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DAUGAVPILS UNIVERSITĀTES 66. STARPTAUTISKĀS ZINĀTNISKĀS KONFERENCES RAKSTU KRĀJUMS

PROCEEDINGS OF THE 66th INTERNATIONAL SCIENTIFIC CONFERENCE OF DAUGAVPILS UNIVERSITY

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Daugavpils Universitātē docētāju un studējošo zinātniskās konferences notiek kopš 1958. gada. Konferencēm ir starpdisciplinārs raksturs un tajās piedalās gan studējošie, gan docētāji, gan arī zinātnieki no dažādām pasaules valstīm. Daugavpils Universitātes 66. starptautiskās zinātniskās konferences pētījumu tematika bija ļoti plaša – dabas, veselības aprūpes, humanitāro un mākslas un sociālo zinātņu jomās.

Zinātnisko rakstu krājumā ***Daugavpils Universitātes 66. starptautiskās zinātniskās konferences rakstu krājums = Proceedings of the 66th International Scientific Conference of Daugavpils University*** apkopoti 2024. gada 18.–19. aprīlī konferencē prezentētie materiāli.

The annual scientific conferences at Daugavpils University have been organized since 1958. The themes of research presented at the conferences cover all spheres of life. Due to the facts that the conference was of interdisciplinary character and that its participants were students and outstanding scientists from different countries, the subjects of scientific investigations were very varied – in the domains of natural sciences, health care science, the humanities and art, and social sciences.

The results of scientific investigations presented during the conference are collected in the collection of scientific articles ***Proceedings of the 66th International Scientific Conference of Daugavpils University.***

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EKONOMIKA UN MENEDŽMENTS / ECONOMICS AND MANAGEMENT

POSITIONALITY IN THE EUROPEAN RESEARCH AREA THROUGH LEARNING SPACES OFFERED BY PROJECTS

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Abstract

POSITIONALITY IN THE EUROPEAN RESEARCH AREA THROUGH LEARNING SPACES OFFERED BY PROJECTS

Key Words: *practice theory, European Research Area, European Southern Neighbourhood, EU Framework Programmes, EU external action*

The European Research Area (ERA) is one of the most versatile supranational, post-Westphalian, and external action support frameworks of the European Union (EU). This article aims to concisely highlight the ERA's importance and ERA's multifaceted functionality as a Bourdieusian framework field with a notable role in sustaining the European project in its contemporary shape and integrationist characteristics. The current stage of the ERA evolution informs about multiple dimensions of the European project itself and its prospects. Next to many emblematic European higher education and research establishments and collaborative initiatives, projects funded by the EU Framework Programmes enable socialisation, mutual learning, and joint action that translate the EU main goals and aspirations into tangible steps across the EU and worldwide. This manuscript articulates various forms of academic liaison, capacity-building offers, and societal engagement within the broader context of the sustained European dynamism marked by the 20th anniversary of the Big Bang enlargement, the 2023 enlargement package, and its implication on the future transformation of the European Neighbourhood Policy, as well as the evolution of the EU high-level and diplomatic representation in the world. Despite various claims made about the ownership of the 21st century across the world, for Europe, these are the decades of profound evolution, growth, and solidification as a capable peace project.

Kopsavilkums

Atslēgvārdi: *prakses teorija, Eiropas Pētniecības telpa, Eiropas Dienvidu kaimiņattiecības, ES Ietvarprogrammas, ES ārējā darbība*

Eiropas Pētniecības telpa (EPT) ir viens no Eiropas Savienības (ES) visdaudzpusīgākajiem, post-Vestfālenes un ārējās darbības atbalsta ietvariem. Šis raksts kodolīgi iepazīstina ar EPT nozīmīgumu un EPT daudzpusīgo funkcionalitāti tā Burdjē ietvarlauka izpausmē. EPT ir vērā ņemama loma Eiropas projekta uzturēšanā, proti šī projekta mūsdienu aprisēs un integrācijas raksturlielumos. Pašreizējais EPT evolūcijas posms lielā mērā norāda uz paša Eiropas projekta daudzām dimensijām un to potenciālu. Paralēli vairākām atpazīstamām Eiropas augstākās izglītības un pētniecības iestādēm un sadarbības iniciatīvām, ES Ietvarprogrammu finansēti projekti veicina socializāciju, abpusēju mācīšanos un kopīgas rīcības, kas pārveido ES galvenos mērķus un centienus konkrētās rīcībās ES un pasaulē. Manuskripts piedāvā plašāku kontekstu dažādām akadēmisko sakaru, kapacitātes veicināšanas un sabiedriskās iesaistes formām, tās aplūkojot Eiropas dinamiskās attīstības kontekstā, proti saistībā ar lielās paplašināšanās 20. gadadienu, 2023. gada paplašināšanās pakotni un tās ietekmi uz turpmāko Eiropas kaimiņattiecību politikas pārveidošanos, kā arī ES augsta līmeņa un diplomātiskās pārstāvniecības attīstību. Neskatoties uz dažādiem apgalvojumiem par 21. gadsimta vadības grožu uzņemšanos daudzviet pasaulē, Eiropai tās ir dziļas pārveidošanās, izaugsmes desmitgades ar nostiprināšanos kā spējīgam miera projektam.

Introduction

It is high time to revisit the vast scope of the European Union's (EU) instruments and strategic frameworks to update the overall understanding of the wealth of routinely exercised expertise that supports EU external action and EU diplomacy. The aim of this article is to stress the important role of

the European Research Area (ERA), its versatility as a (Bourdieu-inspired) framework field for advancing the European project with a pronounced international dimension tied to its integrative aspirations of an 'ever closer union'. By building upon the conclusions drawn from the European Southern Neighbourhood (ESN) context and a broader set of recent EU geopolitical milestones, this article outlines the continued projection of integrationist logic beyond the Union's borders. This manuscript builds on the earlier developed findings concerning the weaving of several ESN countries into the ERA through time-bound, performance-based, research-intense, and result-oriented activities often involving more than one beneficiary and project consortium members from across the world (Šime 2021, 2023a, 2023b, 2024).

The ERA allows an individual or institution to actively contribute to the projection of European ideals and post-Westphalian objectives. This mode of agent's operation in the field is more advanced than a mere restraint to a sufficient level of participation in the pre-planned project activities. The enthusiasm and corresponding actions of project implementers are outstanding resources for the EU. The devotion of project implementers to make the most of all project cycle stages translates a considerably long list of lofty supranational goals into tangible, time-bound actions and results on the ground across the globe. This ERA evolution has far-reaching implications. ERA is one of the crucial enablers of the projection of the EU across the globe. ERA captures the Union's openness to those partners in various parts of the world who share its values and modes of cooperation.

To contextualise in a broader perspective, in parallel with the ERA evolves the European Higher Education Area with its latest invention captured by the European University alliances (EUAs). The aim to build innovation based on a centuries'-old European tradition is captured by the name of one of these alliances. EUTOPIA is named after the book authored by Sir Thomas More. EUTOPIA represents an attempt "to revive the Renaissance through adherence to the core values of creativity, curiosity, and openness" (Piaget 2024). Like several other outstanding EUAs, EUTOPIA assembles six partners from the other continents, including the International University of Rabat located in the ESN and Africa.

To stress this considerable and widespread propensity, the College of Europe positions itself as the "laboratory of European Renaissance" (College of Europe n.d.: 1). The College's campuses host students from more than 55 countries, including a substantial number of individuals from the ESN (College of Europe n.d.: 7). Echoing the historical pattern elaborated by Burke, Clossey & Fernández-Armesto (2017), these reoccurring references among EU-funded advanced higher education initiatives to a new epoch of rebirth retain a strong global dimension. And this is the starting point for the next section on the contemporary world-wide resonance of the European project and why EU-funded projects anchored in

the ERA are so important to the supranational governance architecture and post-Westphalian ambition of the Union.

Discussion

Referring to the remarks by Chave-Dartoen (2023) on the historical and otherwise characterised positionality of an academic and Mury's (2023: 18-19) notes on science as a social process with various opinions on scholarly inventions, the drafting of this article is inseparable from the broader context of the European integration project. The steady evolution of the unity and international stance of the EU entails prominent supranational components and a post-Westphalian sentiment. This development occurs in parallel with the growing ambition of other parts of the world to make their footprint in the international geopolitical landscape. Those aspirations and ambitions to clear space for own growth and influence projection via various hard and soft, tangible and intangible means are captured by the proclamations of the 21st century to be the 'African Century' (Shaw, Kiguru & Munyi 2024: 408) and the 'Asian Century' (Jash 2023; Petersmann 2023). The rise in population and growth of certain economies on these two continents and their international outreach through bilateral, multilateral frameworks, regional, and international institutions remain noteworthy. However, the claims of the African and Asian centuries might be too overtaken by inward thinking that, to a formidable extent, discards the unparalleled and steady progress made by Europe throughout a substantial number of decades.

This article represents the certainty that the 'European Century' did not occur a couple of centuries ago. Irrespective of how one looks at and where exactly identifies the previous centenaries of the European international leadership, the 21st century is and should remain a 'European Century'. But this one is a 'European Century' with distinctively new traits and a truly *sui generis* forward-looking spirit. The present-day 'European Century' has little to do with a backward driven nostalgia for the past elements of glory, such as the contested colonial inheritance (referred to by Kottos 2014; Falchetti 2022: 13-14 among others). As already shown by the EUTOPIA and College of Europe examples, it is a novaturient type of European prominence that deserves a closer look. The solidifying EU international stance and geopolitical weight are founded on a remarkably long list of achievements. However, some of the major recent milestones are worthy of mention to make the argument of the on-going 'European Century' less obscure.

Firstly, the unwavering transformative capacity and success of the EU are celebrated in 2024 with the 20th anniversary of the 'Big Bang' enlargement. This anniversary refers to a major expansion of the area of enduring peace, unity among states for a greater good that surpasses many short-lived national

interests, solidarity across plural societies, and sustainable prosperity founded on a free movement of ideas, talent, quality goods, and services (Anghel & Jones 2024).

Secondly, the political commitment captured by the 2023 Enlargement Package of country-specific paths to EU accession for ten states represents this unwavering support for and long-term commitment to further expansion of this highly integrated zone and the decision-making capacities that it offers to its member states. Noteworthy, this Package depicts the commitment to welcome several states of the European Eastern Neighbourhood into the Union. It demonstrates one more evolutionary aspect and dynamism of the European Neighbourhood Policy (Allin & Jones 2022: 217-218). The envisaged EU enlargement will inevitably result in a major evolution of the European Neighbourhood Policy framework and its coverage of specific countries. The European Neighbourhood Policy is not a static framework of tailored engagement with specific nearby countries. That is why, besides many other considerations, this framework remains a compelling empirical ground for differentiation studies. Recent studies examine the most advanced forms of positive external differentiation to project the EU order and integration spaces for the co-creation of public goods. Sectorial policies, besides the so far regularly examined defence (for example, Houdé & Wessel 2022) and diplomacy (for example, Haugevik 2023), deserve more attention.

Thirdly, in parallel to the continuous geographical expansion, the EU has consolidated its political weight and standing in many regional and multilateral forums across the world through the introduction and evolution of its own diplomatic service (Murray & Lamonica 2021: 14). This institutional invention is combined with reinvigorated efforts towards more internally coordinated and more supranationally-minded outreach to various parts of the world and tailored capacity-building beyond its borders (Krüger & Steingass 2019: 434-439). Moreover, the EU exerts its "contagion effect" through diverse networks and by regularly granting access to countries across the world (on specific pre-conditions and for defined time frames) to these networks (Ansell, Sørensen & Torfing 2022: 7; Winand 2014: 381). Thereby, EU partners around the globe gain a wealth of insights concerning some of the sectorial unified spaces of European integration and pooled resources, such as the ERA (De Lombaerde 2024: 12).

A lot of the hard, meticulous, and routine work that underpins these three examples of major achievements rarely reaches the headlines. It is diligent implementation and constant re-articulation of the newness of the European project that is taken for granted, not always ornated with the public limelight (Valenza & Oddone 2024: 292). One of the most telling reminders of the urgency to recommit to an ambitious European mindset and aim for an even higher level or next generation state-of-the-art democratically grounded supranationalism and post-Westphalian approach was expressed by France's

President Emanuel Macron during his second Sorbonne speech. He mentioned that Europe is mortal (Le Grand Continent 2024). The death of Europe is not unthinkable. Keeping the development of the ERA in mind, Europe is an intellectual construct and a mindset that needs forward-looking and excellence-guided evolutionary thinking, not simply static, routine repetition of pre-planned errands. Thus, the first quarter of the 21st century as a 'European Century' should be a springboard for furthering the European international ambition to even greater heights in the upcoming quarters. Otherwise, any lack of courage to level up to a higher commitment to the EU goals and international stance might run the risk of echoing the concern captured by the emblematic warning that Europe can die. Europe requires a sustained commitment and courage to, using the words of President von der Leyen, "make the impossible possible" (DG NEAR 2023). Nothing less daring will do. Europe exists, and Europe is maintained based on boldness.

The EU stands for an unparalleled type of governance and international engagement model. Its potential death penalty lies in the risk of backsliding among its constituents to old ways of realist-minded national competitive interaction patterns and nostalgia for applying old solutions to the present or emerging row of unprecedently connected rows of wicked problems. Any analytical complacency and a lack of inventiveness to develop more advanced forms of European instruments and intervention logics tied to the ERA and other strategic frameworks drive the European project closer to the probability of its death.

To take one emblematic example with a centuries-old success track record, the Flanders-based KU Leuven (*Katholieke Universiteit Leuven*) will celebrate its 600th anniversary in 2025. KU Leuven sustains its stable position as one of the 50 leading universities in the world, not because it restricts itself to saluting its inception point and its initial administrative set-up as *Studium Generale Lovaniense* (Mayer 2018: 188). The mere fact that it is one of the oldest universities in Europe is far from its major achievement. Tradition combined with novelty and the pursuit of excellence across multiple academic disciplines is what distinguishes KU Leuven as an internationally remarkable establishment of higher education and science. Needless to say, it is constantly involved in major EU-designed strategic frameworks and initiatives for higher education, science, and innovation.

One source of optimism about the EU's ability to not simply maintain but also develop the ERA is the evolution of the European Strategy Forum on Research Infrastructures (ESFRI) (Schneegans & Soete 2024: 331). For example, European users dominate the overall user base of listed facilities (ESFRI 2024: 10). Nevertheless, the sum of international and European users surpasses the local and national engagements in the respective facilities (ESFRI 2024: 10). This attests to the ESFRI being able to hone

the EU and global importance of its listed facilities (ESFRI 2024: 10). This is an important nuance when recalling the earlier mentioned role of the EU as a major capacity-building partner across the world to sustain and update the minimal knowledge base and advanced analytical function among crucial staff of contemporary knowledge-intensive sectors.

Conclusions

In the past (for example, documented by Barron 1999: 27; Graebner 2014: 188; Long 2023), eminent universities established branches across the world to promote the accessibility of advanced learning opportunities. In comparison, contemporary EU-funded consortiums are dynamic intellectual and collaborative springboards with purpose-centric and time-constrained partnerships designed for the exact pressing challenge. This comparison is meant to elucidate the means that support the constantly evolving EU supranational governance frameworks and how those tap into the older European traditions of the academic sector to mobilise nimble expert inputs to tackle the most urgent contemporary societal challenges across the world, such as those external vulnerabilities spilling into the Union through the ESN (Bellou 2020: 34). Such frameworks as the ERA offer diverse expert configurations. These engagement opportunities allow interested researchers and academic administrators to improve their centrality and overall international position among relevant peer circles.

Amidst the international ambition proclaimed by thought leaders in several parts of the world who call the 21st century their own, the importance and weight captured by the claim in this article to the 'European Century' retain its global weight and contemporary magnitude. The European project has proven its dynamism and readiness to adapt to evolving contemporary realities. A truly 'European Century' demands to take the achievements of the first quarter of this century as the starting point of a greater leap, not as bygone heyday clouded by some present dawn. As it is argued in this very concise recap of some of the recent EU achievements in advanced higher education and research, the EU has the tools and continuous will to make the most of them. The EU-funded strategic initiatives uphold its high aspirations internationally and make its expertise and know-how appraised and accessible worldwide.

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SECURITY MANAGEMENT DURING THE MIGRATION CRISIS ON THE POLISH-BELARUSIAN BORDER

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Abstract

Security management during the migration crisis on the polish-belarusian border

Key Words: Belarus, security, border, crisis, migration

The migration crisis on the Polish-Belarusian border was caused by the regime of A Lukashenko and is related to the presidential elections in Belarus Repression and persecution were applied to the opposition, independent media and civil society In response, the EU imposed further sanctions and restrictions and did not recognize the presidency of A Lukashenko, who, in order to force the EU to lift sanctions and change its decision, implemented the operation prepared in 2010-2011 ", Since August 2021, with the support of the Belarusian government apparatus and the participation of uniformed services, thousands of Middle Eastern migrants have been trying to cross the Polish-Belarusian border and enter Polish territory in violation of the law The migration crisis organized by Belarus is intended to lead to internal destabilization, weaken Polish's position and introduce divisions in the EU. The aim of the study is to analyse security management during the migration crisis on the Polish-Belarusian border. In particular, the study focuses on understanding how Poland has responded to the threat posed by the organised migration action and what crisis management and border security mechanisms have been put in place to ensure national security and territorial integrity in the face of this destabilising situation. An important aspect of the study is also the analysis of the effects of this crisis on Polish's relations with the European Union and neighboring countries. The research problem was formulated: How did the Polish state manage the migration crisis on the Polish-Belarusian border, which was the result of the deliberate policy of Alexander Lukashenko's regime aimed at internal destabilization of Polish and exerting pressure on the European Union. The main questions that the study tries to answer are: What actions in the field of security management have been taken by Poland? What were the effects of these actions in the context of border protection and foreign policy? What challenges and problems did the Polish services encounter during the crisis?

Accordingly, a research hypothesis was put forward, which assumes that Poland, using multi-level crisis management mechanisms and international cooperation, has managed to effectively stop the influx of illegal migrants organized by the Belarusian regime, thus protecting its borders and counteracting internal destabilization. Despite this, the crisis has caused long-term tensions in Polish-Belarusian relations and within the European Union. Research methods such as systems analysis, which allowed to understand how different elements of the crisis management system (national, international, local) interacted with each other to solve the migration crisis, and a comparative method, which made it possible to compare Polish's actions with those of other countries that have experienced similar migration crises, which will allow to assess the effectiveness of the crisis management strategies used.

