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THE IDENTITY DILEMMA OF TAIWANESE SOCIETY

ПРОБЛЕМА ІДЕНТИЧНОСТІ ТАЙВАНСЬКОГО СУСПІЛЬСТВА

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Abstract. *The issue of Taiwanese identity occupies a considerable place in assessing the Republic of China (Taiwan)'s ability to preserve its political independence. Despite the marked strengthening of Taiwanese self-identification in recent decades, it is still premature to speak of a consolidated nationwide consensus on national identity. A substantial share of Taiwan's society continues to hold a mixed identity. At the same time, for a significant part of the population the label "Taiwanese" functions primarily as a political marker of self-identification, while cultural and historical embeddedness in a broader Chinese context may still persist as a component of self-perception. This article explains the dynamics of the formation of Taiwanese citizens' identity and its current state, the factors that have shaped this process, and the policies pursued by Taiwan's authorities in this sphere in the context of strained relations with the People's Republic of China. The research is grounded on extensive sociological survey data provided by the Election Study Center at National Chengchi University from 1992 to 2025, which reflects the shift from a Sinocentric model to a distinct Taiwanese national consciousness. The authors examine key internal and external factors driving this transformation, including the democratization and "Taiwanization" policies under presidents Lee Teng-hui, Chen Shui-bian, Tsai Ing-wen, and Lai Ching-te, as well as the systemic military and diplomatic pressure from the PRC. Particular attention is devoted to regional linguistic-demographic variations (northern mixed areas vs. southern Hoklo-dominant communities), generational changes, and the impact of regional geopolitical crises, such as the 2019 Hong Kong protests and the COVID-19 pandemic, on consolidating civic nationalism.*

Keywords: *identity, Taiwan, independence,"Taiwanization", PRC, politics, security.*

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Анотація. *Проблема тайванської ідентичності займає важливе місце у питанні спроможності Республіки Китай (Тайвань) зберігати свою політичну незалежність. Попри помітне посилення тайванської самоідентифікації в останні десятиліття, говорити про усталений загальнонаціональний консенсус щодо національної ідентичності наразі передчасно. У тайванському суспільстві зберігається помітна частка громадян із комбінованою ідентичністю. Водночас для значної частини населення означення "тайванець" функціонує передусім як політичний маркер самоідентифікації, а культурно-історична інтегрованість у ширший китайський контекст може все ще зберігатися як компонент самосприйняття. Ця стаття пояснює динаміку формування ідентичності громадян Тайваню та її сучасний стан, фактори, що впливали на цей процес, політику тайванської влади у цій сфері в контексті напружених відносин з Китайською Народною Республікою. В основу дослідження покладено комплексний аналіз багаторічних соціологічних опитувань Центру вивчення виборів Національного університету Ченчі (NCCU) за період з 1992 по 2025 роки. Автори детально розкривають еволюцію суспільних настроїв від синоцентричної моделі до виразної громадянської національної свідомості, аналізуючи падіння підтримки ідеї об'єднання з КНР до історичного мінімуму та консолідацію електорату навколо збереження статус-кво. Досліджено вплив політики «тайванізації» та «десинізації» культури й освіти, що впроваджувалася за президентства Лі Денхуея, Чень Шуйбяня, Цай Інвень та Лая Цінде. Визначено роль протистояння з КНР та постійної воєнної загрози як ключового зовнішнього фактора викристалізування ідентичності. Окрему увагу приділено регіональним та етнолінгвістичним відмінностям між північними змішаними районами та південними громадами з домінуванням мови хокло, а також впливу демографічних зрушень, зміни поколінь, подій у Гонконгу 2019 року та пандемії COVID-19. Результати дослідження підтверджують формування зрілої громадянської ідентичності, яка виступає психологічним фундаментом національної безпеки острова.*

Ключові слова: *ідентичність, Тайвань, незалежність,* "*тайванізація*", *КНР, політика, безпека.*

Introduction. Identity is a context-dependent politico-philosophical category. Every individual has the right to define their own self-identification. The answer to the question "Who am I?" is shaped by a set of interrelated factors – ethnic, cultural, linguistic, religious, historical, and others.

Taiwanese identity has historically developed against the backdrop of close cultural and civilizational ties with mainland China. The end of the Chinese Civil War in 1949 and the establishment of the Chinese Communist Party's (CCP) rule on the mainland led to the evacuation of the Kuomintang government to Taiwan. Since then, a situation of parallel existence of two political entities has emerged: the Republic of China on the island of Taiwan, which claims to be the successor of the 1911 republic, and the People's Republic of China (PRC), which established control over the mainland.

Proceeding from the assumption of future reintegration of the territory that came under PRC control and the restoration of China's political unity, Taiwan's leadership consistently promoted a state policy model aimed at preserving classical Chinese cultural and linguistic traditions. Due to excessive assimilatory pressure, this strategy had ambivalent consequences for the local population. Over time, as the PRC became internationally established as the sole representative of China and as its military and political capacity increased, Taiwan began gradually distancing itself from the mainland context, placing greater emphasis on developing its own cultural, linguistic, and socio-political distinctiveness. In academic discourse, this policy has been described in terms of "Taiwanization" or "de-Sinicization."

The impact of external factors related to the PRC, together with corresponding domestic policies over recent decades, has resulted in a notable transformation of Taiwanese citizens' self-identification. A significant part of the population refuses to identify as Chinese, as the designation

"Chinese" is increasingly associated with the PRC. The rejection of such self-identification acquires a symbolic dimension, serving to demarcate Taiwan from Beijing and correlating with the desire to preserve independence. At the same time, Taiwan's identity landscape remains complex and heterogeneous. Under conditions of prolonged confrontation with the PRC, the question of identity extends beyond the cultural domain and becomes central to issues of security and the preservation of statehood.

Literature Review. The question of identity in Taiwanese society occupies a central place in contemporary scholarship on Taiwan's political development. Following the island's democratization, issues of national self-identification, historical memory, language policy, and international status have gained particular salience. Researchers focus on the transformation of identity from a Sinocentric model toward the formation of a distinct Taiwanese nation, as well as on the impact of domestic political reforms and external pressure from the PRC on this process.

In preparing this article, particular use was made of the research produced by the Election Study Center at National Chengchi University, which has provided survey data since the early 1990s on Taiwanese public attitudes toward identity and independence.

Bi-Yu Chang (2004) and Yang Zhong (2016) offer detailed analyses of the formation and transformation of Taiwanese national identity. The latter traces these dynamics through numerous public opinion surveys and, in particular, highlights the hybrid character of Taiwanese identity.

Christopher H. Achen and Te-Yu Wang (2017), as well as Chang-Yen Tsai (2007), emphasize the relationship between national identity and electoral behavior. By contrast, Chen Wei-Lin, Lin Ming-Jen, and Yang Tzu-Ting (2023) examine the impact of the 1997 education reform on Taiwanese youths' national consciousness as a component of the policy of "Taiwanization."

Chun-Ying Wu (2020) explores the formation of Taiwanese identity in connection with language policy and the regional demographic distribution of linguistic groups, which have influenced both the emergence and the uneven diffusion of Taiwanese national identity.

Among Ukrainian scholars who study the Taiwan issue in international relations, cross-strait relations between the PRC and Taiwan, Taiwanese nationalism, and identity, the following deserve particular mention: Bilak P., Shevchuk O., Klymchuk I., Zablotskyi V., Honchar B., Taran M., and others.

The purpose of this article is to examine the process and factors shaping the identity of citizens of the Republic of China in the context of crisis-driven relations with the PRC.

Main results of the research. After the Chinese Communist Party (CCP) won the civil war, the Kuomintang (KMT), having established control over Taiwan, transferred a mainland Chinese cultural model to the island and introduced Mandarin as the dominant language, although Hokkien had been the everyday language of the majority of the local population. In public memory, the rule of the "mainlanders" was often perceived as even harsher than Japanese colonial rule: prior to Chiang

Kai-shek's arrival, around 30,000 people were killed during the unrest following the February 28 Incident, which was followed by the years of the so-called White Terror *(Sendyka, 2021).*

In its struggle to preserve Taiwan's right to represent China internationally, the authorities of the Republic of China implemented a policy known as the "Chinese Cultural Renaissance Movement," aimed at preserving and promoting classical Chinese culture. This initiative served as a response to Mao Zedong's Cultural Revolution *(Chang, 2004).* However, this approach significantly affected local culture. In 1963, the state restricted the use of Hoklo and Hakka languages on television and radio, reducing their share of programming to below 50 percent. In 1966, schools were authorized to punish students for using their native languages, and in 1972 the Ministry of Education prohibited both students and teachers from speaking Hoklo on school premises, even in private conversations. By the late 1970s, citizens who did not speak Mandarin were excluded from public service *(Wu, 2020)*. This assimilationist policy was intended to preserve ties with classical mainland culture under conditions of political separation.

The diplomatic struggle between the PRC and the Republic of China for the right to represent China internationally in the 1970s ended with the victory of the communist mainland government.

Taiwan lost its seat in the United Nations – including its status as a permanent member of the UN Security Council – and in other leading international organizations, gradually losing diplomatic recognition. As a result, the PRC became the sole official representative of China in international politics.

As the idea of reunifying China became increasingly illusory, amid growing international isolation and domestic demands for political reform, as well as a broader cultural awakening after decades of strict state control over cultural life, the KMT was compelled to revise its approach. In 1981, the Council for Cultural Affairs (CCA) was established, tasked with overseeing Taiwan's cultural development. For the first time, the ethnocultural heritage of Indigenous peoples began to be promoted alongside Chinese culture, although a Sinocentric mindset continued to dominate. This period is considered a precursor to the later policy of "Taiwanization" *(Chang, 2004).*

The lifting of martial law in 1987, which had been in place since 1949, formally initiated a process of active localization and democratization. In subsequent years, Taiwanese governments asserted the need to cultivate a distinct Taiwanese culture, placing particular emphasis on local history, geography, and cultural traditions as integral elements of a broader policy of foregrounding the Taiwanese context *(Tsai, 2007).*

By the late 1980s and early 1990s, Taiwan had established itself not only as a global industrial and technological hub but also as an open society with strong public support for Western-style democratic institutions and pronounced resistance to authoritarian practices. As Fredrik Barth observed, the formation of a distinct identity occurs through the establishment of boundaries that differentiate group members from non-members. Gradually, old internal divisions within Taiwan receded, giving way to a new boundary – between Taiwanese and mainland Chinese *(Sendyka, 2021).* During the presidency of Lee Teng-hui from the KMT, the National Cultural Association (NCA) was founded in 1991 to develop policies promoting Taiwanese self-consciousness. At the same time, the Ministry of the Interior amended the Household Registration Act, replacing the category "ancestral origin" with "place of birth." This change reflected an official effort to redefine the concept of "Taiwanese" and eliminate unnecessary ethnic distinctions among citizens *(Chang, 2004).*

In 1997, Taiwan introduced a curriculum reform for junior high schools, launching a new series of social studies textbooks titled *Knowing Taiwan*. The most significant changes concerned history education: students began studying Taiwan's history separately in their first year, whereas previously the focus had been primarily on Chinese history. The new curriculum substantially expanded material on the island and more clearly distinguished between "Taiwan" and "China." The reform sparked intense political debates regarding its content and ideological orientation, particularly concerning historical interpretation and national identity *(Chen; Lin; Yang, 2023).* That same year, Aletheia University established the first department of Taiwanese literature, a move later replicated at other universities *(Taipei Times, 2021).*

Although Mandarin remains Taiwan's official language, as in the PRC, the linguistic situation differs markedly from that on the mainland. Beyond differences in accent and the frequent use of other dialects, Mandarin in Taiwan employs traditional Chinese characters rather than simplified ones. Moreover, Taiwanese use the original phonetic system Zhuyin (*Bopomofo*), whereas mainland China adopted Pinyin, a Latin-based romanization system *(Sendyka, 2021).*

The process of "Taiwanization," which accelerated in the 1990s, led to a shift away from the previously dominant Sinocentric identity. A discourse of Taiwanese subjectivity and the emergence of a new local distinctiveness gained momentum. These processes also resulted in changes in political elites: in 2000, the opposition Democratic Progressive Party (DPP) candidate Chen Shui-bian won the presidential election for the first time *(Lousche, 2022).* He continued the policy of Taiwanization not only culturally but also economically, notably through the "Challenge 2008" National Development Plan, aimed at enhancing Taiwan's international competitiveness amid the PRC's growing economic power. The plan consisted of ten major programs of political and financial reform *(Ross; Brown, 2023).*

In the 2008 elections, the KMT returned to power, and Ma Ying-jeou assumed the presidency

(2008–2016). His rhetoric emphasized the Republic of China and the concept of the "greater Chinese nation" (*zhonghua minzu*). This shift reflected the KMT's ideological evolution after 2004 and its rapprochement with the CCP in opposing "Taiwanese separatism." Ma framed Taiwan as a region of the Republic of China, whose formal jurisdiction also encompassed mainland China; accordingly, he viewed relations between Taipei and Beijing not as "state-to-state" but as special equal relations at the "region-to-region" level. This approach effectively disregarded two decades of consolidation of Taiwanese identity. The KMT's logic held that excessive Taiwanization provoked Beijing and fueled separatism; thus, state policy should remain restrained. Under the principle of "no unification, no independence, no use of force," Ma's administration did not deny the existence of a distinct Taiwanese civic identity but sought to limit its active institutional promotion *(Muyard, 2012)*.

