SCENARIOS:

UKRAINE 2040

FORESIGHT RESEARCH
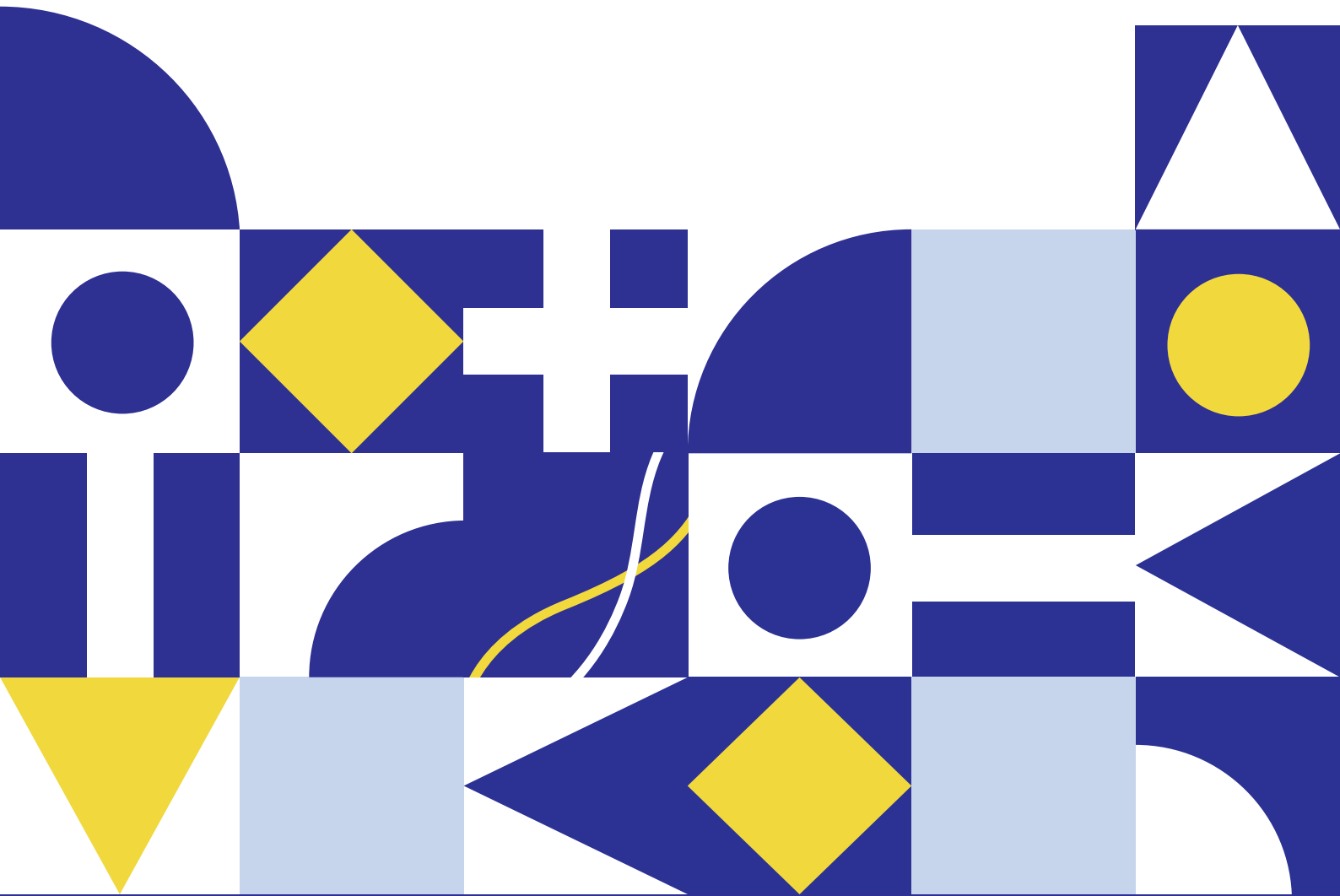
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UKRAINE 2040

FORESIGHT RESEARCH

Inter-factional Union of Members of Parliament of Ukraine
"Strategic Foresight of Ukraine", Verkhovna Rada of Ukraine

KYIV 2023

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Ievgen Kylymnyk is an innovation and security expert, formerly the Head of Exploration at the UNDP Accelerator Lab in Ukraine and a Good Governance Expert in the European Union Advisory Mission to Ukraine on Security Sector Governance and the Administration of the President of Ukraine. Ievgen is also an invited course contributor at the Geneva Centre for Security Policy on foresight. He holds Master's degrees in Public Administration from the National Academy for Public Administration in Kyiv, International Business Administration from Kyiv National Economics University, and Computer Science from the National Technical University "Kyiv Polytechnic Institute". Ievgen coordinated the overall activities of the project, including the chatbot, horizon scanning and environmental scanning, the radar, and also developed and managed the project partnerships.

Co-authors:

Iryna Gerasymenko is a sustainable development and innovations specialist, futures researcher, and foresight practitioner. She has worked for over seven years as an expert and coordinator for multiple UNDP projects in the fields of economic development, entrepreneurship support, sustainable energy, and the environment. Iryna holds a Master's degree in Economics and Entrepreneurship from Kyiv National Economic University and is currently pursuing another one in Futures Studies at the Turku School of Economics and Finland Futures Research Centre. She is a member of the Association of Professional Futurists.

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EXECUTIVE SUMMARY

▶ Origins and scope of this foresight study

The Russian invasion of Ukraine on 24 February 2022 has required Ukrainian parliamentarians and the government to address a large number of uncertainties when planning and developing policies and laws. To ensure that long-term thinking is applied to the policy process, the First Deputy Chairman of the Ukrainian Parliament requested a foresight study on the post-war recovery and development of Ukraine. This study was conducted as a joint project between the Inter-factional Union of Members of Parliament "Strategic Foresight of Ukraine" in the Verkhovna Rada and the All-Party Parliamentary Group for Future Generations in the United Kingdom, with the strong organizational support of the United Nations Development Programme (UNDP) Ukraine as well as other international partners.

▶ Goals

The aim of this study is threefold: to consider different possible scenarios for the recovery and development of Ukraine, including risks and ways to mitigate these risks, opportunities, and possible cognitive biases; and to provide insights about the future that will help parliamentarians engage in more effective decision-making in the uncertainty of wartime; and to generate insights regarding potential strategic implications for Ukraine. The study will feed into the work of the National Council for the Recovery of Ukraine from the War and larger strategic discussions at parliamentary and governmental levels.

▶ Research methodology and process

This foresight study relies on scenario planning, a methodology first developed in the United States during the Cold War to think about nuclear threats that is now widely used around the world and across disciplines. The technique involves developing a small number of scenarios, or stories that describe alternative ways in which the future might unfold. Scenarios are *not* predictions. Rather, they aim to reveal new insights about what the future may hold.

The scenarios presented in this report were developed over the course of seven months, between mid-July 2022 and mid-February 2023. The process was heavily based on workshops and other group work in order to take a broad range of perspectives into account. It included contributions from the Futures Intelligence Team (FIT), a group of experts from diverse disciplines convened as part of this project, as well as inputs gathered by the "ForesightBot" chatbot to obtain views from the Ukrainian population at large.

The first phase of the research consisted of horizon scanning and environmental scanning, which involves identifying weak signals and drivers of change that will affect Ukraine's recovery and

development. To make it easier to examine them and explore their potential impacts, we presented these weak signals and drivers of change in a Future Signals Radar. The second, scenario-building phase involved in-depth discussions around the drivers of change, paying particular attention to critical uncertainties – the most important and uncertain drivers of change – in order to explore how they could interact with each other; this gives rise to different possible scenarios.

Scenarios

The process led to development of four scenarios for the recovery and development of Ukraine. A time horizon of 2040 was chosen in order to offer a perspective several years beyond that in the Recovery and Development Plan of the National Council for the Recovery of Ukraine from the War. The scenarios are summarized below.

Slow slide to world war

The global financial crisis, combined with a war between the US and China, means that the US and EU can no longer provide Ukraine with sufficient military and financial support. Ukraine continues to fight for its freedom and develops a strong wartime economy, dedicating almost all of its resources to producing goods needed for the war. However, Russia, aided by Belarus, is able to capture much of eastern and southern Ukraine. It presses further with its expansionist policies, moving against Moldova and then Estonia. This finally spurs the US, the EU, and NATO to take action. By this point, however, Russia has grown in strength, and a world war is now unavoidable – and even more costly in terms of money and lives.

Drift to autocracy

After much fighting, Ukraine is able to push Russia back to the February 2022 borders and the two countries sign a peace agreement. Ukraine appears poised for a bright democratic future, especially with the power of the oligarchs diminished by the war. But its government turns increasingly autocratic, and a new class of oligarchs emerges owing to corruption in the rebuilding process. Ukraine increasingly moves away from the US, the EU, and NATO, and towards other partnerships, for instance with Turkey, Central Asian states, Saudi Arabia, and China. However, the large Ukrainian community abroad starts to mount an effective opposition, offering a ray of hope.

Decentralized digital survival

The war becomes protracted as neither Ukraine nor Russia can afford to lose. Repeated missile strikes against cities – and fear of a nuclear attack – cause a massive exodus of Ukraine's population to towns and villages, where they live in self-sustaining eco-tech communities. To support this, the Ukrainian government continues its decentralization and digital transformation efforts, providing digital tools for local government. While economic growth is limited, science and innovation decline, and cyber security is a challenge, these eco-tech communities are characterized by strong participation in local democracy and make it possible for civilians to survive the war.

The hard work of unity

Russia's invasion of Ukraine has the opposite effect to what it intended. Its missile attacks, meant to break the spirit of the Ukrainian population, increase their determination to fight and the Ukrainian army makes steady advances on the battlefield. Inspired by this – and by the courage of the Ukrainian people – several separatist regions in Russia rise up and successfully break away. Ukraine is able to regain the Donbas as well as Crimea, and engages in the complex task of reunifying the country. Russia's attempts to splinter the EU and NATO also backfire. Seeking protection from Russia, more countries – including Ukraine – join these organizations.

▶ Analysis and strategic implications

Several of the Ukrainian parliamentarians wanted a rapid way to visualize the scenarios relative to each other, so we developed an "Uncertainties Diagram" illustrating the impact of the critical uncertainties in different scenarios. We also formulated a series of strategic implications of the scenarios for the recovery and development of Ukraine. These include general implications applicable in all scenarios as well as specific implications relevant for particular scenarios.

▶ Next steps

Over the coming months, the scenarios will be periodically monitored, revised, and updated to take changing conditions into account. Their strategic implications will also be expanded upon. The Inter-factional Union of Members of Parliament "Strategic Foresight of Ukraine" plans to stress-test the recovery policies developed by the Ukrainian government and coordinated by the National Council for the Recovery of Ukraine from the War against these scenarios to determine how different policy decisions would fare in each scenario.

FOREWORD FROM THE INTER-FACTIONAL UNION OF MEMBERS OF PARLIAMENT "STRATEGIC FORESIGHT OF UKRAINE"

Corrige praeteritum, praesens rege, cerne futurum –
Correct the past, manage the present, foresee the future (Seneca)

We are happy to present to you the joint work of the Inter-factional Union (IFU) of Members of Parliament of Ukraine «Strategic Foresight of Ukraine» and the All-Party Parliamentary Group for Future Generations in the United Kingdom, which lays the groundwork for planning the post-war future of Ukraine. To develop this report, these bodies worked with our colleagues from the European Union and received organizational support from the United Nations Development Programme. Our work on futures began during the first month of the war and later evolved into this comprehensive foresight study. We believe in the victory of Ukraine and are sure that the war must end the post-Soviet history of Ukraine, finally sever our ties with the totalitarian past and the era of corruption, and open the way to a European future for which our heroes are today paying with their lives.

Strategic foresight is a well-established management practice tool that, under conditions of high uncertainty, best allows policymakers to see a range of possible options for the future, helping them to avoid mistakes, counter threats, and take advantage of new opportunities.

This foresight study is an integrated, important document that is the result of colossal work involving hundreds of participants. The serious intellectual work of the working group of the IFU and international specialists, with wide-ranging public input, provides answers to many difficult and uncomfortable questions, and paves the way for high-quality, realistic long-term planning of Ukraine's state policy for the next 10 years.

Despite the sensitivity of the topic, during the research it was extremely important for us to remain unbiased and adhere to the proven technology of the foresight of the European Parliament and that used in the British Parliament. In this task we were kindly assisted by experts from these institutions.

This study opens up a spectrum of possible scenarios for the future of Ukraine. It draws attention to the global and local processes that may push the country onto one or another historical track, and visualizes various options for the future, demonstrating how inaction or incorrectly made decisions today can lead to adverse outcomes. It also highlights key events and factors that may indicate which way the country is headed.

Work on deepening the foresight continues, and we are sure that these findings will be used by the Ukrainian government to develop more sustainable programmes, strategies, and plans for the future of the country in the coming years, both during and after the end of the war.

We are sincerely grateful to our colleagues from the All-Party Parliamentary Group for Future Generations, experts from the Strategic Foresight and Capabilities Unit of the European Parliamentary Research Service, the people's deputies of Ukraine, analysts, and citizens who are working with us with inspiration and commitment to create a desirable common future for Ukraine.

Oleksii Zhmerenetskyi MP, Co-chair, Inter-factional Union of Members of Parliament "Strategic Foresight of Ukraine"

Viktoriya Podgorna MP, Co-chair, Inter-factional Union of Members of Parliament "Strategic Foresight of Ukraine"

FOREWORD FROM THE ALL-PARTY PARLIAMENTARY GROUP FOR FUTURE GENERATIONS

In times of war, it is more important than ever to think long-term, beyond the immediate future, in order to lay a sustainable path to recovery and development. Ukraine's economy and people have already sustained the immense impact of war, which continues to rage on and has consequences far beyond the territory of Ukraine. It is clear that the outcome of the war in Ukraine has significant implications for global peace and stability. The resilience and determination of the Ukrainian people in the face of such a deeply tragic and unjustified war is an inspiration to us all.

As the Chair of the All-Party Parliamentary Group for Future Generations, we are pleased to have jointly worked with our partners from the Verkhovna Rada of Ukraine in developing their foresight capabilities. It is therefore with great pleasure that we present the result of this collaboration which seeks to explore the future of Ukraine in 2040 and make our decisions more resilient already today.

We are confident that this report will be useful to policymakers in the United Kingdom, Ukraine, and beyond. By examining the broad scenario space and highlighting uncertainties and drivers of change, this work provides invaluable insights for anyone interested in supporting Ukraine's recovery and development efforts. The four scenarios presented in this report, each based on thorough analytical work and participatory discussions among parliamentarians and distinguished experts, challenge our assumptions and offer a nuanced view of what adversities – and opportunities – Ukraine will face in building a strong future.

We stand in solidarity with the Ukrainian people and firmly believe in their aspirations for a peaceful and democratic nation, and commit to doing all we can to support them in achieving this goal.

Finally, we look forward to further expanding our collaboration with our Ukrainian colleagues on the parliamentary level. We hope that this report will be an important piece in forging an even stronger partnership between our two nations.

Bambos Charalambous MP, Chair, All-Party Parliamentary Group for Future Generations

INTRODUCTION

⬗ The context: dealing with high levels of uncertainty

The upheavals of recent years, in particular the Covid-19 pandemic and Russia's aggression against Ukraine, create new challenges for planning and policy development. Decision-makers operating in crises need to find approaches that allow them to be effective in rapidly changing conditions of uncertainty and instability.

In Ukraine, the full-scale war launched by Russia on 24 February 2022 has already led to the injury and death of tens of thousands of people, human rights violations, significant destruction of infrastructure, mass migration both within the country and abroad, and countless other social and economic problems. Under these wartime conditions, state authorities have faced a number of uncertainties when planning and developing state policies and adopting laws. How long will the war continue? What level of destruction and loss will have to be dealt with? Who will support Ukraine during the war and in post-war reconstruction? What challenges must be prepared for now? What shape will the future world order take and what will Ukraine's place be in it?

The Verkhovna Rada of Ukraine (hereinafter referred to as the Verkhovna Rada), as the sole legislative body of the state, has been confronted with such challenges since the start of the war. In conditions of uncertainty, it was necessary to ensure the full and uninterrupted work of the parliament, to take the necessary decisions in order to pass laws in a timely and effective manner, and also, very importantly, to ensure that the parliament exercised a control function over the policies developed and implemented by the government.

⬗ A foresight study requested by the Verkhovna Rada with broad international and societal participation

In view of this, the First Deputy Chairman of the Verkhovna Rada of Ukraine appealed to the United Nations Development Programme (UNDP) in Ukraine to provide support to the Inter-factional Union of Members of Parliament "Strategic Foresight of Ukraine" (hereafter IFU), an inter-party group of parliamentarians established for the purpose of coordinating and promoting the application of anticipatory methods on a parliamentary level. This request also included providing support to the parliament as a whole in organizing and conducting a foresight study on the post-war recovery and development of Ukraine, taking into account key security and socio-economic factors.

Building on an ongoing successful inter-parliamentary collaboration, the IFU in turn asked for methodological and expert support to conduct this study from the All-Party Parliamentary Group for Future Generations in the United Kingdom (hereafter APPG), a body similar to the IFU in nature and goals.

This strategic foresight study was convened by the co-chairs of the IFU, Members of Parliament Oleksii Zhmerenetskyi and Viktoriya Podgorna, as well as the co-chair of the APPG, Member of Parliament Bambos Charalambous.