Kopsavilkums

Drošības vadība migrācijas krīzes laikā uz Polijas un Baltkrievijas robežas

Atslēgvārdi: Baltkrievija, drošība, robeža, krīze, migrācija

Migrācijas krīzi uz Polijas un Baltkrievijas robežas izraisīja Lukašenko režīms, un tā ir saistīta ar Baltkrievijas prezidenta vēlēšanām. Pret opozīciju, neatkarīgiem plašsaziņas līdzekļiem un pilsonisko sabiedrību tika veiktas turpmākas sankcijas un ierobežojumi un neatzina A. Lukašenko prezidentūru, kas, lai piespiestu ES atcelt sankcijas un mainīt savu lēmumu, īstenoja 2010.–2011. gadā sagatavoto operāciju "Lock" Kopš 2021. gada augusta tūkstošiem Tuvo Austrumu migrantu, ar Baltkrievijas valdības atbalsts un uniformēto dienestu virsnieku līdzdalība, ir mēģinājuši šķērsot robežu, kas ir pretrunā ar Polijas un Baltkrievijas robežu un iekļūt Polijas teritorijā noved pie iekšējas destabilizācijas, vājina Polijas pozīcijas un ievieš šķelšanos ES. Pētījuma mērķis ir analizēt drošības pārvaldību migrācijas krīzes laikā uz Polijas un Baltkrievijas robežas. Jo īpaši pētījums ir vērsts uz to, lai saprastu, kā Polija ir reaģējusi uz draudiem, ko rada organizētās migrācijas darbība, un kādi krīzes pārvarēšanas un robežu drošības mehānismi ir ieviesti, lai nodrošinātu valsts drošību un teritoriālo integritāti, saskaroties ar šo destabilizējošo situāciju. Svarīgs pētījuma aspekts ir arī analīze par šīs krīzes ietekmi uz Polijas attiecībām ar Eiropas Savienību un kaimiņvalstīm. Pētījuma problēma tika formulēta: Kā Polijas valsts tika galā ar migrācijas krīzi uz Polijas un Baltkrievijas robežas, kas bija Aleksandra Lukašenko režīma apzinātās politikas rezultāts, kuras mērķis bija Polijas iekšējā destabilizācija un spiediena izdarīšana uz Eiropas Savienību. Galvenie jautājumi, uz kuriem pētījums mēģina atbildēt,

ir šādi: Kādus pasākumus drošības pārvaldības jomā ir veikusi Polija? Kādas bija šo darbību sekas robežu aizsardzības un ārpolitikas kontekstā? Ar kādiem izaicinājumiem un problēmām Polijas dienesti saskārās krīzes laikā? Attiecīgi tika izvirzīta pētījuma hipotēze, kas paredz, ka Polijai, izmantojot daudzlīmeņu krīzes vadības mehānismu un starptautisko sadarbību, ir izdevies efektīvi apturēt Baltkrievijas režīma organizēto nelegālo migrantu pieplūdumu, tādējādi aizsargājot savas robežas un neitralizējot iekšējo destabilizāciju. Neraugoties uz to, krīze ir radījusi ilgtermiņa spriedzi Polijas un Baltkrievijas attiecībās un Eiropas Savienībā. Pētniecības metodes, piemēram, sistēmu analīze, kas ļāva saprast, kā dažādi krīzes vadības sistēmas elementi (nacionālie, starptautiskie, vietējie) savstarpēji mijiedarbojās, lai atrisinātu migrācijas krīzi, un salīdzinošā metode, kas ļāva salīdzināt Polijas rīcību ar citu valstu rīcību, kuras ir piedzīvojušas līdzīgas migrācijas krīzes, kas ļaus novērtēt izmantoto krīzes pārvarēšanas stratēģiju efektivitāti.

Introduction

From the point of view of Polish interests, the collapse of the USSR shaped a favorable geopolitical system, as a result of which a buffer consisting of independent states of Ukraine and Belarus was created, separating Poland from Russia (Mironowicz 2011: 37). Common history, cultural proximity and the lack of historical disputes could have influenced the dynamic development of cooperation (Czachor 2011:133) between Poland and Belarus, which in the case of Russia and Ukraine was difficult due to tragic historical events that cast a shadow in common relations. The official establishment of diplomatic relations between Poland and Belarus was inaugurated on 2 March 1992 with the signing of the Declaration on Good Neighbourliness, Mutual Understanding and Cooperation (Declaration: 1991), followed by the Treaty on Good Neighbourliness and Friendly Cooperation (Treaty: 1992) on 23 June 1992, which was the first Polish-Belarusian document regulating interstate relations.

Starting from 1993, the planned enlargement of NATO to the east became increasingly important. The strategic goal of Polish foreign policy was membership in NATO (Fedorowicz 2011:290) and to prevent the revival of Russia's imperial policy towards this part of Europe. On the other hand, for Belarus, the fight against the expanding North Atlantic Treaty, the destabilization of European security and the extension of U.S. influence on the countries of Central and Eastern Europe have become one of the priorities of domestic and foreign policy (Fedorowicz 2009:67). The Belarusian side openly pointed out that in its concept of Eastern policy, Poland treated their country as a buffer territory to protect Warsaw from Russia (Fedorowicz 2012:80).

The migration crisis on the Polish-Belarusian border, which began in August 2021, is one of the most complex security challenges Poland has had to face in recent years. This situation was triggered by the deliberate actions of the regime of Alexander Lukashenko, which, in response to the sanctions imposed by the European Union after the rigged presidential elections in 2020 and the repression of the Belarusian opposition, organized a migration operation aimed at destabilizing Poland and putting pressure on the EU. This regime, with the support of the Belarusian state apparatus and uniformed services, brought thousands of migrants from Middle Eastern countries, whom it then tried to divert to the territory of Poland and other EU member states in an illegal manner.

The aim of this operation was not only to cause a humanitarian crisis and internal destabilization, but also to weaken Polish's position in the region and to introduce divisions in the European Union. The migration crisis organised by Belarus was a new form of hybrid threat, which combined elements of information warfare, political pressure and social destabilisation. In response, Poland has implemented a number of measures in the field of crisis management and border security, including the construction of a barrier on the border, strengthening the Border Guard and military forces, as well as active cooperation with international partners.

This study aims to analyse the security management during this crisis and to assess the effectiveness of the measures taken. The challenges that Poland has had to face and the impact of the crisis on international relations, especially with the European Union and Belarus, will also be analysed. The crisis on the Polish-Belarusian border is an example of the modern threats faced by states in the face of hybrid actions of hostile regimes, which makes the analysis of this situation particularly important for future crisis management strategies in Poland and Europe.

Methodology

The research methodology on security management during the migration crisis on the Polish-Belarusian border is based on a combination of both qualitative and quantitative methods. This approach will provide a comprehensive understanding of security management strategies and their effectiveness during the migration crisis.

In particular, the study focuses on understanding how Poland has responded to the threat posed by the organised migration action and what crisis management and border security mechanisms have been put in place to ensure national security and territorial integrity in the face of this destabilising situation. An important aspect of the study is also the analysis of the effects of this crisis on Polish's relations with the European Union and neighboring countries. The research problem was formulated: How did the Polish state manage the migration crisis on the Polish-Belarusian border, which was the result of the deliberate policy of Alexander Lukashenko's regime aimed at internal destabilization of Polish and exerting pressure on the European Union. The main questions that the study tries to answer are: What actions in the field of security management have been taken by Poland? What were the effects of these actions in the context of border protection and foreign policy? What challenges and problems did the Polish services encounter during the crisis?

Data collection methods included reviewing government reports, documents and official statements on border security measures, examining news articles, press releases and social media posts to understand public discourse and media coverage of the crisis and security measures. In the article, the

authors used appropriate research methods. Theoretical methods are: inference, comparison, analysis, synthesis, deduction and abstraction. The analysis and synthesis were used as methods to determine, on the basis of the literature on the subject, terms relating to the issues of security, hybrid threats and crisis management. Inference, abstraction, comparison and deduction were used to draw conclusions based on theoretical findings.

Research methods such as systems analysis, which allowed to understand how different elements of the crisis management system (national, international, local) interacted with each other to solve the migration crisis, and a comparative method, which made it possible to compare Polish's actions with those of other countries that have experienced similar migration crises, which will allow to assess the effectiveness of the crisis management strategies used.

Discussion

During the migration crisis on the Polish-Belarusian border, security management becomes extremely important. This requires a comprehensive approach, taking into account both national security aspects and the humanitarian needs of migrants. There is a need for international cooperation to manage the situation effectively.

It is also important to balance border control activities with respect for human rights and humanitarian obligations. The priority is to ensure the security of citizens, especially those living in border areas, and to protect migrants from exploitation by criminal groups.

At the same time, it is important to keep in mind the humanitarian aspect of the migration crisis and to provide adequate assistance and support to people in vulnerable situations. International support and cooperation with NGOs can be crucial in providing the necessary humanitarian resources and services. Ultimately, effective management of the migration crisis requires the interaction of various agencies and actors to ensure the safety of all parties involved.

Political situation in Belarus

The evolution of the political system of Belarus towards the authoritarian rule of the in cumbent President A. Lukashenko, the deepening integration projects within the Union of Belarus and Russia (Fedorowicz 2020: 10), began to be perceived by Putin as a tool for maintaining Belarus's dependence on Russia (Kochan 2020: 51), guaranteeing its stability on four basic levels:

- economic, providing access to cheap energy resources, with the possibility of paying for them on the basis of barter and access to a large, undemanding market;
- political, supporting the regime's actions aimed at strengthening Lukashenka's power, recognising the results of all elections, not taking action to support the opposition, not

supporting any of Lukashenka's opponents, and not making any attempts to create a party loyal to the Kremlin;

- security, through the maintenance of military bases on the territory of Belarus, close cooperation between the arms industry, the deepening joint military alliance, the organisation of joint military manoeuvres and the creation of a joint anti-aircraft system;

- international, defending on forums the inalienable right of the Belarusian government to shape internal relations according to their will, arguing that this is interference in the internal affairs of another state (Koczan 2020: 54).

Belarus is thus in a system of a closed authoritarian regime, and by implementing the solutions suggested by Russia, they place it in the group of hardline authoritarianism. Authoritarian systems have an undemocratic character of exercising power, they are formed after a period of political instability, they are the result of disappointment with the rivalry of political elites after failed social revolts, taking advantage of the apathy of citizens. A political leader is one who is able to get his followers to act voluntarily with the will of the leader. A. Lukashenko is in power, but the fact that he is a leader is determined not only by his exercise of power, but also by the voluntary support provided to him by his supporters and supporters (Kakarenko 2018).

The authors of the article believe that the autocratic methods of conducting presidential campaigns manifested in the intimidation of opponents and civil society, the creation of administrative and legal tools restricting the freedom of action of citizens, the arbitrary manner of their application, the actions of the security services, the control of state propaganda, the restriction of civil liberties and freedom of speech brought Lukashenko uninterrupted rule since 1994 and victories in the presidential elections (Sadowski 2007:3). The dictatorial ruling camp constantly pursued a policy of repression against the opposition, non-governmental organizations and free media. He maintained complete control over the electoral process, manipulating elections as a result of falsification related to the counting of votes. After the elections, many opposition activists had to leave Belarus, and those who did not, together with the organizers and participants of the protests, were arrested, where they were tortured and forced to cooperate with the security apparatus. Courts associated with the government apparatus handed down long-term prison sentences in penal colonies, while the security services searched and confiscated property in apartments and offices belonging to opposition activists and non-governmental organizations.

The European Union has constantly condemned the authoritarian way in which Lukashenko and his closest associates have been in power, while Belarus has deliberately sought confrontation with the

European Union, intensifying its actions against it, hoping to create divisions between member states interested in trade and economic cooperation.

Migration on the Polish-Belarusian border as an element of hybrid warfare

One of the signs of the increase in tension between Belarus and the Western world was migration blackmail in 2002. In the final phase of accession negotiations between Poland and the European Union, Belarus threatened to let into Europe about 150,000 migrants who were allegedly staying there. Further threats of bringing migrants to the Belarusian-EU borders with Poland, Lithuania and Latvia appeared in 2010-2011,

in response to the tightening of EU sanctions, General Ihar Rachkouski, after a meeting of the Border Committee of the Union State of Belarus and Russia, warned that the border service would focus on protecting its own territory, and not on protecting neighboring countries. A noticeable strengthening of border protection was to occur on the Belarusian-Ukrainian section of the state border at the expense of its sections with Poland, Lithuania and Latvia. According to the Belarusian border services, the decision was dictated by an increase in smuggling and the desire to even out the disproportions in border protection. In the opinion of the Belarusian authorities, the border section with the EU was better guarded compared to the Belarusian-Ukrainian section of the state border (Orlovska-Czyż: 2012). Belarusian journalist T. Giczan stated that the Operation Lock, developed in 2010-2011, was designed to force the European Union to provide financial assistance to strengthen the border of Belarus (Oskierko 2022: 205). Along with the announcement of the weakening of the state border protection, an intensive media campaign was carried out in Belarus aimed at linking illegal migration with the terrorist threat. The public media reported on operations carried out by the security services related to the liquidation of organized groups responsible for the smuggling of people, while indicating that illegal migrants are mostly linked to terrorist organizations.

The current migration crisis on the external borders of the European Union: Polish-Belarusian, Lithuanian-Belarusian and Latvian-Belarusian, was caused by the political crisis related to the presidential elections in Belarus. As a result of another rigged presidential election, which took place on August 9, 2020, A. Lukashenko received 80.2% of the votes. In second place, with 9.9% of the vote, came his main opponent, Sviatlana Tsikhanouskaya, who left for Lithuania immediately after the elections were announced, fearing persecution.

The crisis on the Polish-Belarusian state border is a tool of political and geopolitical pressure that has two logics: local and global. Local logic is Lukashenko's interest in forcing the West to make political concessions, freezing sanctions imposed on Belarus and getting it out of international isolation. This

logic is completely subordinated to global logic, i.e. the interests of Russia, which imposes its rules of the game on the EU and NATO in order to establish a new world order (Usov 2021). In response to the questioning of the legitimacy of the elections, the introduction of sanctions, and the assistance and support provided to the Belarusian democratic movement, Lukashenko intensified the hybrid conflict with Polish, Lithuania and Latvia, and significantly intensified his anti-Polish rhetoric.

The migration crisis led by the Belarusian regime as an attempt to destabilize and weaken the position of the European Union began in mid-May 2021. At that time, the Belarusian border guards gradually brought small groups of economic migrants to the border with Lithuania and Latvia, which began to grow over time. The migration crisis on the Polish-Belarusian border began in August 2021, when about 2100 people tried to cross the green border illegally. Attempts to cross the border contrary to the law concerned the Polish-Belarusian section of the state border protected by the Podlaski Border Guard Unit.

**The specificity of the Polish-Belarusian border**

The total length of the Polish border with Belarus is 418 km. It is protected by a total of 19 Border Guard posts, including 12 posts of the Podlaskie Border Guard Unit at a distance of 247 km and 7 posts of the Nadbużański Border Guard Unit at a distance of 171 km. In order to increase the protection of the state border, ensure internal security and public order, additional Border Guard officers, soldiers of the Polish Armed Forces and police officers were sent to operate on the border section. Foot patrols, using vehicles and aircraft, constantly patrolled and monitored the border, and on sections of the border running along rivers and water reservoirs, vessels were used to protect and secure the border. In addition, observation towers equipped with long-range thermal imaging cameras, observation vehicles, portable thermal imaging cameras, portable perimeter sets and night vision goggles were used to protect the state border.

On some sections of the state border – in the border road strip – an arable strip is maintained again, allowing for quick determination of illegal border crossing. For additional security, a section of the Polish-Belarusian border is protected by concertina barbed wire (Oskierko 2022:208).

The success of Operation Sluice, which is an attempt to destabilize and weaken the European Union, was to be ensured by additional forces of the State Border Guard, units subordinate to the Ministry of Internal Affairs and the Ministry of Defense dealing with combating terrorism and extremism in the border area, special units equipped with sniper rifles, machine guns, sniper rifles and RPG-7 grenade launchers. All the activities of the Belarusian services subordinate to the Ministry of Internal Affairs and the Ministry of Defence were carried out under a regime of heightened combat readiness, provoking and

increasing the level of tension and confrontation. They concerned the implementation of tasks related to securing the border, logistical security of operations, security consisting in the control and supervision of the movement of migrants to the border, storming technical security on the Polish, Lithuanian and Latvian sides, and setting up field camps for migrants. In addition, Belarusian services provided technical support to the operation, disrupting communication in the border area. The location and movement of Polish uniformed services were monitored using drones. All the tasks performed were classified, as officers of the Belarusian border services and Belarusian soldiers did not have any identification marks (Gawęda 2021).

The state-owned company Centrkurort, which cooperates with Iraqi, Libyan, Syrian and Turkish travel agencies, was responsible for bringing migrants to Belarus. The prices of week-long trips offered to Belarus ranged from $600 to $1000. Most often, after arriving in Minsk from Baghdad, Erbil, Sulaymaniah, Beirut, Damascus and Istanbul, the migrants stayed in hotels for a few days, and then the Belarusian services organized direct transport to the border. According to T. Giczan, for Iraqis it is *"the cheapest, fastest, safest way to get to the European Union"* to apply for asylum there. Previously, the only option they had was to travel by trucks through Turkey, the Balkans to Hungary, and then to Austria and Germany. This road was very expensive, dangerous and complicated. Thanks to the tourist offer developed by the Lukashenko regime, they can get to the European Union safely, comfortably, quickly and very cheaply. In addition, they are provided with comprehensive assistance from the Belarusian authorities (Oskierko 2022: 209).
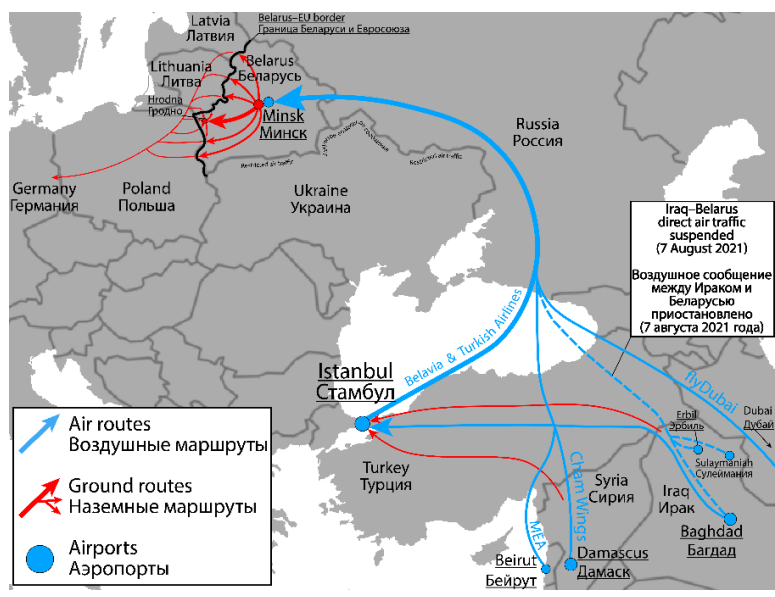
Map 1**. A route for smuggling immigrants to Belarus.**

Source: Migration crisis on the border between Belarus and the European Union, Wikipedia, https://pl.wikipedia.org/wiki/Kryzys_migracyjny_na_granicy_Bia%C5%82orusi_z_Uni%C4%85_Europejsk%C4%85_(od_2021) [accessed 20.03.2022]

The migration crisis on the Polish-Belarusian border in numbers

From the analysis of statistical data provided by the Border Guard on crossing the state border contrary to the regulations on the section with Belarus, we can conclude that in 2018-2019 these were single attempts. In 2021, as a result of Lukashenka's involvement, coordination and support for migrants, the Polish Border Guard registered over 39 thousand attempts to illegally cross the border in the Belarusian section in 2021. In 2022, a border fence was built on the Polish-Belarusian border, which caused the number of state border crossings against the law to drop to 576 attempts in 2022 and 541 in 2023.

Chart 1. **Crossing the state border contrary to the regulations on the Polish-Belarusian section of the state border in 2018-2023.**
Source: In-house analysis based on Border Guard data.