The subsequent government led by DPP President Tsai Ing-wen, responding to Chinese claims over the island's democracy, intensified Taiwanization policies, particularly by increasing attention to Indigenous peoples as a means of highlighting Taiwan's historical and cultural distinctiveness from the PRC. In 2017, the Act on the Development of Indigenous Languages entered into force, regarded as another important step toward strengthening linguistic diversity on the island in contrast to standardized mainland Mandarin *(Taiwan Today, 2017)*. A year earlier, Tsai delivered the first official apology on behalf of the government to Taiwan's Indigenous peoples and expanded support measures, not only through cultural policy but also by addressing inequalities in healthcare access in rural areas, including improved transportation and the development of local medical services, as these communities experience poorer overall health outcomes compared to the majority population *(Ross; Brown, 2023)*.

Public support for deepening Taiwanization was also reflected in the 2002 "511 Parade for Rectifying the Name of Taiwan," which united civic organizations demanding the official use of "Taiwan" as the country's name and seeking UN membership under that designation (Taipei Times, 2002). In 2003, Taiwan's Ministry of Foreign Affairs introduced a redesigned passport cover featuring the English word "Taiwan" alongside "Republic of China." In 2021, the passport was redesigned again: "Taiwan" was made more prominent, while "Republic of China" was reduced to smaller text encircling the national emblem *(TCN, 2025)*.

In December 2025, President Lai Ching-te, speaking at the forum "The Legacy of Free China and the Challenges of Modern Democracy," recalled a 1972 proposal by political dissident Lei Chen to rename the Republic of China as the "Democratic State of China–Taiwan" and renounce claims to mainland China. Lai stated that the DPP had decided not to change the official name of Taiwan from the Republic of China in order to preserve social unity. He emphasized that the name "Republic of China" is enshrined in the Constitution, which defines Taiwan as a sovereign and independent state; therefore, there is no need for a new declaration of independence *(TCN, 2025)*.

Sociological Research on the Identity of Taiwan's Residents

Against the backdrop of the aforementioned historical processes, scholarly interest in the issue of Taiwanese self-identification began to emerge in the late 1980s. One of the earliest surveys on this topic was conducted in 1989 by the Taiwanese newspaper *The United Daily*. Slightly more than half of respondents identified themselves as "Chinese," while only 16 percent considered themselves "Taiwanese" *(Yang, 2016)*.

However, significant shifts in national identity occurred during the 1990s. The proportion of those identifying as "Chinese" sharply declined to around 10 percent, while the share of those identifying as "Taiwanese" rose to nearly 40 percent. This trend continued into the twenty-first century. In the 2000s, the proportion of respondents stating that they were "Taiwanese" exceeded 60 percent. It should be noted that the number of individuals identifying simultaneously as both "Taiwanese" and "Chinese" also declined markedly *(Yang, 2016)*.

Since 1992, the Election Study Center of National Chengchi University (NCCU) has regularly measured how citizens of Taiwan define their identity. Particularly significant for this analysis is the year 1996, when the share of respondents identifying as "Taiwanese only" rose sharply from 24 percent to 34 percent. This shift coincided with a critical political and security situation: shortly

before, Beijing conducted missile tests, during which missiles crossed the median line of the Taiwan Strait for the first time since 1949, and in March 1996 Taiwan held its first fully democratic presidential election. The Chinese leadership perceived these elections as a potential step toward formalizing Taiwanese independence and resorted to a show of force in an attempt to influence electoral sentiment. This example clearly demonstrates that Taiwanese identity is shaped not only by internal self-perceptions but also by the external threat posed by the PRC *(Sendyka, 2021).*

In the following decades, the proportion of individuals identifying as "Taiwanese" continued to grow steadily, while those identifying as "Chinese" declined consistently. The period 2023–2025 is characterized by the consolidation of long-term trends. "Exclusively Taiwanese" identity remains the dominant position in public opinion, encompassing an absolute majority of the population. In 2023, 61.7 percent of citizens identified solely as Taiwanese. In 2024, this figure rose to 63.4 percent, approaching a historical high and indicating the strengthening of national sentiments. Despite a slight decline to 62.0 percent in December 2025, this group continues to define the island's primary sociopolitical trajectory *(Election Study Center, 2025).*

The second-largest segment consists of individuals with a dual identity ("both Taiwanese and Chinese"). Their trend mirrors that of the first group: after declining to 31.0 percent in 2024, it slightly rebounded to 31.7 percent in 2025. This share has remained relatively stable within a corridor of 30–33 percent in recent years *(Election Study Center, 2025).*

Meanwhile, identification "exclusively as Chinese" has become marginal. Between 2023 and 2025, this category remained at the level of statistical insignificance – between 2.4 and 2.5 percent. This suggests that the pro-China narrative has effectively lost its societal relevance. Overall, contemporary Taiwan demonstrates a clear consensus: more than 93 percent of residents, in one way or another, associate themselves with Taiwan, leaving the idea of political affiliation with China largely in the past *(Election Study Center, 2025).*

As can be observed, over the past two decades the national identity of the majority of Taiwan's residents has undoubtedly evolved. However, previous surveys primarily addressed political identification. In a 2014 survey conducted by Taiwan Indicators Survey and the Center for Taiwan Studies at Shanghai University, respondents were asked: "Whom do you consider yourself to be in terms of blood lineage and culture?" More than 50 percent selected the option "member of the Chinese nation," thereby affirming their ethnic and cultural belonging to the Chinese nation. When combined with those who chose "Chinese" and "both," the percentage exceeds 80 percent *(Yang, 2016).* These data suggest that a portion of Taiwan's residents, despite politically identifying as "Taiwanese," may not reject their Chinese ethnocultural identity and may simultaneously not fully embrace the concept of a distinct and separate Taiwanese ethnocultural identity. This indicates that Taiwan remains a divided society when it comes to the foundational concept of national identity *(Achen; Wang, 2017).*

Beyond self-identification, another key issue in Taiwanese political research concerns public attitudes toward possible unification with the People's Republic of China. An analysis of sociological data collected by NCCU from 1994 through December 2025 demonstrates a fundamental transformation of Taiwanese public consciousness and a definitive shift away from a pro-China orientation. The most striking trend of the past three decades has been the dramatic decline in support for unification with mainland China, which has effectively lost its electoral base. Whereas in the mid-1990s unification was considered a realistic alternative by a substantial segment of the population, by the end of 2025 the idea of "immediate unification" had become marginal (1.1 percent), and support for "maintaining the status quo with movement toward unification" had fallen to a historic low of 6.1 percent. Overall support for integration with the PRC amounts to less than 8 percent, reflecting a profound crisis of the "One China" ideology among Taiwanese society *(Election Study Center, 2025).*

Instead, the island's political landscape has consolidated around the desire to preserve sovereignty and democratic governance. The principal beneficiary of this shift has been the pragmatic position of "maintaining the status quo indefinitely," whose support has more than tripled – from 9.8 percent in 1994 to 33.5 percent in 2025 – making it the dominant societal preference. At

the same time, support for independence has steadily strengthened: more than a quarter of the population (approximately 26.3 percent) favor either immediate declaration of independence or gradual movement in that direction. The overall trend clearly illustrates that Taiwanese society is gradually moving away from strategic ambiguity (with the "decide later" category steadily shrinking) toward a clearer choice: distancing itself from Beijing and defending its de facto statehood *(Election Study Center, 2025).*

Factors Shaping a Distinct Taiwanese National Identity

A decisive role in the formation of a distinct Taiwanese political identity has been played by the confrontation with the PRC. Persistent security concerns arising from cross-Strait relations contributed to the emergence of a more state-centered Taiwanese identity, intended to reinforce the island's political autonomy, while Beijing maintains its territorial claim over Taiwan.

To this day, the identity question is strongly shaped by Taiwan's ambiguous international status. As of January 2026, the Republic of China is formally recognized as an independent state by only twelve countries, including the Vatican, Belize, Guatemala, Haiti, Honduras, the Marshall Islands, Palau, Paraguay, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Tuvalu *(Worldpopulationreview.com, 2026).* Taipei has no seat in the United Nations. In practice, however, the picture is more complex: many states – most notably the United States – maintain de facto representative offices in Taiwan and sustain close economic and political ties. Taiwanese passports are widely accepted for international travel and provide reciprocal visa-free arrangements with many countries and the European Union *(Sendyka, 2021).* Nevertheless, the lack of formal recognition and the gradual disappearance of the very name "Republic of China" from the international arena could not but affect how Taiwan's citizens perceive themselves. A situation in which the world officially recognizes only one China – the PRC – while Taiwan seeks to preserve its autonomy encourages a shift in identity toward a primarily state-political understanding.

One of the most widespread explanations among both the public and scholars for why the majority of Taiwanese gravitate toward a distinct identity and support the island's independence is the difference between Taiwan's political system and that of the PRC. The argument suggests that, if the PRC were as democratic as Taiwan, most people on the island would support unification. The 2014 Taiwan Indicators Survey and Center for Taiwan Studies included the question: "If the PRC had the same political system as Taiwan, would you support unification between Taiwan and the PRC?" More than half of respondents stated that they still would not support such a decision *(Yang, 2016).* This supports the assumption that, over a long period of separate statehood, Taiwanese society has developed its own distinct sense of political belonging. It is reasonable to agree that the divergence between political systems in Taipei and Beijing continues to exert significant influence on this negative stance *(Brookings.edu, 2022).* After decades of confrontation, Taiwanese society has difficulty imagining an alternative state of affairs, which contributes to a largely subconscious rejection of the very idea of unification. Accordingly, the reluctance of most Taiwanese to unify with mainland China makes it a logical step to distance themselves from a Chinese identity, since identifying as Chinese provides the PRC with an argument for unification, including by force.

Culture is one of the fundamental components of national identity, as it provides people with a sense of group belonging. Nearly all cultural traits characteristic of Taiwan can also be traced in the PRC. Indeed, traditional Chinese culture has arguably been preserved better in Taiwan than on the mainland. Yet, as sociological research indicates, shared Chinese culture does not prevent island residents from identifying as Taiwanese. Although, as noted above, around 80 percent in 2014 considered themselves members of the Chinese nation, this did not stop them from politically identifying as Taiwanese. This again points to the external nature of the circumstances that prompted Taiwanese society to revise its identity *(Jing; Loden, 2023).*

Taiwan's domestic politics also influences identity formation, because it is linked to the principal political cleavage in Taiwanese society regarding the national future (independence versus possible rapprochement with the PRC). In this context, partisan identification becomes not merely a political choice but an element of self-definition. Through electoral campaigns, political debate,

security concerns, and questions of international status, Taiwan's citizens are repeatedly brought back to the foundational question, "Who are we?" Thus, domestic political competition not only reflects existing identities but also contributes to shaping them *(Achen; Wang, 2017).* The two major political forces – the Democratic Progressive Party (DPP) and the Kuomintang (KMT) – offer different approaches. The former emphasizes Taiwan's distinctiveness as an independent state; the latter stresses historical and cultural ties with China and, at minimum, does not exclude the possibility of unification in the future.

Ethnic origin may also continue to influence self-identification. Among people of mainlander background, only a minority identify as Taiwanese, maintaining strong ties to Chinese culture, history, and family memory. By contrast, almost none of those of Minnan origin – whose ancestors migrated to the island much earlier and historically shaped local culture and language – identify as Chinese. Although such ethnic "shades" remain visible in the data, generational change, intermarriage, and democratization have increasingly blurred these boundaries, and the core issue has become how citizens envision Taiwan's future status vis-à-vis China *(Achen; Wang, 2017).*

Chun-Ying Wu demonstrates that assimilationist processes in the 1950s–1970s affected southern and northern Taiwan differently due to variations in linguistic-demographic structures and everyday language practices. In the south, Hoklo speakers constituted a large and territorially concentrated majority. Even under strict denationalization policies, Hoklo, remaining a living language of daily communication, gradually became a marker of a distinct Taiwanese identity. At the same time, this Hoklo-centered construction of "Taiwaneseness" generated internal tensions: part of the southern population that spoke Hakka distanced itself from a model in which "being Taiwanese" was informally equated with "speaking Hoklo." Although Hakka were also long-established island residents (with families living in Taiwan prior to 1949), their linguistic and cultural specificity did not fully fit the dominant discourse. This had empirically observable consequences: according to a 1993 survey, in southern regions the share of Hakka who identified as "Chinese" was noticeably higher than among Hoklo speakers (38.1 percent versus 23.94 percent), indicating a certain alienation from a one-sided linguistic model of Taiwanese identity. In the north, by contrast, the population was more mixed: there was a higher share of Mandarin speakers, more intergroup contact and intermarriage, and Mandarin functioned more strongly as a common language vis-à-vis Hoklo. These differences were also reflected in self-identification: Taiwanese identity was more frequently recorded in the south, whereas Chinese or mixed identities were more common in the north *(Wu, 2020).*

A study by the Taiwan Indicators Survey and the Center for Taiwan Studies further illustrates differences in how respondents conceptualize Taiwanese identity. Participants were asked: "In your view, which of the following is closest to what it means to be Taiwanese?" Opinions were divided: around 40 percent believed that being Taiwanese means identifying with Taiwanese culture and Taiwan's history, while about 45 percent argued that being Taiwanese primarily means living and working on the island *(Yang, 2016).*

The events in Hong Kong in 2019 discredited the "one country, two systems" model, which had long been promoted as a potentially acceptable scenario for Taiwan. The COVID-19 pandemic became another test that highlighted differences between Taiwan and the PRC through the quality of governance. Taiwan's success in crisis management can be linked to social cohesion and trust in government grounded in the island's democratic character. The pandemic demonstrated that effective crisis response is possible without total control, undermining claims about the alleged advantages of authoritarian governance *(Sendyka, 2021).* These developments also strengthened a specifically "Taiwanese" identity among citizens of the Republic of China.