In this project, we collaborated with the Strategic Foresight and Capabilities Unit of the European Parliament's Research Service (EPRS SFOR) and the Joint Research Centre (JRC) of the European Commission. Experts from EPRS SFOR and the JRC provided methodological advice as well as taking part in the workshops. The Oxford Scenarios Programme at the University of Oxford also partnered on this project. The faculty provided advice on methodology, as well as commenting on drafts of the scenarios.

To ensure wide representation of views and strong analytical backing, the IFU convened an informal working group of experts, the "Futures Intelligence Team" (FIT). The FIT was involved in conducting all stages of the research, and its collective insights are key to the intellectual outcome of the project. It also made use of its chatbot, the "ForesightBot", in order to solicit the views of the Ukrainian population at large. In addition, at various stages of the research, other Ukrainian and foreign experts were involved in discussions, consultations and reviews. (Please see the Acknowledgements for further details.)

▶ Wide-ranging applicability

The purpose of this foresight study is threefold:

1. To raise awareness among parliamentarians and government officials about possible scenarios for the recovery and development of Ukraine, in particular regarding:

- assessments of long-term risks in various areas;
- long-term ways of mitigating adverse consequences;
- opportunities; and
- possible cognitive biases and mistakes.

2. To provide insights about the future that help parliamentarians engage in rapid decision-making under conditions of uncertainty.

3. To consider possible strategy implications for recovery and development policies by the Verkhovna Rada.

This foresight research contributes to ensuring compliance with the principles of democratic governance, in particular by strengthening the control function of the Verkhovna Rada. It also contributes to the accountability of the executive branch of the parliament, as well as to the establishment of parliamentary–government communication in the development and implementation of Ukraine's post-war reconstruction and development policies.

This is a pilot study; the tools developed will be of further use to interested parties, in particular the Verkhovna Rada, in conducting foresight activities and creating an ecosystem for working on

foresight within state bodies. (For example, conducting foresight could be one of the functions of a newly created research service of the Verkhovna Rada, following the example of the parliaments of other European states.)

The results of the foresight study presented in this report can be used not only by representatives of the Verkhovna Rada but also by other authorities and organizations involved in the National Council for the Recovery of Ukraine from the War and its working groups during the planning of development and improvement measures for Ukraine's post-war recovery, and by broader categories of persons who work or are interested in the field of Ukraine's post-war development.

ABOUT SCENARIO PLANNING AND OVERVIEW OF RESEARCH METHODOLOGY

⊿ History of scenario planning

Scenario planning was first developed in the 1950s at the height of the Cold War. The technique was pioneered by military strategist Herman Kahn at the RAND Corporation. At the time, prevailing thinking focused entirely on avoiding nuclear war. Kahn wanted to consider what would happen if nuclear war did break out – something he called "thinking about the unthinkable".

Later, scenario planning was adopted in a range of fields. Corporations started making use of scenarios. One of the most notable examples was Royal Dutch Shell, which in the 1970s adopted and adapted the methodology to give it more relevance for strategic planning; the company still has a large scenario planning team to this day. A number of governments, including the United Kingdom and Singapore, have now embedded foresight teams across government that make use of scenario planning and other futures thinking techniques.

⊿ What scenarios are and why they are useful

Scenarios are stories that describe alternative ways in which the future might unfold. They explore how major forces that are driving changes in various areas might interact with each other, and then imagine the different possible situations that might result.

It is important to emphasize that scenarios are not predictions. The future is uncertain, and we do not have a crystal ball. What scenarios do is describe different possible, plausible futures that *could* occur.

Scenario planning makes it possible to generate new insights about what the future may hold. All too often, people who work closely together tend to have very similar world views, which can result in "groupthink". By taking a broad diversity of perspectives into account, scenario planning helps to challenge commonly held assumptions. Scenarios are generally developed in workshops that bring together participants from a wide range of backgrounds. This typically involves a mix of disciplines, nationalities, gender, and ages, as this yields the most interesting insights.

Scenario planning also allows for more effective planning under uncertainty by considering a range of possible futures. This includes being better prepared to defend against threats that may be coming as well as to embrace new opportunities that may arise. It thus enables better decision-making in the present. Scenario planning has important implications for strategy too. Scenarios

can be used either to develop a new strategy when there is none in place or to update an existing strategy, assessing how it would fare in each of the different scenarios and adapting the strategy as appropriate.

It is also important to emphasize that scenarios do not attempt to describe all of the different possible futures that could occur. There are a multitude of different possible futures. Instead, scenario planning typically involves choosing between two and five different possible futures – those that reveal what the group deems to be the most valuable insights involving key uncertainties – and then developing them into scenario narratives. (In this report, we have chosen to present four scenarios that we found particularly provocative for the recovery and development of Ukraine.)

▶ Overview of the scenario development process

The report authors began by scoping the topic. We first attempted to define the precise meaning of "the recovery and development of Ukraine". After an in-depth internal discussion, we decided that while the financial aspects of recovery and development (such as rebuilding houses and infrastructure or spurring economic growth) are essential, our definition should not rely solely on economic elements. Recovery and development are also very much about building strong institutions and – perhaps most importantly – ensuring a high level of social cohesion.

We then chose a timeframe for our scenarios, deciding upon 2040. This period was chosen because the Recovery and Development Plan developed by the National Council for the Recovery of Ukraine from the War runs to 2032, and we felt it was important to seek a perspective several years beyond this in order to obtain the most useful insights regarding the plan.

The scenarios were developed over the course of seven months, between mid-July 2022 and mid-February 2023, and the research process consisted of three phases:

1. Horizon scanning and environmental scanning
2. Scenario building
3. Analysis and strategic implications

HORIZON SCANNING AND ENVIRONMENTAL SCANNING

The horizon scanning and environmental scanning phase of this project focused on gathering information about signals and drivers, including trends, that will affect Ukraine's recovery and development between now and 2040. We began the scenario development process by carrying out a horizon scan, drawing on the methodology of the European Commission's Joint Research Centre to do so.[1] Horizon scanning consists of looking for what are called "weak signals". These are events, local trends, or other early indicators of coming changes that could grow in size and exert a significant impact on the subject matter at hand.

In parallel, we also carried out an environmental scan, which involves looking for "drivers of change". These are key trends and forces that are already causing changes which will have an impact on the issue being studied (whereas weak signals have the potential to grow into drivers of change). Horizon scanning and environmental scanning involve the scanning of news articles, social media posts, and other sources to identify these weak signals and drivers of change. (See Annex 1 for further details about the process.)

In order to analyse the large number of weak signals and drivers of change gathered, we first grouped them into related clusters. Given that weak signals and drivers of change can come from a wide range of areas, we then categorized them according to the STEEPED[2] (Societal, Technological, Economic, Environmental, Political/legal, Ethical, and Demographic) framework suggested by the Strategic Foresight and Capabilities unit of the European Parliament's Research Service (EPRS SFOR), in order to further systematize them.

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1   https://knowledge4policy.ec.europa.eu/foresight/topic/horizon-scanning_en

2   Van Woensel, L. (2020). A Bias Radar for Responsible Policy-Making. Foresight-Based Scientific Advice. Oxford: Palgrave Macmillan.

The first part of the horizon scanning and environmental scanning process was carried out by the FIT, the group of experts convened by the IFU as part of this project. The FIT consisted of 23 experts who were nominated by state authorities, public bodies, and international organizations. They were selected to ensure input from a broad range of disciplines, ranging from economics and energy to IT and infrastructure, and were also balanced in terms of gender and age distribution. (The members of the FIT are detailed in the Acknowledgements.) The FIT carried out an in-depth scan of news articles, social media posts, and other sources over the course of six weeks in order to identify weak signals and drivers of change that could affect the recovery and development of Ukraine.

We complemented the findings of the FIT by making use of data gathered with the help of the "ForesightBot", the IFU's chatbot which was created with support from UNDP in order to enable broad participation by the Ukrainian population in the creation of the scenarios. This allowed us to take advantage of the "collective intelligence of citizens", bringing in a greater diversity of viewpoints. The ForesightBot was used both to conduct several online polls and also to run an online focus group in order to collect the views of the population at large on the most important drivers of change. (See Annex 2 for further details on the findings.)

We then led a group brainstorm as part of the first scenario planning workshop to add any additional weak signals or drivers of change that had not yet been identified. (The full list of workshops held as part of the project is available in Annex 4.) The team of authors also identified additional weak signals and drivers of change throughout the research process, based on interviews and other inputs.

We have created a "Future Signals Radar" that presents the key weak signals and drivers of change – 160 items in total – gathered during the horizon scanning and environmental scanning phase, in order to make it easier to examine them and explore their potential impacts. The radar is displayed on the next page in the digital version of this report and on a separate fold-out in the print version. We have also made an interactive version of the radar available online, where it can be consulted by the general public (in both English and Ukrainian).

FUTURE SIGNALS RADAR

How to read the radar

Here you will find 160 signals, trends, events, and issues that have the potential to shape the future of Ukraine and the world.
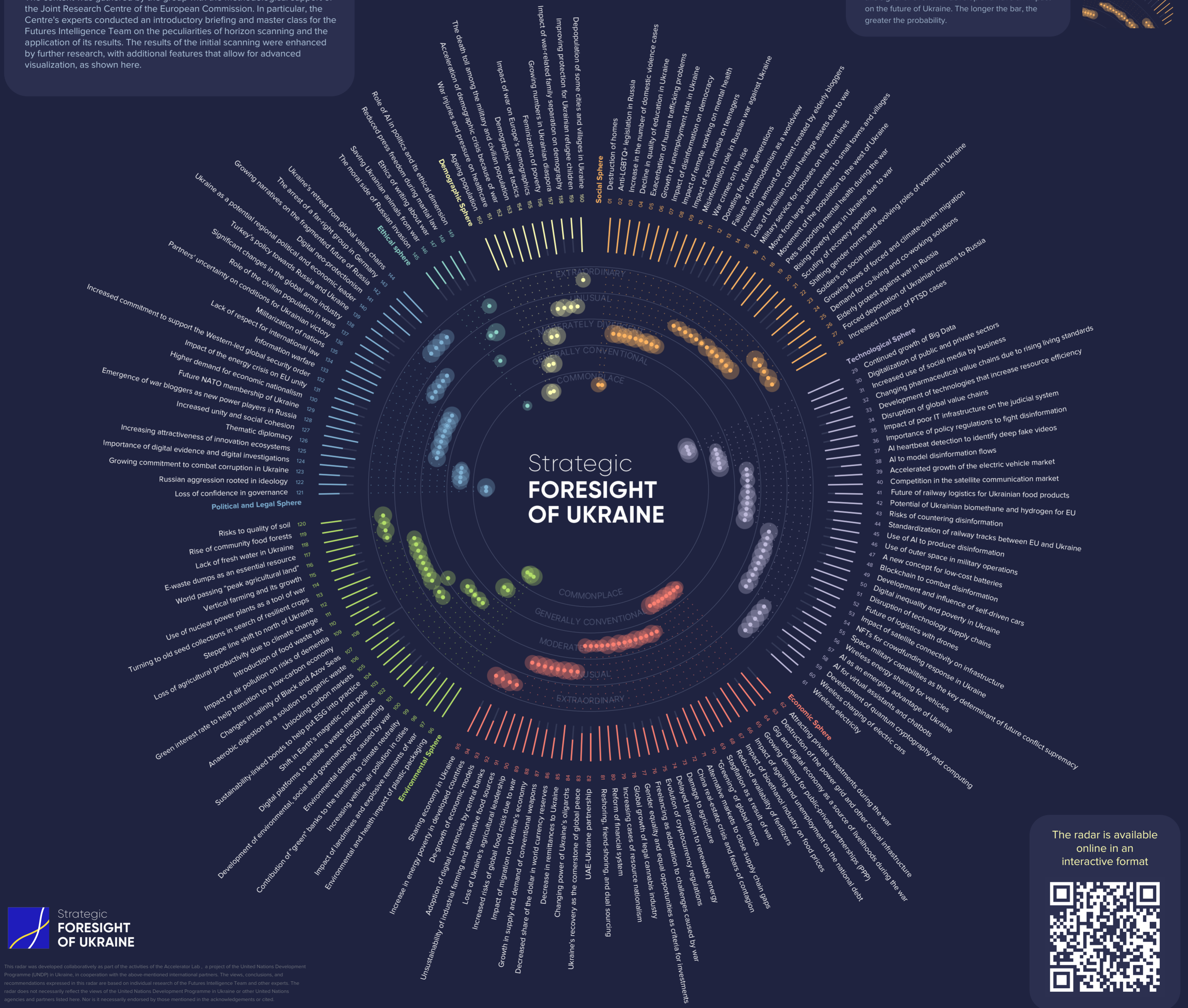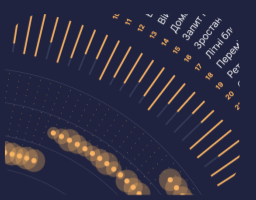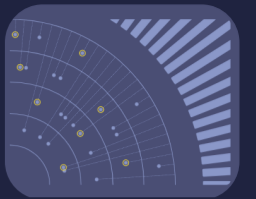
The content of this radar is based on the Foresight research conducted with the support of UNDP Ukraine in 2022. The majority of the content was collected by the "Futures Intelligence Team", a group of 23 analysts convened by the Interfactional Union of MPs "Strategic Foresight of Ukraine" to undertake the futures exploration journey.

The content was gathered by the group with the methodological support of the Joint Research Centre of the European Commission. In particular, the Centre's experts conducted an introductory briefing and master class for the Futures Intelligence Team on the peculiarities of horizon scanning and the application of its results. The results of the initial scanning were enhanced by further research, with additional features that allow for advanced visualization, as shown here.

1. The distance from the centre indicates how much the signal differs from the current situation (status quo)

2. The radius of the point indicates the strength of this influence on the future of Ukraine. The bigger the radius, the bigger the impact

3. The length of the bar indicates the probability that this signal or event will develop and have an impact on the future of Ukraine. The longer the bar, the greater the probability.

Strategic
FORESIGHT
OF UKRAINE

EXTRAORDINARY
UNUSUAL
MODERATELY DIVERGENT
GENERALLY CONVENTIONAL
COMMONPLACE

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- 13 Increasing amount of content created by elderly bloggers
- 14 Loss of Ukrainian cultural heritage assets due to war
- 15 Military service for spouses on the front lines
- 16 Move from large urban centers to small towns and villages
- 17 Movement of the population to the west of Ukraine
- 18 Pets supporting mental health during the war
- 19 Rising poverty rates in Ukraine due to war
- 20 Scrutiny of recovery spending
- 21 Shifting gender norms and evolving roles of women in Ukraine
- 22 Soldiers on social media
- 23 Growing flows of forced and climate-driven migration
- 24 Demand for co-living and co-working solutions
- 25 Elderly protest against war in Russia
- 26 Forced deportation of Ukrainian citizens to Russia
- 27 Increased number of PTSD cases

Technological Sphere
- 28 Continued growth of Big Data
- 29 Digitalization of public and private sectors
- 30 Increased use of social media by business
- 31 Changing pharmaceutical value chains due to rising living standards
- 32 Development of technologies that increase resource efficiency
- 33 Development of global value chains
- 34 Disruption of global value chains
- 35 Impact of poor IT infrastructure on the judicial system
- 36 Importance of policy regulations to fight disinformation
- 37 AI heartbeat detection to identify deep fake videos
- 38 AI to model disinformation flows
- 39 Accelerated growth of the electric vehicle market
- 40 Competition in the satellite communication market
- 41 Future of railway logistics for Ukrainian food products
- 42 Potential of Ukrainian biomethane and hydrogen for EU
- 43 Risks of countering disinformation
- 44 Standardization of railway tracks between EU and Ukraine
- 45 Use of AI to produce disinformation
- 46 Use of outer space in military operations
- 47 A new concept for low-cost batteries
- 48 Blockchain to combat disinformation
- 49 Development and influence of self-driven cars
- 50 Digital inequality and poverty in Ukraine
- 51 Disruption of technology supply chains
- 52 Future of logistics with drones
- 53 Impact of satellite connectivity on infrastructure
- 54 NFTs for crowdfunding response in Ukraine
- 55 Space military capabilities as the key determinant of future conflict supremacy
- 56 Wireless energy sharing for vehicles
- 57 AI as an emerging advantage of Ukraine
- 58 AI for virtual assistants and chatbots
- 59 Development of quantum cryptography and computing
- 60 Wireless charging of electric cars
- 61 Wireless electricity

(Demographic Sphere items, outer ring)
- 160 Depopulation of some cities and villages in Ukraine
- 159 Improving protection for Ukrainian refugee children
- 158 Impact of war-related family separation on demography
- 157 Growing numbers in Ukrainian diaspora
- 156 Feminization of poverty
- 155 Demographic war tactics
- 154 Impact of war on Europe's demographics
- 153 Demographic and civilian population
- 152 Acceleration of demographic crisis because of war
- 151 The death toll among the military and civilian population
- 150 War injuries and pressure on healthcare
- 149 Ageing population

The radar is available online in an interactive format

Strategic
FORESIGHT
OF UKRAINE

This radar was developed collaboratively as part of the activities of the Accelerator Lab, a project of the United Nations Development Programme (UNDP) in Ukraine, in cooperation with the above-mentioned international partners. The views, conclusions, and recommendations expressed in this radar are based on individual research of the Futures Intelligence Team and other experts. The radar does not necessarily reflect the views of the United Nations Development Programme in Ukraine or other United Nations agencies and partners listed here. Nor is it necessarily endorsed by those mentioned in the acknowledgements or cited.