Analyzing the data contained in Chart 2, the authors of the article found that the migration crisis began in August 2021, when Border Guard officers registered over 3 thousand. attempts to cross the border illegally. The peak of the migration crisis can be observed in October 2021 - the Border Guard thwarted over 17 thousand attempts to cross the border illegally. Groups consisting of several dozen people tried to force the border from Belarus to Polish.
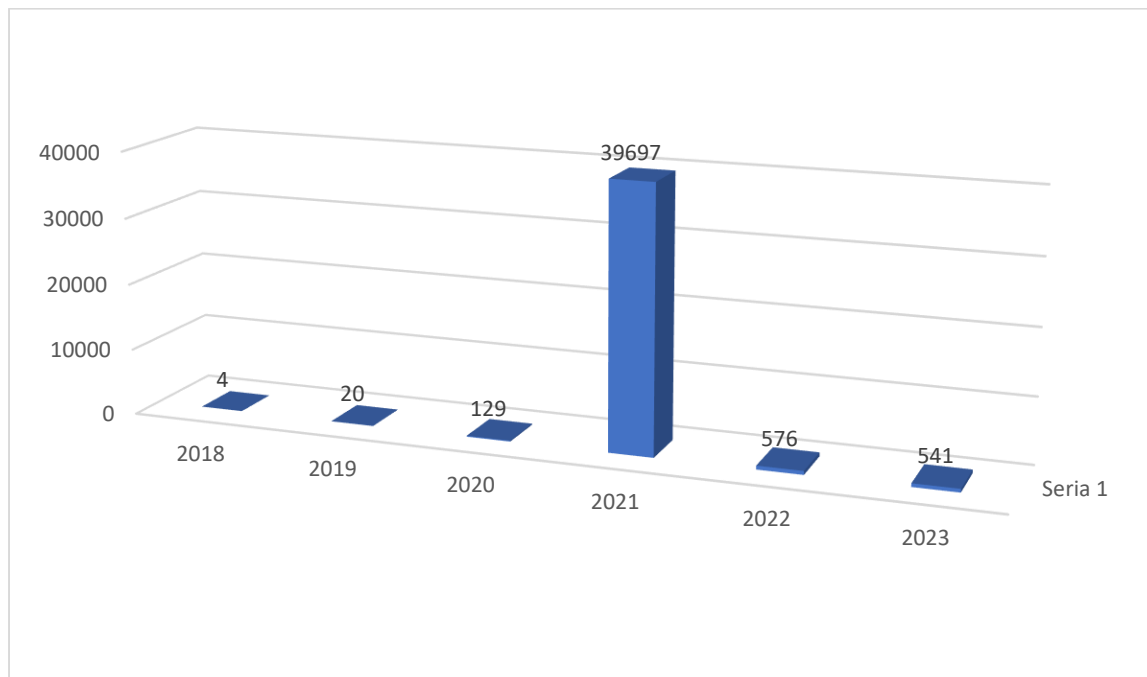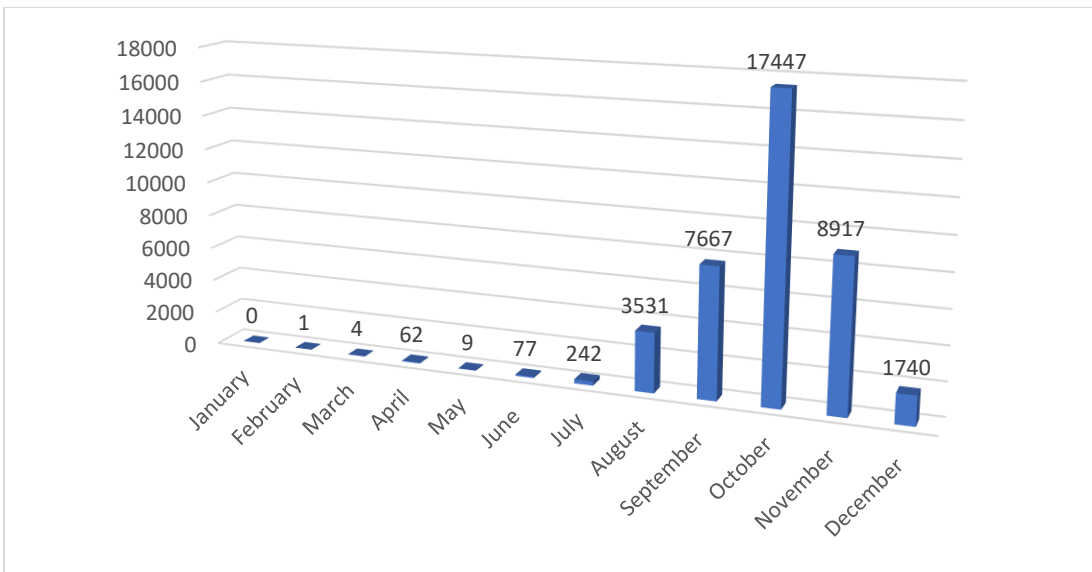
Chart 2. **Crossing the state border contrary to the regulations on the Polish-Belarusian section of the state border in 2021**

Source: In-house analysis based on Border Guard data.

The escalation of the border conflict on the Polish-Belarusian border took place on November 8, 2021. Hundreds of aggressive foreigners gathered near the border crossing in Kuźnica, who, with the active support of Belarusian services, tried to force their way into Polish territory by throwing logs of wood, using metal cutters and spades to destroy the fence located on the border. The whole event took place under the supervision of the Belarusian services, which sent such a large group of foreigners to the area. Since then, the Border Guard has thwarted hundreds of attempts to illegally cross the border every day. These incidents most often took place in the area of operation of the Podlaski Border Guard Unit in the sections protected by the Border Guard Posts in Michałów, Czeremcha, Białowieża, Kuźnica, Szdzialowo, Mielnik and Dubicze Cerkiewne. To try to force the border security, the migrants used various means of mines: they threw stones, firecrackers and used tear gas towards Border Guard officers, soldiers and the Police, blinding them with flashlights and green lasers. In order to cross the border, a concertina was cut, a ladder and a specially constructed platform made of compacted planks were thrown over the border security, on which they crossed the border. People trying to get into Polish territory were constantly coordinated and controlled by the Belarusian security apparatus.
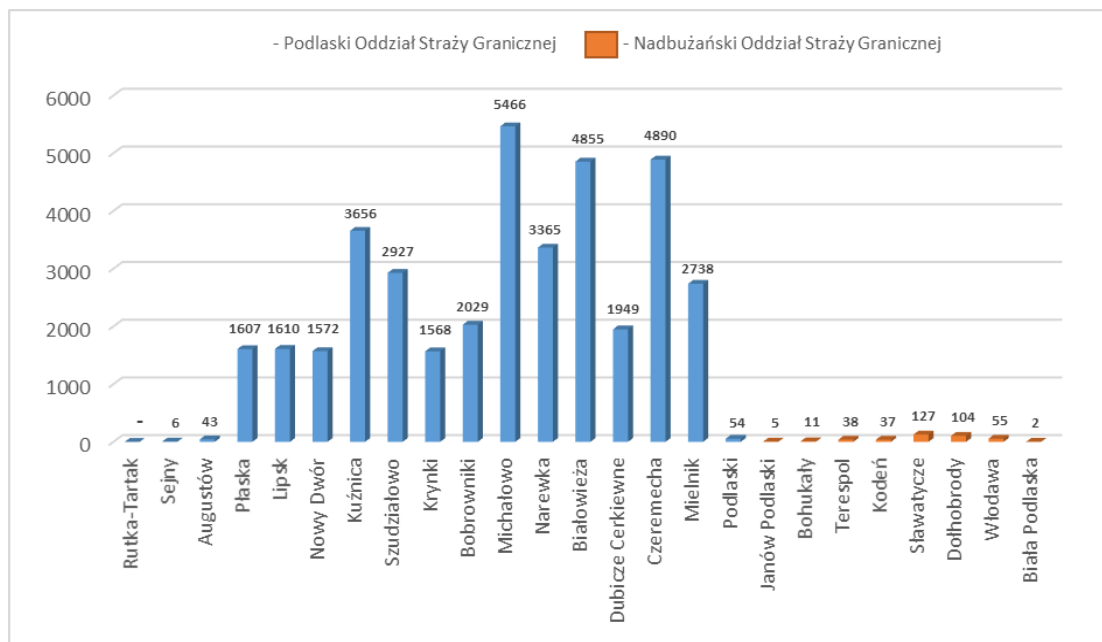
Chart 3. **Crossing the state border contrary to the regulations in 2021 - in the area of operation of the Podlaskie Border Guard Unit and the Bug Border Guard Unit.**
Source: In-house analysis based on Border Guard data.

The Belarusian border guards themselves intensified the atmosphere of hatred and aggression against the Polish Border Guard, the Police and soldiers of the Polish Armed Forces by using verbal assault, throwing stones and objects from which smoke was emitted, and trying to stun officers and soldiers with firecrackers. In order to prevent the identification of aggressive people, Belarusian soldiers blinded Polish services with strong strobe light, flashlights and a green laser.

In order to increase tension on the border, in addition to direct aggression against Polish officials, the Lukashenko regime carried out various provocations. Belarusian soldiers removed a shield with the image of the state emblem from one of their border posts and moved away with it deep into the territory of Belarus. After a few hours, they returned and began to photograph the scene. In the afternoon, it was reported to the Podlaskie Border Guard Unit that the emblem on their sign had been damaged. The media published a message informing about the damage to the Belarusian sign. Other examples of provocations by the Belarusian services were shots fired into the air from long guns at the sight of Polish patrols a few hours apart, a missile from a signal weapon that fell on the Polish side of the border near the place of permanent police station in the section of the Border Guard Post in Białowieża (Mościcki, 2022). In the vicinity of Terespol, as a result of shots from pneumatic weapons, lighting masts set up by soldiers of the Polish Army were destroyed. Another provocation from the Belarusians was the entry of three uniformed people with long guns into the territory of the Republic of Poland. After an attempt by a Polish

patrol to make contact, unknown persons reloaded their weapons and then moved away towards Belarus (Oskierko 2022: 213).

Information policy as a tool to escalate the migration crisis

Disinformation played an important role during the migration crisis on the Polish-Belarusian border. The events were widely commented on by propaganda media and Internet portals. In the information space of Belarus, in current affairs programs and in social media, there were photos of crying and cold mothers with children begging Polish uniformed services to be allowed to enter Polish territory. The image of hundreds of hungry, freezing people camping out under the border fences was described in the media as "inhumane", bestial" or "unchristian treatment" of people (Fraszka 2021: 12). In the Belarusian and Russian media space, E. Checzko, a Polish soldier serving in the 11. Masurian Artillery Regiment, which is part of the 16. Pomeranian Mechanized Division. E. Chechko deserted to Belarus in December 2021. Then, in the Republic of Belarus, he sought political asylum due to his disagreement with Polish's policy towards the migration crisis and inhumane treatment of refugees. In the local media, he talked about the genocide committed by Polish uniformed officers on the Polish-Belarusian border (Chołodowski 2022). He also spoke at a press conference organised by a human rights organisation close to the authorities called Systemic Protection of Human Rights. He claimed then that during his service at the border he was "forced to kill people" by Border Guard officers. Finally, in March 2022, according to the announcement provided by the Belarusian investigative group, *"Chechko was found hanged at his place of residence".* The investigative group noted that all possible versions are being considered, including the involvement of third parties (Oskierko 2022: 214).

As a result of provocative actions and attacks from the Belarusian side, on September 2, 2021. Poland has introduced a state of emergency in the border area. It covered 115 towns in the Podlaskie Voivodeship and 68 towns in the Lubelskie Voivodeship, along the entire Polish-Belarusian border (Regulation of the President of the Republic of Poland of 2 September 2021 on the introduction of a state of emergency in part of the Podlaskie Voivodeship and part of the Lubelskie Voivodeship, 2021). Pursuant to § 2, during the state of emergency, the following types of restrictions on human and civil rights and freedoms were introduced: the right to organise and carry out, in the area covered by the state of emergency, assemblies, was suspended, the rights to organise and carry out, in the area covered by the state of emergency, mass events and artistic and entertainment events conducted as part of cultural activities, which are not mass events, were suspended, an obligation has been introduced to carry an ID card or other document confirming identity by persons over 18 years of age, staying in public places in the area covered by the state of emergency, and in the case of students under 18 years of age – a school

ID, it is prohibited to stay at a fixed time in designated places, facilities and areas located in the area covered by the state of emergency, it has been prohibited to record by means of technical means the appearance or other features of specific places, objects or areas located in the area covered by the state of emergency, the right to possess firearms, ammunition and explosives and other types of weapons has been limited by introducing a ban on carrying them in the area covered by the state of emergency, access to public information on activities carried out in the area covered by the state of emergency in connection with border protection has been limited and preventing and countering illegal migration. On 1 October 2021, after the Sejm gave its consent to extend the state of emergency until 30 November, the President of the Republic of Poland signed a regulation on the extension of the state of emergency introduced in part of the Podlaskie Voivodeship and part of the Lubelskie Voivodeship (Regulation of the President of the Republic of Poland of 1 October 2021 on the extension of the state of emergency introduced in part of the Podlaskie Voivodeship and part of the of the Lublin Voivodeship, 2021). Then, pursuant to the Regulation of the Minister of the Interior and Administration Mariusz Kamiński , from 1 December 2021 to 1 March 2022, a temporary ban on staying in a specific area in the border zone adjacent to the state border with the Republic of Belarus was introduced (Regulation of the Minister of Internal Affairs and Administration of 30 November 2021 on the introduction of a temporary ban on staying in a specific area in the border zone adjacent to the State Border with the Republic of Belarus, 2021).

Strengthening the protection of the Polish-Belarusian border

Due to the systemic nature of the migration crisis related to the continuous provocative and destabilizing actions of the Lukashenko regime, a 187 km long border fence was built on the Polish-Belarusian state border.   The fence was a strategic state investment, and the cost of construction amounted to the Polish state of PLN 1.6 billion – over EUR 372 million. The border fence was built in the Podlaskie Voivodeship and runs along the land border with Belarus. In the Lublin region, the Polish-Belarusian border runs along the Bug River, which is a natural barrier, so the Border Guard has established a team that is working on solutions for the construction of technical support on the rivers.

A firewall's security system consists of several lines of protection. The first line is a physical barrier in the form of a massive steel fence, 5.5 meters high: 5 meters are steel poles, ended with a half-meter coil of barbed wire to prevent passage to the other side. The barrier will not be breached using tools, ladders or boards. The second line of protection in the border protection system are detection cables and sensors signaling the movement of a moving object. The next line includes cameras with motion detection.
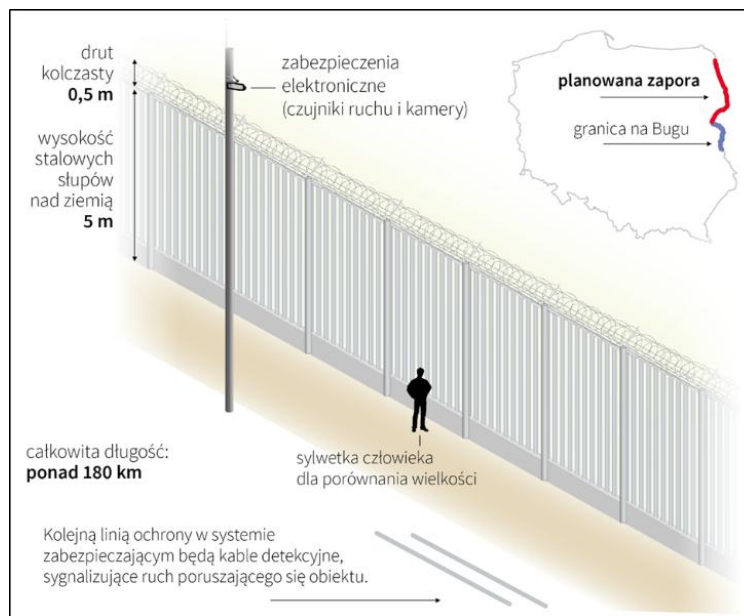
Figure 1. **Visualization of security measures on the Polish-Belarusian state border.**
Source: https://www.pap.pl/aktualnosci/news%2C1060978%2Crusza-budowa-zapory-na-granicy-sg-zalezy-nam-aby-szkody-w-srodowisku-byly

The border fence did not completely eliminate attempts to break it through and illegally cross the Polish-Belarusian border. This solution makes it difficult for illegal migrants to pass through and allows the Border Guard and soldiers to react early enough to attempts to cross the barrier. In swamps and backwaters, in places where such a barrier could not be built on the border, several layers of barbed wire were placed.

Due to the increasing hybrid attacks on the part of illegal migrants, brutal attacks on the Border Guard and the army, Polish security requires immediate strengthening and taking concrete and effective actions. The answer to the threats is the "Shield East" program, for which PLN 10 billion will be allocated. As part of the East Shield, within four years, a belt of military installations will be built on the 700-kilometre section of the eastern border with Belarus and the northern border with Russia, reaching up to 50 km into the country, increasing the level of its tightness. The investment is to pursue four basic objectives:

1. Increase the anti-surprise capabilities of the Polish army;
2. Facilitate the movement of own troops along the border line;
3. Hinder the penetration of the border by foreign troops;
4. Increase the protection of own troops and civilians in this area.