After Tsai Ing-wen came to power, Beijing narrowed formal dialogue with Taipei and intensified the use of coercive instruments. Against this background, the PRC's growing demonstrative military activity has become an important context in which the identity question is increasingly viewed through the prism of security. Tsai's reelection in 2020 was accompanied by the highest intensity since 1996 of incidents involving Chinese aircraft entering Taiwan's air defense identification zone, as well as airspace violations *(Sendyka, 2021).*

In recent years, the PRC's Taiwan policy has increasingly been characterized by a combination of diplomatic isolation, military activity, and economic instruments of influence. Beijing consistently insists on the "One China" principle and has intensified international efforts aimed at limiting Taipei's space for participation. In parallel, the scale of military exercises near the island has grown, including the involvement of air and naval forces, which is interpreted as both deterrence signaling and a demonstration of readiness to uphold its stated position. China's strategy combines elements of sustained long-term pressure with a desire to control escalation levels, leaving open multiple scenarios for the future development of cross-strait relations.

Conclusions. Based on the data analyzed, we find that the majority of Taiwan's population refuses to call themselves Chinese when asked about their national identity, which indicates the formation of a mature civic nationalism. For many Taiwanese, the term "Chinese" is effectively synonymous with "a citizen of China," that is, the People's Republic of China. Most Taiwanese do not identify with the mainland Chinese state in order to safeguard their independence.

At the same time, it should be noted that Taiwan has not yet reached a full-fledged consensus on national identity, as a substantial group of citizens maintains a "dual" identity, considering themselves both Taiwanese and Chinese. In addition, a significant share of the population may call themselves "Taiwanese" in a political sense while retaining a Chinese cultural and historical sense of belonging.

Against this backdrop, in recent decades Taiwan's authorities have pursued policies aimed not only at strengthening a state-based national identity but also at fostering a distinct ethnocultural Taiwanese identity, in an effort to overcome the society's identity divide. The shift in self-identification that intensified from the late 1980s onward has been driven primarily by foreign-policy factors – most notably the existence of "two Chinas," Taiwan's relations with Beijing, and its positioning vis-à-vis the rest of the world.

The existence of a democratic system within a deteriorating cross-Strait security environment shaped by relations with mainland China is not merely part of Taiwan's political agenda; it has also become a long-term psychological reality for the island's residents and, accordingly, a factor that contributes to the strengthening of a distinct Taiwanese identity, as evidenced by sociological research findings.

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ІНСТИТУЦІОНАЛІЗАЦІЯ ЯК ЕЛЕМЕНТ ГАРМОНІЗАЦІЇ ПОЛІТИКИ УКРАЇНИ У СФЕРІ ВИЩОЇ ОСВІТИ У ПРОЦЕСІ ЄВРОПЕЙСЬКОЇ ІНТЕГРАЦІЇ

INSTITUTIONALIZATION AS AN ELEMENT OF UKRAINE'S HIGHER EDUCATION POLICY HARMONIZATION IN THE PROCESS OF EUROPEAN INTEGRATION

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Abstract. *This article systematizes the stages of transformation of Ukraine's higher education system after 2014 and the institutionalization of European standards within it, and also examines the significance of this process as a component of European integration. The study focuses on the institutionalization of European norms within Ukraine's higher education system, tracing its alignment with the European Higher Education Area (EHEA) and the democratization of Ukrainian higher education as part of broader European Union integration dynamics. Using qualitative document analysis, the study examines Ukrainian education legislation (including the Laws on Higher Education of 2014 and on Education of 2017), EU-Ukraine Association Agreement frameworks, NAQA reports, Erasmus+ mobility data, and Horizon Europe participation documents. Education is treated as an element of soft power for shaping international image. The findings demonstrate significant institutional restructuring in the areas of democratization of university governance, external quality assurance (the role of the National Agency for Higher Education Quality Assurance), and integration of Ukrainian universities into the EHEA and EU research networks. However, implementation remains uneven due to institutional capacity gaps, academic integrity challenges in the context of generative AI, legacy administrative practices inherited from the Soviet model, and the severe consequences of the full-scale Russian-Ukrainian war. The article concludes that higher education policy harmonization and the implementation of competency-based learning outcomes aligned with the European Qualifications Framework are key preconditions for Ukraine's long-term integration into the European educational, scientific, and socio-political space.*

Key words: *democratization of Ukrainian higher education, institutionalization, European Higher Education Area, Bologna Process, European Union, European integration of Ukraine.*

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Анотація. *У статті концептуально систематизовано етапи трансформації системи вищої освіти України після 2014 року та інституціоналізації в ній європейських стандартів, а також досліджено значення цього процесу як складової євроінтеграції. На основі якісного аналізу документів: законодавства України у сфері освіти (зокрема законів «Про вищу освіту» 2014 року та «Про освіту» 2017 року), рамок Угоди про асоціацію між Україною та ЄС, звітів НАЗЯВО, даних про академічну мобільність у рамках Erasmus+ та документів щодо участі в програмі Horizon Europe, визначено ключові зміни в системі вищої освіти. Освіта розглядається як елемент «м'якої сили» у формуванні міжнародного іміджу держави та її академічного авторитету. Результати дослідження свідчать про суттєву інституційну перебудову у сфері демократизації університетського врядування, зовнішнього забезпечення якості та інтеграції українських університетів до Європейського простору вищої освіти (ЕНЕА) і дослідницьких мереж ЄС. Водночас реалізація реформ залишається нерівномірною через відмінності в інституційній спроможності закладів вищої освіти, успадковані радянські адміністративні практики, виклики академічної доброчесності в умовах поширення штучного інтелекту, а також наслідки повномасштабної російсько-української війни. Автори аналізують реформи крізь призму теорії інституційного нашарування, показуючи співіснування нових правил із застарілими управлінськими практиками. Додатково досліджено роль транскордонних освітніх та наукових мереж (зокрема Erasmus+ та Horizon Europe) як інструментів публічної дипломатії, що посилюють суб'єктність України на міжнародній арені та її стійкість в гуманітарній сфері. Зроблено висновок, що гармонізація вищої освіти з європейськими стандартами через впровадження компетентнісного підходу та узгодження Національної рамки кваліфікацій із Європейською рамкою кваліфікацій є необхідною передумовою успішної довгострокової інтеграції України до європейського освітнього, наукового та соціально-політичного простору.*

Ключові слова: *демократизація вищої освіти України, інституціоналізація, Європейський простір вищої освіти, Болонський процес, Європейський союз, європейська інтеграція України.*

Introduction. The harmonization of Ukraine's higher education policy with European standards became one of the important directions of reform after the signing of the Association Agreement between Ukraine and the European Union in 2014 *(Association Agreement, 2014).*

At the same time, this process involves more than legal approximation or the formal adoption of European regulations. It also affects the internal organization of universities with gradual transition toward greater autonomy, institutional diversification, research integration, flexible learning pathways, and embedding in the EHEA. *(Kahanec et al., 2022).* However institutions implement European standards differenly, dependending on their capacity. While Ukraine has adopted key European instruments, such as the European Credit Transfer and Accumulation System, the Diploma Supplement, national qualifications frameworks, external accreditation mechanisms, their practical implementation remains uneven.

Therefore, the article examines whether Ukraine’s higher education system has substantially moved closer to European standards and why this process matters in the broader context of European integration as higher education reform continues to function as an important indicator of institutional development and long-term European orientation.

Literature review. The concept of Europeanization of Ukraine's higher education has been the subject of academic studies providing a foundational lens for understanding higher education transformation.

Zakharchuk N. *(Zakharchuk, 2020)* emphasizes that Ukrainian higher education reform must be understood as a dual process shaped by European regionalization through the Bologna Process and persistent institutional legacies inherited from the Soviet governance model. This duality produces a hybrid institutional environment in which new rules coexist with older administrative logics. From this perspective, harmonization is not substitution but layering – new governance

structures are embedded into existing institutional configurations without fully replacing them.

Oleksiyenko A. *(Oleksiyenko, 2023)* extends this analysis by focusing on epistemic and cultural dimensions of reform. He argues that European concepts such as academic freedom, institutional autonomy, and quality assurance require not only procedural adoption but cognitive reinterpretation within academic communities. This implies that harmonization is fundamentally a process of conceptual translation, where imported governance models must be integrated into local academic cultures that may not historically align with them.

Historical institutionalist approaches explain why reforms produce uneven outcomes. Hladchenko, Dobbins, and Jungblut *(Hladchenko et al, 2020)* argue that higher education systems characterized by informal governance practices and weak enforcement mechanisms tend to reproduce stability even under formal reform pressure.

This creates a structural gap between policy adoption and operational change. Universities may comply with formal requirements while maintaining internal practices that diverge from European governance expectations. As a result, reform outcomes depend not only on legislation but also on institutional incentives, administrative capacity, and governance culture.

Kahanec, Leu-Severynenko, Novosad and Stadnyi *(Kahanec et al, 2022)* situate higher education reform within Ukraine's wartime reconstruction agenda, arguing that the war both disrupted the education system and increased the strategic importance of European integration as a long-term rebuilding framework, with international academic partnerships serving as mechanisms of institutional continuity under wartime conditions.

Despite substantial existing research, there remains limited integration between three analytical dimensions: governance transformation, institutional implementation capacity, and external reputational effects. This study addresses this gap by analyzing higher education harmonization as a multi-level institutional process rather than a single policy domain.

The purpose of the study. The purpose of the article is to assess the harmonization of Ukraine's higher education policy with European standards after 2014 and to explain why this alignment matters for European integration, institutional modernization and external credibility.

The study employs qualitative document analysis as the primary methodological approach. Document analysis is appropriate because higher education harmonization is expressed through legislation, institutional decisions, programme participation and official reports. The empirical corpus includes: Ukrainian laws on higher education, the Association Agreement, documents of the European Higher Education Area, NAQA materials, EU-Ukraine cooperation documents, and information on Erasmus+, Eurydice and Horizon Europe.

The analysis is structured around the following interpretive layers: 1. normative alignment (formal policy convergence); 2. institutional implementation (operational practices); 3. integration outcomes (mobility, research cooperation, external recognition). This layered approach allows identification of asymmetries between policy design and institutional reality, assessesing institutional convergence and discussing reputational significance as an indirect consequence of credible alignment.

Main results of the research. The post-2014 reform cycle introduced a structured shift in the governance architecture of Ukrainian higher education. The Law on Higher Education *(2014)* and subsequent legislative acts established a framework that formally redefined the relationship between the state and universities *(Law of Ukraine No. 1556-VII, 2014).* However, this transformation is better understood as partial decentralization under continued regulatory supervision, rather than full institutional autonomy in the European sense *(Hladchenko et al, 2020).* Universities gained expanded managerial rights, but strategic and financial dependencies on the state remain significant, particularly in budgetary allocation and staffing structures.

The Law on Education *(2017)* extended this framework by embedding competency-based learning outcomes as the foundational logic for qualification design *(Law of Ukraine No. 2145-VIII, 2017).* Simultaneously, the National Qualifications Framework (NQF) operationalized this logic by structuring qualifications through eight levels of learning outcomes directly comparable to the European Qualifications Framework (EQF). This alignment reduces informational barriers for

Ukrainian graduates seeking recognition in European academic and professional markets, and signals the depth of normative convergence beyond purely legislative compliance.

Ukraine's inclusion in the Eurydice network in 2024 extends this institutional integration into the domain of comparative education data *(Eurydice Ukraine, 2024).* Eurydice provides standardized descriptions of national education systems for European audiences; Ukraine's participation means its system is increasingly represented alongside EU member states rather than classified separately as an external partner. While this does not constitute full convergence, it marks a qualitative shift in how Ukraine's higher education system is positioned within European comparative frameworks.

Across all three instruments – the Law on Higher Education, the NQF, and Eurydice inclusion – a consistent pattern is visible: governance reform creates the conditions for recognition, but recognition itself depends on the operational credibility of the instruments in practice. This creates a hybrid governance model in which autonomy is formally recognized but functionally constrained.

The establishment of the National Agency for Higher Education Quality Assurance (NAQA) represents one of the most structurally significant reforms in Ukrainian higher education governance. From an institutional perspective, NAQA introduces a shift from administrative control logic toward external evaluative governance, where quality is assessed through peer review mechanisms and standardized European criteria.

NAQA's integration into European quality networks followed a staged trajectory. In 2020, the agency received affiliate status with the European Association for Quality Assurance in Higher Education (ENQA) and became a full member of the Central and Eastern European Network of Quality Assurance Agencies in Higher Education (CEENQA) (*NAQA, 2020a; NAQA, 2020b*). These steps signal institutional recognition within the European quality architecture. NAQA is currently advancing toward full ENQA membership and inclusion in the European Quality Assurance Register (EQAR) – a milestone that would make Ukrainian accreditation decisions formally recognized across the entire EHEA *(NAQA, 2025).* EQAR inclusion would directly reduce the recognition barriers that Ukrainian graduates and academics currently face when seeking to study, work, or collaborate in Europe.

However, this shift does not automatically produce uniform compliance across institutions. Instead, it generates differentiated adaptation patterns: leading universities internalize quality assurance as a development tool; mid-tier institutions treat it as procedural compliance; weaker institutions often struggle with capacity requirements. The scale of accreditation activity as approximately 1,300 programmes processed in 2024 alone (*Annual report of the National Agency for Higher Education Quality Assurance for 2024*) demonstrates institutional penetration of external evaluation mechanisms, but does not resolve structural disparities in implementation quality.

Thus, quality assurance in Ukraine functions simultaneously as a governance modernization instrument and a mechanism of institutional differentiation. The next stage of reform should therefore focus on strengthening implementation quality and consistency, rather than expanding the formal scope of accreditation procedures.

