

Challenges to regional security and current global issues within the framework of cognitive modeling

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Abstract: In the article, the authors note that current threats, challenges, risks and related global problems, and the urgent need for the use of renewable energy sources is coming to the fore in the life of modern societies. It is highlighted that there is a necessity to treat technological progress in correlation with modern science in Russian society, and it should be noted that nowadays the current policy in the field of ensuring climate agreements is subject to legal uncertainty. The authors conduct cognitive modeling and construct a cognitive model.

Keywords: Global problems of modernity, information technologies, cognitive modeling, cyber operations.

Introduction.

At the beginning of our study, we note that long before the advent of a weapon of mass destruction and the era of sanctions, North Korea used the possibilities of a diplomatic network. The use of this network provides a convenient framework for working with illicit procurement or brokering of the goods and weapons related to a weapon of mass destruction. As Daniel Salisbury, research associate, Center for Science and Security Studies (CSSS), Department of War Studies, King's College London, notes in his work «Spies, Diplomats, and Deception: Exploring the Permanent Role of Diplomatic Missions in North Korea's WMD Proliferation and Arms Trafficking Networks» [1]: «The use of embassies and diplomatic networks for carrying out arms sales is common in the international arena. Since arms transfers by most states are state-to-state (rather than state-to-non-state), the missions provide a convenient location for managing these government-to-

government sales. The involvement of embassies in the arms trade in this regard is a form of commercial and security diplomacy. The skill of intelligence officers based in the embassies in creating clandestine networks also makes their involvement logical. The missions and those who work there will also be less likely to be sanctioned compared to well-known trading companies and brokers». Biological hazards cannot be ignored. The coronavirus pandemic, among other things, has also affected new nuclear construction projects around the world. As in other sectors, the nuclear industry has implemented new procedures aimed at limiting the spread of Covid-19 in order to keep the operations going. These include already familiar temperature control measures, face masks, hand sanitizing, travel restrictions and self-isolation. Most companies have also set up remote work where possible, and some nuclear facilities have even set up dedicated Covid-19 testing centers for employees. It must be said that in order for nuclear safety systems to remain effective, they must be regularly maintained, tested against realistic scenarios and independently assessed, while staff must be aware of the full range of potential threats and trained in how to identify safety problems and respond to them. While nuclear safety measures vary between countries and organizations, the pandemic has required significant changes to their implementation. These changes potentially complicate an organization's ability to both identify potential threats and provide assurance that its security systems are functioning properly. In this area, already existing information systems or new online tools have become more widely used. In practice, they began to use information technology to the maximum aimed at minimizing personal activities.

Problem Statement. So, the tasks associated with mitigating the challenges of regional security, minimizing the risks of the possession and use of highly enriched uranium, promoting best practices in the field of nuclear states security, climate change are becoming more and more urgent. These are the most pressing security

issues that all states are facing nowadays. In addition, cyber operations are of great significance in the modern society.

It should be admitted that the issues related to ensuring the state security are highlighted nowadays, and it is essential that the population of municipalities should act as an influential subject of political processes when making managerial decisions. In other words, the opinion of the population should be taken into account in the rules of law. However, as I. N. Titarenko said: «... in the current legislative framework, the population is not an influential subject at all, nor is it generally an influential subject of the political process or managerial decision-making» [2, p. 67].

Analyzing the current situation on a global scale, one cannot ignore cyber operations. Thus, the key tool for using information technology in the competitive struggle for security is a cyber operation, which can be defined as the use of vulnerabilities in information and communication technologies to achieve the desired results in the fight against adversaries. Initial studies suggested that cyber operations would provide independent warfare utility, enable strategic cyber-attacks, and provide offensive advantage [3].

At the present stage, however, strategic subversion promises the states to have the ability to intervene in the affairs of the enemy when diplomacy fails, and yet at less risk and cost than starting a war. Cyber subversion can provide independent strategic utility by undermining, manipulating, or destroying the institutions on which modern societies depend, weakening adversaries or influencing their foreign policy.

Purpose of the Study. So, with a fair degree of evidence, it can be argued that in the modern world, theoretical operations carried out at different levels of political life in states that provide maximum intensity and control are likely to bring significant strategic benefits, but in practice their slow pace makes them mostly useless in urgent crises and makes premature detection probable. If a high speed is

required, such operations are likely to be unable to pursue the most sensitive targets, as they require significant level of intelligence and development time, and the amount of control they have over a given target system is also limited. However, modern advances in artificial intelligence can improve control over operations. Overall, cyberattacking is another significant risk.