SCENARIO BUILDING

The scenario building phase of this project involved drawing on the weak signals and drivers of change in order to develop the scenarios themselves. To do so we made use of the inductive method of scenario planning, as taught by the Oxford Scenarios Programme at the University of Oxford. The inductive method is based on conducting in-depth workshop discussions around the drivers of change in order to identify those that are most uncertain and impactful and explore how they will interact with each other in the future. (NB: By extrapolating the weak signals that we collected, we can derive *potential* drivers of change. For simplicity, throughout this section we use the term drivers of change to refer to both drivers and potential drivers of change.)

Categorizing drivers according to uncertainty and potential impact. As part of the first scenario planning workshop, we categorized the drivers of change according to our perceptions of their level of uncertainty and their potential impact. Drivers of change can be divided into two categories. "Predetermined elements" are drivers that we can predict with near certainty, perhaps because they have already started to occur. "Critical uncertainties" are drivers that are highly uncertain and will also have a major impact on the future; we do not know in which direction they will move, but whichever way they do will have a big effect. It is important to include predetermined elements in the scenarios in order to build in what we already know is happening. However, critical uncertainties are the most important to explore, as these will generate the most useful insights for the scenarios.

Examining interactions between drivers, with particular attention to critical uncertainties. This was followed by a series of scenario planning workshops in which we explored the interactions between drivers of change in depth. We paid particular attention to the impacts of the critical uncertainties in our discussions, although of course we considered the predetermined elements as well. As part of the workshops, we used online collaboration tools to create sticky notes labelled with the drivers of change, then drew arrows to connect sticky notes that had related drivers of change in order to help us identify how the drivers of change affect each other. In this way, groups of related drivers of change began to emerge into scenario storylines.

This approach draws on systems thinking, a discipline that rose to prominence in the mid-1950s at MIT under the direction of Professor Jay Forrester. Systems thinking is based on the idea that systems cannot be understood by studying their individual components in isolation and then summing them. Instead, the components of a system are interconnected and interrelated. They interact with each other in continuous, multidimensional, and often surprising ways so that "the whole is greater than the sum of its parts". Systems mapping, or visual depictions of a system, are used as a key tool in order to understand systems.

To put this in the context of scenarios, group discussions around the drivers of change – i.e., the components of a system – and especially the critical uncertainties led to the realization that certain

drivers could interact with each other in unexpected ways, giving rise to different possible futures, or scenarios. The sticky notes labelled with the drivers of change and connected by arrows that we developed using online collaboration tools can be thought of as simplified systems maps. (See Annex 3 for further details about the scenario building process.

We ran more than ten workshops in total. The first two, larger, workshops brought together the members of the FIT, Ukrainian parliamentarians, UK parliamentarians, and representatives from the EU and Estonian governments working in foresight. We then ran smaller workshops to further refine the scenarios, including two joint workshops between Ukrainian parliamentarians and UK parliamentarians. (See Annex 4 for the full list of workshops held.)

Of the predetermined elements that we identified, we decided that those presented in Table 1 below were the most essential to take into account in our scenarios.

Table 1. Predetermined elements
Ukraine-specific   • War injuries   • High death toll among military and civilian population   • Destruction of homes   • Destruction of power grid and other critical infrastructure, causing severe power outages   • PTSD among military and civilian population   • Landmines and explosive remnants of war, requiring years of demining and decontamination   • Damage to agriculture and environment due to fighting   • Russia's forcible deportation of Ukrainian citizens to filtration camps in Russia and forcible removal of Ukrainian orphans to Russia   • Further population loss due to refugees (women and children) going to neighbouring countries, the EU, and elsewhere   • Russian propaganda and disinformation campaigns, especially in occupied territories, that attempt to undermine national unity   • Internally displaced persons (IDPs), including many moving from the eastern part of Ukraine to the western part   • Government imposition of martial law, including press restrictions   **Global**   • Economic crisis   • Energy crisis   • Climate change

We identified a particularly high number of critical uncertainties, due to a combination of the war and greater global uncertainty. We determined that the 28 critical uncertainties presented in Table 2 below were the most crucial to explore in our scenarios. They are classified into 6 broad categories for greater clarity.

Table 2. Critical uncertainties

Scale and impact of war

1. How long will the war last?

2. What is the extent of the destruction caused by the war? (This can also be phrased as: What level will the recovery need to start from?)

3. What will the borders of Ukraine be at the end of the war?
- How much territory will Ukraine lose (if any)?
- If Ukraine is able to regain some or all its territories, how long will the territories have remained under Russian occupation?

4. Will the war escalate into a world war?
- If so, what other countries are likely to be drawn in?

5. Could the war lead to a nuclear war and/or a nuclear incident?
- Will Russia employ a nuclear weapon against Ukraine? If so, how will NATO respond?
- Could the fighting cause a release of radiation at a nuclear plant?

6. Will most Ukrainians be able to maintain access to basic necessities, e.g. a job or other means of subsistence, housing, electricity, sufficient food and water?

Demography and social capital

7. Will Ukrainian refugees return?
- Will Ukrainian refugees who have gone to neighbouring countries, the EU, and elsewhere return after the war?
- If they do not return, will they be "lost" to Ukraine forever or will they maintain ties with their homeland despite being abroad? Could they turn into a diaspora and help Ukrainian culture be known around the world?
- Will Ukrainian citizens who were forcibly taken to filtration camps in Russia return after the war? What about Ukrainian orphans who were forcibly taken to Russia for adoption by Russian parents? Will they instead assimilate within Russia?
- Will Ukrainian refugees who fled to the western part of Ukraine go back to their homes in the east after the war, despite the heavy destruction?

8. Will Ukraine be able harness a large enough labour force for reconstruction?

9. What will the level of social cohesion and trust be within Ukrainian society?
- What will the attitude be towards people who spent years under temporary occupation?

10. Will the role of women change in Ukraine?
- Will Ukrainian society become less patriarchal?
- Will mandatory military mobilization include women?
- Will family life change? Will separation due to war, including many women and children refugees living abroad, lead to divorces? Or will the hardships of the war cause people to value family ties more than ever?

11. Will it be possible to maintain educational standards during the war, including for internally displaced persons, refugees and others in areas where there is heavy fighting?
- Will online education be sufficient to do so?

12. Will the healthcare system be able to cope?
- Will there be another global pandemic?

Table 2. Critical uncertainties (continued)

Democracy and governance

13. Will Ukraine be able to stamp out corruption?

- To what extent can digitalization enable greater transparency?

14. Will oligarchs emerge as more or less powerful after the war?

15. Will Ukraine be able to develop a truly free press?

16. Will Ukraine be able to effectively fight Russian disinformation and propaganda?

17. What shape will the future government of Ukraine take?

18. Will governance be centralized or decentralized?

19. How effective will the Ukrainian government be?

- Will the government be able to cope with the large number of war wounded, in terms of providing both healthcare and economic support?

Partner support

20. How much military support will there be for Ukraine from the US, EU, NATO, and Western countries in general?

21. Where will the funding for reconstruction come from?

- Which countries will be the main donors? Will the funding primarily be loans or grants?
- What role will the private sector play?

Economic situation

22. Will Ukraine fall into economic stagnation?

23. How important will the role of technology and IT be in driving the recovery?

- Will greater digitalization pose a major vulnerability from a cybersecurity perspective? For example, will there be hacks against e-voting systems? How significant will military technology be?

24. What role will energy play in the recovery?

- Will green energy be central?

25. How important will agriculture be in the post-war economy?

- How difficult will it be for agriculture to recover, given the damage sustained during the war?

World order

26. What will the future world order look like?

- Will there be major changes within Russia?
- What side (if any) will China take in the war?
- What will the US political regime be?

27. What role will be played by countries in Ukraine's neighbourhood?

- Will Belarus continue its support for Russia? Could the government change?
- What role will Turkey and Central Asian states play in the reconstruction?

28. Will Ukraine be able to become a member of the EU and/or NATO?

- To what extent do breakaway processes within the EU continue?

The workshop discussions led to the creation of four scenarios in total, which are presented in the next section. When developing the scenarios, we started in each case with a key critical uncertainty that served as the starting point, and in the process wove in a large number of other related critical uncertainties as well as predetermined elements in order to create scenario stories.

For instance, we began developing the first scenario by discussing critical uncertainty #20 around the level of Western military support, asking what would happen if Ukraine's Western partners were not able to continue providing as much support to Ukraine. This led to a conversation around other critical uncertainties including how much territory Russia would be able to capture (critical uncertainty #3) and whether it would lead to a world war (critical uncertainty #4), as well as what impact predetermined elements such as the economic crisis and energy crisis might have.

The next three scenarios were developed in a similar way. To develop the second scenario we began by discussing critical uncertainty #17 around the shape of the future government, asking what would happen if Ukraine became increasingly authoritarian; in the case of the third scenario we started with critical uncertainty #1 around the length of the war, considering what might happen if it were to turn into a frozen conflict; and for the fourth scenario we began with critical uncertainty #9 on the level of social cohesion, debating whether Ukraine might struggle to reintegrate after regaining Donbas and Crimea.

SCENARIOS

The four scenarios that were developed in the scenario building stage are presented below. In each case, we have also included the simplified systems maps that were created as part of the development process, as they help explain the reasoning used in deriving the scenarios.

Slow slide to world war

The global financial crisis, combined with a war between the US and China, means that the US and EU can no longer provide Ukraine with sufficient military and financial support. Ukraine continues to fight for its freedom and develops a strong wartime economy, dedicating almost all of its resources to producing goods needed for the war. However, Russia, aided by Belarus, is able to capture much of eastern and southern Ukraine. It presses further with its expansionist policies, moving against Moldova and then Estonia. This finally spurs the US, the EU, and NATO to take action. By this point, however, Russia has grown in strength, and a world war is now unavoidable – and even more costly in terms of money and lives.

The world economy experiences a deep-seated economic crisis, much of it attributable to the after-effects of the Covid-19 pandemic. Government stimulus packages at the height of the pandemic have led to a surge in inflation.[3] In an effort to combat this, central banks raise interest rates, but this touches off a debt crisis and decline in spending.[4] [5] Businesses, still reeling from the decline in consumption during lockdowns, are pushed into insolvency, and there are massive layoffs.[6]

The economic crisis is exacerbated by a global energy crisis. This is also partially due to Covid-19, as oil production was slow to restart

following the reopening of national economies after lockdowns.[7] It is made worse by Russia's invasion of Ukraine, causing Western countries to impose sanctions on Russian oil as well as disruptions to gas pipelines, leading to higher energy prices.[8] Meanwhile the effects of climate change, including a series of droughts, have resulted in a reduction in hydropower production.

This contributes to a global food crisis, with inflation – further fanned by the energy crisis – leading to higher transport and food prices. It is exacerbated by Russia's blockade of the Black Sea, which impedes the export of Ukrainian grain and other foodstuffs to international markets.

3   https://openknowledge.worldbank.org/bitstream/handle/10986/38019/Global-Recession.pdf

4   https://fortune.com/2023/01/30/black-swan-investment-manager-mark-spitznagel-debt-time-bomb-great-depression/

5   https://www.wsj.com/podcasts/opinion-free-expression/is-there-a-financial-crisis-in-our-future/e1dd08ff-f1fa-4748-bb23-ee13babff7c1

6   https://www.ft.com/content/8e5b8f8b-a061-4880-acda-cfb53dfbbd3e

7   https://www.iea.org/topics/global-energy-crisis

8   https://www.reuters.com/business/energy/year-russia-turbocharged-global-energy-crisis-2022-12-13/

With the populations of the US and of EU and NATO countries experiencing severe economic hardship, public opinion starts to turn against providing support to Ukraine. This is fed by a Russian disinformation campaign targeting citizens of these countries that blames the energy crisis on the war in Ukraine[9] and accuses Ukrainian refugees of stealing their jobs. The governments of the US and EU countries can no longer justify providing significant amounts of military and financial support for Ukraine's defence. The US and some EU and NATO countries, including Poland, continue to provide limited funding, but it is primarily for humanitarian relief.

Seeing this, China is emboldened to attack Taiwan in 2024. The US comes to Taiwan's defence and a drawn-out war ensues, further reducing the resources that the US is able to provide to Ukraine. The US ends almost all support for Ukraine after Donald Trump, who has close ties with Russian President Vladimir Putin, is re-elected to the US presidency and assumes office in 2025.

Without weapons deliveries from the West, Ukraine sustains a series of military losses. Russia, together with Belarus, which has now firmly entered the war on the Russian side, is able to conquer the east of the country all the way to the Dnipro River and disrupt logistical routes in the north of Ukraine. Kyiv is now on the frontline, with the Russians making repeated attempts to capture the city.

The death of Putin, who has been secretly suffering from a host of health problems, in 2027 does nothing to end the war. Yevgeny Prigozhin, the head of the paramilitary Wagner Group, assumes the Russian presidency, and he presses on with Russia's expansionist policies.

Russia and Belarus make further inroads and in 2030 are able to capture Odesa and the surrounding region, so that Ukraine is now cut off from the Black Sea and left landlocked.

This exacerbates the global food crisis. With Ukraine no longer able to export grain and other foodstuffs by sea, these must travel by rail. This is much less effective as Ukrainian and EU railway track gauges are not compatible, requiring either a change of bogies (undercarriage wheels) or the unloading and reloading of goods between trains at the Polish border.[10] [11] [12] Agricultural production has also declined owing to the war. Farmland has been damaged by exploded missiles and bombs, while Russia's use of antipersonnel mines[13] makes it dangerous for farmers to plough their fields.

Many women have fled Ukraine with their children. In addition, during the war thousands of Ukrainian orphans were forcibly taken by Russia, where they have been adopted by Russian parents, losing all ties with their homeland.

The free part of Ukraine in the northwest continues to mount a steadfast defence against Russian and Belarusian forces, and the majority of men are engaged in fighting in the war.

It has a strong wartime economy, with almost all of its resources dedicated to the production of military equipment and other goods needed in the war. The northwestern part of the

9 https://www.dw.com/en/russian-disinformation-threat-looms-large-over-cold-german-winter/a-63096336

10 https://www.railtech.com/infrastructure/2022/11/23/changing-to-european-track-gauge-not-just-different-width-a-different-philosophy/

11 https://hackaday.com/2022/06/23/grain-stuck-in-the-ukraine-the-fragmented-nature-of-modern-day-railways/

12 https://www.railfreight.com/corridors/2022/10/31/ukrainian-agrarians-want-a-broad-gauge-connection-to-gdansk/

13 https://www.hrw.org/news/2022/06/15/ukraine-russian-landmine-use-endangers-civilians

country transforms from an economy primarily based on small and medium-sized enterprises before the war to one in which manufacturing plays a major role.

All hands are needed for the war effort, and even people of retirement age are employed. Large numbers of IDPs arrive from eastern and southern Ukraine. The people of northwestern Ukraine welcome them warmly, as the influx of population – and labour – is badly needed. Many IDPs settle in cities, where they are swiftly employed in the manufacture of war goods. Others settle in towns and villages, where their labour is needed to boost agricultural production.

The draft eventually expands to include women, and they come to make up some 30% of the Ukrainian army. This causes a subtle cultural shift in Ukrainian society towards greater gender equality, as women take on increasingly prominent roles

Driven by the need to make do with fewer resources, Ukraine engages in high levels of innovation. In the realm of military technology, it develops more cost-effective weapons such as light, long-range drones. It also finds more efficient ways of rebuilding damaged infrastructure. It applies this experience to the construction of a dual-gauge railway compatible with both Ukrainian and EU trains,

greatly increasing the efficiency of exporting grain and other foodstuffs and of importing vital supplies for the war.

The government continues its work to stamp out corruption, as it recognizes that it cannot afford to have resources diverted from the war effort.

The wartime economy is financed in large part by the printing of money, leading to high inflation, as well as by heavy borrowing, often at high interest rates.

Russia continues its expansionist agenda and moves against Moldova in 2032, capturing Transnistria and then pressing further into the country. It opens another front against Estonia in 2033, emboldened to attack a country that is a member of both NATO and the EU.

This finally spurs the US, EU, and NATO into taking direct military action against Russia. At this point, however, it is a much more difficult endeavour – the Russian military has taken large amounts of territory. By not taking action sooner, the US, EU, and NATO have netted themselves a much larger problem. It is no longer possible for them to merely provide equipment and financing to Ukraine to fight the Russians; they must enter the war directly. This ends up being massively more costly in terms of both money and lost lives.