Erasmus+ operates as one of the most effective mechanisms of European integration in Ukrainian higher education, but its impact is structurally uneven. Available data confirm the scale of this engagement: since 2014, Ukrainian institutions have participated in 1,889 cooperation projects involving 227 universities, producing 17,006 student and staff mobilities *(EEAS, 2023).* In the 2023 call alone, Ukrainian organisations were selected for 2,425 new mobility projects – the highest figure among all 144 partner countries in the programme (*EEAS, 2023*). This positions Ukraine not as a peripheral beneficiary but as one of the most engaged partner systems within Erasmus+, reflecting the administrative capacity and European partnerships that Ukrainian universities have developed since 2014.

However, the distribution of participation reveals clear asymmetries. Universities with stronger administrative capacity and international offices accumulate disproportionately higher engagement levels. This produces a stratified internationalization system, where European exposure becomes institutionally concentrated rather than system-wide. Beyond mobility statistics, Erasmus+

generates three long-term institutional effects: curricular adaptation toward European learning outcomes; administrative learning in project-based governance; and norm diffusion regarding academic standards and collaboration practices.

After 2022, mobility also acquired a resilience dimension. It became a mechanism for maintaining institutional continuity under wartime disruption, reinforcing its role beyond traditional academic exchange *(Kahanec et al., 2022).* European support for Ukrainian students and researchers became an additional channel of institutional connection, primarily humanitarian in immediate purpose, but with long-term structural consequences for academic integration.

Ukraine's participation in Horizon Europe represents a deeper form of institutional integration because it requires compliance with complex research governance standards. Unlike mobility programmes, Horizon Europe engagement is conditional on financial accountability systems, research ethics compliance, consortium-based project management, open science requirements, and competitive peer review structures. This creates what can be described as governance transfer through research participation.

Available data confirm accelerating integration. Funding to Ukrainian entities doubled between 2022 and 2023, rising from €13 million to €20.3 million (*Science|Business, 2024).* By 2024, total net contributions reached approximately €50 million across 172 projects – the highest cumulative total for Ukraine in any EU framework research programme to date (*Science|Business, 2025*). The opening of the Horizon Europe Office in Kyiv in December 2023 further institutionalized this relationship, signaling Ukraine's transition from programme participant to recognized research partner requiring dedicated coordination infrastructure (*European Commission, 2023*).

Importantly, participation remains uneven. Institutions with established research infrastructure integrate more effectively, while others remain marginal participants. This reinforces systemic stratification within Ukrainian academia, mirroring the asymmetry observed in Erasmus+ engagement.

The full-scale war has not interrupted Europeanization processes but has fundamentally altered their conditions of implementation. Three structural effects are evident: infrastructure disruption, which has reduced institutional capacity in affected regions; digital acceleration, which enabled continuity but also exposed inequalities in technological readiness; and increased external dependency, through which international partnerships have become essential for institutional survival, particularly in research and mobility.

Thus, war acts simultaneously as a constraint on institutional capacity and a catalyst for international integration. This dual effect reinforces asymmetry rather than eliminating it – institutions already better integrated into European networks have proven more resilient, while those with weaker international connections face compounding disadvantages.

The findings indicate that Europeanization in Ukrainian higher education does not produce uniform systemic change. Instead, it generates a stratified structure in which institutions adapt at different speeds and depths. This confirms that harmonization is not a binary outcome (aligned / not aligned), but a gradient process of institutional convergence. The broader AA implementation data support this assessment: according to the Report on the Implementation of the Association Agreement for 2023, the Ukrainian Cabinet of Ministers fulfilled 86% of AA-mandated tasks, representing a five percentage point increase over the previous year (*Cabinet of Ministers of Ukraine, 2024*). Education and research consistently appeared among the highest-performing implementation clusters, indicating that sectoral convergence is traceable through measurable governance outputs.

A key analytical insight is the existence of a persistent translation gap between formal adoption of European standards and their operational implementation. This gap is not accidental but structurally embedded in governance conditions characterized by administrative legacy systems, uneven institutional capacity, and limited enforcement mechanisms. As a result, European standards are often reinterpreted rather than fully replicated. Closing this gap requires not only continued legislative alignment but sustained investment in institutional capacity and governance culture.

From a soft power perspective, higher education reform contributes to external perception

formation, but only indirectly. Institutional credibility emerges through cumulative signals: participation in Erasmus+, integration into Horizon Europe, and external accreditation recognition through the NAQA–ENQA/EQAR trajectory. As Lami & Myrta *(Lami, Myrta, 2021)* demonstrate, the value diffusion generated through academic mobility operates independently of formal policy declarations, accumulating through individual interactions and institutional relationships rather than top-down signaling. However, these effects function over long time horizons and depend on perceived consistency between formal alignment and practical governance behavior.

The analysis supports the interpretation that Europeanization in higher education is best understood as institutional learning rather than policy transfer. Learning occurs through repeated participation in European programmes, adaptation to external evaluation systems, and incremental internalization of governance norms. This process is neither linear nor complete, but cumulative – and its depth is determined less by legislative frameworks than by the organizational conditions under which institutions engage with European expectations.

Conclusions. The study demonstrates that Ukraine's higher education system has undergone significant transformation since 2014, characterized by increasing alignment with European governance, quality assurance, and research frameworks. However, this alignment is uneven and structurally differentiated. While formal regulatory convergence is substantial and reflected in legislative reform, NQF development, NAQA's integration into European quality networks, Eurydice inclusion, and growing participation in Erasmus+ and Horizon Europe, implementation varies across institutions depending on capacity, resources, and administrative maturity. Harmonization is therefore institutional rather than merely legal, as European standards become embedded through governance practices rather than legislative adoption alone. Europeanization is also structurally stratified: integration outcomes differ significantly across institutions, producing a multi-speed higher education system in which external credibility is indirect and cumulative, arising from sustained institutional participation in European frameworks rather than from formal policy declarations.

These findings have direct implications for policy. Strengthening institutional capacity beyond leading universities is essential to reducing the systemic asymmetry that currently concentrates European programme participation among a small group of institutions. In parallel, NAQA's trajectory toward full ENQA membership and EQAR inclusion should be treated as a strategic priority rather than a technical procedure, given that degree recognition across the EHEA depends directly on this milestone. More broadly, improving the implementation consistency of quality assurance mechanisms requires shifting emphasis from procedural compliance toward governance culture – a change that cannot be achieved through regulation alone but demands sustained investment in institutional development. Regional universities with limited administrative infrastructure require targeted support to expand their access to European programmes equitably. Underpinning all of these directions is the need to reinforce governance autonomy alongside robust accountability systems, so that universities can act as genuine agents of European integration rather than passive recipients of externally imposed standards.Ultimately, higher education harmonization in Ukraine should be understood as a long-term institutional adaptation process shaped by both European integration dynamics and domestic structural constraints. Its significance lies not in formal convergence alone, but in the cumulative depth of institutional change that makes Ukraine's European orientation operationally real.

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CROSS-BORDER COOPERATION AS A FRACTAL SYSTEM: FROM LOCAL INTERACTIONS TO GLOBAL GEOPOLITICAL PROCESSES

ТРАНСКОРДОННЕ СПІВРОБІТНИЦТВО ЯК ФРАКТАЛЬНА СИСТЕМА: ВІД ЛОКАЛЬНИХ ВЗАЄМОДІЙ ДО ГЛОБАЛЬНИХ ГЕОПОЛІТИЧНИХ ПРОЦЕСІВ

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Abstract. *The purpose of this article is to examine cross-border cooperation as a fractal system in which local interactions among border communities, regions and states reproduce the structural and functional characteristics of the international system at higher levels of organization. The study substantiates the applicability of the fractal approach to the analysis of cross-border processes under conditions of globalization, regionalization and the transformation of the world order. Particular attention is devoted to the principles of self-similarity, nonlinearity, scalability and network interdependence that shape the evolution of contemporary cross-border relations. Using systemic, comparative and fractal analysis, the article explores the interconnection between local border practices and broader political, economic and security dynamics. It demonstrates that cross-border cooperation functions not only as an instrument of regional development but also as an important mechanism for the formation of a multi-level architecture of international relations. The study examines the influence of European integration, digitalization, migration processes, security challenges and the Russo-Ukrainian war on the transformation of cross-border interactions. The scientific novelty lies in introducing three key concepts: fractal cascades,*

geopolitical sensors, and fractal networks of cross-border cooperation. A fractal cascade explains the spread of local crises or innovations across levels of the international system. In this context, the Russia-Ukraine war is analyzed as a massive fractal cascade that shifted the security architecture of Europe. Border territories are conceptualized as geopolitical sensors that detect systemic changes at an early stage. The paper concludes that under multipolarity, cross-border cooperation operates as a system-forming rather than a peripheral element, organizing complex adaptive networks.

***Keywords**: cross-border cooperation, fractal model, international relations, border regions, regional integration, geopolitical processes, international security, network interactions, complex adaptive systems, multipolarity.*

***Анотація**. Метою статті є дослідження транскордонного співробітництва як фрактальної системи, в якій локальні взаємодії між прикордонними громадами, регіонами та державами відтворюють структурні й функціональні закономірності міжнародної системи на вищих рівнях організації. У статті обґрунтовується можливість застосування фрактального підходу до аналізу транскордонних процесів в умовах глобалізації, регіоналізації та трансформації світового порядку. Особливу увагу приділено принципам самоподібності, нелінійності, масштабованості та мережевої взаємозалежності, які визначають розвиток сучасних транскордонних відносин. На основі системного, порівняльного та фрактального аналізу досліджено взаємозв'язок між локальними прикордонними практиками та ширшими політичними, економічними й безпековими процесами. Показано, що транскордонне співробітництво виступає не лише інструментом регіонального розвитку, але й важливим механізмом формування багаторівневої архітектури міжнародних відносин. Проаналізовано вплив європейської інтеграції, цифровізації, міграційних процесів, безпекових викликів та російсько-української війни на трансформацію транскордонних взаємодій. Наукова новизна дослідження полягає у розробці та впровадженні трьох взаємопов'язаних аналітичних концепцій: фрактального каскаду, геополітичного сенсора та фрактальної мережі транскордонного співробітництва. Поняття фрактального каскаду пояснює, як локальні кризи (наприклад, воєнні події в прикордонних зонах) або інновації поширюються на регіональний та глобальний рівні. Геополітичні сенсори відображають здатність прикордонних територій першими детектувати системні зрушення у світовому порядку. Зроблено висновок, що фрактальний підхід дозволяє пояснити механізми поширення локальних криз, конфліктів та інновацій на регіональний і глобальний рівень, а також виявити нові закономірності функціонування транскордонних мереж у багатополярному світі. Запропоновано концептуальну модель аналізу транскордонного співробітництва як складної адаптивної фрактальної системи міжнародних відносин, яка демонструє високий потенціал самоорганізації та гнучкості в умовах кризової мобілізації.*

***Ключові слова**: транскордонне співробітництво, фрактальна модель, міжнародні відносини, прикордонні регіони, регіональна інтеграція, геополітичні процеси, міжнародна безпека, мережеві взаємодії, складні адаптивні системи, багатополярність.*

Introduction. Cross-border cooperation is one of the most dynamic phenomena in contemporary international relations. It encompasses a wide range of interactions among border territories, regions, local communities, state institutions, businesses, and civil society actors. Under the conditions of globalization, digitalization, regional integration, and the transformation of the international order, cross-border cooperation extends beyond the traditional understanding of border interactions and increasingly functions as an important mechanism for shaping the multi-level architecture of international relations.

This issue has become particularly relevant in the context of the emergence of a multipolar world, where regions, cities, cross-border networks, and other non-state actors are gaining increasing importance alongside states. Under such conditions, traditional linear models of

international process analysis are becoming insufficient for explaining the complex mechanisms linking local, regional, and global levels of politics. Local processes often generate far-reaching international consequences, while global trends are transformed into specific borderland practices, creating a complex system of interconnected processes.

One of the most promising approaches to studying such phenomena is the fractal approach to the analysis of international systems developed by O.A. Koppel and O.S. Parkhomchuk. According to this approach, the international system is viewed as a complex adaptive structure characterized by self-similarity, nonlinearity, scalability, and polycentricity. The fractal model makes it possible to examine the recurrence of similar patterns at different levels of international interaction, ranging from local communities and border regions to the global international system. Within this framework, cross-border cooperation may be conceptualized as a specific "fractal" of international relations in which the fundamental mechanisms of cooperation, competition, conflict, integration, and adaptation characteristic of world politics as a whole are reproduced.

The Russia-Ukraine war, the intensification of geopolitical competition, migration crises, the rapid development of digital technologies, and emerging challenges to international security demonstrate that border regions are increasingly becoming spaces where processes with consequences extending far beyond the local level are formed. Therefore, the study of cross-border cooperation through the lens of the fractal approach not only contributes to a deeper understanding of the nature of contemporary international interactions but also enables the identification of new patterns in the functioning of the international system under conditions of ongoing transformation.

The **purpose** of this article is to examine cross-border cooperation as a fractal system of international relations and to identify the mechanisms linking local border interactions, regional integration processes, and global geopolitical transformations.

Research on cross-border cooperation occupies an important place in contemporary international relations theory, regional studies, and European integration research. Over recent decades, a substantial body of scholarly literature has emerged devoted to analyzing the role of borders, border regions, and mechanisms of interregional interaction in the context of globalization and regionalization.

One of the earliest directions in the study of cross-border cooperation focused on the transformation of state border functions in the contemporary world. In particular, A. Paasi (1996) conceptualized borders not merely as territorial boundaries of state sovereignty but also as social institutions that shape political, economic, and cultural interactions between neighboring territories. His approach laid the foundation for subsequent studies of deterritorialization processes and the emergence of new spatial forms of international interaction.