In order to increase the anti-surprise capabilities, a network of masts will be built in the border zone, which will act as base stations for communication and reconnaissance systems. Sensors and

cameras (e.g. acoustic, night vision or infrared recording) will be installed on the masts, and the data from them will be transmitted on an ongoing basis to operational centers dealing with their analysis. Ground installations are to be supported by aerial reconnaissance at every level – from short-range tactical drones used by the land forces and territorial defense, through reconnaissance conducted by the air force, to the satellite reconnaissance system. The situational picture obtained in this way will give the Polish Army full real-time information and allow it to react quickly (Chilczuk, 2024).
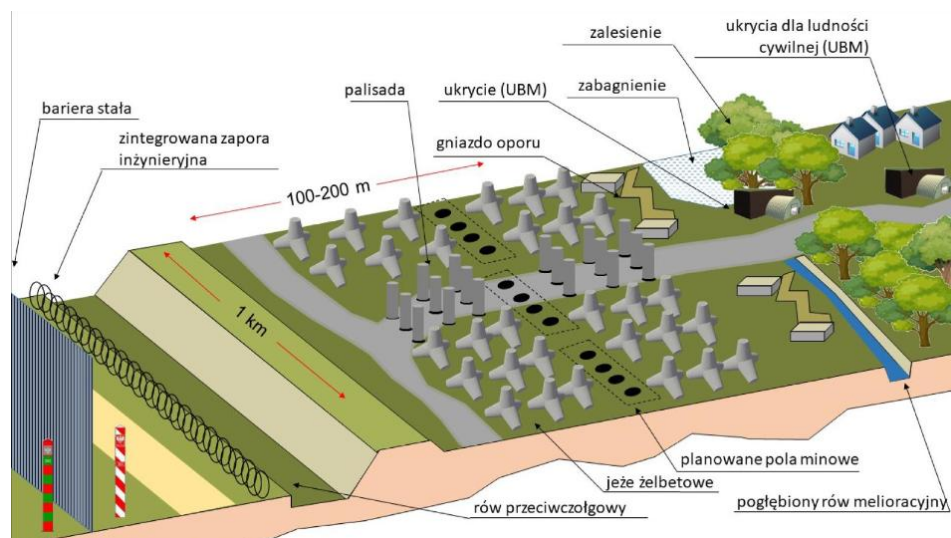
Figure 2. **The "Shield East" program - visualization of the security of the border strip on the Polish-Belarusian state border.**
Source: https://www.gov.pl/web/obrona-narodowa/tarcza-wschod-wzmocni-bezpieczenstwo-polski-i-wschodniej-flanki-nato

Figure 3. **The "Shield East" program - visualization of the security of an area up to 50 kilometers on the Polish-Belarusian state border.**
Source: https://www.gov.pl/web/obrona-narodowa/tarcza-wschod-wzmocni-bezpieczenstwo-polski-i-wschodniej-flanki-nato
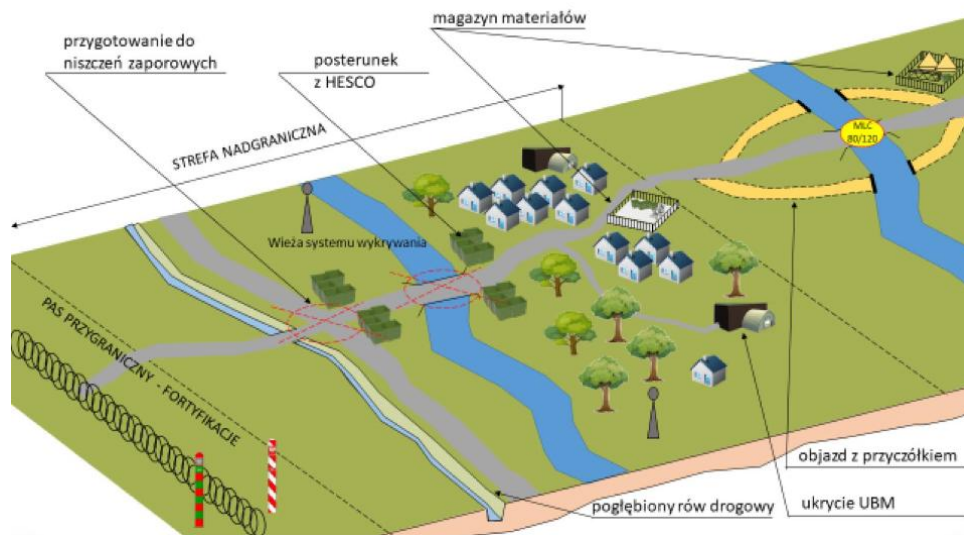
Thanks to investments in communication infrastructure along the border line, the mobility of troops responsible for its defence will increase. The army, together with local governments, will prepare, m.in, places of crossing water obstacles or access roads to bridgeheads, and selected engineering structures will be adapted to significant loads. New road investments in this area will be carried out taking into account the needs of a possible defensive operation. The military will also create eight forward operating bases in the region, m.in, which will reduce the time of force projection, i.e. the time necessary to fully develop the forces designated to conduct the defensive operation (Khilchuk 2024).

Other types of installations are intended to make it as difficult as possible for foreign troops to move around this area in the event of an armed violation of the border. These will be, m.in, anti-tank ditches, deepened drainage ditches and areas prepared for the deployment of minefields. Part of the existing road infrastructure will be prepared for rapid destruction in the event of a conflict. Warehouses for equipment and materials necessary to prepare the border for defence on the eve of a possible conflict and the subsequent conduct of a defensive operation will also be built (Chilczuk 2024).

Conclusions

The migration crisis on the Polish-Belarusian border is systemic. It has become a tool of the Lukashenko regime in order to provoke the Polish state and destabilize it for a long time. These actions also have a confrontational dimension towards the European Union, in order to create divisions between the member states and force dialogue and consent to the easing or lifting of the sanctions imposed on Belarus.

The authors believe that the state border protection system, due to its multifaceted nature, requires many actions related to both the protection of the state border against illegal migration, combating cross-border crime related to the smuggling of goods without Polish excise tax stamps, psychoactive substances, weapons or hazardous materials, as well as protection against military threats from Russia. Therefore, the construction of a physical barrier on the border with Belarus in the form of a steel fence and a perimeter protection system will ensure the protection, inviolability of the Polish state border and internal security of Polish and the EU. The comprehensive protection of the state border will be complemented by cooperation within the state border protection system of the Border Guard with other services operating within the state security system.

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THE SMART CONCEPT TRANSFORMATION AND INTEGRATION IN THE SUSTAINABLE ROAD NETWORK DEVELOPMENT OF LATVIA AND LITHUANIA

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Abstract

The smart concept transformation and integration in the sustainable road network development of Latvia and Lithuania

Keywords: *smart, smart road, smart concept, intelligent transport system*

In an age when the concept of 'smart' has entered almost all sectors, including transport, it seems more important than ever to preserve the true 'wisdom' of road networks by meeting the needs of all users, mainly the vulnerable, using new technologies in the transport sector. Smart roads will provide more automation, higher energy efficiency, lower costs, improved public safety, cleaner air, a greener environment, less traffic congestion, fewer accidents and deaths, thereby improving the overall quality of life of city dwellers. Roads will no longer be seen as static infrastructure, but as a "smart grid" that is fully aware of the situation, context and environment.

The scientific novelty of the topic is reflected in the development of an empirical review of the theoretical transformation of the concept of wisdom. To explain and interpret the conceptual concept of wisdom, the author used the comparison of the scientific axiom of empirical research with the maintenance of a new perspective on the concept of "smartness".

The aim of the topic is to reflect in scientific novelty the evolution of the empirical review of the theoretical transformation of the concept of smart and to provide interpretation of the concept of "smart" and to maintain a new perspective of the scientific axiom of empirical research. **The methods** used are experiments and conclusions from traditional studies in regions, the road sector and the economy. As a result, the methodology of the selected study describes and explains more competently the most relevant relationships and developments in the realm of the smart reality of the road network. **The framework for the discourse of results** consists of a critically comparative approach to the priorities "smart" and "flexible" set out in the sustainable and Smart Mobility Strategy in the development and policy planning documents of Latvia and Lithuania, and practical action in the infrastructure applications of road networks. The results of the phenomenological analysis and synthesis of the authors are presented visually for the comparison between Latvia and Lithuania.

Kopsavilkums

Vieduma jēdziena koncepta transformācija un integrācija ilgtspējīga ceļu tīkla attīstībā Latvijā un Lietuvā

Atslēgvārdi: *vieds, vieds ceļš, vieduma koncepts, inteliģentā transporta sistēma*

Laikmetā, kad jēdziens "vieds" ir ienācis gandrīz visās nozarēs, tostarp transporta nozarē, šķiet svarīgāk nekā jebkad agrāk saglabāt ceļu tīklu patieso "gudrību", apmierinot visu lietotāju, galvenokārt neaizsargāto, vajadzības, izmantojot jaunās tehnoloģijas transporta nozarē. Viedie ceļi nodrošinās lielāku automatizāciju, augstāku energoefektivitāti, zemākas izmaksas, uzlabotu sabiedrības drošību, tīrāku gaisu, zaļāku vidi, mazāk satiksmes sastrēgumu, mazāk negadījumu un nāves gadījumu, tādējādi uzlabojot pilsētas iedzīvotāju vispārējo dzīves kvalitāti. Ceļi vairs netiks uzskatīti par statisku infrastruktūru, bet gan par "viedo tīklu", kas pilnībā apzinās situāciju, kontekstu un vidi.

Tēmas mērķis ir zinātniskā novitātē atspoguļot vieduma koncepta teorētiskās transformācijas empīriskā apskata attīstību un sniegt "vieduma" jēdziena interpretāciju un uzturēt empīrisko pētījumu zinātniskās aksiomas jaunu perspektīvu.

Izmantotās metodes - reģionu, ceļa nozares un ekonomikas tradicionālo pētījumu eksperimenti un secinājumi. Izrietoši, izvēlētā pētījuma metodoloģija kompetentāk apraksta un izskaidro ceļu tīkla vieduma realitātes sfēras būtiskākās sakarības un attīstības tendences.

Rezultātu diskursa ietvaru veido kritiski salīdzinošā pieeja Ilgtspējīgas un viedas mobilitātes stratēģijā noteiktajām prioritātēm "vieds" un "elastīgs" Latvijas un Lietuvas attīstības un politikas plānošanas dokumentos, un praktiskā rīcībā ceļu tīklu infrastruktūras piemēros. Autoru fenomenoloģiskās analīzes un sintēzes rezultāti Latvijas un Lietuvas salīdzinājumam attēloti vizuāli.

Introduction

In an age when the concept of 'smart' has been integrated into all sectors of the economy, t.sk the transport sector, it is critical to preserve the true 'wisdom' of road networks – to meet the needs of all road users, especially the vulnerable, using green technologies.

The origins of the concept of "wise" are found in the Bible, where wisdom or wisdom is the ability to reason correctly – the ability to act according to a given situation, beneficial to oneself and others. The Cambridge Dictionary explains the term "smart" from the "wisdom" dimension – the degree of maturity of the intellect to the ability to be intelligent and think wisely in difficult situations. *"Smart*" also manages to act not only as an adjective, but also as a verb, noun and adjective. The origin is found in English "smeart" - "cause pain". By the 16th century, the term acquires additional meanings in relation to intelligence, wisdom, speed, intensity.

In turn, the desired quality of life in the context of the Latvian economy is integrated into the State Research Programme (2014) "Transformation of the national economy, smart growth, governance and the legal framework for the sustainable development of the state and society - new approaches to the formation of a sustainable knowledge society". The program confirmed the program's contribution to smart growth in all its research blocks - economic development, community development, space development and the transversal legal aspect.

"Smart" is a popular term used in the road industry with the meaning "intelligent", "smart", "ass", "able to predict" to describe any kind of available technology with a high innovative contribution (Papadopoulou, Maniou, 2021). Ricky & Hultink (2009) highlights the importance of "smart products" in the road network - navigation systems, digital cameras, mobile phones. In a similar way, scientists use synonym of the term, expanding the space of the term, namely the reference to "clever objects" in Lopez, Rasasinghe, Patkai and McFarlane (2011), Hoffman & Novak (2017, 2018). The above definitions show the deep development of thinking, which is formed over the years, on the one hand, and along the development of language, which was implemented in various applications. Thus, we can take, for example, the following "new" words that were adopted and used every day: information technology (ICT0, city stakeholders, data, digital, sustainability, inclusion and quality of life in the city.

The first scientific justifications for the thesis "innovation and data will drive mobility" can be seen in the "intelligence" dimension of the concept of smartness with the intelligent transport system of routing network modeling proposed by Taniguchi (2002). By developing a combination of vehicle routing model and traffic simulation (Barceló, Grzybowska, Pardo, 2007), the proposed dynamic router and planner

puts the beginnings of a smart road network of "intelligence" with a reduction in the rational flow and environmental impact of the city.

The theoretical basis of the scientific idea "**Innovation and data will drive the future of mobility"** is provided by *Chinese scientists* Zhao, Wu (2015) with hierarchical prediction for the combination of road user and road service information. Scientists create the concept of "Smart Path" with four elements interacting with each other – 1. real-time road data, 2. compatibility of the Internet of Things with smart devices, 3. self-adaptation of smart technologies to road conditions, 4. energy extraction – ability to adapt green energy.

Italian, Greek scientists justified the explanation of the terms "smart, intelligent, sharp, fast" with a new paradigm of mobility - emphasizing the role of highways in the smart age from the point of view of the safety and reliability of transport infrastructure. Scientists demonstrate consideration-based interactions between road network management, safety, reliability, and the smart age (Pompigna e.tc.(2021). By interacting road criteria and power assessment, the founders of the dynamic map algorithm for predicting trunk flows using artificial intelligence on the road network (Guerrieri, Mauro, Pompigna, 2021). The importance of the infrastructure aspect for the economic growth of transport and road networks is discussed in scientific discourse by Ethimos (2019) with the impact of engineering in urban mobility and provides a scientifically critical approach to the planning and policy configuration of the national level. With in-depth analytics of the mobility aspect, offers policy interventions of the concept of smartness through the smart city paradigm. The road network mobility indicator is included in the concept of a "smart city", which consists of six criteria - government, mobility, environment, economy, life and people.

Capello, Camagni, Nijikamps (2000, 2019, 2020) develops a methodology for the territorial impact of transport policy. Puts forward indicators and indicators of influence on forecasting methods for polycentrism, ICT, transport policies. Analyses the economic and environmental link for sustainable regional growth and provides a critical approach to empirical evidence research for road network impact in assessments of urban growth models. A holistic and integrated approach to analysing the region's sustainability is used by *Australian scientists* Byrne, Wallis, Graymore M. (2010) to assess the effectiveness of current regional-wide sustainability assessment methods – ecological footprint, well-being, ecosystem health, quality of life and access to natural resources.

 Next level, the term 'smart roads' appears as a key component of road intelligent transport systems (ITS)' plan, based on innovation, collaboration, connectivity and automation. In March 2013, the European Road Federation (ERF) published the Road Asset Management Manifesto "The European

Movement: A Manifesto for the Long-term and Efficient Management of a Trans-European Road Network" in Brussels. The framework of the manifesto reflects the historical stereotype that road infrastructure is not considered a financial value for society and the economy. The document reflects the rationale for road asset management at the state and local levels. To promote convergence in all European countries and experience in innovation in smart roads, in 2016 the European Commission adopted the European strategy C-ITS (European Commission, 2020). The strategy's framework is a watershed moment for a smart and sustainable transport industry with widely available green alternatives.

The extension of the concept of the future path in the **space "Smart Highway"** combines the physical infrastructure of a smart path with software and data. Zalvars &Nikalje (2022) views the concept of smart highways from the point of view of energy efficiency - to use solar, wind and vibration energy for transport power, lighting and road functionality. Traditionally, road network classification systems have focused on two essentially opposite dimensions: mobility and accessibility. The importance of the development of the urbanization process and the analysis of the causes of relations in the development of transport technologies is explained by Kalmeiere (2022), integrating the concept of "economic growth" →"city-wide economy". Urbanization reduces the geographical proximity of economic entities, significantly increasing the mobility of goods, services, labour, technology and capital (Kalmeiere, 2022).

The scientific approach of the concept of "smart network" is expanded with a view to the future on the signals of smart technologies in road infrastructure - the future of smart transport is associated with smart signs and roads in Shen (2022), Toh, Sanguesa, Martinez (2020). In fact, we are entering an era in which information (connectivity, the Internet, and the data network) meets the trunk. The theoretical framework of the concept combines information and transport technologies (Ernst &Young, 2017) to improve traffic and population mobility. In addition, the 'smart grid' refers to other socio-economic aspects related to security/security, efficient and sustainable energy (Bach e.tcl., 2010). The development of the transport network paves the way for a more environmentally friendly, smarter and flexible sustainability of the transport system. **Sustainability and smart** are the cornerstones of mobility. **Sustainable and smart mobility dimension - in the** European Commission's Mobility Strategy (European Commission, 2020). The Sustainable and Smart Mobility Strategy is in line with three important dimensions: the objectives and actions of the EU transport system, the European Green Deal and the EU Digital Strategy. Mimbela & Klein (2020) puts forward in the regional sustainability considerations of "Smart growth" the smartness of transport, stressing that the sustainability elements of

the concept of a smart transport environment must respond to current transport needs without disrupting future opportunities for generations to meet their own needs.

Summing up the theoretical transformation of the concepts of "smart", the authors concludes that the basis of the concept of smartness is formed by the interaction between social, economic, environmental capital and the world ecosystem. The extension of the concept consists of the features, characteristics and requirements that determine reality that are characteristic of space. In turn, the authors analysed the scope of the concept of smart in an objective empirical determination of reality and in a visualized way with a logical systemic approach to the scientific idea (Figure 1). The author describes the phenomena of the reality of the concept of smartness, explains the most significant dynamic changes in the volume aspects of the concept, and gives his forecast of the development of the concept of "smart road network volume" in time.
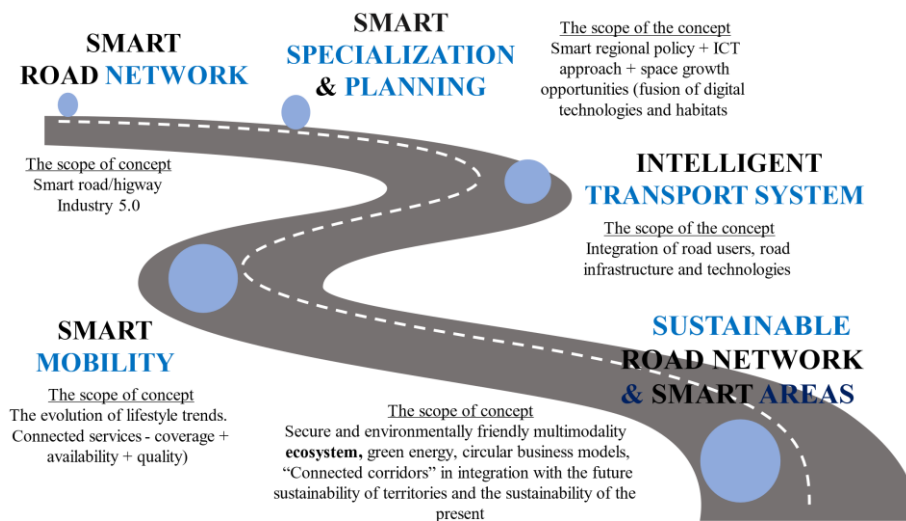
Figure 1**. Theoretical transformation of the scientific idea of the "Smart concept"**

Considering the "smart concept" definition and main functions of the smart path, in reviewing innovative technologies and strategies, the author summarized the interpretation of the current smart era in the field of roads and the scope of the concept of a socially and environmentally sustainable mobility ecosystem for tomorrow.

The scope of the concept of "**smart road network**" consists of the use of real-time data in integration with the processed knowledge and optimal solutions – routes, traffic forecasts, road traffic statistics. Coordinated action by the end-user and transport with a new paradigm of Industry 5.0 – giving less attention to technology, but with a tendency to achieve the development of cooperation between man and the road (Alojaiman, 2023).

The components characterizing the scope of the concept of extension transformations "**Smart specialization and planning**" are the advanced solutions to be used for national level strategic decision-making Adopt innovative technical approaches to use more advanced solutions and thus more closely monitor the development of road networks (Raff, Wentzel, Obwegesser, 2020) Factors of environmental impact of social infrastructure, diversification of economic activity and attractiveness are included in thoughtful medium- and long-term specialisation arguments at the national level (OECD, 2013). Regional development's smart specialisation axis focuses investment in knowledge and focuses on policy instruments adapting to technological change and globalisation. Characterization of the volume elements of the concept – efficiency in solving emergency situations, real-time traffic simulations and visualizations. The competitive advantages of the road network can be used as a toolkit for the leap of territorial governance from "smart cities" to "smart territories".

The 20th century marks the first traffic management centres, highways are equipped with cameras and integrated detectors. Global market incentives contribute to **the exponential development of the "Intelligent Transport System**" (ITS) (SIA Ernst &Young, 2017, Cabinet of Ministers, 2020.) ITS is a mobility support service based on modern information and telecommunication technologies (ICT), which complements traditional transport infrastructure and traffic organisation – with the acquisition and comprehensive use of binding data to improve transport safety, efficiency and accessibility (Cabinet of Ministers, 2020). ITS-related services are divided into several groups - infrastructure planning and maintenance, law enforcement provision, financial transaction management, emergency notifications and response, travel information and guidance, traffic, accident and demand management, intelligent vehicle systems, truck and fleet management, and public transport management.

The world's achievements in creating future roads use short-term forecasts based on the volume of traffic in the present to identify distracting obstacles and make more thoughtful decisions on how best to change traffic routes, change lane priorities, and modify traffic lights. **'Smart mobility'** traffic management services must also provide visual tools for displaying real-time traffic situations related to the location of traffic jams; accidents; congestion levels in each segment of the road network. Connected and automated driving technologies will significantly improve traffic flows, reduce the emergence of critical situations, optimise the management of relevant scenarios, ease pressure on drivers and the environment, and support jobs and growth.