Figure 1. Simplified systems map: "Slow slide to world war"
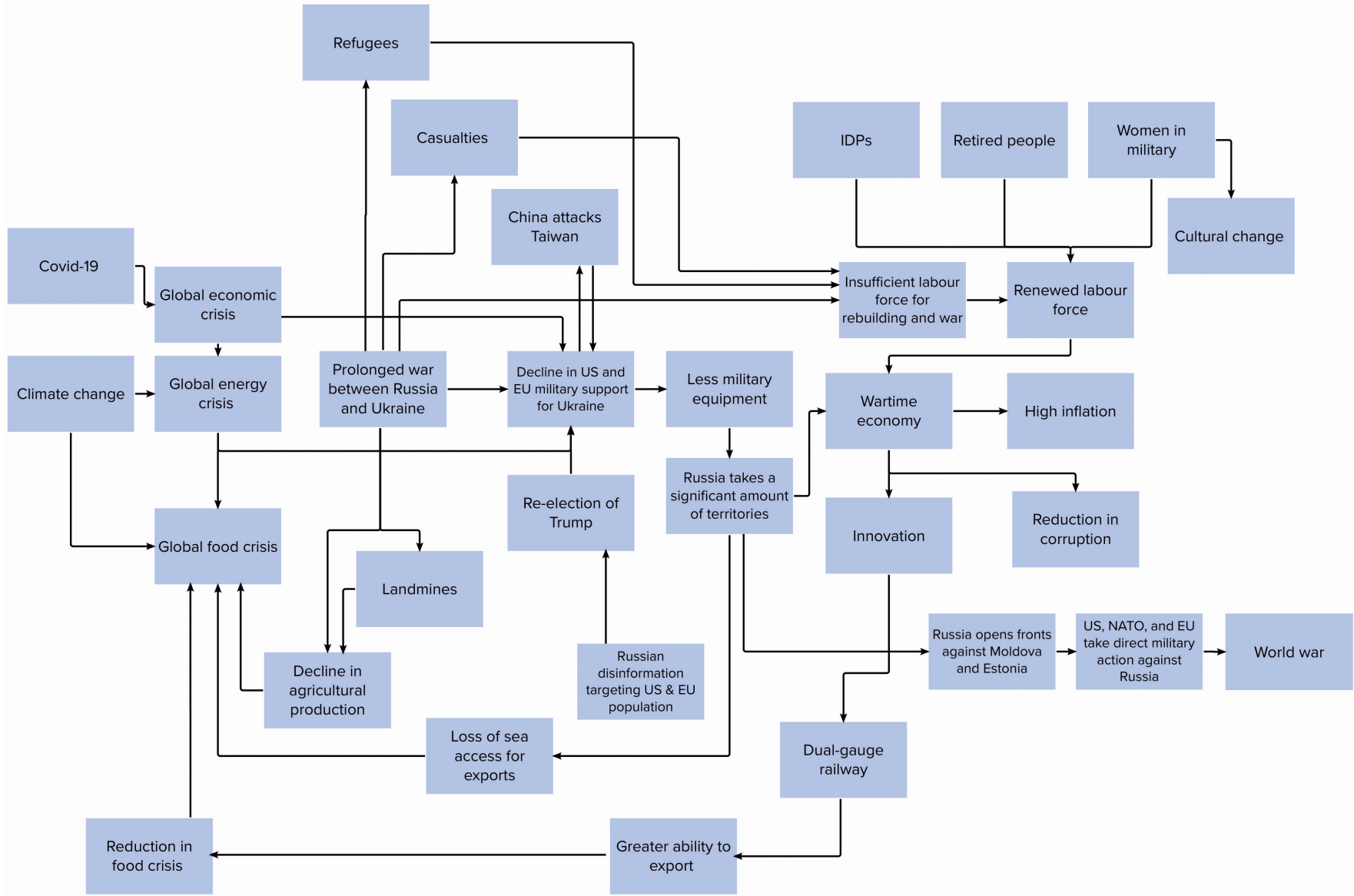
Drift to autocracy

After much fighting, Ukraine is able to push Russia back to the February 2022 borders and the two countries sign a peace agreement. Ukraine appears poised for a bright democratic future, especially with the power of the oligarchs diminished by the war. But its government turns increasingly autocratic, and a new class of oligarchs emerges owing to corruption in the rebuilding process. Ukraine increasingly moves away from the US, the EU, and NATO, and towards other partnerships, for instance with Turkey, Central Asian states, Saudi Arabia, and China. However, the large Ukrainian community abroad starts to mount an effective opposition, offering a ray of hope.

Ukraine fights a long war with Russia, marked by much sacrifice and bloodshed. By 2027, Ukraine is able to regain control over its effective February 2022 boundaries.

Ukraine signs a peace agreement with Russia that same year, under heavy urging from the US, EU, and NATO. Given fears during the war that Russian President Vladimir Putin would make use of nuclear weapons, the EU, NATO, and US are keen to see a de-escalation of the conflict. In addition, providing large amounts of financial and military assistance to Ukraine has been a significant strain on their finances, especially since the world is in the midst of a major economic crisis, made worse by a global energy crisis.

Ukraine is fêted in the West for its defeat of its much larger adversary. The path towards a prosperous, democratic future shines brightly ahead. Having finished the war with one of the most powerful armies in Europe, Ukraine is a strong candidate for NATO membership.

The road to EU membership beckons as well – especially given that corruption, one of the biggest obstacles that Ukraine must overcome in order to join the EU, has diminished during the war. The power of the oligarchs, who had long leveraged their money and ownership of the media to influence the Ukrainian government for personal gain, has been severely weakened. Their holdings – primarily big industrial companies in the eastern part of the country – were in large part destroyed during the war. Since the government maintained tight control over the media under martial law, they were not able to exert their media power to influence the government either. The government's major 'de-oligarchization' push also made headway.

In 2026, a new candidate – a highly decorated former military officer – is elected as the president of Ukraine. This reflects the high level of trust that the population places in the military as a result of their heroism during the war.

Meanwhile in Russia, Putin's military defeat causes the elites in the Kremlin to turn against him, and several conspire to overthrow him in 2028. A short contest for power ensues, and one of Putin's former generals becomes the new president. While Russia has been weakened by its military losses and the impact of sanctions, it is still a significant global power.

Putin's ouster has not ended the threat from Russia, and Ukraine remains on high alert. Because of this, the Ukrainian government does not let up on the autocratic tendencies that were useful during the war. Meanwhile the public, having lived under martial law for years, has come to accept authoritarian ways.

There is widespread fear that Russian conspirators remain in Ukraine, and the new government sets out to uncover any Russian spies. To this end, the government conducts widespread digital surveillance of the population, pushing the country further into autocracy. The government also continues to exert control over the press, as it did under martial law, requiring it to take a strong anti-Russia stance. Meanwhile, publishing anything overtly critical of the government is considered unpatriotic.

This opens up big cracks in the country's social fabric, as neighbours start to accuse each other of being Russian sympathizers. Further challenges emerge during the reconstruction, with tensions reignited when significantly larger amounts of funding for rebuilding flow into the eastern part of Ukraine, given that it has been the most heavily destroyed. People in western Ukraine are resentful, as they too are struggling economically, and think it unfair that "Russian collaborators", as they call them, should be rewarded.

Despite the decrease in corruption during the war, the influx of billions in reconstruction funding causes it to make a resurgence. There is heavy corruption in the allocation of reconstruction funds, which are more likely to be allocated to regions where mayors or regional authorities are of the same political party as those in power. Regions that are badly in need of funds are sometimes left out, especially communities with mayors from opposition parties, further inflaming a sense of injustice among the population.

The largest reconstruction contracts are awarded to those with close ties to the government; some of them are in the president's inner circle. Many of these contracts involve large infrastructure projects, such as rebuilding roads or other construction projects, where costs can be heavily inflated. This leads to the emergence of a new class of oligarchs who have acquired money and power in this way.

The stalling of democratic reforms and increase in corruption cause cracks in Ukraine's relationship with the EU, NATO, and US, which call out Ukraine on these issues. The EU grows concerned that admitting Ukraine as a member could create a situation similar to its current predicament with Hungary, while NATO is fearful of another Turkey in its midst.

Ukraine struggles to find sufficient labour for rebuilding. Millions have been either killed or wounded during the war, some left with debilitating injuries. Many refugees also choose not to return once the war is over, believing that they have better opportunities by remaining abroad. As Ukraine pulls away from the EU, NATO, and the US, it increasingly partners with countries that have more authoritarian tendencies. It turns towards Turkey and Central Asian countries as a source of labour, and workers from these regions come to Ukraine to work on building and other reconstruction projects. China is heavily involved in rebuilding as well, seeing an opportunity to provide loans to Ukraine for large infrastructure projects as part of its Belt and Road Initiative, while Saudi Arabia also invests in the country. These partners tend not to be particularly preoccupied with environmental considerations when implementing projects, thereby putting further stress on lands that had just started recovering

from the damage caused by war. Nor do they always respect workers' rights.

The Ukrainian population, observing the failure of democratic reforms and blatant corruption going unaddressed, laments that it was not worth so many years of fighting and sacrifice to just have more of the same. All of Ukraine's efforts at liberating itself from Russia have in

the end resulted in a regime remarkably similar to that of Russia today.

However, the large Ukrainian community that has grown abroad, much of it in the EU, starts to mount an effective opposition. Ukrainian-language media outlets outside the country increasingly publish reports critical of the government, providing a ray of hope.

Figure 2. Simplified systems map: "Drift to autocracy"

Decentralized digital survival

The war becomes protracted as neither Ukraine nor Russia can afford to lose. Repeated missile strikes against cities – and fear of a nuclear attack – cause a massive exodus of Ukraine's population to towns and villages, where they live in self-sustaining eco-tech communities. To support this, the Ukrainian government continues its decentralization and digital transformation efforts, providing digital tools for local government. While economic growth is limited, science and innovation decline, and cyber security is a challenge, these eco-tech communities are characterized by strong participation in local democracy and make it possible for civilians to survive the war.

The war has turned into a protracted conflict, one which neither side can afford to lose. For Ukraine, it has always been an existential war. As one of the world's foremost military powers, Russia expected to trounce its much smaller neighbour within a few weeks. Its failure to do so in the face of fierce Ukrainian resistance has left it humiliated. As a result, the war has become existential for Russia as well – and for President Putin, who cannot expect to stay in power if Russia is defeated.

Russia calls up additional rounds of military mobilization and launches further attacks against eastern, northern, and southern Ukraine. Meanwhile, large amounts of military equipment from the US and EU and NATO countries help Ukraine mount a strong defence.

Russia also continues its missile strikes against large cities. This generally involves 1-6 months of regular shelling, marked by breaks of up to 6-9 months during ceasefires or while waiting for more missiles to be produced.

These missile strikes cause thousands of civilian deaths, and leave Ukrainians without electricity, heat, and internet for days and even weeks at a time. This is especially difficult in winter, with temperatures below freezing. Many apartment blocks are destroyed, leaving large numbers homeless. Businesses in cities struggle to operate and a number close down. People must contend with water and food shortages, and high food prices, as the fighting disrupts agricultural production and transport networks.

As the war drags on, fears grow that Russia may use a nuclear weapon to secure a decisive victory.

These conditions lead to a major de-urbanization movement over the course of several years. Many people move to towns and villages, primarily in the central-west part of Ukraine further from the fighting.

Towns and villages offer a number of advantages in these difficult times. They are less likely to be targeted by missiles – or by a nuclear attack. Rural areas also allow people to make do with limited resources and are more self-sufficient; it is easier to harness enough energy, food, and water locally to support them. In some cases people rely on firewood

from nearby forests, or make use of solar panels and other renewable energy sources. They can more easily collect rainwater and grow their own food. The cost of living is much lower. All of this enhances Ukraine's resilience.

Urbanites arriving in towns and villages embrace this greener lifestyle. They also value the strong sense of community, with people coming together to share resources. People from cities also become better acquainted with traditional Ukrainian culture, including folklore and rural customs, which are strongly maintained in villages.

However, this is accompanied by a loss of Ukraine's historical and artistic culture. The shelling of cities has heavily damaged museums, libraries, churches, and other monuments that are an important source of national pride, while their depopulation is accompanied by a decline in art, music, and theatre. Science and innovation also suffer, as the shrinking of universities and research centres means fewer opportunities for development.

With the frequent bombing of factories, Ukraine also undergoes de-industrialization. The economy is primarily composed of small businesses and microenterprises, with many products produced and consumed locally. There is limited economic activity; new businesses that do emerge tend to be small in size, often making use of the sharing economy or providing small goods for the war such as bullets, uniforms, and drones.

Against this backdrop, the Ukrainian government presses on with its decentralization efforts to give greater decision-making power to local authorities[14] [15] as well as with its digitalization drive.[16] [17] [18] It views these as key to further enhancing Ukraine's resilience.[19] The government enables this decentralization by making digital tools available to support local government.

City dwellers, who are accustomed to using technology, are among the first to adopt these digital tools. They make use of the Diia app to rapidly register as IDPs and apply for benefits upon arriving in towns and villages,[20] and quickly embrace online access to local healthcare and to education for their children.

They also use digital tools to take part in local democracy, including e-voting in local elections. People from towns and villages soon emulate this and there is an increase in grassroots democratic participation.

The local police chief and local judges are now elected through online voting, giving citizens a greater measure of control over local authorities. This goes some way towards reducing corruption, although it does not eliminate it entirely. Local businessmen – mini oligarchs of sorts – have long held sway over local politicians, and their power cannot be broken so easily. These digital tools also enable Ukrainians who have left the country to vote in their home towns' elections, fostering a sense of decentralized nationhood.

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14   https://decentralization.gov.ua/en

15   https://www.kmu.gov.ua/en/reformi/efektivne-vryaduvannya/reforma-decentralizaciyi

16   https://www.kmu.gov.ua/en/yevropejska-integraciya/coordination/cifrova-transformaciya

17   https://www.undp.org/ukraine/projects/digital-inclusive-accessible-support-digitalisation-public-services-ukraine-dia-support-project

18   https://www.defenseone.com/technology/2022/12/ukraine-pushes-government-digitization-war-rages/380433/

19   https://www.foreignaffairs.com/articles/ukraine/2022-06-28/source-ukraines-resilience

20   https://www.undp.org/blog/digital-lifeline-ukrainians-move

These eco communities grow highly tech-centric. Many people arriving from cities are able to continue working remotely for their current employers, while businesses that have had to relocate can retain their workforce by teleworking.

This makes internet outages that follow heavy bombings particularly disruptive, although many people are able to access the internet via satellite. Networks and digital tools are also under constant attack from Russian hackers, who are able to temporarily prevent access to essential services such as healthcare and education.

It also means people who are less tech savvy, including older people and those in extreme poverty, are left out. As a result, those who most need public services often struggle to access them.

The devolution of power also causes inefficiency in some instances. The need for coordination between local governments sometimes slows down the repair of damaged large-scale infrastructure such as roads.

As the fighting drags on into its seventh year, the Russian economy has been increasingly impacted by sanctions and has entered into a slow decline. Russian casualties have been exceptionally high, with three times the death rate of Ukrainian soldiers. Ukraine's resources have severely dwindled as well, with the US and EU and NATO countries struggling to continue to provide as much military equipment as in the early stages of the war.

The situation is a stalemate but Putin – still clinging to power – cannot be seen to publicly back down. Instead, Russia gradually slows its attacks and the war turns into a frozen conflict.

Ukraine has suffered greatly. However, the movement of people to towns and villages, paired with the government's decentralization and digitalization drive, has enabled civilians to survive until the end of the Russian onslaught – and even enabled progress in some areas such as greater local democratic engagement.

While a number of people do move back to cities after the cessation of overt hostilities, the majority continue to live in towns and villages – some because they appreciate the lifestyle, others because they are aware that the threat from Russia is not over and fighting could break out again in the coming years.

Figure 3. Simplified systems map: "Decentralized digital survival"
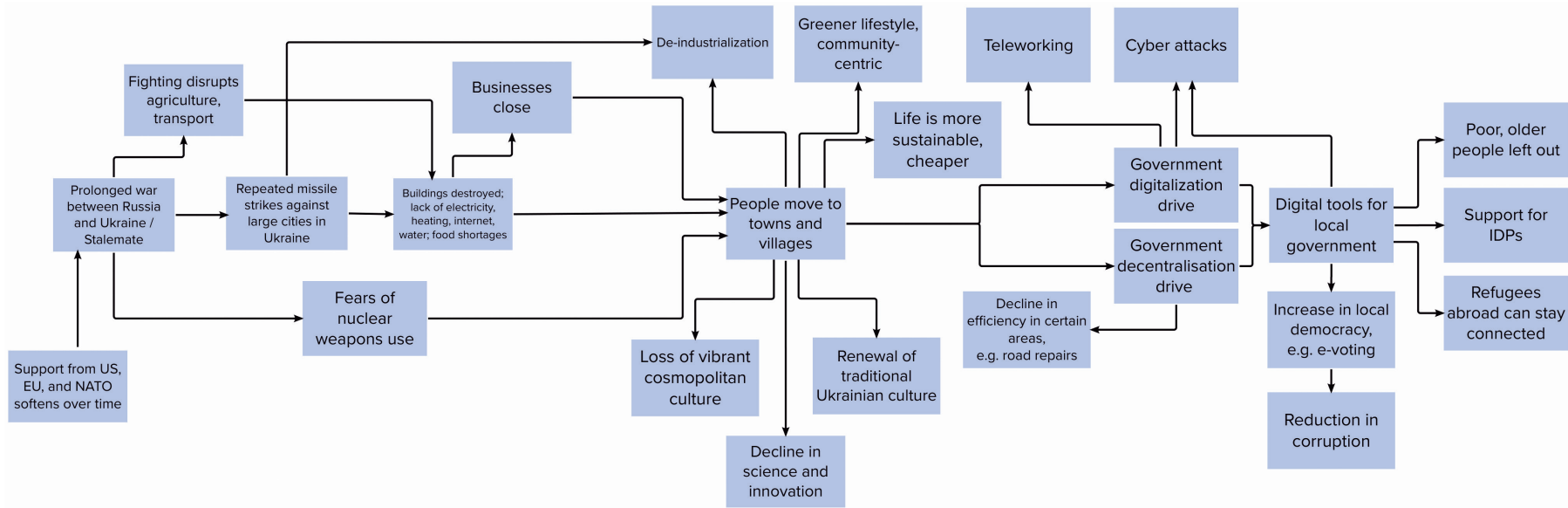
The hard work of unity

Russia's invasion of Ukraine has the opposite effect to what it intended. Its missile attacks, meant to break the spirit of the Ukrainian population, increase their determination to fight and the Ukrainian army makes steady advances on the battlefield. Inspired by this – and by the courage of the Ukrainian people – several separatist regions in Russia rise up and successfully break away. Ukraine is able to regain the Donbas as well as Crimea, and engages in the complex task of reunifying the country. Russia's attempts to splinter the EU and NATO also backfire. Seeking protection from Russia, more countries – including Ukraine – join these organizations.