It is significant to consider how the states should go along the path of rethinking the way of understanding intelligence, which is aimed at coping with global problems and challenges, focusing on the exchange of global information for finding the solutions to the modern issues. It is possible to talk today about the use of «informed agitation» to solve problems in the field of sustainable development of the states in the post-COVID period. It seems that in modern social practices the most important area is public opinion, and it remains insufficiently studied and not systematized. It should be developed and further applied in practice of the relationship. In our opinion, it is worth analyzing the relationship between the changes of macropolitical conditions and political values at the individual level, realizing that the preferences for political trust are not fixed according to cultural characteristics of the population, but they can change rapidly in the conditions of insecurity.

In general, the ability to prosper now and in the future in any case in modern society requires increased attention not only to economic and social progress, but also to the preservation of the Earth's life support systems: fundamental ecological processes and natural resources. More attention needs to be paid today to the ability of the Russian state and its institutions to promote more positive scientific, technological and social trends that can help realize the promise of a carbon-free economy.

For example, Calder Walton, Associate Director of Research at the Belfer Center Intelligence Project, in the article «How Climate Change Will Affect National Security» notes that during the Ebola crisis, the US National Geospatial-

Intelligence Agency, using its satellite platforms, collected and then publicly disseminated through its website on the spread of Ebola in West Africa. This is exactly the direction in which we need to move in relation to climate change [4]. The electronic media also voiced the opinion of US Secretary of State John Kerry, who, in his keynote address, stressed that intelligence is critical to the successful conclusion of climate agreements [5].

In general, it is already undeniable that climate change has the potential to increase the threats that will lead to an innumerable number of refugees and migrants, disruption of food supplies, danger for military facilities around the world, exacerbation of territorial conflicts and creation of increasingly fragile states and societies in which extremists and terrorists can thrive.

In Russian society, technological progress should be correlated with scientific advances, and it should be also mentioned that nowadays we must take into account that the current policy in the field of ensuring climate agreements is subject to legal uncertainty. At present, it is necessary to develop standards related to the regulation of emissions and, in doing so, the risks of political and economic uncertainty should be taken into account. Innovation related to the need of shaping a decarbonizing economy should be linked to real, not potential, positive outcomes associated with emission reductions. What is undeniably happening today is the rapid warming of the Arctic, which has intensified northern wildfires and the thawing of carbon-rich permafrost. There are carbon emissions from melting permafrost and Arctic wildfires that are not fully accounted for in global emissions budgets.

And, indeed, in modern practices, it is simply necessary for states to carry out work on the development of long-term emission reduction programs throughout the economies of the countries, which should become a priority, and in turn this requires the formation of new legislation. But at the same time, making progress in combating climate change, as well as facilitating innovations and attracting

partners around the world should become priority goals for the countries of the world.

So, any tool of correcting the situation (e.g. a mechanism for adjusting the carbon frontiers or anything else), should be required only on a time-limited basis to address the inconsistency with the goals of global climate policy. Such an approach would reflect a consensus on the efforts and contributions of each State Party to address the climate crisis and would avoid the need for coercive or enforcement mechanisms. The Paris Agreement provides an ongoing opportunity to expand ambitions to reduce society's greenhouse gas emissions, which will also lead to reductions in emissions from melting permafrost. More than 70 countries are known to have announced more ambitious nationally determined contributions in December 2020 as part of their commitments under the Paris Agreement; however, the carbon budgets that contained these commitments were incomplete as they did not fully take into account feedbacks in the Arctic. There is an urgent need to incorporate the latest scientific data on carbon emissions from thawing permafrost and wildfires in the north into the international debate on how much more aggressively societal emissions need to be reduced to address the global climate crisis.

In addition to the above mentioned, we note that over the past decade the Arctic has been warmed by $0,75^{\circ}\text{C}$, well ahead of the world average, while the temperature in the Antarctic has remained relatively stable. As the Earth moves closer to 2°C warming, the Arctic and Antarctic could reach 4°C and 2°C average annual warming and 7°C and 3°C winter warming, respectively. Expected consequences of the warming in the Arctic include the loss of land and sea ice, threats to wildlife and traditional livelihoods, increased methane emissions, and extreme weather at lower latitudes. With low biodiversity, Antarctic ecosystems can be vulnerable to state changes and species invasions. Loss of land ice in both regions will greatly contribute to global sea level rise, with sea level rises of up to

3 m possible if certain thresholds are crossed. Mitigation efforts may slow or reduce warming, but without them, warming in northern high accelerate in the next two to four decades [6].

Consequently, international cooperation is considered to be a solution to the problem because there is no state which is able to solve these problems alone, and it is crucial for the world to be able to anticipate and adapt itself to the expected changes.