The European Green Deal and its objective of reducing transport-related greenhouse gas emissions by 90% by 2050, as well as the new EU urban mobility framework, place urban mobility and logistics at the heart of EU mobility policy (European Commission, 2022). The European urban mobility analysis,

complemented by the latest urban research projects (Gkoumas, Stepniak, Cheimariotis, Marques dos Santos, Grosso, Pekár, 2022), raises the main themes of smart mobility – TEN urban nodes, mobility indicators, micro-mobility, zero-emission urban freight logistics and last-mile delivery, mobility as a service, hydrogen within the urban framework.

For motorways and urban authorities around the world, overcoming traffic congestion and ensuring the safety of road users are the main and constantly growing problems. For example, the US National Road Safety Administration estimates that nearly 43,000 people died in road accidents in 2021, with 19,800 deaths reported in all EU countries, and the number of road accidents involving vulnerable road users (VRUs) has also increased in recent years, accounting for more than 50% of more than 1.3 million deaths, resulting from worldwide road accidents. The impact of traffic congestion on costs and the environment is also a glaring concern in cities around the world with significant initiatives in all regions going on to reduce emissions from "stop-start.

The transition to next-generation mobility will depend on a new generation of connected vehicles, autonomously and electrically in shared and public mobility, and on rethinking urban planning to make it easy and safe for people to switch to less efficient modes of transport. Consequently, the next stage of the transformation of "smartness" in the space **"Sustainable Road network in smart areas" -** AI-based layers of mobility traffic, helping cities and adjacent areas to plan and analyses safety scenarios and the line of vision in urban environments, as well as to study various traffic scenarios to improve spatial and traffic planning in the future. The results of the scientists' research show that "smart, sustainable pathways" have been viewed and analyzed outside the box by a "symbiosis of intelligence and artificial intelligence", but viewed from the perspective of "territories", putting **the ecosystem of smart and sustainable road stakeholders** first.

Comparison of the strategic perspective of the concept of smartness of the Latvian and Lithuanian road network

The European Commission's Strategy for Sustainable and Smart Mobility (European Commission, 2020) states that transforming the transport sector into a truly multimodal system providing sustainable and smart mobility services requires decisive action at national level, which means incorporating the relevant provisions into national development and planning documents. **The authors summarised the four dimensions of the 'smart concept' of the road network (OECD, 2001**) – 1." Strategic perspective", 2. "Smart Specialisation", 3. "Smart Development Criteria" and 4." Performance indicators" requirements in the Ishikawa diagram Figure 2 **and made dimensional comparisons in the**

development and planning documents of the Latvian and Lithuanian road sector and in the established smart criteria of the road network (Tables 1-3).
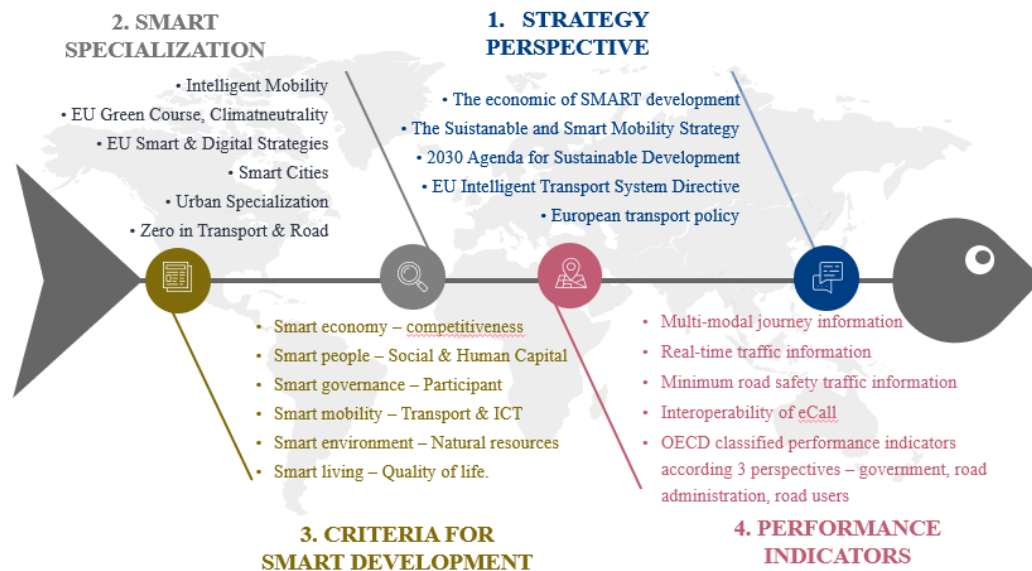

Figure 2 **The four dimensions of the smart concept of the European Union's road network**

New technologies, sustainable solutions and innovation play a key role in smart thinking. In order not to lose its competitive advantage in the field of clean technologies, the EU needs to expand the deployment and demonstration of new technologies in all sectors, including the inclusion of smart criteria for the Latvian and Lithuanian road network (Tables 1-3).

Table 1. **Smart concept strategic framework for Latvian and Lithuanian road network**
(comparison of strategic and policy planning documents at national level)

Latvian case study	Lithuanian case study
Criterion : Sectoral strategic policy and planning	
• Transport Development Guidelines for 2021-2027 (TAP 2027) (balance of human mobility needs and economic profitability, while ensuring balanced and sustainable development of the national territory) (TAP 2027, 2021). • Latvian State Motorway Network Development Plan until 2040 (A single, safe and efficient network of the main State motor roads has been established with accessibility from any administrative centre of Latvia for up to two hours) (Ministry of Transport, 2021)	• Lithuania's long-term transport strategy until 2025 (New generation for the development of logistics centers with intermodal logistics in the transport network of the European continent and the Baltic Sea region (Long-term development strategy of the Lithuanian transport system until 2025, 2005). • Lithuanian National Road Development and Maintenance Strategy until 2035 (Until 2035, no bridge and transmission in poor condition may remain on the national road network (Ministry of Transport and Communications of Lithuania, 2021)).

Criterion : Intelligent Transport System (ITS)	
• The development of ITS infrastructure in Latvia is characterized by the phase of implementation and daily use of ITS components (various data acquisition and transmission technologies, information and communication systems and ITS services of private and public administration) (Ernst &Young, 2017). • Such projects as SMART E67, placement of speed cameras in the territory of Latvia, emergency call system eCall (Ernst &Young, 2017).	• The deployment of ITS in Lithuania started at the beginning of 1999 with the first road weather information system (RWIS) and meteorological stations on national roads as part of the project "KOSIS" (Ernst &Young, 2017). • In 2008 and the establishment of the Vilnius traffic management system in 2009. In 2009, the National Road Traffic Information System (EIS) was introduced, which is now connected to the central power supply and runs on solar panels (Ernst &Young, 2017).

The transport policy of Latvia and Lithuania aims at an integrated transport system that ensures safe, efficient, accessible, accessible, smart and sustainable mobility, promotes the country's economic growth, regional development and provides a path to a climate-neutral economy (Table 2).

Table 2. **Transport policy smart specializations and criteria of Latvia and Lithuania**

Criteria	Latvian case study	Lithuanian case study
SMART specialization	• **The European Green** Deal: accelerating the transition to sustainable and smart mobility (TAP, 2021; Ministry of Transport 2021) • **Intelligent mobility**: automated and intermodal mobility, smart traffic management systems and intermodal services. New technologies, sustainable solutions and innovations (TAP, 2021; Ministry of Transport 2021).	• **European Green Deal** (free residential areas for intensive transport flow and the creation of an environmentally friendly transport system. In addition, modern technology guarantees the possibility of "door-to-door") (The government of republic of the Lithuania, 2005; Ministry of Transport and Communications of Lithuania, 2021). • **Digitalisation and smart mobility** (Modern and sustainable multimodal transport system, safety and quality of service, The new generation of logistics centres ('freight villages') (The government of republic of the Lithuania, 2005; Ministry of Transport and Communications of Lithuania, 2021).

SMART criteria for SMART development	**SMART economy** (ensuring the competitiveness of international connectivity and logistics services) **SMART people, SMART governance**: (research and innovation u se, cooperation between researchers and policy makers) **SMART mobility** (multimodal public transport network with rail as the backbone of public transport, a safe and sustainable transport system) *Source of information:* On Transport Development Guidelines for 2021-2027. Ministry of Transport "On the Development of State Motorways from 2020 to 2040", 2021.	**SMART Living**: (National Traffic Safety Program "Vision 0" by 2030 – halve the number of road fatalities compared to 2019.) **SMART economy** (improve the quality of logistics services to stimulate the economy of the region **SMART mobility** (efficient use of various transport technological options, widely used modern IT, "cargo villages") *Source of information*: The government of republic of Lithuania. Long-term development strategy of the Lithuanian transport system until 2025, 2005. Ministry of Transport and Communications of Lithuania. Strategic Guidelines for National Road Maintenance and Development for 2022-2035., 2021.

Table Nr.3 **Road network performance indicators in Latvia and Lithuania have been determined and accumulated at the national level**

Criteria	The case of Latvia	The case of Lithuania
Goal	The total length of state highways is **20.034 km**. The average density of the national road network is 0.310 km per 1 km^2	The total length of state highways is **21.249 km.** The average density of the national road network is 0.325 km per 1 km2.
Performance-based indicators	- Traffic volume (average number of vehicles) - National research network statistics (construction works (km), road maintenance (EUR), traffic safety, traffic reference points and road weather stations, road funding *Source of information* : Statistical data of road netweork indicators in Latvia. Available at: https://lvceli.lv/celu-tikls/statistikas-dati/valsts-celu-tikla-dati/	- Dynamic traffic data (traffic meter data, road weather station data, EV charging stations, traffic control data) - Statistical data on motorways (road elements, road characteristics, environmental protection, road safety, speed cameras, data flow information, work on the road, statistical information) - Public transport data (GTFS data, NeTex data) *Source of information* : Statistical data of road network indicators in Latvia. Available at: https://lvceli.lv/celu-tikls/statistikas-dati/valsts-celu-tikla-dati/

Comparing the indicators of the concept of a smart road network of both countries, we can see that in the case of Lithuania they cover three broad areas – dynamic traffic data, statistical and public transport data. In the case of Latvia, however, there is untapped potential and opportunity for improvement. Looking from the perspective of benefits in the case of Latvia, there is an incomplete achievement of the

objectives of the European transport system (European Commission, 2020) in the field of sustainable, smart and resilient mobility.

Thus, the authors believe that by purposefully developing the intellectual transport system of Latvia (existing already since 2012!) with performance indicators determined and accumulated in Europe, a meaningful service is provided to traffic participants - information about weather conditions, public transport data, information on road load, congestion, accidents, stops, etc. For the public sector, on the other hand, making full use of data can help make informed, data-driven decisions. The State Audit Office (2024) in its audit on the introduction of intelligent transport system in Latvia found that by efficiently using and expanding the data structures of existing performance indicators, it is possible to develop services:

- information for travellers (both before and during travel – route planning, navigation);
- Monitoring weather and environmental changes
- Operation of the public transport service
- traffic management and management – management of road users along the road network, accident management, infrastructure maintenance)

The information provided by artificial intelligence POE (https://poe.com/chat/21jombjmonkxwlg5vg0, 04042024,) on smartness performance indicators in the Lithuanian road network (without statistical data in Table 3) provides a detailed description of the Smart Road Panevezys project, launched in 2018, which aims to create smart road infrastructure in Panevezys city. The project envisages the integration of different technologies and data-driven solutions to improve traffic management, improve road safety and provide real-time information to drivers. Some of the main features of the project include:

- **Smart traffic management system**: The project uses a network of sensors, cameras and other monitoring devices installed in the road network to collect data on traffic flow, congestion and road condition. This information is then processed and analysed in order to optimize the timing of traffic signals and manage traffic more effectively.
- **Variable message signs (VMS):** Variable message signs are installed on roads to provide drivers with real-time information such as traffic conditions, road closures, and alternative routes. It helps drivers make informed decisions and improves overall traffic management.
- Smart Parking System: The project involves the introduction of a smart parking system that provides real-time information about the availability of parking spaces in the city. Drivers can access this information through mobile apps or electronic signage, thereby reducing the time spent searching for parking spaces and reducing congestion.

- **Intelligent pedestrian crossings**: pedestrian crossings in the project area are equipped with sensors and LED lights that capture pedestrians and dynamically adjust the time of traffic lights to ensure safe crossing.

- **Data analysis and integration**: The project integrates a variety of data sources, including traffic data, weather information and public transport data, to make informed decisions and optimise the overall transport system. Data analytics is used to identify traffic patterns, predict congestion, and develop strategies to improve traffic flow.

The Panevezys Smart Road project is an example of how smart road technologies can be used to improve mobility, safety and efficiency in urban areas. Using data-driven solutions and advanced technologies, Lithuania is working to build a smarter and more sustainable transport infrastructure.

In 2022, Lithuania is the winner of this year's European Transport Safety Council (ETSC) Road Traffic Safety Indicators (PIN) award, recognizing significant improvements in road safety in the last decade. Of the European countries tracked by the ETSC, Lithuania was the only EU country to halve road traffic accidents by 50% between 2011 and 2021.

Conclusions

1. To explain and interpret the conceptual concept of smart, the authors used the comparison of the scientific axiom of empirical research with the concept of "smartness" to maintain a new perspective on the concept.

2. An empirical review discusses the transformation of the scope of the concept of smartness, from a smart road grid to an extension of the scope of the concept - a sustainable road network in smart areas, with a characterizing safe environment and harmless green energy of the multimodal ecosystem.

3. The use of the term "smart" in the road sector with the meaning "intelligent", "smart", "axis", "able to predict" to describe any type of available technology with a high innovative investment, thus highlighting the importance of "smart products" in the road network.

4. Considering the definition and main functions of the smart path, in reviewing the innovative technologies and strategies, the authors summarized the interpretation of the current smart era in the field of roads and the socially and environmentally sustainable mobility ecosystem of the scope of the concept in tomorrow.

5. A comparison has been made to the sustainable and smart mobility policy of Latvia and Lithuania in order to ensure the action directions set out in the European Commission's Sustainable and Smart Mobility Strategy and the prerequisites for the OECD road network "smart concept".

6. Compared to the diversity of data on the Lithuanian road network, public accessibility, the monitoring system in Latvia is complete and non-exhaustive.

7. Comparing the indicators of the concept of a smart road network of both countries, we can see that in the case of Lithuania they cover three broad areas – dynamic traffic data, statistical and public transport data. In the case of Latvia, however, there is untapped potential and opportunity for improvement.

8. In 2022, Lithuania received the Road Traffic Safety Indicators Award of the European Transport Safety Council for significant improvements in road safety in the last decade.

9. The Panevezys Smart Road Project (Lithuania), launched in 2018, is an example of how smart road technologies can be used to improve mobility, safety and efficiency in urban areas.

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CRISIS MANAGEMENT AS AN IMPORTANT ELEMENT OF THE STATE'S PREPARATION FOR HYBRID THREATS

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Abstract

Crisis management as an important element of the state's preparation for hybrid threats

Key Words: *security, state, hybrid threats, crisis management*

The main objective of this article is to analyze the country's preparedness for hybrid threats in relation to crisis management. The article discusses the issue of crisis management. The types of threats are presented next. The main part of the analysis was made of the state's preparedness and resilience to this type of threats. The research problem was formulated: What role does crisis management play in preparing a country for hybrid threats? The following hypothesis was adopted in accordance with the research problem: Effective crisis management enables a quick and effective response to hybrid threats, minimizing their effects and restoring stability and security. The study used the latest research presented in documents and reports, mainly from the report of the Supreme Audit Office, and an analysis based on scientific articles from recent years.

The study aims to understand and optimize the crisis management system in the context of hybrid threats, so that the state can effectively protect its strategic interests and the security of citizens in the face of increasingly complex threats of the modern world. In the article, the authors used appropriate research methods. Theoretical methods are: inference, comparison, analysis, synthesis, deduction and abstraction. The analysis and synthesis were used as methods to determine, on the basis of the literature on the subject, terms relating to the issues of security, hybrid threats and crisis management. Inference, abstraction, comparison and deduction were used to draw conclusions based on theoretical findings.

Kopsavilkums

Krīzes vadība kā svarīgs elements valsts sagatavošanā hibrīddraudiem

Atslēgvārdi: *drošība, valsts, hibrīddraudi, krīzes vadība*

Šī raksta galvenais mērķis ir analizēt valsts gatavību hibrīddraudiem saistībā ar krīžu vadību. Rakstā apskatīts krīzes pārvarēšanas jautājums. Tālāk ir aprakstīti draudu veidi. Galvenā analīzes daļa tika veikta par valsts gatavību un noturību pret šāda veida apdraudējumiem. Tika formulēta pētījuma problēma: Kāda ir krīzes pārvaldības loma valsts sagatavošanā hibrīddraudiem? Atbilstoši pētījuma problēmai tika pieņemta hipotēze: Efektīva krīžu vadība ļauj ātri un efektīvi reaģēt uz hibrīddraudiem, minimizējot to ietekmi un atjaunojot stabilitāti un drošību. Pētījumā izmantoti jaunākie dokumentos un ziņojumos izklāstītie pētījumi, galvenokārt no Augstākās kontroles ziņojuma, un uz pēdējo gadu zinātniskiem rakstiem balstīta analīze.

Pētījuma mērķis ir izprast un optimizēt krīzes vadības sistēmu hibrīddraudu kontekstā, lai valsts varētu efektīvi aizsargāt savas stratēģiskās intereses un iedzīvotāju drošību, saskaroties ar arvien sarežģītākiem mūsdienu pasaules draudiem. Rakstā autori izmantoja atbilstošas pētniecības metodes. Teorētiskās metodes ir: secinājumi, salīdzināšana, analīze, sintēze, atskaitīšana un abstrakcija. Analīze un sintēze tika izmantotas kā metodes, lai, pamatojoties uz literatūru par šo tēmu, noteiktu terminus, kas saistīti ar drošības, hibrīddraudu un krīzes pārvarēšanas jautājumiem. Secinājumi, abstrakcija, salīdzināšana un atskaitīšana tika izmantoti, lai izdarītu secinājumus, pamatojoties uz teorētiskiem konstatējumiem.

Introduction

Today's security environment is characterized by increasing complexity and unpredictability of threats, among which hybrid threats are becoming increasingly important. These complex and multifaceted forms of conflict conduct, combining traditional military activities with modern techniques such as cyberattacks, disinformation campaigns, economic activities and other forms of destabilization,

pose significant challenges to countries around the world. In the face of these challenges, crisis management becomes a key element of the state's preparations to effectively respond to such threats.

Crisis management encompasses a wide range of activities, from early warning and monitoring of threats, to the development of response plans and procedures, to the coordination of the activities of various government agencies and international organizations. In the era of globalization and dynamic technological development, effective crisis management requires the integration of various fields of knowledge and cooperation at many levels to ensure that countries can respond quickly and effectively to hybrid threats.

In this study, the authors focus on the analysis of the role of crisis management in the context of hybrid threats, discussing its key elements, challenges and strategies that can help minimize the effects of such threats. Conclusions and recommendations for further development of this field will also be presented, taking into account the need for further research that will allow countries to better prepare for future security challenges.