A significant contribution to the development of the concept of cross-border cooperation was made by M. Perkmann (2003), who examined cross-border regions as new forms of multi-level governance emerging at the intersection of national and supranational political structures. He argued that cross-border cooperation is gradually evolving into a distinct level of political organization functioning alongside traditional state institutions.

A similar position is advanced by J. Scott (2012), who emphasizes the role of border territories as spaces of innovation and experimentation in international cooperation. According to Scott, border regions frequently serve as laboratories for new models of governance, integration, and conflict resolution that subsequently diffuse into the broader international environment.

Contemporary research increasingly focuses on the relationship between cross-border cooperation and European integration processes. In this regard, E. Medeiros (2018) considers cross-border cooperation to be an important instrument for implementing the European Union's territorial cohesion policy. The author argues that cross-border networks contribute to regional economic convergence, the development of shared infrastructure, and the formation of a common European identity.

In Ukrainian scholarship, cross-border cooperation has traditionally been studied within the framework of regional development, European integration, and border policy. Significant contributions to this field have been made by M. Mikula (2004), I. Studennikov (2005), A. Yurkiv

(2024), M. Resler and T. Reis (2023), among other researchers.

In their works, particular attention is devoted to the institutional mechanisms governing the functioning of Euroregions, the role of local self-government, and the potential of cross-border cooperation as an instrument for the socio-economic development of border territories.

At the same time, most existing approaches are primarily based on linear models of analysis that conceptualize cross-border cooperation either as a separate area of international activity or as a component of regional policy. Such approaches do not always adequately explain the complex mechanisms linking local processes with global transformations.

In this context, the authors' fractal approach to the analysis of international systems acquires particular significance. This approach is grounded in the understanding of the international system as a complex adaptive structure characterized by self-similarity, nonlinearity, scalability, and process recursiveness. Unlike traditional hierarchical models, the fractal model makes it possible to examine international relations as a set of interconnected levels, each reproducing similar patterns of interaction among actors.

The fractal approach opens new opportunities for the study of cross-border cooperation. If a border region is viewed as an element of the international system, then the processes of cooperation, competition, conflict, adaptation, and integration occurring at the local level may be interpreted as reflections of analogous processes operating within regional subsystems and the global international system. In this perspective, cross-border cooperation functions not merely as an instrument of regional policy but also as a model of the functioning of the international system as a whole.

Despite the substantial body of research devoted to cross-border cooperation, its analysis as a fractal system of international relations remains largely unexplored. This gap determines the scientific novelty of the present study and highlights the relevance of applying the fractal approach to investigating the relationship between local border interactions and global geopolitical processes.

The methodological foundation of this study is the fractal approach to the analysis of international systems, which enables cross-border cooperation to be examined as a complex adaptive system operating simultaneously at local, regional, national, and global levels. In contrast to traditional linear models, the fractal approach provides a framework for exploring interactions among different levels of the international system through the principles of self-similarity, nonlinearity, scalability, and recursiveness. Within this framework, a border community, a cross-border region, an interstate association, and the global international system can be conceptualized as interconnected levels of a single fractal space of international relations.

One of the key methodological principles of this study is the principle of self-similarity. This principle assumes that the fundamental forms of interaction among actors-cooperation, competition, conflict, coordination, and adaptation-are reproduced at different levels of the international system. For example, coordination processes among border communities may reflect the logic of interaction between states or international organizations. Similarly, local disputes over resources, infrastructure, or security may mirror the mechanisms of geopolitical competition operating at regional and global levels.

The second important principle is the nonlinearity of development. In fractal systems, there is no direct proportionality between causes and consequences. Minor local events may generate large-scale political, economic, or security effects at the international level. Such processes are particularly characteristic of contemporary cross-border spaces, where local migration crises, environmental disasters, or border conflicts can rapidly evolve into international challenges.

Particular importance is attached to the principle of scalability. This principle implies the possibility of analyzing the same patterns at different levels of the international system. Within the framework of this study, cross-border cooperation is examined simultaneously as a local mechanism of interaction among border territories and as a component of broader processes of regionalization, integration, and transformation of the global order. Such an approach makes it possible to trace how local initiatives shape wider international processes and, conversely, how global trends influence the development of border regions.

An important analytical tool employed in this research is the concept of fractal cascades. A

fractal cascade is understood as a process through which local changes spread across different levels of the international system. In the context of cross-border cooperation, such cascades may include the diffusion of innovative governance practices, migration processes, economic crises, security challenges, or conflicts. The Russia-Ukraine war provides an illustrative example of such a cascade, where developments within specific border areas gradually evolved into a large-scale regional and global crisis that affected both the security architecture of Europe and the international system as a whole.

To achieve the objectives of the study, a combination of general scientific and specialized research methods has been employed. The systems approach is used to analyze cross-border cooperation as an integrated multi-level system. The comparative method is applied to examine and contrast different models of cross-border interaction in Europe and other regions of the world. The case study method enables the investigation of specific examples of cross-border cooperation and their impact on broader international processes. Fractal analysis is utilized to identify self-similar structures and recurring patterns at different levels of international interaction.

Thus, the application of fractal methodology makes it possible to develop a comprehensive understanding of cross-border cooperation as a complex adaptive system that integrates local, regional, and global processes within a unified space of international relations. At the same time, it opens new opportunities for analyzing contemporary geopolitical transformations and the evolving architecture of the international system.

Main results of the research. In the twenty-first century, cross-border cooperation has increasingly moved beyond the classical understanding of interaction between neighboring border territories. While it was previously associated primarily with the development of local infrastructure, economic contacts, and cultural exchanges, contemporary cross-border spaces are becoming complex nodes of global interaction where economic, security, political, technological, and humanitarian processes intersect. For this reason, cross-border cooperation should be viewed not merely as a distinct area of international activity but as a fractal system that reflects the fundamental patterns governing international relations as a whole.

Within the fractal model, each border region functions as a micro-level representation of the international system. Nearly all the basic elements of world politics are present within such regions: competition for resources, struggles for influence, cooperation, integration processes, security challenges, information interaction, and cultural diplomacy. Consequently, border territories may be regarded as “geopolitical laboratories” in which the processes characteristic of the international system are reproduced on a smaller scale.

The principle of self-similarity is particularly evident in the functioning of Euroregions. For example, the activities of the Carpathian Euroregion effectively reproduce the principal mechanisms underlying the operation of the European Union itself, including multi-level governance, policy coordination, interinstitutional cooperation, resource allocation mechanisms, and joint decision-making processes. In this way, a local system of cross-border interaction becomes a model of broader integration processes taking place at the European level.

At the same time, the fractal nature of cross-border cooperation is manifested not only through cooperation but also through conflict. Border territories frequently become the first areas where global contradictions emerge. Local conflicts may gradually evolve into large-scale international crises, creating the effect of what may be termed a fractal cascade. In such cases, a relatively small local event generates a chain of interconnected processes that spread to regional and global levels.

A striking example of such a fractal cascade is the Russia-Ukraine war. Events that initially appeared as a localized conflict centered on specific border territories gradually evolved into the most significant security crisis in Europe since the end of the Cold War. The war has affected not only the regional security architecture but also global energy markets, food security, migration dynamics, international logistics, and systems of international alliances. In this case, a local border space became the point of origin for a large-scale geopolitical cascade whose consequences are felt across virtually all regions of the world.

Fractal logic is also evident in the diffusion of innovation. Contemporary cross-border regions

increasingly serve as platforms for testing new models of governance, digitalization, and economic integration. Innovative practices that emerge at the local level can gradually scale up and spread across broader international spaces. Many mechanisms of European integration developed in precisely this way: initially tested within individual border regions and later incorporated into wider European policies and institutional frameworks.

Particular importance in the contemporary era is attached to the digital dimension of cross-border cooperation. While traditional borders were shaped by geographical space, modern digital networks create new forms of cross-border interaction that are increasingly independent of territorial proximity. As a result, the phenomenon of "digital fractals" emerges, whereby similar patterns of communication, mobilization, and interaction are reproduced across different levels, ranging from local online communities to global digital platforms.

Interestingly, contemporary cross-border networks increasingly resemble the structure of neural networks. Within such systems, individual nodes may possess relatively limited significance on their own, yet collectively they form a complex web of interdependencies. Similar to neurons in the human brain, border communities, cities, regions, and institutions create networks through which information, resources, and political influence spread in nonlinear and uneven ways. This helps explain why even relatively small border regions can sometimes play a disproportionately important role in international processes.

The fractal approach also offers a new perspective on the issue of international security. Traditional security concepts often view security primarily as a product of the actions of states and international organizations. Contemporary challenges, however, demonstrate that sources of instability increasingly emerge at the local level. Migration crises, transnational crime, cyber threats, terrorist networks, and information campaigns frequently originate within specific border spaces but rapidly spread through global networks of interaction. Consequently, border territories increasingly function as sensors of the international system, often serving as the first areas to register emerging transformations within the international environment.

Particular attention should be devoted to the phenomenon of fractal adaptation. Unlike rigid hierarchical structures, cross-border networks demonstrate a high capacity for self-regulation and adaptation to changing conditions. During the COVID-19 pandemic, migration crises, and the Russia-Ukraine war, many border communities proved capable of responding to new challenges more rapidly than certain state institutions. This suggests that contemporary cross-border cooperation increasingly operates as a complex adaptive system characterized by a high degree of internal self-organization.

In the context of the emerging multipolar world order, the role of cross-border spaces continues to grow. While states were the principal actors of the international system throughout most of the twentieth century, regions, cities, networked communities, and cross-border associations are increasingly gaining prominence today. In this sense, border territories are no longer peripheral to the international system; rather, they function as active nodes through which key flows of resources, information, technologies, and political influence pass.

Consequently, cross-border cooperation may be conceptualized as a fractal model of international relations in which local interactions reflect the broader patterns governing global political development. Through the analysis of cross-border processes, it becomes possible to identify the underlying mechanisms driving transformations within the international system. This is particularly important in an era characterized by increasing instability, multipolarity, and the nonlinear nature of contemporary geopolitical dynamics.

One of the key characteristics of complex adaptive systems is the capacity of local processes to generate large-scale consequences at higher levels of organization. In contemporary complexity theory, such phenomena are examined through the concepts of nonlinearity, network interdependence, and cascading effects (Mitchell, 2009; Holland, 2014). Within the framework of the fractal approach to international relations, these processes can be conceptualized as fractal cascades–sequences of interconnected changes that spread from local to regional and global levels, thereby transforming the structure of the international system (Koppel & Parkhomchuk, 2024).

Ukraine represents one of the most illustrative examples of the functioning of such cascades within the contemporary international system. Its geopolitical position at the intersection of the European, Black Sea, and Eurasian spaces creates a distinctive pattern of cross-border interactions in which local developments frequently acquire international significance (Medeiros, 2018). From a fractal perspective, Ukraine's border regions can be viewed as nodes within the international system through which flows of security, energy, migration, trade, and information are transmitted.

The Russia-Ukraine war has become the most significant example of a fractal cascade in Europe since the end of the Cold War. Events that initially unfolded within specific border regions gradually evolved into a systemic crisis affecting the entire European security architecture. As Buzan (2018) argues, contemporary regional security complexes are characterized by a high degree of interdependence, enabling local conflicts to spread rapidly beyond their original environment. In the Ukrainian case, the consequences of such diffusion included the reassessment of NATO's strategic approaches, the strengthening of the Alliance's eastern flank, and the emergence of new formats of security cooperation across Europe.

A particularly illustrative example is the Black Sea Grain Corridor. The blockade of Ukrainian seaports was initially perceived as a regional security issue; however, within a matter of months, its consequences extended to countries in Africa, the Middle East, and South Asia. According to assessments by the Food and Agriculture Organization of the United Nations (FAO, 2023), disruptions in Ukrainian grain exports affected global food markets and intensified the risks of food insecurity in numerous countries. In this case, a localized logistical challenge evolved into a factor of global food security, demonstrating how cross-border processes can trigger cascading effects across multiple levels of the international system.

An equally important example is the migration cascade. According to the United Nations High Commissioner for Refugees (UNHCR, 2024), millions of Ukrainian citizens left the country following the outbreak of the full-scale invasion, with the majority crossing the borders of Poland, Slovakia, Romania, and Hungary. Initially, this represented a humanitarian phenomenon concentrated in border regions; however, it subsequently evolved into a major factor shaping the demographic, social, and economic policies of the European Union. As Castles (2020) argues, contemporary migration flows increasingly function as mechanisms of structural change within international systems, influencing labor markets, social institutions, and political processes in receiving states.

Another example of a fractal cascade can be observed in the transformation of Europe's energy architecture. For decades, energy relations between Russia and the European Union were based on principles of economic interdependence. Following 2022, however, a large-scale restructuring of cross-border energy networks took place, including the diversification of supply sources, the expansion of LNG infrastructure, and increased investment in renewable energy projects (European Commission, 2024). As a result, a localized military conflict became a catalyst for the transformation of the entire European energy system.

A particularly illustrative example of the fractal diffusion of influence is the shift in the security policies of Northern Europe. The accession of Finland and Sweden to NATO after decades of military neutrality demonstrates how developments in one segment of the international system can trigger transformations within other regional subsystems. In this case, the Ukrainian security environment became a source of change that significantly altered the geopolitical configuration of the Baltic region and Northern Europe as a whole (NATO, 2024).

Contemporary logistical transformations also exhibit a fractal character. The closure of traditional transport routes through Russian territory and the partial disruption of Black Sea shipping corridors stimulated the development of alternative transportation networks through Poland, Romania, the Baltic states, and the South Caucasus. Particular importance has been attached to the Trans-Caspian International Transport Route, which is increasingly viewed as an alternative link between Europe and Asia (World Bank, 2023). Consequently, changes occurring in specific Ukrainian border areas have contributed to the restructuring of logistical flows across the Eurasian continent.