At the same time, the most important thing is that in the issue of political support for the problem field related to resolving issues aimed at regulating emissions, the positions of the states should be based on the use of soft power, which in turn should be understood as the ability to influence others by attracting, rather than aggressive and forced intimidation. There is no doubt that soft power is not the only or even the most important source of power, since its impact is usually slow and indirect. As J.S. Nye notes: «If a country presents the values that others find attractive, it can spare carrots and sticks» [7].

It is known that the issues related to greenhouse gas emissions and climate change in the world as a whole are the problems of great concern both domestic researchers and European ones. For example, the measures for carbon emissions reduction are being actively analyzed from the standpoint of making calculations and creating mathematical models at a higher level of accuracy aimed at defining the main vectors of land use dynamics and the potential for reducing carbon emissions over time in terms of order of magnitude impacts. It must be said that uncertainty in many of these variables is significant in these studies, which makes it difficult to accurately determine greenhouse gas emissions from land use in Europe by 2050 in the calculations. As such, an attempt is being made to prioritize climate change mitigation options accordingly.

A model has also been created to analyze global carbon footprints and land use using the web tool Global Calculator, which is available on the Internet. The model

assumes a single international scenario in the Global Calculator for the proposed models. Calculator to support UK 2050 path analysis DECC (now BEIS) has developed a 2050 energy and emissions calculator model. The calculator is an open source energy and emissions model. This allows the user to explore all the energy and high emission pathways that a country, territory or region is facing. For each possible 2050 path, the user can further explore the impact on land use, electricity, energy security, energy flows, costs, etc. The Calculator is also a tool for elevating the issue on energy in the UK [8].

Research Methods. The article proposes a cognitive model «Intelligence, information technology and global problems of modern society». The issues of analyzing social processes from the perspective of cognitive modeling are considered in the works of the authors [9, 10].

The composition and interaction of the blocks of the «Opposition» model.

«Counteracting transnational criminal organizations», «Mixed military and law enforcement structures», «New strategic and tactical doctrines», «Joint management of borders between the former Soviet republics», «Coordination with the private sector», «Development of new international legal sources», «Diplomatic structures».

Composition and interaction of blocks of the model «Biological hazards».

«The coronavirus pandemic has affected the construction of new nuclear projects», «Nuclear industry has implemented procedures to limit Covid-19», «Nuclear facilities have established Covid-19 testing centers for employees», «Nuclear safety issues and timely response to them», «New online tools to ensure nuclear safety», «Use of information technologies to minimize the personal activities of employees», «Promotion of best practices in the field of nuclear security of states».

The composition and interaction of the blocks of the «Cyber Operations» model.

«Exploiting vulnerabilities in information and communication technologies», «Ensuring of independent utility in warfare, strategic cyber attacks and offensive advantage», «Cyber disruption can provide independent strategic utility by undermining, manipulating or destroying the institutions on which modern societies depend», «Cyber disruption can weaken adversaries or affect their foreign policy», «Cyber attacks are among the most significant risks for states».

The composition and interaction of the blocks of the model «Information campaign»

«Collective intelligence for solving problems in the field of sustainable development in the post-COVID period», «Collective intelligence for solving problems in the field of sustainable development in the post-COVID period», «Public opinion», «Civil consent / disagreement», «The relationship between changes in macropolitical conditions and political values at the individual level», «Political trust preferences can change rapidly in the society of perceived insecurity», «Saving the Earth's life support systems».

Composition and interaction of blocks of the Climate Agreements model.

«Climate change has the potential to amplify threats», «Climate change will lead to untold numbers of refugees and migrants», «Climate change will disrupt food supplies», «Will endanger military installations around the world unless new international agreements are adopted», «Current Climate Agreement Policies Subject to Legal Uncertainty», «Standards Needed to Be Developed to Regulate Emissions» «Risks of Political and Economic Uncertainty», «Rapid warming in the Arctic, which has exacerbated northern wildfires and thawing of carbon-rich permafrost», «Carbon emissions from melting permafrost and arctic forest fires», «Working to develop long-term programs to reduce emissions across the entire economy of countries», «Engaging partners around the world to solve climate problems and stimulate innovation», «A mechanism for adjusting carbon frontiers», «Carrying out more aggressive policies to address the need to reduce

emissions», «Expected impacts of increased warming in the Arctic include continued loss of land and sea ice», «Loss of land ice in regions will greatly contribute to global sea level rise», «International cooperation , because no state alone can solve climate problems», «Solving climate problems using soft power, not aggression and coercive intimidation», «A model that allows you to analyze global carbon footprints and land use using the Global Calculator web tool».

We select blocks of factors in the models and show their interaction (See Fig. 2)

Block 1. «Reaction» (See Fig. 1)

P1 - countering transnational criminal organizations.

P2 - mixed military and law enforcement structures.