The study aims to understand and optimize the crisis management system in the context of hybrid threats, so that the state can effectively protect its strategic interests and the security of citizens in the face of increasingly complex threats of the modern world.

Methodology

To effectively examine crisis management as a key element of a state's preparedness for hybrid threats, a research approach was used, including qualitative analysis. The following are the main steps and tools used in this methodology. It began with an extensive review of the scientific and industry literature on hybrid threats and crisis management. Articles, reports, books and policy documents were analysed to identify key aspects, challenges and best practices in the field. The literature included both theoretical and empirical works that allowed for a broad understanding of the subject. Selected case studies were analysed that present specific examples of crisis management in situations of hybrid threats. The case studies covered different countries and situations, such as cyberattacks, disinformation campaigns or hybrid military-political activities. This analysis allowed to identify effective strategies and tools used in practice. On the basis of the collected data and analyses, conclusions and recommendations were developed to improve crisis management in the context of hybrid threats. These conclusions take into account both strategic and operational aspects and underline the need for further research and development. This methodology provided a comprehensive and interdisciplinary view of crisis management issues in the face of hybrid threats, enabling the development of comprehensive and practical recommendations.

In the article, the authors used appropriate research methods. Theoretical methods are: inference, comparison, analysis, synthesis, deduction and abstraction. The analysis and synthesis were used as methods to determine, on the basis of the literature on the subject, terms relating to the issues of security, hybrid threats and crisis management. Inference, abstraction, comparison and deduction were used to draw conclusions based on theoretical findings.

Discussion

Crisis management in the context of hybrid threats requires a comprehensive and integrated strategy that includes both traditional methods and modern approaches to countering threats. Hybrid threats are multifaceted and have the ability to quickly adapt to different environments, posing new challenges for countries and organisations. Early warning and monitoring of risks is a fundamental element of effective crisis management. Early warning systems, based on advanced information technologies, enable quick identification and analysis of potential threats. Such systems should be integrated into national and international information networks to ensure comprehensive monitoring of the situation. An example is cyber monitoring systems that analyze data in real time and identify suspicious activities. Another key element is preparation and planning. Create detailed response plans for different threat scenarios hybrid tests, including simulations and exercises, allows you to test the readiness and effectiveness of existing procedures. Regular conduct of such exercises increases the state's ability to react quickly in crisis situations. Effective crisis management also requires coordination and cooperation between various government agencies, international organizations, and the private sector. Hybrid threats often cross the borders of a single country, so international cooperation, information sharing and joint action are crucial. An example is international alliances, such as NATO, which support member states in their security and defence against hybrid threats. Communication and information play a key role in crisis management. Transparent and effective communication with citizens, the media and international partners helps to minimise panic, prevent disinformation and build trust. An example is the use of social media to quickly communicate threats and actions taken to combat them. The resilience of critical infrastructure to hybrid attacks is another important aspect. Such infrastructure, including energy, telecommunications, transport and other systems, must be designed and maintained taking into account the possibility of hybrid attacks. Investments in modern security technologies and regular security audits can significantly increase the resilience of the infrastructure to various threats. Education and social awareness are equally important. Raising public awareness of hybrid threats and educating citizens on basic security rules can significantly affect society's ability to respond appropriately to crisis situations. Information campaigns, training, and educational programs in schools can help build a culture of safety.

Further research is necessary for the continuous improvement of crisis management methods and strategies. Research on new techniques used by aggressors, analysis of the effectiveness of different crisis management strategies and the development of innovative technological solutions can contribute to better preparing countries for future challenges. International cooperation in the field of information exchange, joint research and the development of security standards is crucial for effective countering of hybrid threats. Initiatives such as international emergency drills and cooperation within international organizations can significantly increase global security. In conclusion, crisis management in the face of hybrid threats requires a comprehensive and integrated approach that takes into account both traditional methods and modern technologies and strategies. Cooperation, education, investment in infrastructure, and continuous research and development are key to effectively countering these complex threats.

Crisis management system in Poland

Intensive technological development, which brings many new threats, or progressive climate change, which significantly increases the probability of adverse technical and natural events, have made crisis management a very commonly used concept since the beginning of the 21st century. In Poland, as in other European countries, already at the turn of the 20th and 21st centuries, the creation of appropriate organizational and legal bases began to create an efficient system for ensuring the security of citizens in the event of crisis events (Krzeszowski, 2023: 102). An important inspiration for such actions were the events of July 1997, when a catastrophic flood caused enormous damage. The scale of these events forced politicians to take intensive legislative actions aimed at constructing a mechanism for counteracting adverse events, but also organizational solutions allowing for effective rescue operations at all levels of public administration (Włodarczyk 2021: 40).

Despite numerous attempts to define and systematize the concept of a "crisis management system", the lack of ambiguity in the literature and legal acts in this area is still noticeable. This leads to difficulties in unambiguously locating key elements of the system, including executive elements, which are often overlooked or treated very generally. According to the Crisis Management Act of 2007, crisis management is: *the activity of public administration bodies which is an element of managing national security, which consists in preventing crisis situations, preparing to take control over them by means of planned actions, responding in the event of crisis situations, removing their effects and restoring resources and critical infrastructure* (Authority of Crisis Management 2007).

The Crisis Management System is an integral part of the National Security System relating to one of the basic needs of every person as an individual and as a member of society (Nowicka, Ciekanowski 2017: 261). This is related to the need to provide citizens with protection against threats resulting from

natural disasters and catastrophes caused by both nature and human activity. Providing conditions for survival in situations of external threats is one of the key functions of the state. Creating conditions for the effective and efficient functioning of this system in the face of the growing number of non-military threats – while taking into account military threats – is the responsibility of state and local authorities (Cieślarczyk, Grzywacz 2015: 60).

In order to present the characteristics of the crisis management system in Poland, the phases of crisis management should be listed. They are also specified in the Crisis Management Act and consist of four elements:

- phase one: prevention;
- phase two: preparation;
- phase three: reacting:
- phase four: reconstruction.

The prevention phase should be understood as actions that reduce or eliminate the possibility of a disaster or eliminate its effects (Ciekanowski, Krysiński 2014: 49). The prevention phase is carried out on a continuous basis at the local, provincial and central levels. Prevention tasks are carried out by crisis management centres, assigned to structures of appropriate levels, which are on duty as part of their duties in the field of increasing state preparedness and for the needs of crisis management (Walczak 2009). The preparation phase consists in planning how to respond to a potential disaster and taking steps to increase the forces and resources necessary to carry out rescue operations. In this phase, an assessment of potential hazards, their nature and the likelihood of their occurrence is carried out. In this phase, planning and reconnaissance activities should be undertaken in terms of the forces and resources necessary to undertake rescue or logistical activities. The response phase includes actions taken after a disaster or natural disaster has occurred. These activities are aimed at limiting the damage and providing assistance to the injured. In this phase, all the negligence created in the previous phases may occur, including cumulative. The response phase is directly affected by the actions taken in the prevention and preparation phases, so the greater the negligence taken in these phases, the greater the problems that may arise during the response phase. The final phase is reconstruction, which includes actions taken to restore damaged systems to their pre-disaster state or to a better condition than they were before the disaster. These actions are taken after the hazard is controlled, in order to restore the normal state of functioning in the areas affected by the disaster, threat or disaster. In the rebuilt phase, it is necessary to analyze the reasons for the situation in order to eliminate them in the future (Ciekanowski, Marjański 2017: 107).

The presented phases build comprehensive crisis management, which aims to ensure the elimination of potential threats, preparation for their potential occurrence, appropriate and effective response after the occurrence of a dangerous event and effective actions taken after the occurrence of a danger in order to restore the state from before its occurrence. Poland has a multi-level crisis management system, which consists of such components as:

- Crisis management authorities;
- Consultative and advisory bodies competent for initiating and coordinating actions taken in the field of crisis management;
- Crisis management centers.

Crisis management bodies include: the Prime Minister, the Council of Ministers, the Minister in charge of the operation of government administration, the head of the central authority, the voivode, the district governor, the head of the commune head, the mayor, the president of the city.

The consultative and advisory bodies include: the government crisis management team, the crisis management team (ministry, central office), the provincial crisis management team, the district crisis management team and the municipal crisis management team. Crisis management centres include: the government centre for security, the crisis management centre (ministry, central office), the provincial crisis management centre, the district crisis management centre and municipal crisis management centres (Żmigrodzki 2012: 87).

All these elements make up the structure of crisis management in the state, which in territorial terms is as follows:

1. National Level:
   - Prime Minister;
   - Council of Ministers;
   - Government Crisis Management Team;
   - Government Centre for Security.

2. Departmental level:
   - Minister in charge of the government administration department;
   - Head of the central authority;
   - Crisis Management Team (ministry, central office);
   - Crisis Management Centre (ministry, central office).

3. Provincial level:
   - Voivode;

- Provincial Complex of the Prison Complex;

- Provincial Centre of the Prison;

- Mayor.

4. District level:

- District Complex of ZK;

- District Centre of ZK.

5. Municipal level:

- Wójt (Mayor, President);

- Communal Complex of ZK;

- Communal Centre of ZK[1].

In Poland, the crisis management system is constructed in a bottom-up orientation, in which the services at the level that is appropriate to eliminate them react to the occurring threat. All elements that make up the structure of the crisis management system and the crisis management system have their tasks, which are defined by law.

An important element of the crisis management system in Poland are planning documents, which consist of: crisis management plans, a report on threats to national security and the National Program for the Protection of Critical Infrastructure.

Crisis management plans are created at the national level, separately for the needs of individual ministries and the government, at the provincial, district and municipal levels. They are drawn up in order to determine the actions that are necessary to be taken in crisis situations. They also define responsibility for specific actions, the nature of actions to be taken and indicate with whom to cooperate. The report on threats to national security is prepared on the basis of partial reports, which are prepared by ministers of government administration, heads of central offices and voivodes. This report is created in order to determine the greatest threats to Polish, which are the basis for creating crisis management plans.

The National Programme for Critical Infrastructure Protection is prepared to improve the security of critical infrastructure in Poland. This program defines the nature and objectives of critical infrastructure protection, visions of cooperation, and defines the roles for individual elements involved in its protection. To sum up, the crisis management system in Poland is a key element of the national security system, aimed at protecting citizens against various threats, both natural and man-made. Its effective functioning is based on comprehensive planning and coordination of activities at all levels of

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[1] https://www.czk.pl/index.php [access: 13.02.2022]

administration – from national, through provincial and county, to communal. Within this system, crisis management plans, reports on threats to national security and the National Programme for the Protection of Critical Infrastructure play a special role. These documents enable the identification of threats, planning appropriate actions and cooperation between various entities responsible for crisis management (Wilińska 2015: 133).

All elements of the crisis management system are designed to achieve a state in which the response to crisis situations in the state is effective, thus ensuring the security of citizens and the stability of the state's functioning.

Types of threats

Ensuring national security should be a fundamental goal of every state, including Polish, which is reflected in the constitution, which indicates that ensuring the security of citizens, as well as the inviolability of the territory is crucial (Constitution Polish Republic 1997). The concept of national security has changed significantly over the years. Initially, security was perceived through the military prism, which was considered the most important, and sometimes the only area of interest. However, with the changing environment over the years, new threats, not only of a military nature, began to be quickly identified. A threat in the simplest sense can be described as a lack of security, thus making it an inseparable element in human life. Knowledge of threats and their identification are the basic condition for taking preventive measures and organizing effective defense. One of the basic models of threat classification classifies them as:

- political;
- economic;
- psychosocial;
- ecological;
- military (Ciekanowski 2010: 31).

Political threats arise from the deliberate and organized manipulation of ideologies and organizational structures in order to overthrow legitimate authority. Such actions can lead to the establishment of an undemocratic government that can make decisions contrary to national interests. Examples of such threats include coups d'état, political coups, as well as the activities of extremist organisations seeking to destabilise the country's political system.

Economic threats arise as a result of the violation of the ability of the national economy to meet the basic needs of society. These can include financial crises, high inflation, unemployment, as well as adverse changes in international trade. The result of such threats is the deterioration of the quality of life

of citizens and the limitation of the possibilities of technological and productive development of the country.

Psychosocial risks are associated with a planned impact on social consciousness using methods of political and propaganda subversion. The aim of such actions is to evoke emotions conducive to the destabilization of the state's defense system. Examples include disinformation campaigns, the spread of fake news, as well as the use of social media to manipulate public opinion.

Ecological threats result from activities that change the natural relationship between humans and the environment. They can lead to environmental degradation, reduced biodiversity, and even natural disasters such as floods, droughts, and forest fires. The long-term effects of such threats can include climate change, which threatens the survival of humanity.

Military threats occur when the goals of state policy are contrary to the policy goals of other countries, and the conflict can only be resolved through military action. Military threats include demonstrations of force, sabotage, blockades, provocations, blackmail and border incidents. The most extreme forms are armed clashes and wars, which can lead to serious material and human losses.

Hazard typology is a key element of risk analysis, enabling the understanding and classification of the different types of hazards that can affect society. This chapter will discuss various hazard typologies, which can be divided into several categories: objective, sources of threats, environments and the extent of threats (Mroczko 2012: 64)

Subject hazards refer to different areas of life that may be affected by specific risks. In this category, we distinguish political threats related to political instability, corruption, terrorism, internal and international conflicts. Military threats result from warfare, armaments, arms race and external aggression. Economic threats concern the economy, such as financial crises, unemployment, inflation and social inequality. Social threats include social problems such as crime, social pathologies, migration and social inequalities. Ecological threats are associated with environmental degradation, climate change, pollution and natural disasters (Bąk, Błażejewska 2018: 12).

Sources of hazard are factors that cause or may cause hazards. They can be divided into several main categories: natural, technical, systemic, demographic, ideological, economic, educational, psychological and cultural. Natural hazards include natural disasters such as earthquakes, hurricanes, floods, and forest fires. Technical hazards result from technological failures, engineering errors, industrial disasters and traffic accidents. Systemic threats are related to the political and legal system, such as authoritarianism, corruption and administrative inefficiency. Demographic problems include an aging population, migration, overpopulation and a decline in births. Ideological threats stem from

ideological extremism, radicalisation and cultural conflicts. Economic risks relate to economic problems such as recessions, financial crises and economic inequality. Educational problems include low level of education, lack of access to education and insufficient professional competences. Psychological risks include stress, depression, social alienation, and mental health problems. Cultural threats are related to cultural conflicts, loss of cultural identity, and erosion of social values (Pawliszak 2018: 223).

Threats can come from different environments that surround individuals and societies. We distinguish here natural, social, political, economic and scientific and technical environments. The natural environment includes natural resources, ecosystems and climatic conditions. The social environment is social structures, interpersonal relations and social norms. The political environment includes political institutions, law and international relations. The economic environment includes the labour market, economic systems and businesses. The scientific and technical environment includes the development of science, technology and innovation. The extent of the hazards determines in which area a given threat can have an effect. We can distinguish here the global, continental, regional and local levels. Global threats are global, such as climate change, pandemics and financial crises. Continental threats affect entire continents, such as population migration, armed conflicts and economic problems. Regional hazards refer to specific geographical regions, such as natural disasters, ethnic conflicts, and regional economic crises. Local threats affect smaller, local areas, such as cities, municipalities or specific communities (Sobolewski, Sikora 2014: 39).

Hazard typology analysis allows us to better understand and prepare for the diverse risks that can affect our lives. This classification is an important tool in crisis management and planning preventive actions. The hazard typology presented in this chapter allows you to understand and classify the various risks that may affect society. The subject category includes political, military, economic, social and ecological threats. The sources of threats are diverse and include natural, technical, systemic, demographic, ideological, economic, educational, psychological and cultural factors. These threats can come from various environments: natural, social, political, economic, and scientific and technical. Their reach can be global, continental, regional, or local.

Today's threats are increasingly hybrid in nature, combining elements of different categories and sources. An example is cyberattacks, which can have both technical and political aspects, affecting critical infrastructure and destabilizing state systems. Hybrid threats require a new approach to risk analysis and crisis management, integrating various areas of knowledge and practice to effectively counteract and minimize their impact on society (Rogozińska 2021: 60). Maintaining the state of security at an appropriate level is the primary task of the state, thus creating the possibility of the existence of

society, its development and maintaining its independence and sovereignty (Ciekanowski, Ulijasz 2015: 73). In order to maintain this state, the state must also identify hybrid threats, which are becoming common threats. Poland is constantly the target of hybrid attacks, so ensuring effective mechanisms to counteract these threats is crucial. It is important to assess the effectiveness of the Polish state against hybrid threats, which will be the main task of the last part of this article.

State resilience to hybrid threats

The modern world is becoming increasingly complex and dynamic, creating new challenges for national security. In recent years, there has been more and more talk about hybrid threats, which are a combination of traditional military operations with various forms of unconventional attacks. The term "hybrid threats" encompasses a wide range of activities, such as cyberattacks, disinformation, information warfare, terrorism, the use of economic means, as well as political actions aimed at destabilizing the state.

Hybrid threats are complex and coordinated actions that combine different methods and tools to achieve the strategic goals of an adversary. They are characterized by the fact that they are difficult to clearly identify and attribute to a specific actor. These often include cyber activities, psychological operations, disinformation campaigns, as well as the use of proxy groups such as separatist militias or private military companies (Chudoba 2023).

A state's resilience to hybrid threats is a key element of modern security strategy. It includes the ability to anticipate, identify, respond to and neutralize a variety of threats in an effective and coordinated manner. This resilience is not only the domain of the armed forces, but requires the involvement of many sectors, including public administration, the private sector, civil society, and international cooperation (Keplin 2023: 20). Hybrid activities can be carried out in various ways. Diagram 1 below presents the ways of conducting hybrid activities.

multidimensional
- may involve several activities at the same time

secretive
- making it difficult to identify the enemy and attributing responsibility for them to the perpetrator

planned and coordinated
- are often spread over a longer period of time;

combining different measures
- exerting pressure and addiction from a potential aggressor

conducted indirectly
- using local entities and organizations and private individuals, which makes it difficult to detect and counteract them

using means
- political, economic, legal, military and social, including using various types of social communication channels.
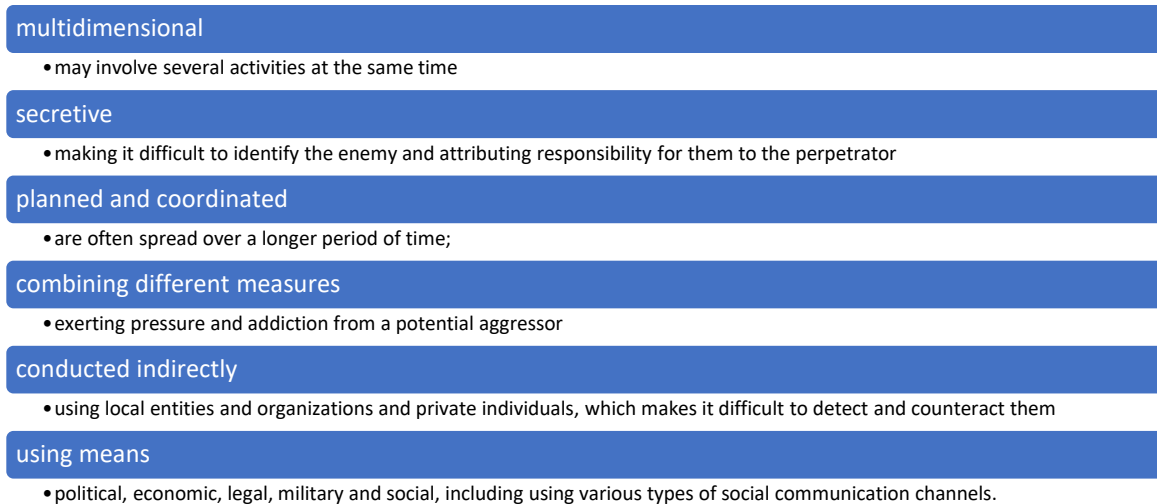
Figure 1. **Ways of conducting hybrid activities.**
Source: NIK report, Preparing the state for the threats associated with hybrid activities, 2023.