At the same time, fractal cascades are capable of transmitting not only crises but also innovations. Ukraine has emerged as one of the most notable examples of rapid digital transformation in public administration under wartime conditions. The introduction of digital public services, electronic identification systems, and mobile governance solutions has attracted considerable attention from governments and international organizations worldwide (OECD, 2024). In this case, locally developed innovative practices are gradually evolving into internationally recognized experiences that are being adapted and implemented in other countries.

Therefore, Ukraine should be viewed not only as an object of global processes but also as an active node within the international system through which numerous fractal cascades are transmitted. The analysis of the Ukrainian experience demonstrates that contemporary cross-border cooperation can no longer be understood solely as an instrument for the development of border territories. Instead, it is increasingly becoming one of the mechanisms shaping new configurations of the international order, where local processes play an ever more significant role in determining the direction of global transformations.

Traditional approaches to the study of international relations have generally viewed border territories as peripheral zones of state space, influenced by political and economic decisions adopted at the national or international level (Paasi, 1996; Scott, 2012). However, contemporary processes of globalization, digitalization, and increasing network interdependence indicate a gradual transformation in the role of cross-border regions within the international system. These regions increasingly function not as passive recipients of external influence but as active nodes within international networks through which flows of information, capital, migration, technology, and security interactions are transmitted (Castells, 2010).

Within the framework of the fractal model of international relations, border territories may be conceptualized as geopolitical sensors of the international system. Just as peripheral elements of a complex adaptive system are often the first to respond to changes in the external environment (Holland, 2014), border regions frequently become the spaces where emerging political, economic, or security transformations first become visible. This perspective allows cross-border regions to be viewed as important indicators of change within the international environment (Koppel & Parkhomchuk, 2024).

A particularly illustrative example is the migration crisis of 2015–2016. The first consequences of large-scale population movements were experienced by the border regions of Greece, Italy, and the countries of the Western Balkans. It was within these segments of the international system that processes became visible which later reshaped the political agenda of the European Union, contributed to the revision of migration policies, and strengthened the position of right-wing populist political forces in several European states (Medeiros, 2018; European Commission, 2022). In this sense, local cross-border processes effectively functioned as early indicators of broader political transformations across Europe.

A similar pattern can be observed in the security sphere. According to the Regional Security Complex Theory developed by B. Buzan and O. Wæver (2003), security threats most frequently spread through geographically contiguous spaces. Consequently, border regions are often the first areas to register changes in the security environment. The developments preceding Russia's full-scale invasion of Ukraine in 2022 were reflected in the concentration of military activity, shifts in transportation flows, and transformations of border regimes. As a result, Ukraine's border territories became a significant indicator of the impending crisis affecting the entire European security architecture (NATO, 2024).

In the context of the digital transformation of international relations, the informational dimension of cross-border regions has acquired particular significance. As M. Castells (2010) argues, the contemporary network society generates new forms of spatial organization in which information flows increasingly shape political and economic dynamics. Border territories, simultaneously embedded within multiple information spaces, frequently become the first targets of information operations, cyberattacks, and influence campaigns. For this reason, they may be viewed as zones for the early detection of emerging forms of hybrid threats.

Fractal analysis also helps explain why certain cross-border regions occasionally play a disproportionately significant role in international affairs. From the perspective of complexity theory, the importance of an element within a system is determined not primarily by its size but by its position within networks of interdependence (Mitchell, 2009). Consequently, relatively small border territories may function as nodes through which political decisions, economic innovations, or security challenges spread across much broader geographical areas. Examples include the Poland-Ukraine borderland during the humanitarian crisis of 2022 and the Finnish-Russian border following Finland's accession to NATO.

Within this context, it is useful to formulate the principle of fractal sensitivity of cross-border regions. The essence of this principle lies in the assumption that the influence of a border territory on the international system is determined less by its geographical or demographic characteristics than by the degree of its integration into networks of international interaction. The higher the level of such integration, the more rapidly a region responds to changes in the international environment and the greater its capacity to influence broader geopolitical processes.

Accordingly, cross-border regions should not be viewed as peripheral components of the international system but rather as its active nodes and geopolitical sensors. It is through these regions that the earliest signs of transformations in the international order frequently become visible, making the analysis of border spaces an important instrument for anticipating future developments in international relations.

The contemporary transformation of the international system is driven not only by shifts in the balance of power among major states but also by the increasing complexity of the architecture of international interactions. Multipolarity in the twenty-first century cannot be reduced merely to the emergence of several centers of power. Its deeper essence lies in the formation of a complex networked system in which states, regions, cities, corporations, international organizations, cross-border associations, and local communities increasingly operate as interconnected elements of a single international space (Acharya, 2014; Castells, 2010; Khanna, 2016).

In this context, cross-border cooperation acquires a new significance. It ceases to be merely a technical instrument of regional development or a mechanism for overcoming the peripheral status of border territories. In a multipolar world, cross-border cooperation increasingly functions as a mechanism for the formation of new fractal networks of international interaction. Such networks may be understood as multi-level systems in which similar patterns of coordination, competition, adaptation, and integration are reproduced across different levels, ranging from local communities to regional subsystems and the global international order (Koppel & Parkhomchuk, 2024).

The analytical value of the concept of a fractal network lies in its ability to explain why local cross-border processes can acquire disproportionately significant geopolitical importance. Within the traditional hierarchical model, a border region is viewed primarily as a state's periphery. Within the fractal model, however, it appears as a network node capable of accumulating, transforming, and transmitting impulses across different levels of the international system. Consequently, the importance of a cross-border region is determined not only by its territorial size or economic potential but, above all, by the degree of its integration into international flows of security, trade, energy, migration, information, and technology.

The European experience of cross-border cooperation illustrates this logic particularly clearly. The Interreg programs, originally established as instruments to support cooperation among neighboring regions, have gradually evolved into a complex system of multi-level governance linking local, regional, national, and supranational levels. During the 2021–2027 programming period, the European Commission identified 73 cross-border cooperation programmes with a total budget of €6.7 billion, demonstrating the institutionalization of cross-border networks as an integral component of the EU's territorial cohesion policy (European Commission, 2024). In this sense, Interreg represents not merely a financial instrument but an example of a fractal institutional architecture in which similar principles of coordination are reproduced across different levels of governance.

Importantly, fractal networks emerge not only under conditions of stable integration but also

during periods of crisis. Following the outbreak of the full-scale Russia-Ukraine war, the Ukraine-Poland, Ukraine-Slovakia, Ukraine-Romania, and Ukraine-Moldova borderlands became spaces of intensive humanitarian, logistical, security, and economic interaction. These processes extended far beyond interstate channels. They involved local communities, volunteer networks, universities, charitable organizations, transportation companies, border services, local authorities, and international institutions. Such multi-level mobilization demonstrates that, under crisis conditions, cross-border networks are often capable of operating more rapidly and flexibly than traditional bureaucratic structures.

The migration dimension of this transformation is particularly illustrative. According to UNHCR data, in 2024 the number of refugees from Ukraine reached 6.9 million, while the number of internally displaced persons amounted to 7.1 million (UNHCR, 2025). This means that Ukraine's border regions became not merely crossing points but key nodes in the redistribution of human mobility flows across Europe as a whole.

From a fractal perspective, migration should not be understood as a linear process of movement from point A to point B. Rather, it constitutes a networked cascade that reshapes the social, demographic, and political structures of receiving states.

A similar logic can be observed in the field of logistics. The closure or disruption of traditional transport routes as a consequence of the war has increased the importance of alternative corridors connecting Europe and Asia. The World Bank considers the Middle Corridor, or the Trans-Caspian International Transport Route, to be an important link connecting Chinese and European markets through Central Asia and the South Caucasus (World Bank, 2023). This demonstrates that changes occurring in one segment of the Eurasian transport system can generate new network configurations across a much wider geographical space.

In the security sphere, the formation of fractal networks is manifested through the growing interconnection between the local level of defense resilience and the broader architecture of European security. Finland's accession to NATO on 4 April 2023 and Sweden's accession on 7 March 2024 demonstrated that the Russia-Ukraine war generated not only a regional crisis but also a structural transformation of the entire Northern European security configuration (NATO, 2024). In fractal logic, this means that a localized conflict can alter the behavior of actors in other geographical subsystems when they are connected by shared perceptions of threat.

Therefore, under conditions of multipolarity, cross-border cooperation functions not as a peripheral but as a system-forming element of the international system. Through cross-border networks, not only are resources exchanged and local projects implemented, but new models of political coordination, security interdependence, and geoeconomic adaptation are also created. For this reason, fractal networks of cross-border cooperation may be regarded as one of the fundamental forms of organization of international relations in the twenty-first century.

Conclusions. The conducted research makes it possible to conclude that cross-border cooperation in the twenty-first century can no longer be viewed solely as an instrument of regional development or a technical mechanism of interaction between border territories. Under contemporary conditions, it acquires systemic significance and becomes one of the forms of organization of international relations through which the deeper processes of transformation of the world order are manifested.

The fractal approach makes it possible to conceptualize cross-border cooperation as a complex adaptive system in which local interactions reproduce patterns characteristic of regional and global processes. Border communities, Euroregions, cross-border networks, states, and the international system emerge not as isolated levels of analysis but as interconnected fragments of a single multi-level structure. This constitutes the principal heuristic value of the fractal model of international relations: it enables an explanation of why local processes may produce global consequences and why global trends frequently manifest themselves through specific border practices.

The article demonstrates that cross-border cooperation operates according to the principles of self-similarity, nonlinearity, scalability, and network interdependence. Self-similarity is reflected in the recurrence of patterns of cooperation, competition, adaptation, and conflict across different

levels of the international system. Nonlinearity implies that minor local changes may generate large-scale regional or global consequences. Scalability makes it possible to trace how local practices spread to broader international spaces. Network interdependence explains why the significance of a border region is determined not only by its geographical location but also by its degree of integration into flows of people, resources, information, energy, and security.

The scientific novelty of the study lies in the introduction and substantiation of three interrelated analytical concepts: the fractal cascade, the geopolitical sensor, and the fractal network of cross-border cooperation. The concept of the fractal cascade explains the mechanism through which local events spread to regional and global levels. The concept of the geopolitical sensor highlights the capacity of border territories to detect emerging changes in the international environment at an early stage. The concept of the fractal network describes a multi-level structure of cross-border interaction in which local, regional, national, and supranational actors operate as elements of a single system.

The Ukrainian experience confirms the analytical value of this approach. The Russia-Ukraine war, migration processes, the transformation of logistical routes, the restructuring of Europe's energy system, the digitalization of public administration, and changes in NATO's security architecture demonstrate that developments related to Ukraine's cross-border space possess not only local or regional significance but also global importance. Ukraine functions not as a periphery of the international system but as one of its key nodes through which the major flows of contemporary geopolitics pass and are transformed.

Particular significance should be attached to the conclusion regarding the changing role of border territories within the international system. Whereas borders were previously viewed primarily as lines of separation, they increasingly function today as spaces of interaction, adaptation, and strategic forecasting. Border regions are becoming zones for the early detection of crises, spaces for testing new governance models, and platforms for the development of cross-border resilience. This makes it possible to regard them not as peripheral elements of state policy but as important resources for geopolitical positioning.

From a practical perspective, the findings of this study are relevant to the formulation of Ukraine's policy on cross-border cooperation with the European Union, the countries of the Black Sea region, Central Europe, and the Caucasus. The strengthening of cross-border networks may become one of the factors contributing to Ukraine's post-war reconstruction, European integration, and enhancement of regional security. At the same time, an effective cross-border policy should consider not only economic and infrastructural aspects but also security, digital, humanitarian, and informational dimensions.

Thus, cross-border cooperation as a fractal system represents an important analytical tool for explaining contemporary international dynamics. It makes it possible to understand how the local becomes global, how the periphery is transformed into a center, and how border spaces become sources of new forms of international interaction. For this reason, future research on cross-border cooperation should develop not only within the fields of regional studies or European studies but also as part of a broader theory of international relations capable of explaining the nonlinear, networked, and fractal nature of the contemporary world order.