P3 - new strategic and tactical doctrines.

P4 - joint border management between the former Soviet republics.

P5 - coordination with the private sector.

P6 - development of new international legal sources.

P7 - diplomatic structures.

Block 2. «Biohazards» (See Fig. 3)

B1 - the coronavirus pandemic has affected the construction of new nuclear projects.

B2 - the nuclear industry has implemented procedures to limit Covid-19.

B3 – nuclear facilities have set up Covid-19 testing centers for employees.

B4 - problems of nuclear safety and timely response to them.

B5 - new online tools for nuclear safety.

B6 - the use of information technology to minimize the personal activities of employees.

B7 - promotion of best practices in the field of nuclear security of states.

Block 3. «Cyber Operations» (See Fig. 4)

K1 - exploitation of vulnerabilities in information and communication technologies.

K2 - will provide independent utility in war, allow for strategic cyber attacks and provide an offensive advantage.

K3 - cyber subversion can provide independent strategic utility by undermining, manipulating or destroying the institutions on which modern societies depend.

K4 - cyber subversion can weaken adversaries or influence their foreign policy.

K5 - cyber attacks are the most significant risks for states.

Block 4. «Information campaign» (See Fig. 5)

E1 - a collective intelligence focused on the exchange of global information to counter Covid 19.

E2 - collective intelligence for solving problems in the field of sustainable development in the post-COVID period.

E3 - public opinion.

E4 - civil consent / disagreement.

E5 - the relationship between changes in macropolitical conditions and political values at the individual level.

E6 - the preference for political trust can change rapidly in the face of perceived insecurity.

E7 – preservation of the life support systems of the Earth.

Box 5. «Climate Agreements» (Fig. 6)

S1 – climate change is a potential that amplifies threats.

S2 - climate change will lead to the emergence of an incalculable number of refugees and migrants.

S3 - climate change will disrupt food supplies.

S4 - will jeopardize military installations around the world if new international agreements are not adopted.

S5 – current policy in the field of securing agreements on climate is subject to legal uncertainty.

S6 – it is necessary to develop standards related to emission regulation.



S7 – risks of political and economic uncertainty.

S8 - rapid warming in the Arctic, which has intensified northern wildfires and thawing of carbon-rich permafrost.

S9 - carbon emissions occur as a result of permafrost melting and arctic forest fires.

S10 - work on the development of long-term programs to reduce emissions throughout the economies of countries.

S11 - engaging partners around the world to address climate challenges and stimulate innovation.

S12 is the carbon boundary correction mechanism.

S13 - the task of pursuing a more aggressive policy aimed at the need to reduce emissions.

S14 - the expected impacts of increased warming in the Arctic include continued loss of land and sea ice.

S15 - loss of land ice in the regions will greatly contribute to global sea level rise.

S16 - international cooperation, because No country alone can solve climate problems.

S17 - address climate issues with soft power, not aggression and forced intimidation.

S18 is a model that analyzes global carbon footprints and land use using the Global Calculator web tool.

It is known that a cognitive map is a weighted directed graph [11].

$$G = \langle V, E \rangle,$$

where V – point of a graph:

$$V = \{v_i\}, v \in V, i = \overline{1, k};$$

$$E – \text{graph arcs:} \quad (1)$$

$$E = \{e_i\}, e \in E, i = \overline{1, k}.$$

In fig. 1, 3-6, solid lines and the symbol «+1.00» indicate a positive relationship between the vertices V_i and V_j , that is, an increase (decrease) in the influence of the vertex V_i causes an increase (decrease) in the vertex V_j , the lines and the symbol «-1.00» mean a negative relationship between V_i and V_j , that is, an increase (decrease) in the influence of the point V_i causes a decrease (increase) in the point V_j [11, 12].

Findings.

«Intelligence, information technology and global problems of modern society»