Russia continues its repeated missile attacks against Ukrainian critical infrastructure, attempting to impede the day-to-day functioning of the country by cutting off its electricity, internet, heating, and other essential utilities and to break the Ukrainian people's will to fight.

Determined to weaken Ukraine's EU and NATO allies, Russia also persists in its attempts to widen divisions within both organizations.[21] [22] This includes funding political parties, for instance in France and Italy, that want their countries to leave the EU.[23] [24] It also uses propaganda to stoke fears of energy shortages in EU countries, hoping to cause tensions between hawkish eastern members and western members that are heavily dependent on Russian energy and more conciliatory towards Russia. In addition, Russia spreads disinformation, including in the Czech Republic and Bulgaria, that blames the war in Ukraine on NATO, aiming to ignite movements to leave NATO.[25]

Rather than letting these attacks impede its work, the Ukrainian government presses on determinedly. It carries out a massive anti-corruption drive, engaging in the large-scale firing of corrupt police officers and judges and above all the prosecution and jailing of high-ranking government officials found to have taken bribes. While prior to the war Ukraine spent years attempting to tackle corruption but only made limited progress, the war creates the conditions that enable it to do so successfully. By weakening the power of the oligarchs, whose eastern holdings have been largely destroyed, it has removed one of the largest obstacles. It has also galvanized political will, since tackling corruption is key to joining the EU and NATO – a higher priority than ever before – and to reassuring the US,

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21   https://www.voanews.com/a/russian-disinformation-spreading-in-new-ways-despite-bans-/6694083.html

22   https://www.voanews.com/a/report-democracies-at-risk-from-russian-money-meddling/6746880.html

23   https://www.washingtonpost.com/world/national-security/a-russian-bank-gave-marine-le-pens-party-a-loan-then-weird-things-began-happening/2018/12/27/960c7906-d320-11e8-a275-81c671a50422_story.html

24   https://www.nytimes.com/2019/07/10/world/europe/salvini-russia-audio.html

25   https://www.politico.eu/article/bulgaria-ukraine-russia-war-nato-fault/

EU and NATO countries, and other donors that the funding they are providing for the war is being well spent.

The February 2022 invasion has also strengthened the determination of the Ukrainian people. No longer satisfied with simply repelling Russia, they are now bent on regaining not just the Donbas and the rest of the mainland, but Crimea too – which was previously left out of the discussion.

Meanwhile the EU has become more unified than ever in its support for Ukraine. This is helped by the success of the EU's plan to achieve energy independence from Russia, diversifying its sources of conventional fossil fuels in the short term while accelerating its transition to renewables.[26] NATO is also buoyed by Finland and Sweden joining the alliance in 2024, seeking greater protection from Russia.

With strong military and financial support from the US as well as EU and NATO countries, the Ukrainian army makes steady gains against Russia and by mid-2024 is able to regain the Donbas and the rest of the mainland.

Seeing this, several separatist regions in Russia rise up. Chechnya and Dagestan are the first to do so, followed by Bashkortostan. Russia has called up especially large numbers of soldiers from these regions, resulting in a disproportionate number of deaths.[27] Fearing that it may announce another military mobilization drive, they are inspired by the courage displayed by the Ukrainian people and take up arms against Russia instead. Russia's unsuccessful attempts to quell these uprisings distract its attention from Ukraine.

The Ukrainian army presses on and is able to liberate Crimea by 2026. Ukraine has emerged victorious. But victory has come at a heavy cost, with large numbers of Ukrainian soldiers and civilians killed.

Some of the hardest challenges still lie ahead. Among the survivors, many have debilitating injuries, while others are dealing with severe PTSD. Billions of dollars are needed to be able to provide advanced medical care, prosthetics, rehabilitation, and therapy, and those unable to work will need lifelong disability payments.

In addition, the scale of the rebuilding challenge is enormous, with the cost of reconstructing critical infrastructure and buildings topping $1 trillion.[28] [29]

Reunifying the country is also highly complex. In regaining Crimea and Donbas, Ukraine must reintegrate territories that have been under Russian occupation for some 12 years. During this period, more Russians have moved in and more Ukrainians have been expelled. They have been subjected to massive pro-Russian propaganda, much of it aimed at turning them against Ukraine. As a result, a number consider Ukraine an occupying force.

Alongside this, much of the Ukrainian population living elsewhere in the country has feelings of mistrust towards the inhabitants of Crimea and the Donbas, viewing them as having collaborated with Russia. As IDPs – including a number of Crimean Tatars, the indigenous people of Crimea long persecuted by Russia – return to their homes in these regions, clashes break out with those who remained. Some returnees even perpetuate revenge attacks.

26 https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/repowereu-affordable-secure-and-sustainable-energy-europe_en

27 https://www.sundayguardianlive.com/world/putins-russia-will-collapse

28 https://www.bloomberg.com/news/articles/2022-06-21/ukraine-reconstruction-may-cost-1-1-trillion-eib-head-says

29 https://fortune.com/2022/12/07/rebuilding-ukraine-trillion-dollar-investment-opportunity/

The Ukrainian government recognizes the importance of successful reintegration. It assuages the Ukrainian population's need for justice by enforcing the restitution to their rightful owners of homes seized by Russia and given to Russians, and by expelling the Russians who settled in these regions during the occupation. Yet it tempers this with the need to promote social cohesion. Despite some opposition from the Ukrainian population, it proclaims an amnesty for those whose collaboration with Russia was relatively minor. Little by little tensions start to abate.

In regaining Crimea, Ukraine gains access to large offshore oil and gas reserves in the Black Sea, providing vital financial revenue for reconstruction. Ukraine becomes an exporter of oil and gas to the EU, helping the latter achieve energy independence from Russia. Russia has now permanently lost what before the war was its largest energy customer.[30] With the aid of EU funds, Ukraine also develops wind, solar, and other renewables, enabling it to export green energy as well.

Being widely considered the defender of Europe, Ukraine becomes a NATO member in 2028, its military power helping to boost the Alliance. Georgia and Bosnia and Herzegovina are admitted shortly afterwards.

Ukraine is also a strong candidate for EU membership and continues to implement reforms. Under urging from the EU, it liberalizes the press, which it had severely restricted during the war to clamp down on Russian propaganda, and focuses on countering disinformation instead. It is aided in this by the return of refugees who spent the war in the EU, learning EU practices, and who take roles in the state administration.

Ukraine attains EU membership in 2038. This brings a host of benefits, including hundreds of billions of euros in additional funding for reconstruction, much of it in the form of grants rather than loans. Montenegro, Serbia, and Georgia also join the EU around this time, becoming firmly rooted in the European community. There is a subtle shift in balance within the EU and NATO towards eastern members, which have led the fight against Russia.

Ironically, Russia's massive efforts to crush Ukraine and to divide the EU and NATO have caused them all to emerge stronger and more united.

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30   https://www.ft.com/content/d52bcb07-ba5f-4ffd-a919-53bcf9085690

Figure 4. Simplified systems map: "The hard work of unity"
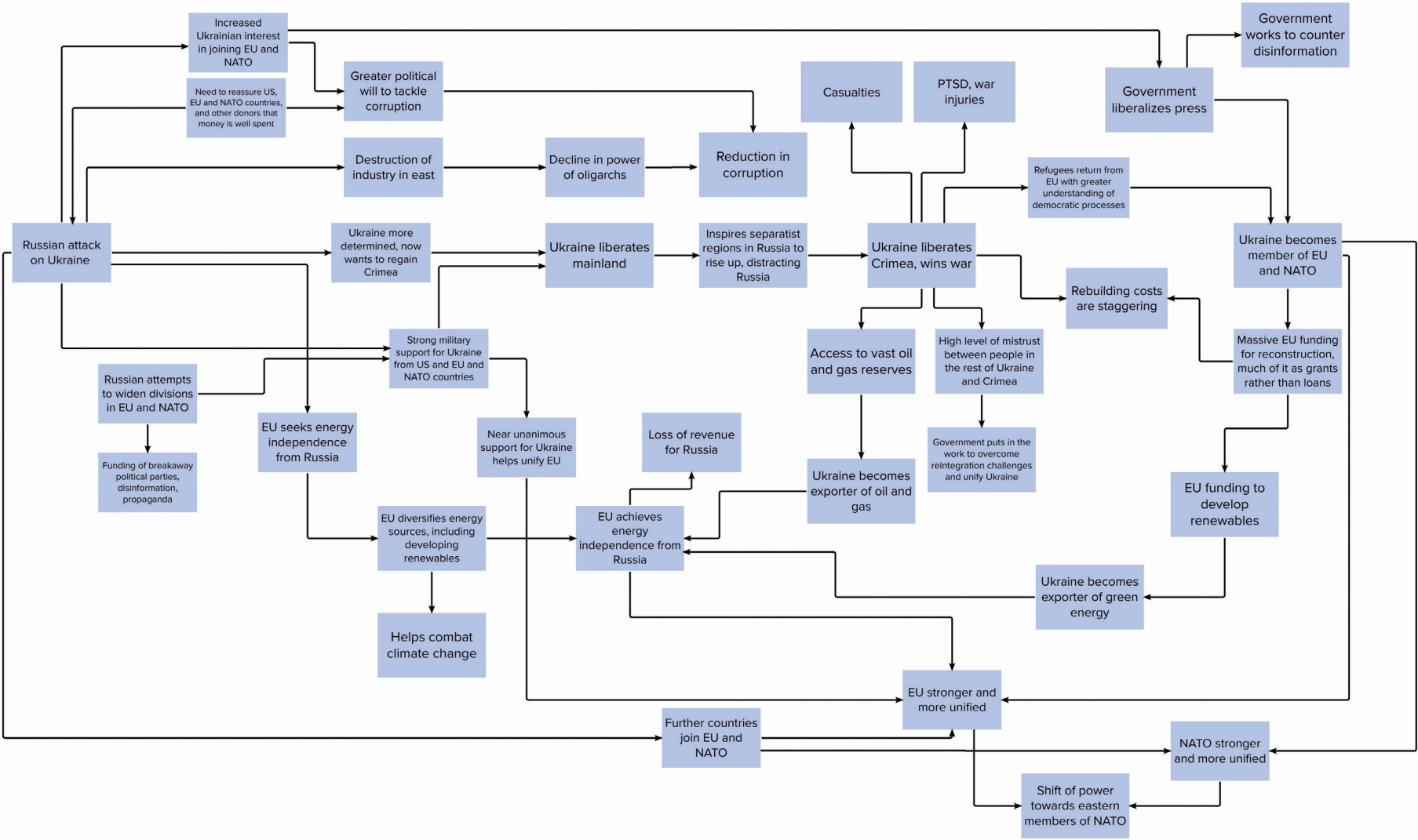
ANALYSIS AND STRATEGIC IMPLICATIONS

ANALYSIS

Once the scenarios were developed, several of the Ukrainian parliamentarians wanted to have a quick way to visualize the scenarios relative to each other, especially regarding the impact of the critical uncertainties in each scenario. This led to the development of an "Uncertainties Diagram" that illustrates how the six broad categories of critical uncertainties fare in each scenario. Each of them is given a colour code: green if they have a largely positive impact on Ukraine in that scenario, yellow if their impact is mixed, and red if their impact is negative.

Of course, given that the six broad categories of critical uncertainties are composites that regroup a number of different critical uncertainties within them, the colour codes are approximate. For example, if within one of the broad categories some of the critical uncertainties have positive impacts and others have negative ones, then these are evaluated to determine if the impact of the category as a whole is mostly positive, mostly negative, or mixed.

While grouping the critical uncertainties into six broad categories leads to a loss of nuance, reducing the complexity of the information makes it possible to provide the user with a clear and concise overview of the scenarios, enabling understanding of the relationships between the critical uncertainties in the different scenarios. This helps to facilitate rapid decision-making and planning. The diagram is displayed below.

UNCERTAINTIES DIAGRAM

The hard work of unity

Decentralized digital survival

Drift to autocracy

Slow slide to world war

Critical Uncertainty

1. Scale and consequences of war
2. Demography and social capital
3. Democracy and government
4. Partner support
5. Economic situation
6. World order

Impact of uncertainties

- positive impact
- mixed impact
- negative impact
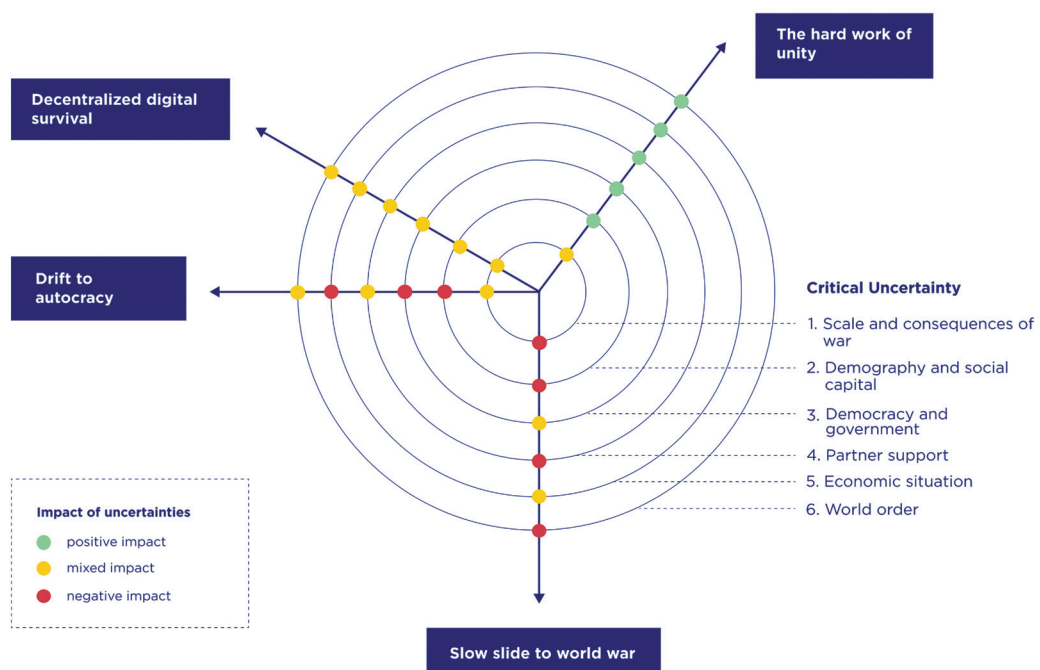
STRATEGIC IMPLICATIONS

We then turned to the strategic implications of the scenarios for the recovery and development of Ukraine. To this end, we held a workshop bringing together representatives from the Ukrainian government, parliament, and the FIT. Drawing on the workshop findings, we developed a set of first-order strategic implications. We have been able to identify some general implications that are common to all scenarios, as well as some specific implications for each scenario. These are discussed below.

⊳ General implications applicable to all scenarios

Tackle corruption as key to effective recovery and development. Addressing corruption is a complex and challenging task, but it is crucial for the sustainable growth and stability of Ukraine. By giving priority to and successfully tackling corruption, the country can create a more favourable environment for investment, increase public trust in government institutions, and improve the quality of life for its citizens.

Accelerate public administration reform. The roles of the civil service and political leaders should be clearly differentiated, and the civil service should offer appealing and safe employment conditions to attract talented individuals. There is also a need for better training of government leaders and specialists. For Ukraine to join the EU, it will be important to develop high-quality learning and development programmes aligned with EU practices, including international training and exchange programmes, and to deploy special programmes to attract talent to serve the state.

Promote social cohesion. Social cohesion between IDPs, host communities, and returnees is essential for the health, economic development, and stability of communities in western Ukraine. By promoting social cohesion, Ukraine can help to build trust and foster collaboration between different groups.

Shape positive narratives in the EU. The reputation of Ukraine in the EU is crucial for recovery and development; it can attract investment and strengthen support from the EU and other partners. Shaping positive narratives about Ukraine can help to counter disinformation and promote the country's strengths, such as its potential for innovation and entrepreneurship.

Countering disinformation through media literacy and fact-checking initiatives can help to counteract Russian influence operations and promote a more accurate understanding of Ukraine. The country can leverage the large community of refugees currently in the EU to dispel negative stereotypes and promote a more accurate understanding of their experiences and contributions, and the realities in Ukraine.

Promote education aimed at teaching youth and children principles of good citizenship and strengthen the educational system. Youth and children need to be taught the importance of holding the government to account and of the roles and responsibilities of individuals in democratic systems of government. While this is important in terms of patriotic education, it is also crucial to ensure that such teaching does not reach an unhealthy level and veer towards propaganda. Education should foster the civic and political engagement of young people.