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EUROPEAN INTEGRATION POLICY OF THE BALKAN COUNTRIES IN THE CONTEXT OF MODERN GEOPOLITICAL TRANSFORMATIONS

ЄВРОІНТЕГРАЦІЙНА ПОЛІТИКА КРАЇН БАЛКАНСЬКОГО РЕГІОНУ В УМОВАХ СУЧАСНИХ ГЕОПОЛІТИЧНИХ ТРАНСФОРМАЦІЙ

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Abstract. *This article provides a comprehensive analysis of the contemporary trends, structural dynamics, and geopolitical contradictions of the European integration policy of the Balkan countries in the context of the deep transformation of the European security architecture after 2022. It examines the unique political, economic, and socio-cultural characteristics of the Western Balkan states (Albania, Bosnia and Herzegovina, Serbia, Montenegro, North Macedonia, and Kosovo) that determine the asymmetric pace of their convergence with the European Union. Methodologically based on systemic, comparative, and regional approaches, the study examines the evolution of the EU's enlargement policy from a technocratic process of norm-alignment to a primary geopolitical and security instrument of the Union. The research investigates the strategic competition in the region among the EU, the United States, China, and Russia, showing how Serbia serves as Russia's geopolitical foothold, illustrated by the activities of sanctioned figures like A. Vulin and the involvement of Russian intelligence. It also explores China's economic footprint through the Belt and Road Initiative and its infrastructural investments in projects like the 'Danube Corridor'. It compares the integration paths of the Western Balkans and Ukraine, utilizing the taxonomy of candidate states (the frontrunners, the second-tier eastern candidates, the stagnating states, and the polarized outliers) and reinterpreting the structural difference between Ukraine's existential integration (to survive) and the Balkans' developmental integration (to catch up). Furthermore, it evaluates newly proposed integration models in 2026, such as gradual integration, the 'reverse enlargement' model for Ukraine, and F. Merz's observer status model. The paper concludes that the future of the Balkan states depends on the EU's capacity to balance institutional reforms with geopolitical credibility, ensuring that regional stagnation does not create security vacuums on the Union's external borders*

Keywords: *Balkan region; European Union; European integration; EU enlargement policy; candidate countries; geopolitical contradictions; Western Balkans; international relations; Ukraine; European security.*

Анотація. *У статті здійснено комплексний порівняльний та критичний аналіз сучасних трендів, інституційної динаміки та геополітичних суперечностей євроінтеграційної політики країн Балканського регіону в умовах кардинальної трансформації європейської безпекової архітектури після 2022 року. Детально досліджено*

політичні, економічні та соціокультурні особливості держав Західних Балкан (Албанії, Боснії і Герцеговини, Сербії, Чорногорії, Північної Македонії та Косово), які зумовлюють виразну асиметричність та нерівномірність їхнього наближення до членства в Європейському Союзі. Методологічну базу дослідження сформовано на основі системного, порівняльного, структурно-функціонального та геополітичного підходів, а також дискурс-аналізу офіційних звітів Європейської Комісії, Freedom House та аналітичних матеріалів Balkan Barometer. Автор доводить, що після початку повномасштабного вторгнення Росії в Україну політика розширення ЄС зазнала концептуального зсуву — від суто технократичного інструменту згуртованості до визначального чинника безпеки та стратегічного позиціонування. Проаналізовано запекле суперництво великих геополітичних акторів за вплив у регіоні. Визначено роль США у стримуванні дестабілізації через запровадження санкцій (зокрема проти М. Додіка), економічну експансію Китаю в межах ініціативи «Пояс і шлях» (проєкт «Дунайського коридору»), а також підривну діяльність РФ, що використовує Сербію як розвідувальний плацдарм (кейс А. Вуліна та залучення ФСБ до придушення громадянських протестів у Белграді). Здійснено концептуальне порівняння євроінтеграційного досвіду Балкан та України за чотирма категоріями кандидатів (лідери, кандидати другого ешелону, стагнуючі країни та країни з проросійською орієнтацією). Розглянуто нові моделі інтеграції, запропоновані у 2026 році (зокрема концепцію «зворотного розширення» та модель спостерігача Ф. Мерца на саміті в Нікосії). Обґрунтовано, що успіх інтеграції Західних Балкан залежатиме від здатності ЄС поєднати внутрішні інституційні реформи з відновленням довіри до розширення, оскільки утворення геополітичного вакууму на кордонах Союзу несе критичні гібридні загрози для всієї Європи.

***Ключові слова**: Балканський регіон; Європейський Союз; євроінтеграція; політика розширення ЄС; країни-кандидати; геополітичні суперечності; Західні Балкани; міжнародні відносини; Україна; європейська безпека.*

Introduction. The Balkan region has traditionally occupied an important place in contemporary international relations, remaining one of the most politically sensitive and geostrategically significant regions in Europe. Its importance is determined by a combination of several factors, including its advantageous geographical location at the intersection of major transport, energy, and civilizational routes, a high level of ethnopolitical and confessional diversity, and a historically rooted potential for conflict that continues to shape contemporary integration processes.

Following the end of the Cold War, the Balkans became a key focus of the European Union's foreign policy, with the EU viewing the region's stabilization as an essential prerequisite for the formation of a coherent European security space. Under current conditions, the Balkans remain an arena of strategic competition among major international actors. Alongside the EU, the United States, China, and Russia exert considerable influence on the region's political and economic processes, significantly shaping the dynamics of European integration.

Russia's full-scale war against Ukraine has further increased the strategic relevance of the Balkan dimension within the European Union's foreign policy agenda. In particular, growing attention is being paid to the political resilience of the Balkan states, their capacity to withstand external informational and political influence, and the effectiveness of democratic reforms. In this context, the Ukrainian factor is also of particular importance, as Ukraine's experience in resisting Russian aggression has substantially contributed to the reconsideration of security priorities by both the EU and candidate states.

Literature review. The issue of European integration policy in the Balkan region occupies an important place in contemporary studies of international relations, European integration, and regional security. One of the key research directions concerns the analysis of Europeanization mechanisms in the Western Balkans. In particular, O.Anastasakis emphasizes the asymmetrical nature of integration processes and the uneven character of political transformations in the Balkan states (Anastasakis, 2008).

A significant contribution to contemporary scholarship has been made by F.Bieber, whose works focus on democratic development in the Western Balkans. The scholar argues that the EU's emphasis on political stability has, in some cases, contributed to the persistence of hybrid political regimes and slowed democratic reforms (Bieber, 2018; Bieber, 2020). The impact of European integration on democratic transformation in the region is also examined by Vienna University researchers V.Dzihic and A.Wieser, who highlight the institutional contradictions of post-conflict Balkan states (Dzihic & Wieser, 2011).

The problem of "enlargement fatigue" and its impact on the EU membership prospects of Balkan states is explored in the works of J.O'Brennan, who argues that the slowdown of integration processes negatively affects both the effectiveness of reforms and public support for European integration in candidate countries (O'Brennan, 2014). The prolonged and complex process of Western Balkan integration into the EU is also analyzed by Greek researcher E.Dionysiou, who maintains that stagnation in this process creates a geopolitical vacuum and threatens the stability of both the region and Europe as a whole (Dionysiou, 2022).

Contemporary academic literature increasingly emphasizes that the Balkans remain a strategic arena of competition among major international actors. At the same time, the European integration of the region has acquired a distinct security dimension. In this context, I.Zarić and Ž.Budimir examine the Balkans as a space of competing great-power interests, arguing that Russia's full-scale war against Ukraine has altered the regional balance of power. The authors stress that intensified geopolitical rivalry between the West and Russia has generated new security challenges for the Western Balkans and directly affects the stability of their domestic political trajectories (Zarić & Budimir, 2022).

Since 2022, scholarly discourse has increasingly focused on the transformation of the EU enlargement policy in response to Russia's full-scale aggression against Ukraine. These studies emphasize the growing security dimension of European integration and the reconsideration of the role of candidate states in shaping a new European security architecture (Hunter, Wunsch & Bélanger, 2025).

The purpose of the article is to examine contemporary trends in the European integration policies of the Balkan states amid current geopolitical transformations, and to identify the impact of the European Union's renewed enlargement policy on the countries of the region after 2022.

The methodological framework of the study is based on a combination of general scientific and specialized methods of political analysis, international relations, and regional studies. The research primarily relies on a systems approach, which made it possible to examine the Balkan region as an integral component of the contemporary system of international relations and European security, where political, economic, security, and sociocultural factors are closely interconnected. The comparative method was employed to analyze European integration processes across EU member states, candidate countries, and potential candidates, enabling the identification of differences in the pace of reforms, adaptation to the acquis communautaire, and levels of political integration. A structural-functional approach was applied to examine the role of political institutions, economic mechanisms, and sociocultural factors in the process of European integration. The geopolitical approach was used to analyze the Balkans as an arena of strategic competition among the United States, China, Russia, and the European Union, and to explore the relationship between European integration and contemporary geopolitical contradictions in the region. Discourse analysis was applied to investigate contemporary political and expert discourse on EU enlargement, the security significance of the Balkans, and Ukraine's role in the emerging European security architecture. The empirical basis of the study includes official documents of EU institutions, statistical and analytical materials (Eurobarometer, Balkan Barometer, World Bank, Freedom House), as well as scholarly works by Ukrainian and international researchers on European integration, international security, and the geopolitics of the Balkans.

Main results of the research. *The Balkan Region as a Space of Geopolitical and Integration Interaction.* Over a long historical period, the Balkans have remained a zone of intersecting interests of major powers, which has significantly shaped both the region's political development and the

contemporary characteristics of its integration processes. In expert analysis, the term "Balkans" is traditionally used as a historical and geographical category encompassing the states of Southeastern Europe located on the Balkan Peninsula. At the same time, contemporary political discourse increasingly employs the term "Western Balkans," as used in European Union documents, to refer to Albania, Bosnia and Herzegovina, Serbia, Montenegro, North Macedonia, and Kosovo.

One of the key political characteristics of the Balkan region is its post-conflict nature. The consequences of Yugoslavia's dissolution, the ethnic conflicts of the 1990s, unresolved territorial disputes, and the complex system of interethnic relations continue to affect the region's domestic political stability. According to V.Dzihic and A.Wieser, excessive institutional complexity and dependence on external governance significantly complicate democratic transformation and the effective functioning of state institutions in Balkan countries (Dzihic & Wieser, 2011).

Another characteristic feature of the region is ethnopolitical fragmentation, reflected in the high level of politicization of ethnic and religious identities. Many political parties in the Balkan states continue to operate along ethnic lines, complicating the development of inclusive governance models and intensifying domestic political contradictions. In this context, L.Scazzieri argues that "relations between Serbia and Kosovo remain one of the main factors of regional instability and an important element of EU policy toward the Western Balkans" (Scazzieri, 2021).

Experts characterize the economic development of the Balkan region as highly uneven and strongly dependent on external financial resources. States in the region demonstrate different levels of industrialization, economic growth, and integration into the European market. Slovenia and Croatia are the most economically integrated into the EU, whereas the Western Balkan states remain heavily dependent on foreign investment, EU financial assistance, and external credit resources. An important driver of regional economic transformation remains the European Union's policy toward the economic integration of the Western Balkans. Within the framework of the "Growth Plan for the Western Balkans," the EU allocated a €6 billion financial package for 2024–2027 to stimulate reforms, develop a common regional market, and gradually integrate the region into the EU single market (European Commission, 2023). At the same time, the region's economic vulnerability is reinforced by external dependence, labor migration, structural imbalances, and a substantial shadow economy.

The energy factor also represents an important aspect of the region's economic specificity. The Balkans remain one of the key transit routes for energy supplies to Europe, which increases their geoeconomic significance. Since 2022, issues of energy security and the diversification of energy supplies have become strategic priorities for the Balkans, prompting the EU to intensify policies to integrate the region into the broader European energy space.

The sociocultural specificity of the Balkan region is shaped by its civilizational multidirectionality and the coexistence of diverse historical and cultural traditions. Over the centuries, the region was influenced by the Ottoman Empire, Austria-Hungary, and other European political centers, resulting in a complex cultural and religious structure. The coexistence of Orthodox, Catholic, and Muslim traditions characterizes contemporary Balkan societies. For this reason, experts note that the formation of a common European identity in the Balkan states remains a contested issue. While the majority of the population supports European integration and perceives EU membership as a guarantee of economic development and security, strong nationalist sentiments, historical memories of conflicts, and skepticism toward certain aspects of European integration continue to shape political processes in the region (Greiçevci, 2025).

Differentiation of the Balkan States by the Level of Integration into the European Union. Within the framework of the EU enlargement policy, a functional typology of Balkan states has emerged based on the degree of their integration into the European political, legal, and economic space. This classification distinguishes between EU member states, candidate countries, and potential candidates. Such differentiation is reflected in the European Commission's analytical approaches and demonstrates progress in meeting the Copenhagen criteria (European Commission, 2024a).

The group of EU member states in the Balkan region includes Greece, Bulgaria, Romania,

Croatia, and Slovenia. Although these countries have different historical experiences with European integration, they are united by full participation in the European Union's institutional system and by their involvement in shaping common EU policies. According to Eurobarometer data, public support for EU membership remains relatively high: approximately 80% in Slovenia, 70–75% in Croatia, around 65% in Romania, and 55–60% in Bulgaria (Eurobarometer, 2025). These states are integrated into the mechanisms of the EU's Common Foreign and Security Policy and the single market, which positions them as a stabilizing element within the regional political architecture.

The group of candidate countries includes Albania, Montenegro, Serbia, North Macedonia, and Bosnia and Herzegovina. These states are at different stages of the accession negotiation process, reflecting uneven institutional reforms and varying levels of political convergence with the EU. According to the Balkan Barometer, an average of 59% of citizens in the Western Balkans support EU membership, although only 35–40% consider accession realistic in the medium term (Balkan Barometer, 2024). Albania demonstrates the highest level of public support for EU membership, exceeding 80%, which reflects the country's stable pro-European orientation (European Commission, 2024b). Support in Montenegro reaches approximately 75%, corresponding to its status as the most advanced candidate country. In Serbia, support for European integration has declined to 46–50%, indicating growing political polarization and the influence of alternative foreign policy orientations (Balkan Barometer, 2024). In North Macedonia, support remains relatively high at around 65%, though the integration process has slowed due to political disputes. In Bosnia and Herzegovina, support reaches approximately 72%, yet reforms remain constrained by institutional fragmentation and weak governance structures (Freedom House, 2025). Democratic transformation in these countries remains uneven. As Florian Bieber argues, the formal implementation of European standards is often accompanied by limited institutional effectiveness (Bieber, 2018).

A special position is occupied by Kosovo, which holds the status of a potential candidate. Its European integration policy is shaped by its specific international legal status and only partial recognition by EU member states. At the same time, according to the Balkan Barometer, Kosovo has one of the highest levels of public support for European integration in the region, with approximately 90% of citizens supporting EU membership (Balkan Barometer, 2024). Nevertheless, institutional limitations, weak governance capacity, and dependence on external assistance continue to create structural barriers to integration.

Geopolitical Contradictions of European Integration in the Balkan Region. It should be noted that the European integration processes in the Balkan region are unfolding amid intense geopolitical competition, in which domestic transformations are closely intertwined with the external influence of major international actors.