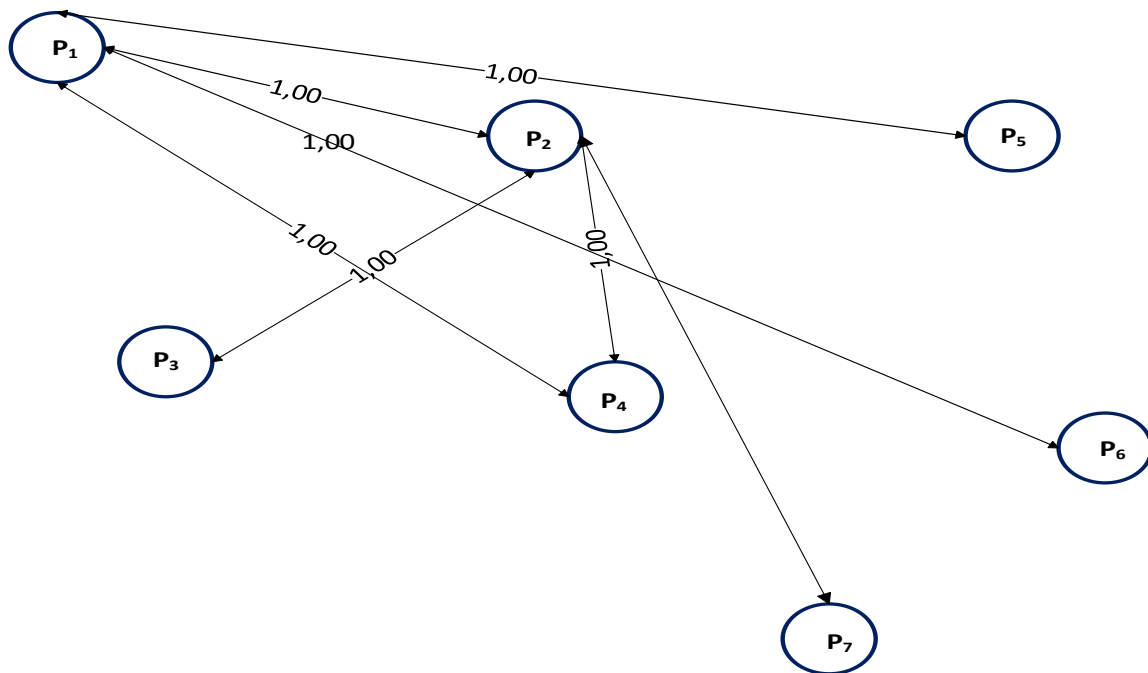


Fig 1. – Block 1. «Countermeasure»