Fast-track ambitious and innovative recovery projects. A slow and gradual recovery process can put Ukraine at risk of falling behind neighbouring countries in terms of development. To overcome this, the country should embrace a more ambitious approach by fostering innovation and deregulating its economy. This will create the potential to leap-frog the development gaps and position Ukraine as an innovation leader.

Stimulate joint EU-Ukraine business enterprise development. Stimulating joint business enterprises in the regions that border the EU as well as throughout the country would facilitate stronger economic cooperation between Ukraine and the EU. The creation of these joint ventures would result in a better understanding of EU regulations and faster harmonization of laws with the EU. Strong economic ties with the EU are crucial for Ukraine's resilience and future growth and stability.

Ensure balanced regional development. Government needs to ensure that there is a balanced and equal distribution of resources, opportunities, and support across all regions of Ukraine, to address the imbalances in population and economic growth caused by the displacement of people and the impact of war. It will need to implement policies to support the recovery and development of the more heavily impacted eastern regions, and work to attract investment and business opportunities – while ensuring that the west is not neglected. Additionally, supporting the return of people to their homes will help to rebuild communities and increase the overall population.

Develop international partnerships and innovations for the military industry. Developing international partnerships, local production, and research and development – particularly in the military industry – can help Ukraine grow more independent and self-sufficient. By producing its own weapons, the country can reduce its dependence on imports and ensure that it has the resources it needs to defend itself and become a top producer of innovative military solutions.

Harness the strength of the army for social development. Ukraine's military has gained a reputation for strength and trustworthiness among the people. This trust in the military can be leveraged to drive social development in the country. By pairing military service with education and employment initiatives, the military can help to build national pride, unity, and security. In doing so, it can become a driving force for positive change in Ukraine, beyond its traditional role in deterring aggression from Russia.

Develop digital skills and the digital economy. Developing digital skills among the population, including IDPs and refugees, can help to increase their participation in Ukraine's economy, even if they are unable to work in traditional jobs. By fostering a supportive legal and regulatory environment and partnerships with the private sector, government can create an enabling environment for the growth of the digital economy in Ukraine.

Balance Ukraine's relations with China. Ukraine must consider its stance towards China carefully in light of the wider geopolitical context. It needs to achieve a balance, formulating a well-thought-out, consistent policy towards China that protects its own interests while also ensuring stability and cooperation in its relations with other countries and international organizations.

Consider climate change in recovery policies. Long-term environmental trends such as climate change should be factored into recovery policies. With changes in humidity, reduced precipitation, and temperature extremes, Ukraine's current agricultural methods and agricultural zones might evolve. Incorporating climate change into recovery policies can help to promote sustainable development and resilience in the face of these challenges.

Prioritize environmental clean-up. The ongoing work to assess the environmental impact of the war on the soil, air, and water supply must be sustained at a high level. This is important for resources overall, not only for agriculture but also for the health of the population, both in Ukraine and in other countries that consume food produced in Ukraine. This in turn has impacts on the productivity of the labour force.

Continue the de-oligarchization movement. The recovery process in Ukraine should prioritize preventing the emergence of new oligarchs. Large infrastructure projects can attract individuals with criminal interests, and extra oversight and scrutiny are required to ensure public funds are spent effectively.

Legislation should be introduced and regulations enforced to prevent the concentration of wealth, political power, and media in the hands of a few individuals. This will ensure a more equal distribution of resources, promoting stability and sustainability in the long term.

⬙ Slow slide to world war

Leverage Ukraine's experience in adaptive innovation. The early war response in 2022 demonstrated how collective action and creativity can quickly solve complex problems. Ukraine has the potential to become a leader in innovation, in particular in terms of adapting and converting existing solutions – for instance, developing wood-based heaters for the military, repurposing defence items such as anti-tank hedgehogs into urban furniture, or using simple drones to deliver explosive payloads. By leveraging the experience of innovating in extremely resource-scarce environments, Ukraine can contribute to global sustainable innovation approaches and enhance its preparedness for worst-case scenarios when access to technologies and external support is practically unavailable.

Invest in off-grid energy generation. With energy and communication grids and generation capacities being continuously targeted by missile attacks, investing in off-grid energy generation solutions such as biomethane from household organic waste, wind, and solar power becomes a priority and can deliver positive environmental results.

Plan for the growth of Ukraine's western regions. Being far from the war and becoming a new home for IDPs, cities in western Ukraine are projected to grow, with local economies changing as a result. Planning new value chains and investing in local entrepreneurial ecosystems is an important task. At the same time, the government should consider "just" policies between depopulated cities in the east and growing cities in the west. While fostering the integration of IDPs in their host communities, it should also have long-term plans to facilitate their return home when conditions allow.

Develop new bilateral regional partnerships with neighbouring countries based on security and international alliances. Developing new bilateral regional partnerships with neighbouring countries will ensure that Ukraine is not solely dependent on the support of NATO and the EU. With the current economic crisis and the potential success of enemy disinformation campaigns, there is a risk of a gradual reduction of support from these organizations. Through smaller regional alliances, Ukraine can strengthen its security in the long term and leverage these partnerships to guard against potential threats.

◰ Drift to autocracy

Further strengthening of democratic governance in Ukraine. Direct participation of citizens in governance and in the formation of public policy will lead to improved transparency and accountability in governmental decision-making. It is therefore important to provide citizens with the opportunity to exert influence through participatory mechanisms. The strengthening democratic institutions will require a review of the constitutional powers of the branches of power.

Strengthening of parliamentary control and the role of the Verkhovna Rada in shaping state policy. Parliamentary control and oversight will promote accountability of the executive branch and a balance of power between branches of government. Additionally, this will allow for a higher level of transparency in decision-making and government spending, enhance respect for human rights, and diminish the possibility of corruption.

Foster public oversight through civil society organizations and the media. It will be important to balance the need for security and stability with the protection of civil liberties and democratic values. In this regard, the development of civil society organizations is critical in ensuring accountability and transparency in the recovery process. They can play a watchdog role, monitoring the use of public funds and international aid.

The role of journalists in holding the executive accountable is critical in ensuring a fair and transparent recovery process. They play an important function in building the legitimacy of the government.

To ensure quality journalism, education in media literacy is also necessary, along with the development of new protection mechanisms for journalists. This will encourage independent and fearless reporting, promoting accountability and transparency.

Ensure compliance with construction standards in the rebuilding process. It is important to ensure that companies involved in reconstruction projects strictly adhere to adequate building standards. The massive number of buildings that collapsed, and the huge death toll that resulted, in the February 2023 earthquake in Turkey have been attributed to sub-par construction. It will therefore be important for the Ukrainian authorities to oversee and inspect the rebuilding work carried out to ensure that it complies with codes of practice. Poor-quality building work in Turkey has also been linked to corruption in the building process,[31] further underscoring the importance of tackling corruption for Ukraine.

Diversify sources of funding for recovery and development. In considering funding for the recovery process, the focus should be on a healthy and diversified combination of sources to prevent over-exposure and risky dependency, promoting sustainability and stability in the long term.

Ensure data privacy and prevent excessive surveillance. The recovery process must address the issue of excessive personal data collection and the potential risks of surveillance that it poses. Effective policies and oversight mechanisms must be established to ensure the protection and responsible use of personal data. It will also be important to have educational initiatives for law enforcement.

⬈ Decentralized digital survival

Foster digital connectivity in remote areas. Efforts to increase mobile and internet connectivity in remote areas of Ukraine must be accelerated, connecting communities and improving access to information and services. This will allow the population that moves to smaller settlements or non-urban areas in search of greater safety to stay connected and participate in the digital economy.

Ensure a balanced digital transformation drive. It is important to find a balance in the digital transformation drive between the state and local self-governance actors. Successful cases of digital transformation need to be promoted at the local level, by sharing practices of digitalization of services provided by local institutions, and developing tools that encourage greater citizen engagement and accountability.

Decentralize the value chain. Methods should be considered to support the decentralization of large industries so as to reduce the risk of targeting by missiles and to support business relocation. Subsidizing the Fourth Industrial Revolution transformation will also help increase flexibility and reduce Ukraine's environmental footprint.

Develop digital tools for refugees and diaspora. Digital tools need to be developed for the large number of refugees abroad as they increasingly form a large diaspora, so that they can stay connected with their home towns in Ukraine. This will actively engage them in discussing and co-creating local policies.

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31   https://www.theguardian.com/world/2023/feb/19/erdogan-faces-backlash-over-building-standards-in-city-wrecked-by-quake

Prioritize investment in cybersecurity. High levels of cybersecurity are key to ensuring Ukraine's resilience. The government will also need to limit the collection of citizens' personal data in order to avoid the risk of misuse.

Consider developing policies for internal digital nomads. Ukraine can internally leverage a growing trend of "digital nomads", individuals who can work remotely and choose to live in locations that offer a desirable quality of life. Developing policies to attract these individuals to certain settlements and to retain them has the potential to drive economic growth and development, especially in smaller towns and villages. By encouraging this growing segment of the workforce, Ukraine can tap into the economic benefits of the digital economy and position itself as a leader in this field.

⯈ The hard work of unity

Ensure reintegration strategies for territories under temporary occupation. It is important to recognize the importance of reintegration strategies for territories that have been under temporary occupation for a long time. Restoring justice and facilitating the guaranteed safe return of those who had to leave their homes is essential. These territories face unique challenges, including social and political division, mistrust, and the effects of conflict and occupation.

Reintegration strategies must also consider the economic needs of these communities, including support for small businesses, job creation, and the restoration of essential infrastructure and services. At the same time, the government should have a plan for organizing elections in the de-occupied territories and train staff who will be appointed to manage them.

Recognize that the nation's mental and physical health is the cornerstone of a prosperous future. The mental and physical health of the population is a critical factor in ensuring a prosperous future for Ukraine. The government must prioritize the development and strengthening of the national health system to address the increasing number of PTSD cases and provide access to prosthetics for those who need them. By focusing on health, Ukraine also has the potential to drive innovation in the healthcare sector.

NEXT STEPS

The strategic implications of the scenarios illustrate a wide range of issues that should be considered on the governmental and parliamentary levels and that concern nearly all ministries' governance areas. To mitigate the risks and leverage emerging opportunities, joint and whole-of-government action is required. Over the coming months, the IFU will carry out additional work to further refine the strategy implications. In particular, the IFU will stress test the recovery policies developed by the Government of Ukraine and coordinated by the National Council for the Recovery of Ukraine from the War against these scenarios to determine how the particular public policy decisions would fare in each scenario. Additionally, this report will serve as the basis for other foresight work, including forecasting, the development of scenario simulation workshops, and expanding on the system mapping and testing modelling of certain elements highlighted in the scenarios.

Scenarios should regularly be revisited in order to take changing conditions into account. The IFU will therefore continue to monitor and revise the scenarios periodically over the coming year, updating them as certain drivers of change become stronger or weaker, and new weak signals emerge.

This foresight study offers an opportunity to open a discussion between the parliament and the government, promoting accountability of the executive branch to the parliament with regard to long-term thinking and the resilience of its policies. This report and its findings form a stepping stone for the foresight ecosystem of the public sector of Ukraine that the IFU is committed to develop.

ANNEXES

Annex 1: Further details on the horizon scanning and environmental scanning phase

1

This annex provides supplementary details on the horizon scanning and environmental scanning aspect of this project.

Methodological support for the horizon scanning and environmental scanning phase was provided by the Joint Research Centre (JRC) of the European Commission, whose main function is to carry out research in order to provide independent scientific advice and support for EU policy, including through foresight work. JRC experts conducted an introductory briefing and master class for the FIT on conducting horizon scanning and environmental scanning and analysing its results.

Following the JRC methodology,[32] the FIT members filled out a Signal Collection Form for each of the weak signals and drivers of change that they identified. The form included such items as:

- Name of signal;

- Signal category (according to the STEEPED framework: Societal, Technological, Economic, Environmental, Political/legal, Ethical, and Demographic);

- Signal description;

- Why this signal is relevant and/or important;

- Likelihood that the signal will become widespread: assessment on a five-point scale, where 1 is low likelihood and 5 is high likelihood;

- Potential impact of the signal: assessment on a five-point scale, where 1 is low impact and 5 is high impact; and

- Timeframe in which the signal will have the most effect: (1) Short term (2022–23); (2) Mid term (2024–25); (3) Long term (2026–30); (4) after 2030.

- Link to sources: experts were not limited in their choice of sources; they could use the media (newspapers, internet, TV, Twitter, Facebook, Instagram, LinkedIn, etc.), blogs and opinion pieces, think-tank publications, webinars and conferences, interviews, and conversations with partners or stakeholders.

The use of this form helped to ensure the consistency of the data collected.

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32   https://www.europarl.europa.eu/thinktank/en/document/EPRS_STU(2021)690031

<table>
<tr><td>**2**</td><td># Annex 2: Overview of chatbot survey findings</td></tr>
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This annex explains how the "ForesightBot" chatbot was developed and how the surveys were conducted, then it presents the data that was collected via the chatbot.

⟩ Development of the chatbot and survey methodology

The "ForesightBot" chatbot was developed for both Viber and Telegram as these are among the most popular mobile applications in Ukraine. They are very often used not only to exchange messages but also for other functions (e.g. checking the news).
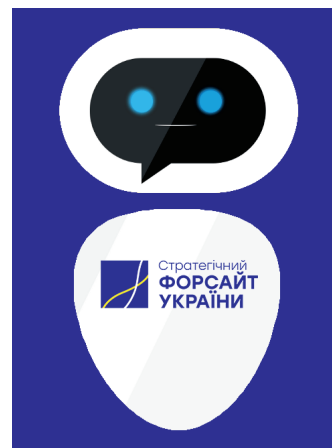
The chatbot was promoted and potential survey respondents identified through communication outreach actions via the Verkhovna Rada of Ukraine's official communication channels in Viber and Telegram. Overall, as of January 2023, 881 people (54.5% women and 44.2% men) participated in the surveys conducted via the chatbot. All participants took part on a voluntary basis. The researchers did not limit or model representation according to gender, age, or location. Hence surveys are not representative in a sociological sense, and should be considered "indicative".

These surveys were developed based on the findings of the scanning stage of research and workshop discussions. The goal was to engage as many citizens as possible to take part in foresight research by formulating questions in a conversational manner. The questions in the surveys were developed to validate and expand on the elements shaping the scenarios. The questions asked in the surveys covered a variety of aspects such as uncertainties, visions, drivers of change, and the hopes and fears of the participants. The results of the surveys were an important piece of information that helped to paint a complete picture of different possible ways the future may unfold and were used to further refine the scenarios.

The responses were recorded in a database, allowing the application of quantitative analysis methods. To interpret the results of "conversations", the team utilized data visualization techniques to understand and summarize quantitative answers. The answers to the open-ended questions were also analysed for common themes and main narratives.

In total, three surveys and one focus group were conducted via the chatbot. Their results are summarized below.

In addition, an interactive data visualization platform was prepared, enabling the visualization of survey results in real-time. This is available at the following links:

Dashboards (in Ukrainian):

1. General poll: http://bit.ly/3uddzRq
2. Ukraine 2040: http://bit.ly/3OLB3X7
3. Drivers of change and uncertainties: http://bit.ly/3ijDwMd

Each survey also had a feedback button enabling respondents to leave feedback about their experience of interacting with the bot.

The chatbot has proven to be an effective instrument for the IFU to tap into the collective intelligence of citizens. It will continue to be further developed and used by the parliamentary actors in Ukraine to reach wider audiences and exercise principles of inclusion and citizen participation.

The chatbot can be accessed via these links (Ukrainian):

Viber   Telegram

Data collected by the chatbot

General poll

The general poll was focused on the hopes and fears of citizens of Ukraine, as well as their "future agency" – whether they feel responsibility for the future of Ukraine.

The survey was launched on 19 August 2022. Overall, as of January 2023 there were 649 respondents participating in the survey (55% - women, 42% - men; others did not specify).

1.1. Sex

19; 3%   2; 0%

272;42%

356;55%

■ Man   ■ Woman   ■ I will not say   ■ Other
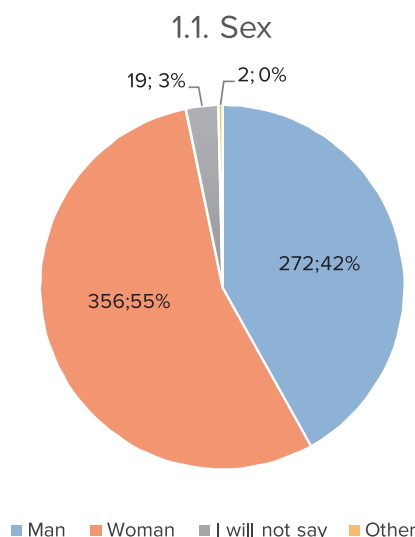
A large majority of Ukrainians constantly or often think about the future of Ukraine (91% of respondents). This may indicate the uncertainty that exists over issues connected with the war and other indirect factors related to it (Figure 1.2).