Hybrid operations are a comprehensive strategy that combines a variety of means, such as military, cyber, informational, and psychological, to achieve strategic goals. One of the basic elements of these activities are information operations. In this case, disinformation plays a key role. It involves the deliberate dissemination of false information to mislead the public, destabilise the political situation or undermine trust in institutions. In parallel, propaganda is used to manipulate information in a way that reinforces certain narratives and weakens the opposing ones. Figure 2 below shows the types of operations that can be implemented under hybrid actions.

information psychological activities of a terrorist nature

criminal
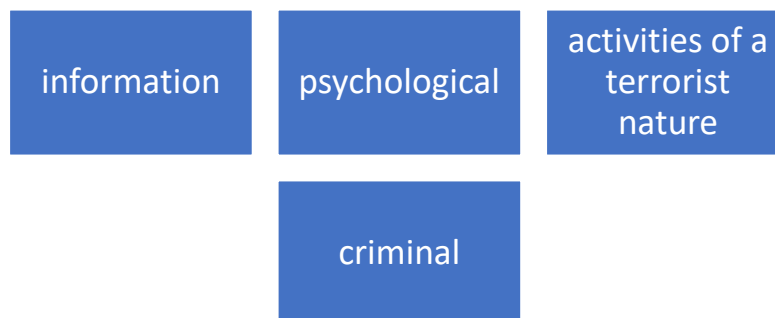
Figure 2. **Types of operations that can be implemented under hybrid activities.**

Media manipulation, both traditional and social, is also widely used to shape public opinion in line with the intentions of the hybrid operator. Psychological activities are another important aspect. Psychological Operations (PSYOPS) are aimed at influencing the morale, beliefs, emotions, and behaviors of both civilians and military populations and political leaders. Intimidation, or intimidation, also plays an important role in these activities. By creating an atmosphere of fear, aggressors can paralyze

the opponent's actions and force him to make unfavorable decisions. Terrorist activities are another element of hybrid activities. Terrorist attacks, whether directed against civilians or symbolic targets, are intended to create widespread fear and destabilisation. Sabotage, i.e. the deliberate destruction of critical infrastructure, is also used to disrupt the functioning of a state or organization. In the context of criminal activities, hybrid activities often also include organized crime. Examples include activities aimed at money laundering, human trafficking, or arms smuggling. These actions not only destabilize countries internally, but can also be used to finance other aspects of hybrid activities.

Hybrid activities are therefore a complex combination of various techniques and strategies, which together form a powerful tool in the hands of states or organizations striving to achieve their goals without having to engage in open war. According to the Supreme Audit Office (NIK), the most important role in counteracting hybrid threats is played by national security entities, including entities responsible for managing this security, constituting the defense and protection potential of the state. For this reason, it is important to prepare public administration, services, inspections, guards and armed forces to respond to hybrid threats, also by giving them appropriate competences and providing forces and resources in the event of an unexpected escalation of the crisis. Military means used by the enemy as part of hybrid operations may camouflage preparations for the actual use of the armed forces (e.g., unannounced military exercises accompanied by a large concentration of armed forces).

The results of the 2023 NIK audit indicate the need to legally organize and practically intensify the activities of central level units, including national security entities, in the process of preventing and combating hybrid threats. At the same time, the Supreme Audit Office shares the view expressed in the National Crisis Management Plan, which emphasizes the important role of preparing the entire public administration, services, inspections and guards, and the armed forces to respond to hybrid threats. That is why it is so important to precisely define the appropriate competences and to provide forces and resources in the event of an unexpected escalation of the crisis.

Conclusion

Crisis management is a fundamental element in the preparation of the state for hybrid threats, which combine traditional and non-traditional forms of conflict. These threats can include military action, cyberattacks, disinformation, economic pressure, and other forms of destabilization. Effective crisis management enables a quick and effective response to these threats, minimizing their effects and restoring stability and security.

In the context of hybrid threats, effective crisis management requires an integrated approach. It is important to establish early warning systems and continuous monitoring of potential threats. It is also

crucial to develop detailed plans for responding to various crisis scenarios, which allows for quick and adequate action. Coordination and cooperation between various government agencies, international organizations and the private sector is essential for effective crisis management. Regular training and simulations make it possible to check the readiness and effectiveness of crisis management procedures, and transparent and effective communication with citizens and the media helps to minimize panic and disinformation. An important element is also to increase the resilience of critical infrastructure to various hybrid attacks.

States must be flexible and able to adapt in the face of dynamically changing hybrid threats. Investments in modern technologies and information systems are essential for effective crisis management. It is equally important to raise public awareness of hybrid threats and educate citizens on basic security rules. Hybrid threats are often cross-border in nature, so international cooperation is crucial for effective countermeasures.

Further research into the evolution of hybrid threats is necessary to understand the new methods and techniques used by aggressors. Analysing and optimising existing crisis management structures will help you better prepare for future threats. It is also important to study the effectiveness of different crisis management strategies and tools and to adapt them to the specific conditions and needs of individual countries. Finally, the development of international mechanisms for cooperation and information exchange can significantly contribute to increasing global security in the face of hybrid threats.

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IZGLĪTĪBAS ZINĀTNES, PSIHOLOĢIJA /
EDUCATIONAL SCIENCES, PSIHOLOGY

APPROBATION OF THE CRITICAL THINKING TEST FOR THE EVALUATION OF REFLECTION SKILLS IN THE 7TH GRADE OF THE GYMNASIUM

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Abstract
     Approbation of the critical thinking test for the evaluation of reflection skills in the 7th grade of the gymnasium
Key Words: critical thinking, reflection, reflection skills, critical thinking evaluation tests.
Introduction: Critical thinking is an essential skill therefore, teachers have to have a tool to measure it. It is a process in which methods are used to do an objective and critical evaluation of information, ideas and to reasonably reflect of one's accomplishments.
Objective: To validate the Critical Thinking Test developed by USA Professor H.R. Ennis as a teaching tool. The Cornell Test X is designed for students aged 5 to 12+.
Methods: The test was validated in the 7th grade because students come to the Gymnasium from different schools, it is a reference point for students critical thinking skills, and Gymnasium implements the second cycle of primary education.
Results: The study obtained a maximum score of 48 out of 71 out of 113 test results, the average level is 50.4%. 48.7% of students have a high level.
Conclusions: The analysis of the empirical study concludes that there is no significant difference between genders. If we look at the highest score, the results show that some students have good critical thinking skills, but if we look at the overall score, we can conclude that students critical thinking skills are average. The test results do show that there are differences in skills between the blocks, with the lowest scores shown in the identification of assumptions. And as this study concludes, the students' results are only 27%, which is average according to the assessment criteria. So critical thinking skills should be improved and developed. Also, if the average score is taken as the mean score, then the average score in the test is 33 points or 48%, it can be concluded that overall, the students' critical thinking skills are at an average level.

Kopsavilkums
          Kritiskās domāšanas testa aprobācija refleksijas prasmju novērtēšanai ģimnāzijas 7. klasē
Atslēgvārdi: kritiskā domāšana, reflesijas prasmes, refleksija, kritiskās domāšanas novērtēšanas testi
Ievads: Kritiskā domāšana ir būtiska prasme, kas jāapgūst katram skolēnam, tāpēc skolotājiem nepieciešami instrumenti to izmērīšanai. Tas ir process, kurā tiek izmantotas dažādas metodes, lai veiktu kritisku novērtējumu un reflektētu par saviem sasniegumiem.
Mērķis: aprobēt ASV profesora H. R. Ennis kritiskās domāšanas testu, kas domāts kā kritiskās domāšanas novērtēšanas rīks. *Cornella tests* X ir paredzēts skolēniem 5 - 12+ gadu vecumam.
Metodes: Tests aprobēts ģimnāzijas 7. klasē, jo skolēni atnāk no dažādām skolām, un šis posms ir kā atskaites punkts par skolēnu kritiskās domāšanas prasmēm, jo ģimnāzija īsteno pamatizglītības otrā posma izglītības programmu.
Rezultāti: Pētījumā no 113 iegūtajiem testa rezultātiem iegūtais maksimālais punktu skaits ir 48 no 71 jeb augsts līmenis, ņemot vērā, ka šie 7.klases skolēni tikko uzsākuši mācības ģimnāzijā. Vidējs līmenis ir 50,4 % skolēnu un augsts līmenis ir 48,7 % skolēnu.
Secinājumi: Veicot empīriskā pētījuma analīzi, secināts - nav nozīmīgas atšķirības starp dzimumiem. Vērtējot pēc augstākā iegūtā punkta skaita, rezultāti parāda, ka dažiem skolēniem ir labas kritiskās domāšanas prasmes. Testa rezultāti parāda atšķirības prasmēs starp blokiem, viszemākie rezultāti uzrādīti pieņēmumu identifikācijā. Pieņēmumu identificēšana un analīze argumentos ir galvenā kritiskās domāšanas prasme. Pētijumā secināts, ka skolēnu rezultāti ir tikai 27 % jeb vidējs līmenis. Kritiskās domāšanas prasmes būtu jāuzlabo, jāpilnveido. Ja vērtē pēc iegūtā punkta skaita, testā ir iegūti vidēji 33 punkti jeb 48 %. Var secināt, ka skolēnu kritiskās domāšanas prasmes ir vidējā līmenī.

Introduction

As the education system changed, so did the standards and contents of education. At every stage of education, students need to understand where and how they will apply their knowledge in everyday life, to be able to evaluate themselves and to argue their opinions. Skills such as critical thinking and reflection are increasingly important.

Students need to be encouraged to use critical thinking skills (Merma - Molina, G., et.al., 2022) and they develop critical thinking skills, for example, when they analyze and evaluate data about objects, situations, events, and processes. Students can analyze and evaluate the use of percentages in everyday life, in media materials, consciously follow the process of calculations in general and check the results. Education is essentially a process that promotes learning, the acquisition of knowledge, skills, values, morals, beliefs, habits, and personal development for each student. The ability of each student to adequately evaluate themselves is crucial in the learning process and is closely linked to reflective skills. The educator plays a key role in the development of learners' reflective skills, as teaching and learning are a two-way process.

Critical thinking is a rational, question-oriented way of thinking where students are encouraged to think and express themselves critically. One of the pressing challenges of contemporary pedagogy is to identify the opportunities for improving critical thinking. (Rubene, 2009)

If students were taught to combine critical thinking about others with critical self-reflection, they would not have difficulties in reflecting qualitatively on their achievements. (Procevska, 2021)

One of the founders of the critical thinking movement, R. H. Ennis, believes that critical thinking is a process aimed at making sensible decisions about what is right and what to do. (Ennis, 1996). Ennis refined his definition a few years later - that critical thinking is rational reflective thinking. (Ennis, 2013)

Critical thinking involves a wide range of thinking skills that lead to desired outcomes, while reflective thinking focuses on the process of making judgements about what has happened. However, reflective thinking and reflection skills are important for promoting learning in complex problem-solving situations as they enable students to step back and reflect on how they actually solved the problem and how to use a particular set of problem-solving strategies to achieve their goals.

The main problem is how to determine whether a student is able to think critically and reflect on their achievements and how to assess these skills? A critical thinking test will help to diagnose a student's ability to analyze information, evaluate arguments, assess trials of solutions and the ability to draw logical conclusions, as reflective thinking is part of the critical thinking process, in particular the process of analyzing what has happened and making judgements (see Fig. 1).

Methods

Reflection is an important part of the learning process, developing students' critical thinking skills.
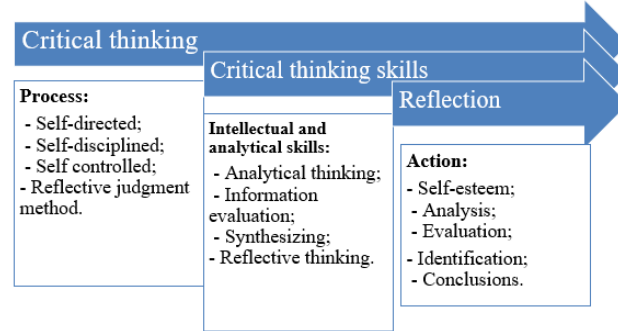
Fig.1. **The relationship between critical thinking and reflection**

A variety of skills can be used to develop critical thinking, which is acquired through learning. Reflection is one of the critical thinking skills that can be improved and developed throughout the learning process. Different techniques can be used to improve critical thinking through reflection skills, and there are also different tools that can help to assess the level of reflection skills, such as critical thinking exercises, tutorials, and tests. (Kūlis, 2018).

A critical thinking assessment test is a tool that can be used to assess individuals' ability to think critically, use a logical and analytical approach to solve problems and make decisions. Critical thinking assessment tests can be useful in schools, colleges, job interviews and many other contexts where the ability to think critically and solve problems is required.

The Cornell Critical Thinking Test is a widely used measure of critical thinking designed for use in educational settings for students in grades 4-12.

The Cornell Critical Thinking Test (CCTT) is one of many multiple-choice, validated tests that measure general critical thinking skills.

The Cornell Critical Thinking Test therefore consists of 4 blocks or strategies:

1. Induction (Hypothesis Testing) as in logical thinking and undersanding of argument's credibility (questions 3 – 25);
2. Credibility of Sources & Observation as in information evaluation skill (questions 27 – 50);
3. Deduction as in analytic thinking skill (questions 52 – 65);
4. Assumption Identification as in critical thinking (questions 67 – 76). (Ennis & Millman, 2005).

It contains 71 multiple-choice questions, takes about 50 minutes to complete, has three answer options (only one is correct), is scored based on the number of correct answers, and can be used to assess students' strengths and weaknesses in critical thinking skills.

Results

Based on the test author's (R.H. Ennis) reasoning that if respondents answered more than 85% of the questions correctly, this is a very high level and indicates excellent critical thinking skills (Ennis & Millman, 2005), and V. Vorobjov's four descriptions of the level of critical thinking, if students have strong critical thinking skills, then they can evaluate results objectively, with a healthy skepticism; if they have good critical thinking skills, then they interpret, analyze, draw conclusions and evaluate well, but may have imprecision in judgements, if these skills are moderate then they are able to interpret the results literally and draw conclusions comprehensively, but if the skills are low or non-existent then they make poor and uncritical judgements, analysis, evaluation, interpretation and conclusions due to lack of knowledge. (Vorobjovs, 2021).

The maximum score is only 43 out of 71. The mode of the data is 32, or 4 students, so it can be concluded that the most frequent students in this study scored 32 points, or 45% of the total maximum score. 14 students scored 50% or more. The highest score was a student who scored 60% correct on this test, but this is not an accurate indicator to draw valid conclusions about a student's critical thinking skills.

Analyzing the data by gender, out of 113 respondents, 42 were boys and 71 were girls. When examining the difference in data between girls and boys, it can be concluded that gender does not play a significant role in the level of competence. (see Table 1)

	Gender	Number of respondents	Standard deviations	Standard mistakes
Competence level	Boys	42	0,552	0,085
	Girls	71	0,503	0,060

Table 1. **Level of competence by gender**

Summarizing the students' answers to Section 1 questions, or the induction questions, no students answered all 23 questions correctly, only 1 student 20th – 22nd answered correctly question. In the data mode, only 2 students 5th – 8th questions answered correctly, 18 students answered at least 65% of all questions correctly. When analyzing students' answers to the Section 2 questions on reliability of sources and observations, no students answered all 24 questions correctly, while 18 students answered 12

questions correctly, i.e. half of them. The maximum score was 19 out of 24, which was achieved by 1 student. Data mode - 2, or 2 students were able to answer at least 16 questions correctly. The reliability of the sources and observations is mediocre, with only 47% of students answering this section correctly. When analyzing the students' answers to the Section 3 questions or the deduction questions, 2 students answered all 14 questions correctly. From $7^{th} – 8^{th}$ question, 15 students answered correctly, but the highest number of correct answers was 21 students for only 5 questions, or only 19%. When the data is examined by question, the highest number of correct answers is for question 65, 82 respondents answered correctly, or 73%. The lowest score was for question 61. When analyzing the students' answers to the questions in section 4, or hypotheses, no respondent answered all 10 questions correctly. Only 1 student answered 7 questions correctly. 36 students answered only 2 questions correctly. The highest number of correct answers, 54, was given to question 67, while the lowest number of correct answers was given to question 69, with only 7 correct answers When examining the closeness of the correlation between the questions, whether the correlation coefficient can be considered statistically significant depends on the sample size, it is concluded that the sample size r = 113, so r $_{0,05;113}$ = 0,185. Correlation is reliable if r = 0.185. An examination of the data suggests that the results are statistically significant, as the correlation between inference and confidence is 0.350. So, with 99% confidence, the results of one block will increase the results of the other. If students have deductive skills, or the ability to draw conclusions from multiple statements, then they will also develop credibility or source evaluation skills and will be able to evaluate information confidently when given plausible reasoning statements. Similarly, the correlation between induction and reliability is 0.315, so with 99% confidence it can be concluded that if general judgements can be made from specific ones, then the reliability of sources can be assessed.

If we also examine the correlation between the assumption and deduction blocks, we can conclude that r = 208, i.e. there is a significant correlation in 95% of cases and the relationship between the two variables is moderately strong. It can be concluded that if students have deductive skills, they will also have presuppositional or critical thinking skills to make sound decisions based on the available evidence.

Also, by performing an analysis of variance, it can be concluded that there is no statistically significant difference between the blocks as the Sig scores range from 0.701 - 0.866.

Conclusions

To summarize, the induction block scores higher, with 60% correct answers. Thus, students have sufficient skills to reach a general conclusion from individual cases and are able to find, classify and hypothesize. There is no significant difference between the plausibility and deduction blocks, as the percentages of correct answers are the same at 47% and 48%. Here we can conclude that the students'

skills are mediocre in order to form or derive a third judgment from two, so they are not really able to summarize all the facts in order to draw the right conclusions.

The lowest scores are in the Assumptions Identification block, at just 28%. It can be concluded that students' skills in this respect are low, i.e. they have not developed the ability to question their own judgements, they believe that their beliefs are true and do not know how to question them. Although identifying assumptions is the most important part of critical thinking, by questioning one's assumptions one can learn to analyze more carefully the information or statement given and to consider or even make alternative decisions.

If we judge by levels of competence, no student has a low level. Therefore, it can be concluded that 56 students have a medium level of competence in critical thinking and the remaining 48% have a high level of competence in critical thinking. No students have a very high level because the maximum score obtained in this test is 48 points or 68% and this was obtained by 1 respondent, a girl.