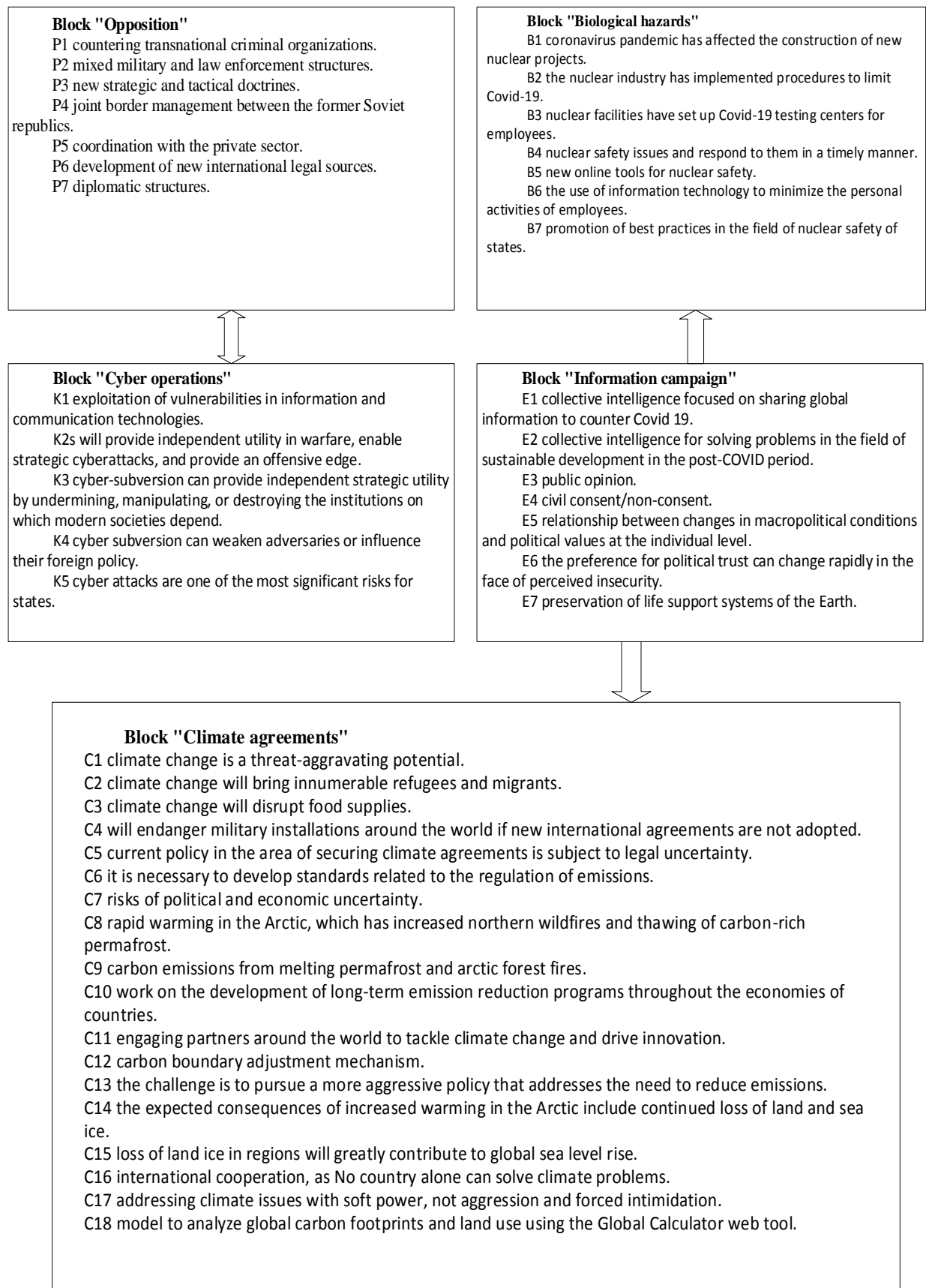


Fig. 2. – The composition and interaction of the blocks in the model

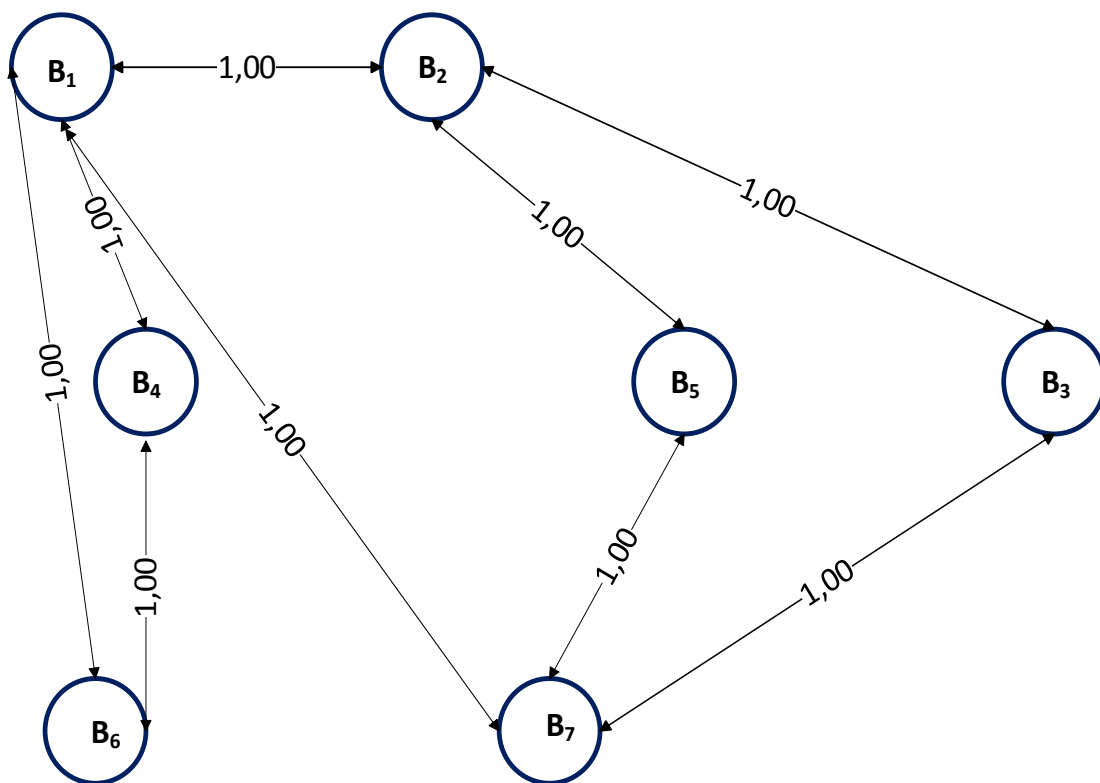


Fig. 3. – Block 2. «Biological hazards»

