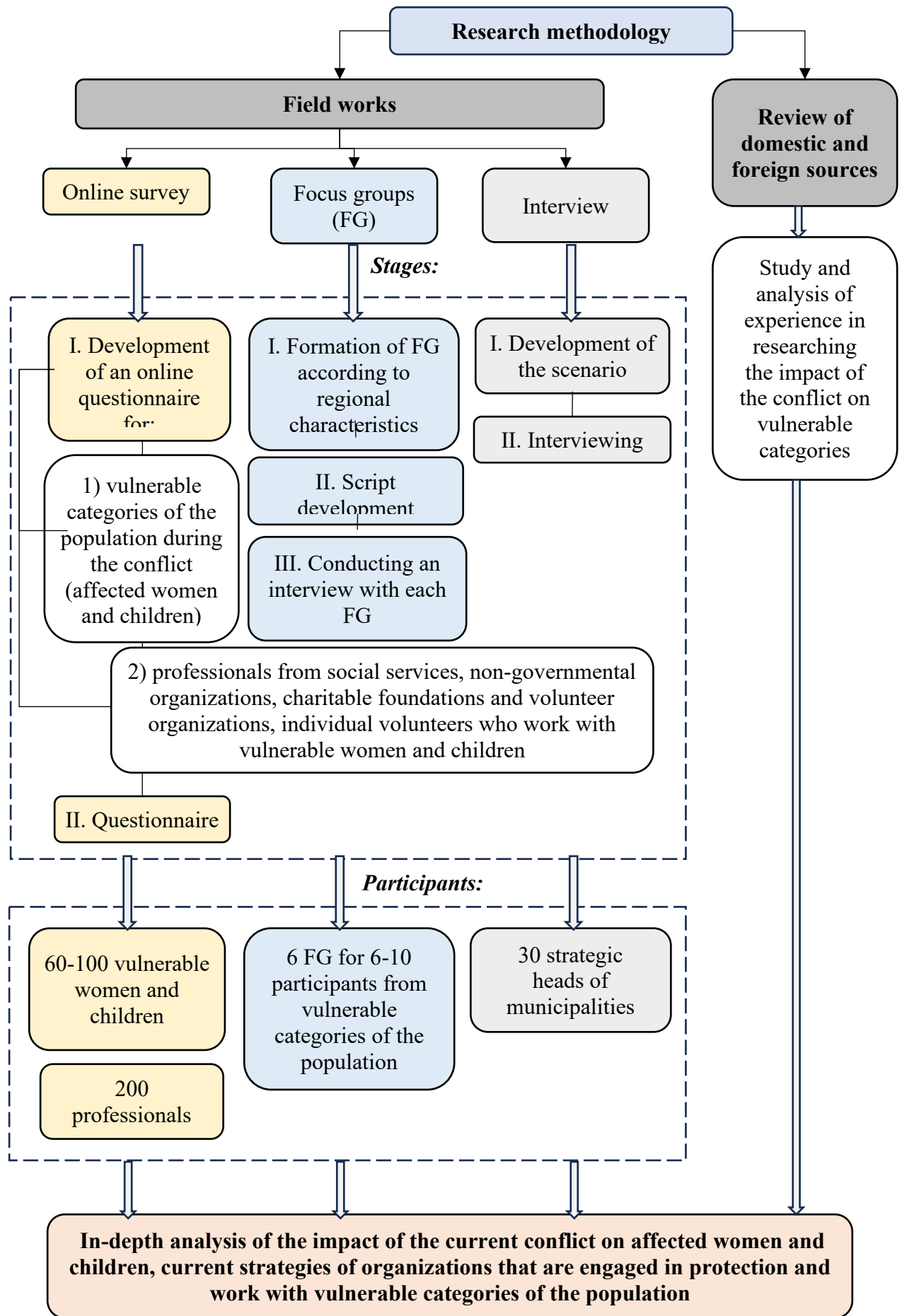


Figure 2 – Research methodology

- conducting two types of online surveys: 1) 60-100 vulnerable women and children and 2) 200 professionals from social services, non-governmental organizations, charitable foundations and volunteer organizations, individual volunteers with the aim of obtaining data on conflict victims and opportunities to help these people ;
- forming and conducting focus groups (up to 6 to 6-10 participants from vulnerable categories of the population (affected women and children);
- development of the format and scenario of interviews with 30 strategic heads of municipalities responsible for social security strategy and planning (Odesa City Council, territorial united communities in Odesa, Mykolaiv and Kherson regions);
- an in-depth analysis of the impact of the current conflict on affected women and children, the current strategies of organizations engaged in protection and work with them during this time;
- summarizing the obtained results and developing an outline of the theoretical basis for justifying the necessary changes in post-conflict strategies and solutions to support the reintegration and resocialization of women and children back into society.

This research aims to listen to and take into account the perspectives of women as well as children and young people. For this purpose, *focus group interviews* are conducted during the research with strict security protocols in place - the focus group research will be conducted in partnership with a specialist consultant who can offer input on focus group discussion issues (in particular, the tone and approach to certain topics), as well as provide further support to participants. Both children and parents will receive information about the study, how it will be distributed, and how their data will be stored during age-appropriate discussions. All focus group interviews will be conducted in person. Findings will be analyzed using descriptive and inferential statistical analysis.

Conducting semi-structured interviews focused on strategic leaders responsible for social security strategy and planning, the results of which will be analyzed using thematic analysis.

The composition of participants consists of three categories:

- a) Women and children from vulnerable categories,
- b) Professionals from non-governmental organizations, charitable foundations, volunteer organizations, individual volunteers who work with vulnerable women and children from displaced persons (IDPs);
- c) Heads of municipalities responsible for social security strategy and planning:
 - 60-100 unprotected women and children. These women will be mothers or guardians of children. Children will not be interviewed separately; however, they may be interviewed accompanied by a guardian (their mothers/legal guardians);