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PATTERNS OF PARENT-CHILD RELATIONSHIPS IN LATVIAN EMERGING ADULTHOOD: A CLUSTER ANALYSIS APPROACH

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Abstract
      Patterns of parent-child relationships in Latvian emerging adulthood: a cluster analysis approach
Key Words: *Emerging adulthood, family relationships, perceived parent-child relationships*
The onset of emerging adulthood marks a crucial stage marked by substantial changes in family dynamics. The journey into adulthood marks a notable milestone in the developmental pathway of families, encapsulating the phases of parent-child disengagement, the integration of this detachment, and the reconfiguration of roles within familial frameworks. This person-centred study aims to identify clusters of perceived parent-child relationships. Perceptions of Parents Scales (POPS) were utilized to assess parent-child relationships, with the College-Student Scale measuring six subscales: mother and father Autonomy Support, mother and father Involvement, and mother and father Warmth. The study comprised emerging adults (total N = 408, 67% women) aged between 18–29 (M = 21.20, SD = 2.83). Two-step cluster analyses were employed to create perceived parent-child relationship clusters. Hierarchical cluster analysis using Ward's method was conducted in the first step, followed by a k-means clustering procedure in the second step. Perceived parent-child relationship clusters were categorized as low-quality family relationships, low mother and moderately high father quality family relationships, low father and moderately high mother quality family relationships, high-quality family relationships, moderately low-quality family relationships, moderately high-quality family relationships and non-differentiated.

Kopsavilkums
      Latvijas jauniešu vecāku - bērnu attiecību klāsteri: klasteranalīzes pieeja
Atslēgvārdi*: jaunieši, ģimenes attiecības, uztvertās vecāku bērnu attiecības*
Jauniešu vecumposma iezīmē būtisku ģimenisko attiecību pārstrukturizēšanās posmu, ko raksturo ievērojamas izmaiņas ģimenes dinamikā. Izmaiņas ir saistītas ar jauniešu un vecāku atdalīšanos fāzi, šīs atdalīšanās integrāciju un lomu pārkonfigurāciju ģimenes struktūrā. Šī pētījuma mērķis ir identificēt kā jaunieši uztver attiecības ar vecākiem, tādējādi ar klāsteranalīzes palīdzību izdalot jauniešu vecāku attiecību klāsterus. Lai noteiktu jauniešu uzskatus par attiecībāma ar vecākiem tika izmantota Vecāku atttiecību uztveres aptauja, kas domāta jauniešu vecumpsomam. Šī aptauja mēra sešas apakšskalas: mātes un tēva autonomijas atbalstu, mātes un tēva iesaistīšanos un mātes un tēva sirsnīgumu. Pētījumā piedalījās jaunieši (N = 408, 67% sievietes), vecumā no 18 - 29 gadiem (M = 21.20, SD = 2.83). Lai noteiktu jauniešu-vecāku attiecību klāsterus tika izmantota divu soļu klāsteranalīze. Pirmajā klāsteranalīzes solī dati tika analizēti ar hierarhisko klāsteranalīzes metodi *Ward's* un balstoties uz analīzes rezultātiem tie tika izmantoti, lai veiktu k-means klāsteranalīzi. Klāsteranalīzes rezultātā tika izdalīti sekojošie klāsteri: zemas kvalitātes ģimenes attiecības, zemas mātes un vidēji augstas tēva kvalitātes ģimenes attiecības, zemas tēva un vidēji augstas mātes kvalitātes ģimenes attiecības, augstas kvalitātes ģimenes attiecības, vidēji zemas kvalitātes ģimenes attiecības, vidēji augstas kvalitātes ģimenes attiecības un nediferencētais.

Introduction

      Emerging adulthood is a distinct developmental period occurring between the ages of 18 and 29 (Arnett 2015), marked by the transition from adolescence to adulthood. This phase was first conceptualized by Jeffrey Arnett in 2000 (Arnett 2000). Prolonged and more widespread education, delayed entry into parenthood and marriage, and the transition to stable employment characterize emerging adulthood as a new life stage. This period is critical for development, characterized by exploration, instability, self-focus, a sense of being in-between, and optimism. The top three criteria for adulthood include accepting responsibility for oneself, making independent decisions, and becoming financially independent. One of the key developmental tasks and challenges during emerging adulthood is establishing independence (Arnett 2015).

Self-Determination Theory (SDT), developed by psychologists Edward Deci and Richard Ryan in 1985, is a comprehensive framework for understanding human motivation and personality. This theory emphasizes the extent to which human behaviours are self-motivated and self-determined, focusing on three fundamental psychological needs: autonomy, competence, and relatedness. SDT has been extensively applied across various domains, including education, work, relationships, sports, and healthcare.

A significant component of SDT is the Basic Psychological Needs Theory (BPNT), which posits that individuals have a limited set of basic psychological needs essential for psychological health and well-being. Although the theory is open to the potential inclusion of additional needs, these three are currently recognized as crucial (autonomy, competence, and relatedness). BPNT is particularly relevant in the context of parental influence, as it explores how supportive environments can facilitate the fulfilment of these needs. The Perceptions of Parents Scales (POPS) College-Student Scale, developed by Robbins in 1994, assesses students' perceptions of their parents' support concerning autonomy, competence, and relatedness. Specifically, autonomy support refers to how parents encourage self-initiation and provide rationales for their children's requests. Competence support involves parents offering feedback and opportunities for skill development, while relatedness support pertains to the emotional connection and warmth parents provide (Robbins 1994). Autonomy support from parents is linked to greater intrinsic motivation, which enhances engagement and persistence in various activities (Deci, Vallerand, Pelletier & Ryan 1991). Satisfaction of the needs for autonomy, competence, and relatedness is strongly associated with higher levels of self-esteem, life satisfaction, and overall well-being (Vansteenkiste, Zhou, Lens & Soenens, 2006, *Steele & McKinney 2019*). Competence support from parents promotes better academic outcomes and social skills, contributing to overall success in life (Joussemet, Landry & Koestner 2005, Soenens & Vansteenkiste 2005).

Studies regarding the parental context have received considerable attention in the research literature focused on families with children and adolescents; however, less attention has been given to outcomes in emerging adults (McKinney & Brown 2017, Parra, Sánchez-Queija, Garcia-Mendoza, Coimbra, Egídio Oliveira & Díez 2019). There is a need for the conceptualization of parenting styles during emerging adulthood.

A small number of studies have used person-cantered approaches to examine styles of parenting across dimensions of parenting in emerging adulthood. Two such studies involved samples of university students in the United States (Nelson, Padilla-Walker, Christensen, Evans & Carroll 2011) and Spain (Mendoza, Queija & Jimenez 2018) (Jensen, Navarro, Chase, Wyman & Lippold 2024).

In analyzing family relationships during the emerging adulthood period, Mendoza, Queija, and Jimenez (2018) distinguish three clusters. These clusters are: low-quality family relationships (LQ, with scores below the mean in parental dimensions), high-quality family relationships (HQ, with scores above the mean in parental dimensions), and intermediate-quality family relationships (IQ, with scores slightly below the mean in parental dimensions) (Mendoza et al. 2018).

The aim of this study is using person-centred approach distinguish perceived parent–child relationship clusters. Research questions are:

1) What are relationships between perceived parent–child relationship dimensions during emerging adulthood?

2) What kind of perceived parent–child relationship clusters can be found during emerging adulthood?

Material and methods

Participants

In this study, 408 respondents participated. The ages of the respondents ranged from 19 to 29 (M = 21,20, SD = 2,83). Other demographic indicators are as follows:

1) gender – 67% women;

2) occupation – 40,9% student, 40,9% student and employed, 11,2% unemployed and student and others 7%;

3) education (completed) – 78,9% secondary education, 10,8% university education, 9,5% professional secondary education and lower than secondary education 0,9%;

4) residence – 24,54% Daugavpils, 41,36% Riga and 34,1% other parts of Latvia;

5) living arrangement – 22,4% living with partner, 22,0% living with parents, 13,8% living with one parent, 12,1% living alone, 11,6% living in student dormitory and 18,1% other.

Instrumentation

The parental context was measured using the Perceptions of Parents Scales (POPS) College-Student Scale (Robbins 1994). The scale comprises 42 items: 21 for mothers and 21 for fathers, rated on a 7-point Likert scale ranging from 1 (not at all true), 2, 3, 4 (somewhat true), 5, 6, 7 (very true), assessing six subscales:

1) mother and father Autonomy Support (MAS or FAS), sample "My mother, whenever possible, allows me to choose what to do",

2) mother and father Involvement (MI or FI), sample "My mother spends a lot of time with me",

3) mother and father Warmth (MW or FW), sample "My mother clearly conveys her love for me".

Reliability measures indicate that the POPS, the Cronbach' Alpha (α) – MI α = 0,86, MAS α = 0,86, MW α = 0,89, FI α = 0,89, FAS α = 0,82 and FW α = 0,88.

The POPS was translated from English to Latvian by a bilingual translator and then independently back-translated by another bilingual translator who was unaware of the original version. This translation was then discussed between the authors and translator until a consensus was reached and developed a final Latvian version of the POPS.

Procedure

Participation in the study was voluntary, and anonymity was guaranteed. Participants filled out both paper and Google forms. The form consisted of three sections: firstly, the DIDS, then the POPS, and finally questions regarding demographic indicators. The data collection took place from October 11, 2023, to November 15, 2023. Statistical analysis was conducted using IBM SPSS 22.00.

To create clusters, Z-scores were used, and the data was analyzed in a two-step procedure. In the first step, a hierarchical cluster analysis was carried out using Ward's method and based on squared Euclidean distances. The second step involved an iterative k-means clustering procedure, using the initial cluster canters calculated in the first step of the cluster analysis.

Results

Correlation Analyses

The results of the correlation between six parental context dimensions are represented in Table 1. All correlations between the six parental context dimensions are statistically significant and positive. More high correlation numbers are between one parent dimensions. Mother Involvement positively correlates with other two mother dimensions Mother Autonomy Support ($r_s = 0,76$) and Mother Warmth ($r_s = 0,88$), and with Father dimensions - Father Involvement ($r_s = 0,25$), Father Autonomy Support ($r_s = 0,21$), Father Warmth ($r_s = 0,31$). A similar pattern is observed for other mother parental context dimensions, and it also applies to father parental context dimensions. Father Warmth dimension positively correlates with other two father dimensions Father Involvement ($r_s = 0,75$), Father Autonomy Support ($r_s = 0,82$) and mother parental context dimensions - Mother Involvement ($r_s = 0,31$), Mother Autonomy Support ($r_s = 0,36$), Mother Warmth ($r_s = 0,42$).

Table 1. **Spearman's Correlations among the six parental context dimensions**

Dimensions	Means (SD)	MI	MAS	MW	FI	FAS	FW
MI	4,93 (1,39)	-					
MAS	4,88 (1,21)	0,76**	-				

MW	5,25 (1,42)	0,80**	0,88**	-		
FI	3,79 (1,67)	0,25**	0,25**	0,28**	-	
FAS	4,30 (1,29)	0,21**	0,26**	0,27**	0,71**	-
FW	4,59 (1,58)	0,31**	0,36**	0,42**	0,75**	0,82**	-

** $p < 0,01$

Note: MI - Mother Involvement, MAS - Mother Autonomy Support, MW - Mother Warmth, FI - Father Involvement, FAS - Father Autonomy Support, FW - Father Warmth

Empirically parent context derived statuses

To identify the optimal number of clusters, analyses were conducted starting from a 4-cluster solution and ending with a 9-cluster solution. The optimal number of clusters was found to be 7 (Figure 1). In the subsequent steps, with 8 and 9 cluster solutions, the existing clusters began to separate into smaller clusters.
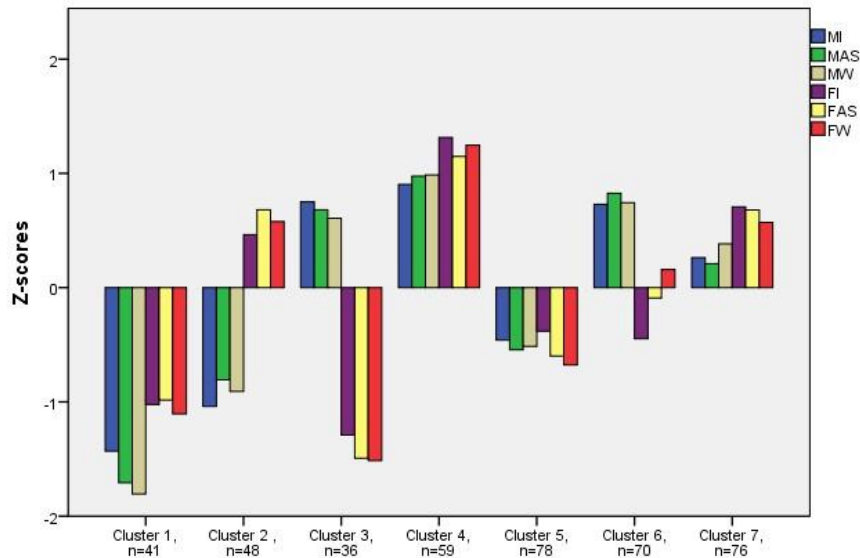

Fig. 1. **Parent context seven cluster solution in Latvian emerging adult sample**

Note: MI - Mother Involvement, MAS - Mother Autonomy Support, MW - Mother Warmth, FI - Father Involvement, FAS - Father Autonomy Support, FW - Father Warmth

To describe parental context cluster will be used Means Standard Scores Cohen's (1988) conventional criteria: 0,2 small efect, 0,5 medium effect and 0,8 large effect (Scholte, vanLieshout, deWit&vanAken, 2005). In following analyses data will be analysed small Z-score [0,2 – 0,5), medium Z-score [0,5 – 0,8) and large Z-score[0,8 - ...). For analyses where used following numbering:

1) „-4" [-0.8 - …) - large   5) „1" (0 – 0.2)

2) „-3" [-0.5 – -0.8) - medium   6) „2" [0.2 – 0.5) - small

3) „-2" [-0.2 – -0.5) - small   7) „3" [0.5 – 0.8) - medium

4) „-1" (0 – -0.2)   8) „4" [0.8 - … - large

Table 2. **Parent context final cluster centres (1-4) Means Standard Scores (Z-score)**

Parent context dimensions	Clusters							
	1	G1	2	G2	3	G3	4	G4
MI	-1.43	*-4*	-1.04	*-4*	0.75	*3*	0.90	*4*
MAS	-1.71	*-4*	-0.81	*-4*	0.68	*3*	0.98	*4*
MW	-1.81	*-4*	-0.91	*-4*	0.61	*3*	0.99	*4*
FI	-1.02	*-4*	0.46	*2*	-1.29	*-4*	1.31	*4*
FAS	-0.98	*-4*	0.68	*3*	-1.49	*-4*	1.15	*4*
FW	-1.10	*-4*	0.58	*3*	-1.51	*-4*	1.25	*4*

Note: MI - Mother Involvement, MAS - Mother Autonomy Support, MW - Mother Warmth, FI - Father Involvement, FAS - Father Autonomy Support, FW - Father Warmth

Table 3. **Parent context final cluster centres (5-7) Means Standard Scores (Z-score)**

Parent context dimensions	Clusters					
	5	G5	6	G6	7	G7
MI	-0.46	-2	0.73	3	0.26	2
MAS	-0.54	-3	0.83	4	0.21	2
MW	-0.51	-3	0.74	3	0.38	2
FI	-0.38	-2	-0.45	-2	0.71	3
FAS	-0.60	-3	-0.09	-1	0.68	3
FW	-0.68	-3	0.16	1	0.57	3

Note: MI - Mother Involvement, MAS - Mother Autonomy Support, MW - Mother Warmth, FI - Father Involvement, FAS - Father Autonomy Support, FW - Father Warmth

Cluster canters are presented in Table 2 (1-4) and Table 3 (5-7) using Means Standard Scores (z-value) and analysing based on previously created numbering. Results show that 1.cluster is characterised

with negative large Z-score in all parental context dimensions. 2.cluster is characterised with negative large Z-score in all mother dimensions and positive small (FI) and medium (FAS and FW) Z-score. 3.cluster is characterised with negative large Z-score in all father dimensions and medium in all mother dimensions. 4.cluster is characterised with positive large Z-score in all parental context dimensions. 5.cluster is characterised with negative Z-score small in mother and father involvement dimensions and medium in all others. 6.cluster is characterised with big variety MI and MW – positive medium, MAS – positive large, FI – negative small, FAS – negative smaller and FW – positive smaller. 7.cluster is characterised with positive small all mother parental context dimensions and positive medium father parental context dimensions.

Discussion

What are relationships between perceived parent–child relationship dimensions during emerging adulthood?

In this study, it was found that the relationship between parent–child relationship dimensions is positively correlated. Results show that all parent–child relationship dimensions are significantly and positively correlated. If there are high results in one dimension, there will also be high results in other dimensions. Higher correlations were found regarding one parent's dimensions; for example, the correlation between Mother Autonomy Support and Mother Warmth is ($r_s = 0,88$, *p < 0,01*), compared to the correlation between Mother Autonomy Support and Father Involvement ($r_s = 0.25$, *p < 0,01*). Based on the rule-of-thumb scale for evaluating the correlation coefficient (Asuero, Sayago, & González 2006), dimensions regarding one parent have high correlations, while the same dimensions between two parents have low correlations. This indicates that there is a stronger relationship between mother involvement, autonomy support, and warmth compared to, for example, mother involvement and father involvement.

Similar results were found in other research regarding correlation between Mother Involvement, Mother Autonomy Support and Father Involvement, Father Autonomy Support (Zulfiqar, Shafi & Ajmal 2023). Correlation between Mother Warmth and Father Warmth ($r = 0,63$, $p < 0,01$) (Romm, Barry, Kotchick, DiDonato & Barnett 2018). Correlation between Mother Autonomy Support, Mother Warmth, Father Autonomy Support and Father Warmth (Såstad 2023).

What kind of perceived parent–child relationship clusters can be found during emerging adulthood?

Based on study result perceived parent–child relationship clusters are following:

- 1.cluster - low-quality family relationships,
- 2.cluster - low mother and moderately high father quality family relationships,

- 3. cluster - low father and moderately high mother quality family relationships,

- 4. cluster - high-quality family relationships,

- 5. cluster - moderately low-quality family relationships,

- 6. cluster – non-differentiated (because there were mixed results for dimensions),

- 7. cluster – moderately high-quality family relationships.

A small number of studies have used person-cantered approaches to examine styles of parenting across dimensions of parenting in emerging adulthood (Jensen et al., 2024). One study conducted with Spanish emerging adults by Mendoza and colleagues (Mendoza et al., 2018) distinguished the following clusters: high-quality family relationships (HQ), intermediate-quality family relationships (IQ), and low-quality family relationships (LQ). It is important to consider that in their study, they combined mother and father dimensions and used other variables for cluster analyses. In our study, we analyzed mother and father dimensions separately, allowing us to identify more detailed perceived parent–child relationship clusters. Additionally, we took into consideration that women are generally more involved in family ties than men, although these differences may vary across generations as gender roles have shifted (Fingerman, Huo & Birditt 2020). Worth mentioning that non-differentiated cluster allows space for untypical parent- parent–child relationship clusters.

The limitations of the study include the limited research done regarding the parental context using a person-centred approach, making it difficult to compare with other studies.

Suggestions for future research include exploring other potential variables, such as gender differences or ethnic variations, in relation to perceived parent–child relationship clusters.

Conclusion

Results show that all parent–child relationship dimensions are significantly and positively correlated. High results in one dimension, such as Involvement, Autonomy Support, or Mother Warmth, are associated with high results in other dimensions. Higher correlations were found within the dimensions of each parent.

Based on the person-cantered approach, it is possible to distinguish the following parent–child relationship clusters: low-quality family relationships, low mother and moderately high father quality family relationships, low father and moderately high mother quality family relationships, high-quality family relationships, moderately low-quality family relationships, moderately high-quality family relationships, and non-differentiated clusters.

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