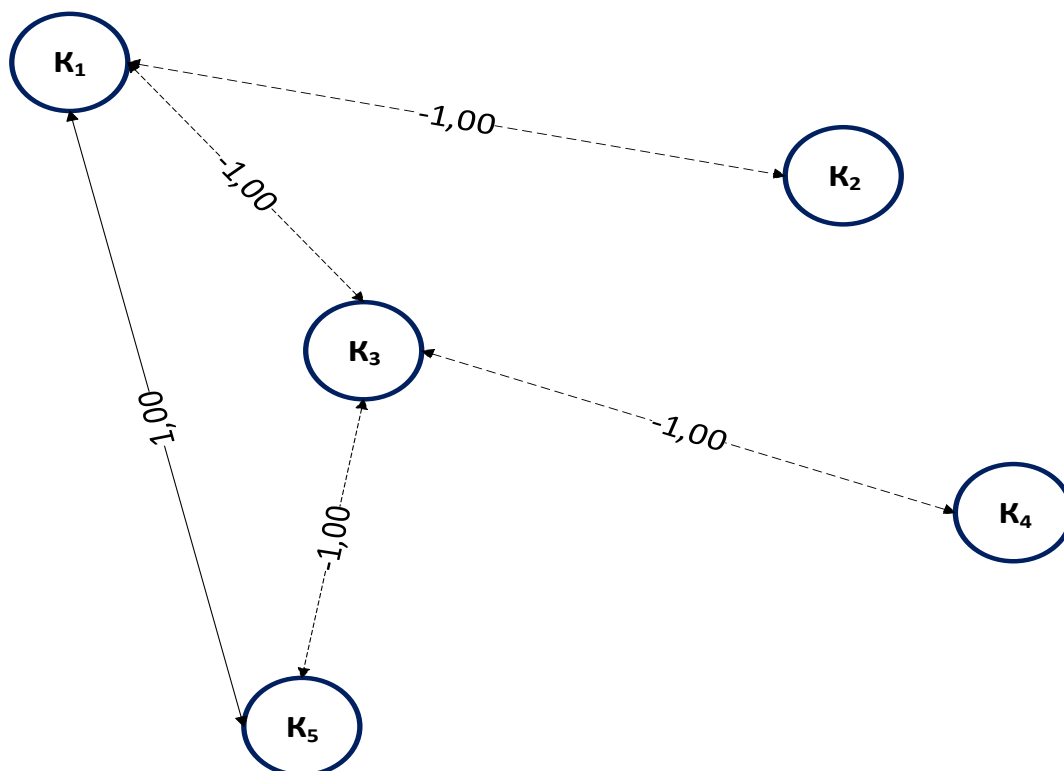


Fig. 4. – Block 3. “Cyber operations”

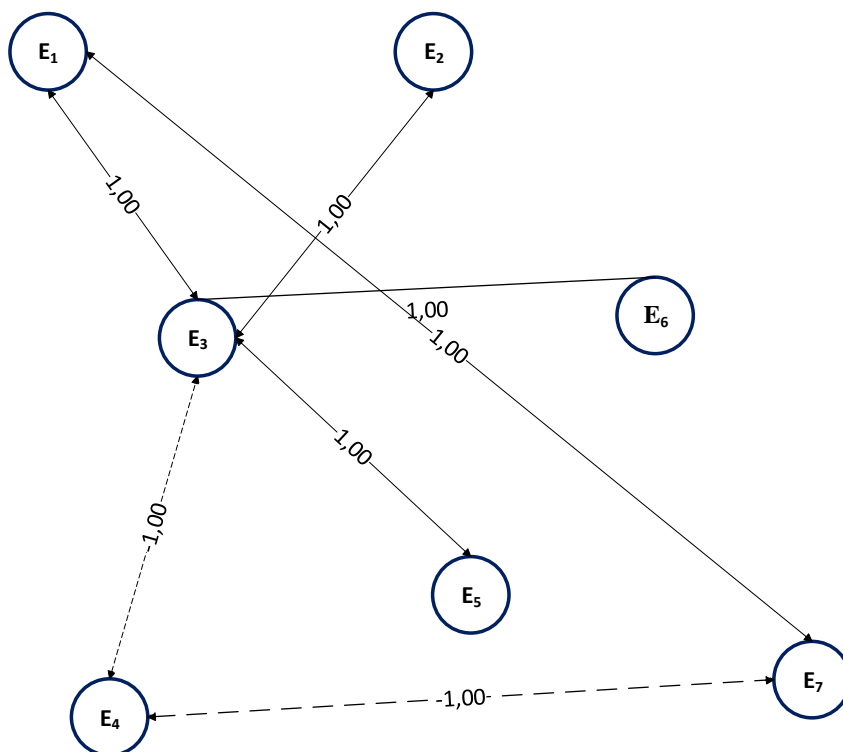


Fig. 5. – Block 4. «Information campaign»