1.2 How often do you think about the future?

- constantly
- often
- occasionally
- I try not to think
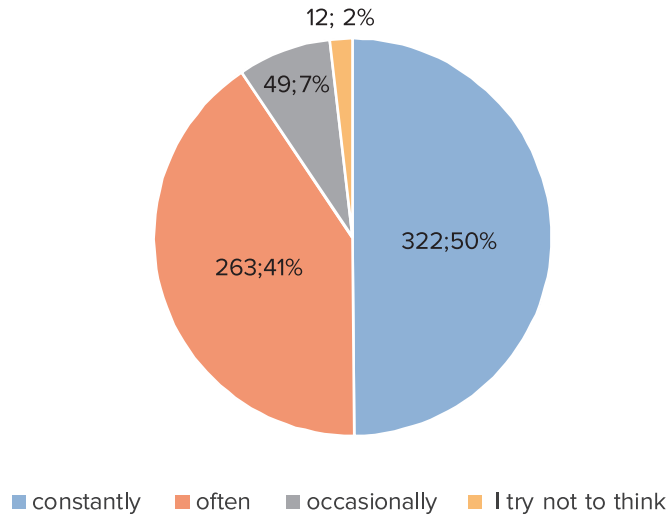
No certainty emerges about which perspective should be considered first, but more lean towards 5 years (31.5%) and 10 years (24%) than other time horizons (Figure 1.3).

1.3 In order to plan the recovery and development of Ukraine, what perspective do you think should be considered first?

- 1 year
- 2 years
- 3 years
- 5 years
- 10 years
- 20 years
- 50 years
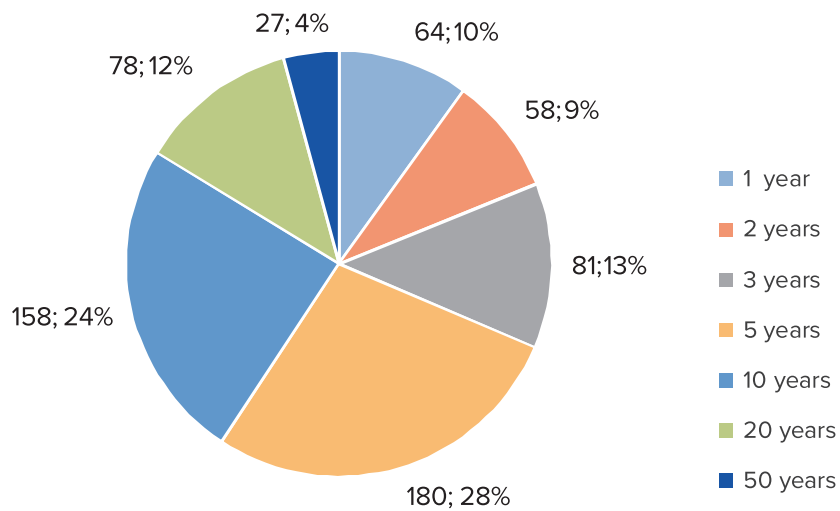
A large majority of respondents believe that their life will be much or a little better in 2030 (a combined total of 93%), which is most likely also connected with perceptions of Ukraine's rapid post-war recovery (Figure 1.4).

1.4 Imagine yourself in 2030. What do you think your life will be like?

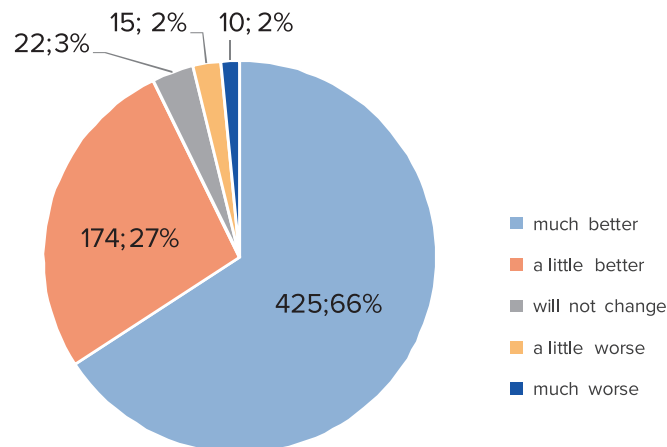
At the same time, the majority of respondents (72%) believe that they have a very strong or significant responsibility for the recovery of Ukraine (Figure 1.5).

1.5 Do you feel a personal responsibility for the recovery and development of Ukraine?
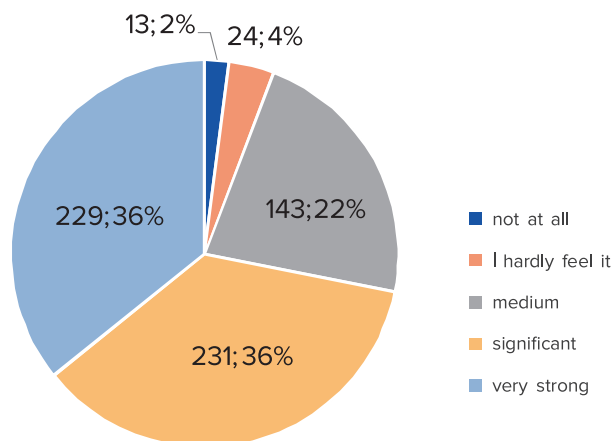
However, this proportion is still far lower than the proportion of respondents who believe their lives will be a little or much better. This may lead to the conclusion that most people expect rapid growth should happen "by itself" rather than through the efforts of everyone in their field.

Responses vary widely about the opportunities that will appear by 2030. However, most are related to cooperation with the EU and NATO, the development of the IT industry and new technologies. At the same time, one of the biggest persistent problems is corruption, which was directly mentioned

by at least 7.7% of respondents. Since this was one of the main problems even in pre-war times, failure to find a solution may become one of the principal reasons for disappointment in the future. Corruption was also the most frequently mentioned among the key issues that Ukrainians could, but did not do to solve these problems by 2030. This indicates the acuteness of the problem.

To the question of who should be responsible for solving the problems of recovery and development of Ukraine, 419 respondents chose the answer «state» and 290 «citizens» (Figure 1.6). This suggests that citizens are not ready to take direct responsibility for the further resolution of problems, but are definitely ready to be an active component of this process.

1.6 Who should be responsible for solving the problems of recovery and development of Ukraine?

Category	Value
state	419
citizens	290
communities/local self-government	249
business	115
NGOs	108
international partners	104
all together	9
state and citizens	3
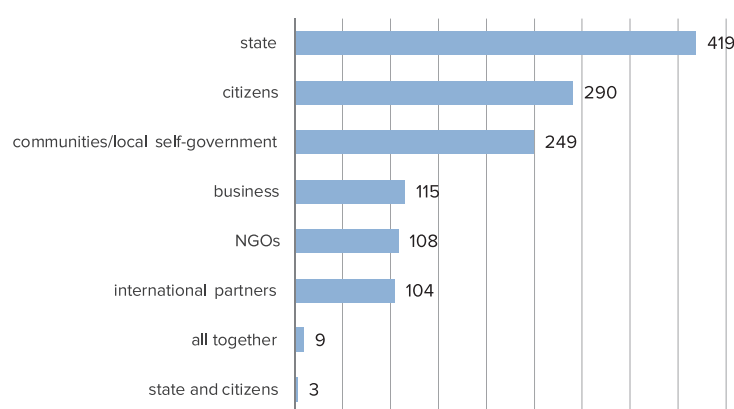
The final question was about which projects the respondents would like to see launched by 2030, if enough opportunities existed. Responses indicated a preference for projects on environmental topics and the development of electronic services. In considering which spheres had the greatest potential for achieving the development of Ukraine by 2030, the largest number of responses related to the integrity of the authorities and the fight against corruption (285), closely followed by innovation and science: digitization and technologies (254) (Figure 1.7).

1.7 What areas do you think have the greatest potential for accelerating Ukraine's development by 2030? (choose the 3 most important)

Category	Value
The integrity of the authorities and the fight against corruption	285
Innovation and science: digitalization and technologies	254
Efficiency of public administration	157
Justice and fairness	137
Construction and infrastructure	124
International support for Ukraine	118
Education	102
Civil society	90
Unity and social cohesion	72
Business	67
Culture	39
Demography	15

◪ Ukraine 2040

The Ukraine 2040 poll focused on Ukrainians' visions for the future. This survey was launched on 24 August 2022 (Ukraine's Independence Day). Overall, as of January 2023, there were 206 respondents participating (51% - women, 43% - men; others did not specify).

2.1 Sex
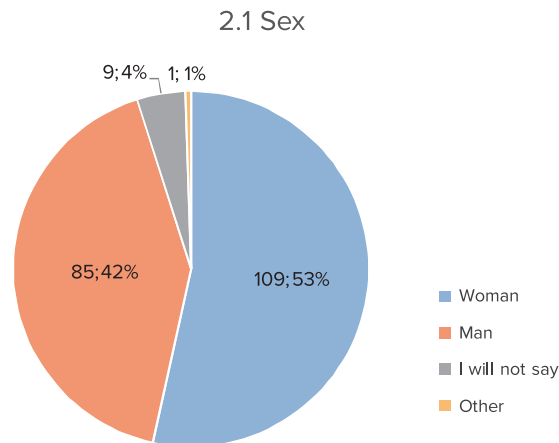
Imagining themselves in 2040 and describing what they would see, respondents most frequently used words with largely positive connotations, such as «Ukraine», «independent», «free», «work» and «happy», thereby showing positive expectations of the future. The use of a large number of words such as «restored» indicates the importance attached to overcoming the post-war crisis.

Answering the question «What would you ask the first person you meet about the period from 2022 to 2040?», respondents quite often used such words as «war», «changes» and other phrases concerning the Russian Federation. This again shows how much influence the war has on Ukraine right now, and how much influence Russia could have on Ukraine in the future.

When asked on what principles and qualities Ukrainian success in 2040 was based, at least 79 respondents answered "human rights, cultural diversity and social cohesion" (Figure 2.2). This indicates the importance for Ukrainians of the sense of protection and opportunities for further development in the future.

2.2 On what principles and qualities is the success of our state based in 2040? Choose the 3 most important.
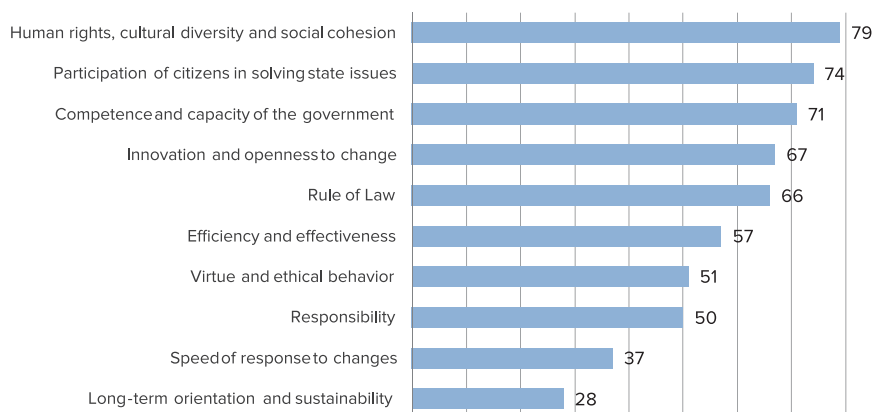
⊠ Drivers of change and uncertainties

This survey asked respondents about the key uncertainties that Ukraine is facing in the period up to 2040. It was launched on 27 August 2022. Overall, as of January 2023, there were 139 respondents (55% - women, 44% men; others did not specify).

Respondents considered the level of support for the recovery of Ukraine to be by far the most important driver (42%). This result indicates that Ukrainians have high expectations of help from the country's partners. The three other answer options were selected in almost equal numbers: "demographic situation in Ukraine" (21%), "energy sovereignty" (18%) and "degree of destruction caused by the war" (19%), showing the significance accorded to all these factors (Figure 3.2).

3.2 Choosing the most important driver (it is recommended to choose 1 of the 4 offered)

- Demographic situation in Ukraine
- The level of support for the recovery of Ukraine
- Energy sovereignty
- The degree of destruction caused by the war
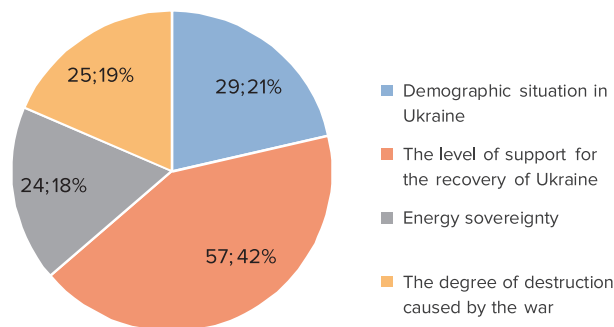
Among the key factors of the future (drivers of change) seen as most strongly determining the future (Figure 3.3), respondents mentioned «innovation: digitalization and technologies» 17 times, «civil society» 10 times, «the integrity of the government and combating corruption» 8 times. As analysis of the survey results above shows, this last remains one of the key problems for Ukrainians. «Education» was also mentioned 8 times. A significant improvement in education can be a good basis for further development in Ukraine; however, in the context of war, resources for this sphere can be very limited. Also considered an important factor (mentioned 7 times) was «efficiency of public administration». Here, improvements at both local and state level could lead to better outcomes for the functioning of the state and therefore to the overall development of Ukraine.

3.3 What factors of the future (drivers of change) most strongly determine the future of Ukraine? (text responsesare clustered)
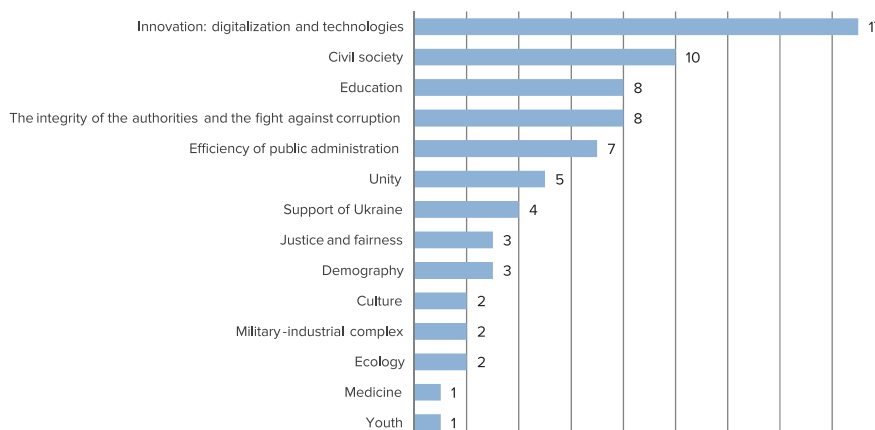
◪ Chatbot scenarios focus group

Between 21 November 2022 and 15 December 2022, the Accelerator Lab of UNDP Ukraine conducted focus group research to strengthen the scenarios. The survey consisted of five open-ended questions on which government policies and actions participants believed were most and least effective in addressing some of Ukraine's most pressing issues and emerging challenges, as well as opportunities that might arise beyond the government's control. The focus group was composed of 23 Ukrainian citizens. Respondents were selected from ForesightBot subscribers based on analysis of their previous participation in surveys. The selected participants were invited to engage in a conversation with the chatbot and give open answers without a word limit.

The questions and scenarios were developed using results from previous chatbot conversations and workshops. The following is a summary of the focus group scenario conversation.

1. **What would be the most effective steps that could be taken by the government to encourage Ukrainians abroad to return to their homeland in the case that the war between Russia and Ukraine becomes long-term?**

Results show that the most frequent responses could broadly be divided into three main categories: (1) Ukraine's adaptation to war conditions; (2) its further development in areas where it is possible; and (3) non-material factors such as vision.

The most popular answer was the rebuilding of infrastructure necessary for living, such as new houses, bomb shelters, stable access to water and electricity regardless of possible outages caused by Russia's attacks, and transport. One of the participants noted the necessity of government guarantees; the development of effective private insurance services which could cover the expenditure incurred by loss of or damage to property and goods by war; or other creative solutions such as:

> *"The development of a single all-Ukrainian platform for the labour market, possibly even as a mobile application with notifications for job seekers when new vacancies appear according to the criteria specified in the search. Like Diia, which is 'the state in the phone', but here [it] is the entire labour market in your phone. With all development statistics, comparison of the level of payment in different regions of the country." (Woman, 32 years old)*

Additionally, facilitation of new employment opportunities and social benefits for those who lost their jobs and struggle to transition to another job or sector were discussed. This is perhaps not surprising given that Russia's full-scale attack caused high unemployment among the Ukrainian population.

The second cluster of ideas was oriented towards the further development of Ukraine. It seems to come from the realization that some displaced Ukrainians **might not want to come back, owing to the better living conditions in Europe**.

> *"In any scenario, including the scenario of a long-term war, a person will change their more or less stable life only if there are significant incentives for it. The assessment of some*

specialists who became forced refugees about the experience of staying in Switzerland, Germany, and Poland is that it is very expensive to live, and it is lonely, but it is stable. There is enough income for living and vocations, but not enough for savings or investing. Interaction with local authorities, general medicine, preschools, primary schools either does not meet expectations or is too difficult. So, if the Ukrainian authorities radically improve general medicine, interaction with the authorities and prosecutors, and create opportunities for the stable upbringing of children, this will stimulate the return of Ukrainians." (Man, 44 years old)

Another potential explanation behind such thinking, though it was not spelled out by any of the contributors, could be recognition of the fact that the war has brought a higher level of instability. It has made Ukrainians realize that bordering Russia can lead to unpredictable outcomes and should be balanced by even greater economic and developmental opportunities.

To progress, Ukraine could, for example, improve public institutions and services in the spheres of medicine and education; ensure stable continuation of the previous democratic and economic reforms; encourage further cooperation with international actors: the EU, NATO, and others; and strengthen Ukraine's energy sector.