 - 200 professionals from social services, non-governmental organizations, charitable foundations and volunteer organizations, individual volunteers who work with vulnerable women and children from displaced persons;
 - 30 strategic heads of municipalities responsible for social security strategy and planning. They will include heads of local government units - Odesa City Council, territorial united communities in Odesa, Mykolaiv and Kherson regions.

The developed open online questionnaire (up to 100 participants) of unprotected women and children is anonymous and will be on the Google Forms resource. Focus groups (up to 6, 6-10 participants each) with the selection of respondents based on their consent, interviewed under the Twinning UK and Ukraine grant scheme). Work in focus groups is recorded by a photo report with the consent of the participants.

As for the survey of up to 200 professionals from social services, non-governmental organizations, charitable foundations and volunteer organizations, individual volunteers who work with vulnerable women and children from displaced persons, their survey is also conducted online by direct contact with the consent of the respondent with recording of his answer on the resource Google Forms. The questionnaire will provide brief information about the participant at intake and will include consent questions. As the survey is anonymous, respondents will not be provided with a separate consent form.

Regarding practitioners and strategy leaders, the research team uses direct approaches and uses snowball sampling with mandatory consent of respondents.

As a result of the research, the following is carried out:

- preliminary quantitative and qualitative analysis of the received data, which leads to the development of a theoretical basis for justifying the necessary changes in post-conflict strategies and solutions to support the reintegration and resocialization of women and children back into society;
- an in-depth analysis of the impact of the current conflict on affected women and children, current strategies of organizations engaged in protection and work with vulnerable categories of the population.

Data analysis includes quantitative analysis (regressions and structural equation modeling) and qualitative analysis (process theorizing based on pattern matching and thematic analysis).

Thus, the research is expected to provide recommendations for the necessary changes in post-conflict strategies and solutions to support the reintegration and resocialization of women and children back into society.

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