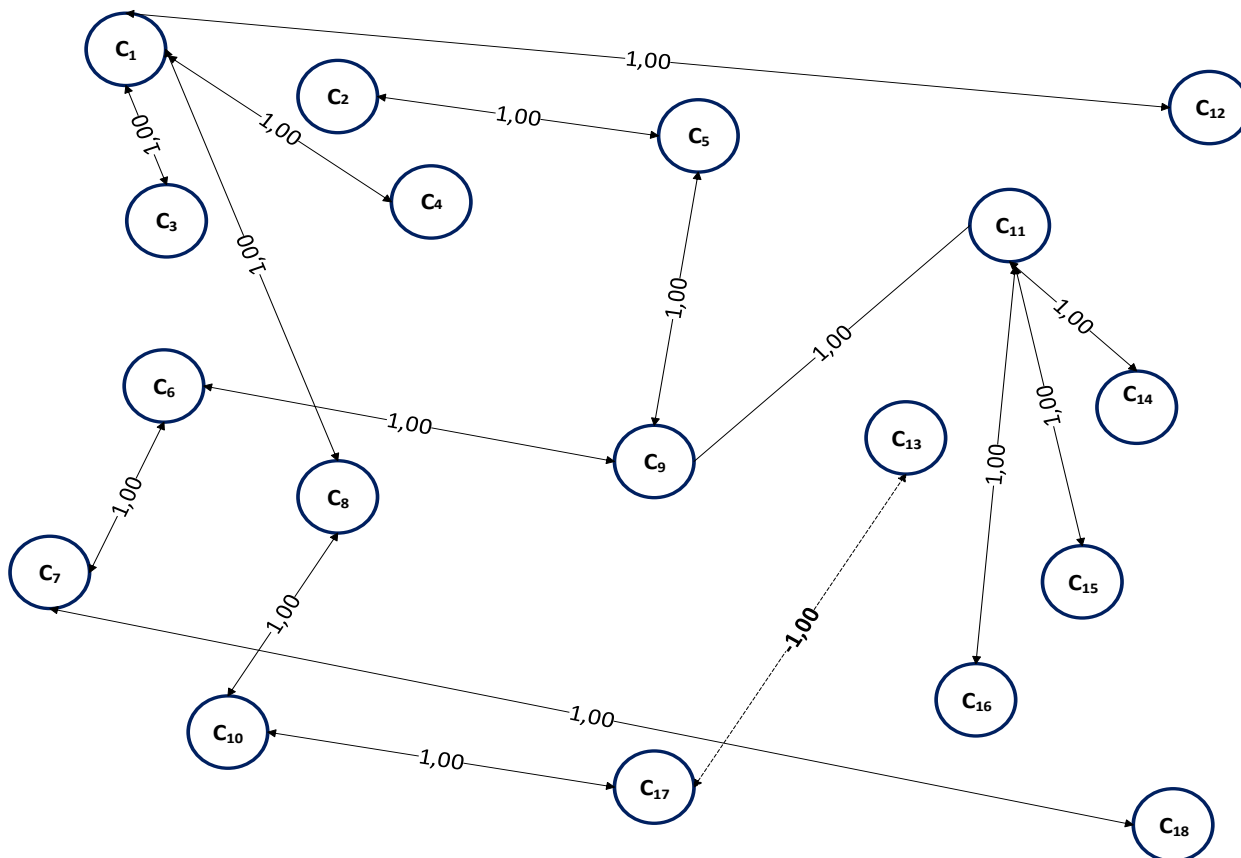


Fig. 6. – Block 5. «Climate agreements»

Conclusion.

When constructing cognitive maps, we identified the following relationships that mutually influence each other and have positive and negative relationships: P1, P5+P1, P2+P1, P6+P1, P4+P2, P3+P2, P4; B1, B2+B1, B4+B1, B6+B4, B6+B1, B7+B2, B5+B5, B7+B2, B3+B3, B7; K1, K5-K1, K3, K1, K2-K3, K4-K3, K5; E1, E3+E1, E7+E3, E5+E2, E3-E3, E4-E4, E7; C1, C3+C1, C4+C1, C8+C1, C12+C2, C5+C5, C9+C6, C9+C6, C7+C8, C10+C10, C17+C13, C17+C7, C18+C9, C11+C11, C14+C11, C15+C11, C16.

So, we can make an intermediate conclusion that in the course of cognitive modeling and identifying relationships, it is clear that individual elements of the constructed maps have an impact on a number of other elements of the maps. So, for example, this is the connection of elements in block 5 (Fig. 6) “Climate Agreements” - climate change is a threat-enhancing potential, it affects the elements: climate change will disrupt food supplies and jeopardize military installations around the world, if new international agreements and a mechanism for adjusting carbon boundaries are not adopted, etc.

Thus, the points of view and opinions of researchers analyzed above and the issues related to the multilateral security of civilians suggest that some of their elements, or rather strategies and tactical maneuvers are based on the use of coercive tools in modern society. However, pressure and violence are always unequivocally negatively perceived by the states, although it should be recognized that their use is sometimes expedient.

Russia's position in relation to a huge range of transboundary risks and threats, climate problems is based on the need to counter them by uniting on a generally recognized international legal basis and on mutual respect for political partners on the world stage.



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