In the third cluster of ideas, participants emphasized non-material factors. Among those were: (1) a clear vision of the country's better future; (2) greater involvement of temporarily displaced Ukrainians in development to promote their sense of being needed; (3) policies aimed at future generations.

A focus on future generations was prominent, albeit indirectly, in a couple of answers. These participants emphasized that there should be an increase in payments to help with the costs of a new baby, and the transfer of educational institutions to areas where military operations were not taking place. These responses indicate the desire of Ukrainians not only to satisfy their short-term needs but also to be able to plan a long-term future for their children.

2. **What three events beyond our (government's) control could affect the choice of citizens abroad on whether to return to Ukraine?**

Answers to this question mostly focused on events happening in Ukraine, the policies of other countries towards temporarily displaced Ukrainians, and the willingness and ability of Ukrainians to adapt to life in other countries.

The most popular answers were the dynamics of the war, whether intense or non-intense, and its outcome (Ukraine's victory or defeat). The economic situation in the country featured equally frequently in responses, including the factors which can affect Ukraine's development or stagnation – for example, international support for its recovery. Other factors mentioned were the political transformations in Russia and other states, which might directly determine events on the battlefield, the long-term security situation in Ukraine, and the speed of recovery.

Another important factor could be the extent to which displaced citizens are seen as useful actors in the economies of the states where they currently reside. If they are seen as a burden for the

economies of European countries, and if the economic and political situation in those countries worsens, the level of support for hosting Ukrainians could fall. Ukrainian citizens could additionally be seen by local inhabitants as taking their jobs; this might stimulate hostile policies. On the other hand, if migration has a positive impact on the economies of receiving countries, their government may take steps to integrate migrants, making it less appealing for them to return home.

> *"If social programmes for Ukrainians abroad suddenly end, and people do not find a means of livelihood, they will have to return, but in my opinion, this is not a good option in the event of a protracted war, because many of those who left simply do not have anything in Ukraine." (Woman, 36 years old)*

Lastly, regardless of the policies of other states, an important factor affecting the decision to remain or return home could be the willingness and ability of Ukrainians themselves to integrate in other countries, and to overcome the difficulties of adopting foreign languages. Their willingness to adapt could be affected by their interest in reconstructing Ukraine and engaging in its development, which in turn could be affected by the success of reforms in Ukraine itself, the feeling of being needed, or of excitement to be involved in rebuilding and developing Ukraine instead of a possibly more difficult and dull adaptation to the existing structures abroad. Additionally, as was noted by two participants, if war started in other countries where Ukrainians reside, they would be unwilling to stay, as they saw security as the key reason for their migration.

3. What three events outside of a government's direct control could lead to a prolonged war?

Key events identified by participants were: (1) the lack of international unity against the war and unwillingness to continue supporting Ukraine by actors who already do so; (2) other wars or crises abroad; (3) the militarization of Russia; and (4) lack of action in Ukraine.

First, the **lack of international unity** could be roughly divided into three groups of ideas:

(1) The failure/unwillingness of all countries to fully isolate Russia, thereby allowing its economy to stabilize and making continued military action feasible.

(2) Unwillingness to further support Ukraine, impose new sanctions on Russia and its allies, decrease or not increase volumes of military and economic aid to Ukraine. Or too slow a response from international partners, which could give Russia an advantage: the delay in supplying political, military, and economic aid to Ukraine, delayed decision-making on the subject of the war, negotiations, discussions, consultations, etc. with the aggressor.

(3) Fracturing of the former unanimity of society regarding views on ways to end the war.

Secondly, **other wars or crises abroad** was a popular answer. Participants commented that this might be the next global pandemic or armed conflicts in other countries:

> *"Armed conflicts in other strategic locations of the world – Ukraine's loss of support from strong states that will supply their armed and financial reserves to places of greater*

importance for them, a large-scale military conflict with the participation of key states (for example, an attack by the PRC on Taiwan), which will disperse the efforts of the West and will push the war in Ukraine to the background." (Woman, 22 years old)

Thirdly, the **militarization of Russia** was mentioned. This could be a result of increasing support for the war by Russian citizens; Russia's ability to produce military equipment with help of other states; or the involvement of other countries which might decide to actively support Russia.

The final potential event or situation was the **lack of help coming from Ukrainians themselves**, their detachment from the war and lack of unity, which could cause a prolonged war.

4. **Let's imagine that within a year, Ukraine regained all temporarily occupied territories and restored territorial integrity within the 1991 borders. What three events outside of our direct control could contribute to this scenario?**

The most common answer was related to international support, its continuation or increase. Some participants believed that sustainable support from international partners delivered in time would be enough to help Ukraine achieve full recovery of the temporarily occupied territories. Others commented that there should be a significant increase in support, for example more sanctions to ensure the economic collapse of Russia, or the refusal of Belarus to collaborate with Russia. Other points mentioned included allies' permission to conduct military operations on the territory of the Russian Federation and Belarus; Chinese interference on the Ukrainian side; and the realization by international actors of the importance of Ukraine's quicker victory, which could lead to the creation of new and/or reform of old institutions (for example NATO), through which, in turn, more support could be given to Ukraine.

Another frequent answer related to Russia, including a change in the Russian government, civil protests in Russia, or other unexpected events for the Kremlin such as Putin's sudden death, an outbreak of violence in the Northern Caucasus, or a significant increase in the number of Russians refusing to fight. The effectiveness of the Kremlin's propaganda in Russia could also play a key role. If citizens became aware of the extent of the fake reality this was spreading, there was a chance that a new government opposed to Russia's aggression in Ukraine could be established.

Thirdly, much hope was put in Ukraine's armed forces and the ability of Ukrainians to continue volunteering and uniting for the common cause.

5. **What three events outside of our direct control could prevent this scenario [Ukraine regaining all temporarily occupied territories and restored territorial integrity within the 1991 borders] from happening?**

According to respondents, key events which could be an obstacle for Ukraine in its attempt to recover all temporarily occupied territories and restore its territorial integrity according to the 1991 borders within a year would most likely be dependent on events in Russia, other countries or Ukraine itself.

In Russia, ineffective or insufficient sanctions could allow Russia to purchase military equipment abroad and continue importing products, stabilizing their economy. Propaganda could gradually increase the appeal of the war and turn it into a national struggle, meaning that Russians would no longer perceive it as a special operation carried out by professionals and would actually regard it as their war. Another factor could be the willingness of the Russian government to use chemical or nuclear weapons.

International supporters of Ukraine could potentially change direction, not recognizing Ukraine's victory as in their direct interest and thus halting further aid. Russian propaganda combined with domestic crises could have an impact on public opinion abroad, leading to the victory of populist, pro-Russian forces in countries strategically important for Ukraine. Additionally, even if Russia's disinformation is ineffective and Ukraine's victory is perceived as highly desirable, the slow pace of the procedures facilitating the transfer of military equipment could prolong the war.

Lastly, it was noted that events in Ukraine could affect the success of the war: an inability to mobilize and unite the population, the demoralization of society if the price of gaining control over the occupied territories became unattractive or unacceptable. Negative attitudes in society towards residents of temporarily occupied territories could lead to the polarization of Ukrainian society.

3 Annex 3: Further details on the scenario building phase

This annex contains additional details about certain aspects of the scenario building phase beyond what is presented in the main body of this report.

▶ Moving from the deductive to the inductive approach

There are two main approaches to scenario planning: deductive and inductive.[33] The deductive approach involves selecting two critical uncertainties (that are independent of each other) and plotting them on a 2 x 2 matrix. This creates 4 quadrants, or 4 different possible scenarios. From there, additional critical uncertainties and predetermined elements are woven into each of these scenarios. This can be thought of as a top-down approach, where an overall framework is created at the outset and then additional elements are fitted into that structure.

The inductive method, as explained in detail in the main body of the report, involves starting with certain key drivers of change (critical uncertainties and/or predetermined elements) and exploring how they relate to other drivers of change. This creates clusters of related drivers of change, or different possible scenarios. This can be thought of as a bottom-up approach, in which the scenarios emerge on their own in an unstructured way.
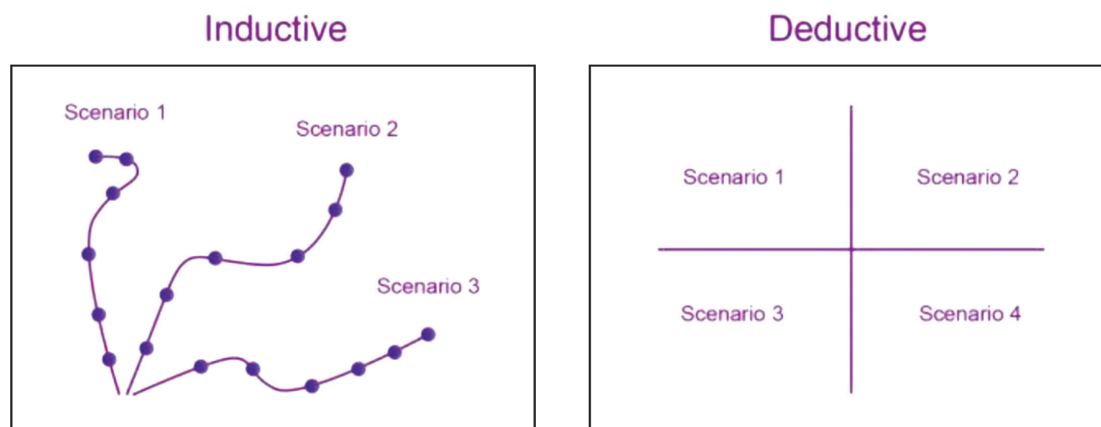
Illustration adapted from the Government of Canada's Policy Horizons course[34]

We initially made use of the deductive approach in the first two scenario building workshops. However, it soon became apparent that we were dealing with an unusually large number of critical uncertainties, due to a combination of the war and greater instability in the broader geopolitical environment. We therefore moved to the inductive approach, as we felt this would help us better take this large amount of complexity into account.

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33 Ramírez, R. and Wilkinson, A. (2016). Strategic Reframing: The Oxford Scenario Planning Approach. Oxford: Oxford University Press.

34 https://horizons.gc.ca/en/our-work/learning-materials/foresight-training-manual-module-6-scenarios-and-results/2/

◢ Using a Table of Future States to complement the inductive approach

The creation of a Table of Future States was used to complement the development of the scenarios.

The Table of Future States is known under different names. It has its roots in the work of astronomer Fritz Zwicky at the California Institute of Technology (Caltech) in the late 1940s, where it is known as a "Zwicky box". He created the Zwicky box to help structure and explore possible solutions to non-quantifiable, multi-dimensional problems in the field of astrophysics, establishing the field of morphological analysis in the process.[35] The method was then adapted for use in a futures context by the futurist Yriö Seppälä in the 1980s, who named it the Futures Table. It was further refined by Russell Phyne in the 1970s under the name of Field Anomaly Relaxation (FAR). The Table of Future States is a frequently applied method in Finnish futures research.

The technique involves creating a table which, for each driver of change, lists several different possible future states for that driver. Then, the possible future states of various drivers can be combined in order to create scenarios.[36] This helped us to confirm the findings that we obtained using the inductive approach.

◢ Use of the World Café format applied to an online environment as part of some of the workshops

All of the workshops were held virtually using teleconferencing software (Zoom), supported by online collaboration tools (Mural).

The workshops made use of a variety of conversation methods. One method that we employed several times was the World Café format, which aims to create an informal, conversational setting where participants can exchange ideas at several tables like those in a café. We adapted this method for the virtual environment.

Participants were divided into smaller groups and engaged in discussions in virtual rooms focused on specific scenarios. After a set period of time, the groups moved to new virtual rooms to build upon and review the previous group's discussion, allowing all participants to have the opportunity to share their perspectives on all scenarios in a short amount of time. The ideas developed were then processed and systematized by the team of authors.

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35 https://www.swemorph.com/ma.html

36 https://info.futuresplatform.com/en/hub/futures-table-a-powerful-scenario-planning-tool

4 **Annex 4: Research chronology**

The chronology of the foresight study is presented in the table below.

Stages and dates	Activities
Horizon scanning and environmental scanning: July - August 2022 **FIT provided scanning input throughout this period**	
July 21	Introductory Horizon Scanning Briefing and Workshop for the FIT, delivered by the Joint Research Centre of the European Commission
July 21 - August 22	Independent work by the FIT: gathering weak signals and drivers of change
August 1	Mid-term meeting, discussion of the results obtained, coordination of further steps
Scenario building: August 2022 - February 2023	
August 22	First Scenario Development Workshop (plenary meeting, 25-30 participants): refining drivers of change, identification of critical uncertainties and predetermined elements
August 30	Second Scenario Development Workshop 2 (plenary meeting, 25-30 participants): development of scenario matrix (deductive method)
September 9	Inductive Scenario Development Workshop (5 participants)
September 19	Inductive Scenario Development Workshop (5 participants), focus: energy
September 22	Inductive Scenario Development Workshop (5 participants), focus: democratic governance and ethics
October 11	Briefing for FIT on next steps, and presentation of the Table of Future States
October 11 - November 4	Independent work by participants: input into the Table of Future States
October 20	Online meeting to discuss and finalize results of work on the Table of Future States
October 28	Inductive Scenario Development Workshop, using the World Café format
October 20 - November 22	Internal workshops among research team to further develop and refine the scenarios (3-5 participants)
November 3	Inductive Scenario Development Workshop, focus: nuclear threats, bringing together parliamentarians from the APPG for Future Generations and from the Verkhovna Rada of Ukraine (20-25 participants)
February 10	Inductive Scenario Development Workshop, focus: Russia, bringing together parliamentarians from the APPG for Future Generations and from the Verkhovna Rada of Ukraine (20-25 participants)
Strategy implications: February 2023	
February 9	Strategy Implications Workshop, with the participation of parliamentarians from the Verkhovna Rada of Ukraine, members of the FIT, and other experts

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Futures Intelligence Team (FIT)

The project owes a great deal of its success to the involvement of the FIT. They contributed to all stages of the research, from horizon scanning and environmental scanning to scenario building to developing strategy implications.

Olena Bazylivska	UNDP Ukraine
Mykhailo Chudyk	Verkhovna Rada of Ukraine
Bohdan Denysenko	European Union Advisory Mission (EUAM) Ukraine
Fedir Dzen	Ukrainian Cluster Alliance
Iryna Gerasymenko	UNDP Ukraine
Andriy Gyzhko	Institute of Electron Beam Nanotechnologies and Nanomaterials
Evheniya Iltyo	Verkhovna Rada of Ukraine
Nataliia Kaminska	Verkhovna Rada of Ukraine
Mykhailo Kiktenko	UNDP Ukraine
Ievgen Kylymnyk	UNDP Ukraine
Vasyl Masiuk	Expert in forestry and wood
Dmytro Naliotov	Verkhovna Rada of Ukraine
Volodymyr Panchenko	KSP Strategies
Viktoriya Podgorna	IFU "Strategic Foresight of Ukraine", Verkhovna Rada of Ukraine
Nataliia Reznikova	Taras Shevchenko National University of Kyiv
Nataliia Rozmaritsyna	German University of Administrative Sciences Speyer
Max Semenchuk	Ministry of Digital Transformation, Impact UA, Support Ukraine Now
Oleksandr Shevchenko	National Agency for Spatial Development Programme, Re-Start Ukraine
Valeriy Tsiupa	International Cyber Academy
Viktoriia Udaltsova	UNDP Ukraine
Oksana Udovyk	UNDP Ukraine
Svitlana Yurchenko	Research Service of the Verkhovna Rada of Ukraine
Volodymyr Yurchenko	State Migration Service of Ukraine
Oleksii Zhmerenetskyi	IFU "Strategic Foresight of Ukraine", Verkhovna Rada of Ukraine

Parliamentarians

We are grateful to the following members of parliament from the Verkhovna Rada of Ukraine and from the Parliament of the United Kingdom for participating in one or more of the scenario building workshops.

Members of the Verkhovna Rada of Ukraine	Members of the Parliament of the United Kingdom
Solomiya Bobrovska MP Hanna Bondar MP Yehor Chernev MP Vadym Galaychuk MP Victoria Kinzburska MP Oleksandr Korniyenko MP, *First Deputy Chairman of the Verkhovna Rada* Evgeniya Kravchuk MP Anna Lychman MP Galyna Mykhailiuk MP Dmytro Mykysha MP Dmytro Naliotov MP Roksolana Pidlasa MP Viktoriya Podgorna MP, *Co-chair of the IFU "Strategic Foresight for Ukraine"* Mykyta Poturaev MP Yaroslav Zheleznyak MP Oleksii Zhmerenetskyi MP, *Co-chair of the IFU "Strategic Foresight for Ukraine"*	Harriett Baldwin MP The Rt Hon Hilary Benn MP Deidre Brock MP Bambos Charalambous MP, *Chair of the APPG for Future Generations* The Lord Bishop of Coventry (Christopher Cocksworth) Janet Daby MP Richard Foord MP The Lord (Toby) Harris of Haringey The Baroness (Arminka) Helic Dr John Howell OBE MP Christine Jardine MP The Rt Hon David Jones MP The Lord Bishop of Leeds (Nick Baines) Sir Tony Lloyd MP Caroline Lucas MP Liz Saville-Roberts MP The Rt Hon the Lord (James) Selkirk of Douglas Jeff Smith MP Alex Sobel MP The Rt Hon the Lord (Paul) Strasburger of Langridge The Baroness (Manzila Pola) Uddin Dr Philippa Whitford MP The Rt Hon Sammy Wilson MP