Expert analyses indicate that the United States, which historically played a significant role in ending the wars in the former Yugoslavia, continues to remain an important, though not always consistent, factor of regional stability. U.S. policy is primarily aimed at preventing destabilization, countering Russian influence, and supporting the Euro-Atlantic aspirations of the Western Balkan states. One of the principal instruments of American policy is the use of sanctions against political leaders perceived as undermining regional stability. According to expert assessments, the case of M.Dodik, former President of Republika Srpska in Bosnia and Herzegovina, is particularly illustrative. In March 2026, a group of influential U.S. senators, including J.Shaheen, C.Grassley, and E.Warren, called on the administration to reintroduce sanctions against M.Dodik, arguing that his "separatist rhetoric, coordination with foreign actors, and attempts to undermine the Dayton Peace Agreement threaten to destabilize the Western Balkans at a critical moment" (Shaheen et al., 2026).

Another instrument of influence was the adoption, in December 2025, of the Western Balkans Democracy and Prosperity Act as part of the National Defense Authorization Act (NDAA) for Fiscal Year 2026. As analysts from the Institute of Regional and Country Studies at Peking University note, the legislation is particularly notable for its strong focus on Serbia, whose policies are subjected to "unprecedentedly explicit criticism" (Li, 2025). The Act refers to the OSCE report on

the December 2023 electoral process. It identifies corruption among senior political elites as "the greatest obstacle to the economic and political development of the Western Balkans."

As emphasized in contemporary expert analysis, a growing concern within the EU is the possibility that the United States, as the principal guarantor of European security within NATO, may become an unreliable ally. According to the study "Global Risks for the EU" (2025), the withdrawal of U.S. security guarantees for European allies is considered one of the most probable and potentially destructive scenarios for EU security in 2026 (European Experts, 2025).

In contrast to the United States, China pursues a "soft power" strategy in the Balkans, focusing on economic cooperation and infrastructure projects within the Belt and Road Initiative (BRI). Experts note that Serbia serves as China's key regional partner and follows a policy of "strategic hedging" (Tzifakis & Vasdoka, 2025). Contemporary media and expert analyses also emphasize that Chinese investments are primarily infrastructure-oriented and function as an instrument for strengthening Beijing's regional influence. A notable example is the "Danube Corridor" project, a 68-kilometer expressway from Požarevac to Golubac constructed by Shandong High-speed Group (European Times, 2026). During a visit to the construction site in December 2025, the President of Serbia stated that the project would "provide a strong impetus for the development of eastern Serbia" and reaffirmed Serbia's support for the "One China" policy, which constitutes an important political signal for Beijing.

As emphasized in expert analysis, China's deep economic involvement creates several challenges for the EU. In particular, it increases the dependence of Balkan states on Chinese capital, which may conflict with the rules of the EU internal market, while also indirectly strengthening the position of pro-Russian elites that use the Chinese factor as leverage in their relations with Brussels. According to N.Tzifakis and E.Vasdoka, Western Balkan leaders encourage the involvement of external actors in order to strengthen their bargaining position with traditional partners (Tzifakis & Vasdoka, 2025).

Numerous studies conducted by security policy think tanks emphasize the problem of Russian influence on the European integration policies of EU candidate and potential candidate states in the Balkans. Expert analyses indicate that the Russian Federation has preserved and, in some areas, intensified its influence in the region. Serbia remains the primary focus of Russian policy, particularly because it has refused to join the EU sanctions regime against Russia. According to experts from the Center for Security Studies (CENSS), Russia uses Serbia as a "foothold in the Western Balkans," enabling it to conduct operations not only within the region but also across Europe (CENSS, 2025).

Analysts argue that cooperation between Serbia and Russia extends across multiple sectors, including intelligence activities, the defense industry, and internal security. A particularly illustrative example is the presence of pro-Russian politicians, especially A.Vulin, in key national security positions. Having previously served as Minister of Defense, Minister of the Interior, and head of the Security Information Agency, A.Vulin was sanctioned by the United States Department of the Treasury in July 2023 for "supporting Russia and facilitating its malign activities that undermine security and stability in the Western Balkans" (U.S. Department of the Treasury, 2023). Despite these sanctions, he has continued to hold senior political positions, demonstrating the deep institutional penetration of pro-Russian influence within Serbia's political system.

Particular concern among European policymakers is generated by the use of Serbia as a "safe haven" for Russian intelligence personnel expelled from other European states following the invasion of Ukraine. According to data from the Serbian Ministry of Foreign Affairs, the number of Russian diplomats in Serbia increased from 54 in February 2022 to 64 by January 2025 (Serbian Ministry of Foreign Affairs, 2025, cited in CENSS, 2025). As noted in expert assessments, some of these individuals were reportedly linked to the 16th Center of the FSB, which specializes in cyber operations, as well as to the Russian Foreign Intelligence Service, and were transferred to Belgrade after expulsions from Croatia and Poland.

Expert studies also emphasize the ideological dimension of Russian influence in the Balkans. Public statements made by Russia's president at the Valdai Forum in October 2025, as well as the

rhetoric of the head of Russia's Foreign Intelligence Service regarding a supposed "Kyiv Maidan" in Serbia, were aimed at discrediting pro-Western civic movements and legitimizing domestic repression. The establishment of a branch of the Russian Historical Society in Serbia, focused on shaping historical narratives, indicates, according to I.Bandović, "an attempt by Russia to consolidate its influence in the long term" (Belgrade Centre for Security Policy, 2026).

Expert analyses suggest that, following Russia's invasion of Ukraine, the European integration process of the Western Balkans has continued to slow because of the phenomenon of "enlargement fatigue." The EU requires candidate states to implement complex reforms, particularly in the fields of rule of law, anti-corruption policy, and the normalization of bilateral relations, especially between Serbia and Kosovo, while simultaneously demonstrating limited readiness for rapid enlargement. This reluctance is partly linked to the unwillingness of several member states, including France and the Netherlands, to assume additional financial obligations. As noted in professional analytical reports, the Serbia–Kosovo dialogue, regarded as a key prerequisite for the EU progress of both countries, remains stalled (BGNES, 2026).

Russia's full-scale invasion of Ukraine in February 2022 significantly transformed the European security environment and reshaped EU perceptions of the Balkan region. Whereas enlargement had previously been viewed primarily as a project for promoting stability, democracy, and the rule of law, the security dimension has now become central. The integration of the Western Balkans is increasingly seen as a means of preventing the emergence of zones of instability along the EU's borders that could be exploited for hybrid operations.

Analysts identify hybrid attacks on critical infrastructure as one of the most probable security threats facing the EU in 2026 (European Experts, 2025). In this context, the Western Balkans, characterized by complex political structures, weak institutions, and significant Russian and Chinese influence, are increasingly viewed as a potential source of such threats. A study by European Experts (December 2025) classifies a potential conflict in the Western Balkans, either through escalation between Kosovo and Serbia or separatist actions by Republika Srpska, as a low-probability but high-impact scenario for European security. As stated in the report, "the Balkans remain a potential source of instability" (European Experts, 2025).

Particular attention should also be paid to Russia's use of frozen conflicts and weak state institutions for conducting hybrid operations. As an illustrative example, experts from the Belgrade Centre for Security Policy cite the decision of the government of A.Vučić to invite the Russian FSB to "investigate" the alleged use of a "sound cannon" against peaceful demonstrators on 15 March 2025, instead of conducting an independent national investigation. The incident was subsequently addressed by the European Court of Human Rights, which issued an interim measure requiring the Serbian authorities to clarify what device had been used (Belgrade Centre for Security Policy, 2026). Serbian authorities refused an independent investigation and instead relied on FSB conclusions, which, according to analysts, demonstrate the transfer of sovereign state functions to an external actor outside both the EU and NATO.

Ukraine and the New EU Enlargement Policy: The Balkan Dimension. The decision to grant Ukraine EU candidate status in June 2022 transformed the logic of the enlargement policy, as for the first time in the history of the European Union, this status was granted to a country engaged in a full-scale war and lacking control over part of its territory. According to experts from Internationale Politik Quarterly, by early 2026, the ten candidate countries could be divided into four categories. The first category, described as the "Balkan frontrunners," includes Montenegro and Albania, which have made the greatest progress in accession negotiations. The second category, the "second-tier eastern candidates," consists of Ukraine and Moldova, which lag behind the Balkan frontrunners in formal negotiations but surpass them in political mobilization around the European integration agenda. The third category comprises states experiencing stagnation because of domestic political problems, including North Macedonia, Bosnia and Herzegovina, and Kosovo. The fourth category includes Serbia, whose relations with the EU have deteriorated due to its pro-Russian orientation. Turkey and Georgia remain outside these categories, as their accession processes are effectively frozen (Morina & Nič, 2026).

A comparison of the Ukrainian and Balkan experiences reveals both common patterns and significant structural differences that are relevant to future EU enlargement. Matteo Bonomi, a scholar at the Italian Institute for International Affairs (IAI), argues that for Ukraine, gradual integration has become "an essential instrument of state resilience under conditions of war" (Bonomi, 2026). For the Western Balkans, by contrast, "the credibility of full membership remains the EU's most powerful instrument for political reform and regional stability." According to the analyst, the fundamental difference is that "Ukraine integrates in order to survive, whereas the Balkans integrate in order to catch up" (Bonomi, 2026).

As noted by Ukrainian scholar O.Tankovsky, "Ukraine demonstrates a high level of political mobilization around the European integration agenda, which constitutes its competitive advantage compared to the Balkan countries," where reforms are often hindered by domestic political contradictions, oligarchic ecosystems, and, in the cases of Serbia and Bosnia and Herzegovina, pro-Russian influence (Tankovsky, 2026).

Russia's full-scale invasion of Ukraine became a catalyst that accelerated the EU enlargement policy as a whole, including the Balkan track. Researchers at the International Center for Defense and Security, S.Blockmans and M.Emerson, argue that "the EU enlargement process received a renewed impulse of energy after Russia's full-scale invasion of Ukraine" (Blockmans & Emerson, 2026). In their view, the impact of the war on the Balkan states has been multidimensional, as enlargement ceased to be perceived merely as a technocratic process and increasingly became an instrument of geopolitical positioning. At the same time, the war has also generated new risks for the Balkan candidate states. S.Blockmans and M.Emerson argue that countries experiencing stagnation, particularly Bosnia and Herzegovina and North Macedonia, may be pushed to the periphery of the enlargement agenda, potentially contributing to deeper Euroscepticism and stronger pro-Russian sentiments.

In the context of Ukraine, the EU has intensified discussions on new models of integration. In early March 2026, the European Commission presented several options for reforming the enlargement methodology. According to experts from Internationale Politik Quarterly, these options include maintaining the status quo, introducing gradual integration packages requiring a new legal framework, and the model of "reverse enlargement," designed primarily for Ukraine, which envisages phased accession before the formal completion of all technical requirements (Morina & Nič, 2026).

F.Merz proposed an alternative approach based on observer status within EU institutions, allowing regular participation in EU summits and Council meetings without voting rights. According to F.Merz, the initiative received "broad support" during the informal summit in Nicosia on 24–25 April 2026 (Merz, 2026). It is noteworthy that F.Merz also acknowledged the possibility of territorial concessions by Ukraine as part of a future peace settlement. This issue directly resonates with the Balkan experience, particularly the unresolved questions surrounding Kosovo and Republika Srpska, which, for decades, have complicated regional integration processes. As emphasized in the report "Global Risks for the EU," "enlargement without reform risks paralysis; reform without enlargement risks irrelevance" (Moreira de Sá et al., 2026).

Conclusions. The contemporary European integration policy of the Balkan states is shaped by multilayered political, security, and geoeconomic transformations that have significantly altered the logic of the European Union's enlargement policy after 2022. The analysis in this study demonstrates that the Balkans remain a key region of strategic interaction between the EU and major international actors.

One of the defining trends of the current stage is the asymmetrical character of integration processes within the region. EU member states - Greece, Bulgaria, Romania, Croatia, and Slovenia - are fully integrated into the European Union's institutional system and participate in shaping common EU policies. Their political role is increasingly associated with supporting the stabilization of the Western Balkans and contributing to the formation of the EU's renewed enlargement policy. At the same time, candidate countries - Albania, Montenegro, Serbia, North Macedonia, and Bosnia and Herzegovina - remain at different stages of adaptation to the acquis communautaire, reflecting

uneven reforms, institutional fragmentation, and varying levels of political convergence with the EU (European Commission, 2024a).

The study also confirms that integration processes in the Balkan region remain closely connected to geopolitical competition. The United States continues to act as the principal security actor in the region, supporting the stabilization of the Western Balkans and their Euro-Atlantic integration. China is expanding its economic presence through infrastructure and energy projects under the Belt and Road Initiative. At the same time, Russian influence primarily manifests through political and informational mechanisms, particularly in Serbia. As a result, the Balkans remain a space where competing geopolitical strategies intersect, complicating and slowing integration processes. At the same time, after 2022, the EU enlargement policy underwent a substantial transformation, with the security dimension becoming a defining component of integration policy.

Thus, the contemporary European integration policy of the Balkan states is developing under conditions shaped by the interaction of internal transformations and external geopolitical competition. The future integration of the Balkans will largely depend on regional states' ability to ensure institutional stability, implement effective reforms, and adapt to the EU's evolving security priorities.

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ROLE OF ECONOMIC DIPLOMACY IN THE FOREIGN POLICY OF THE PEOPLE'S REPUBLIC OF CHINA

РОЛЬ ЕКОНОМІЧНОЇ ДИПЛОМАТІЇ У ЗОВНІШНІЙ ПОЛІТИЦІ КИТАЙСЬКОЇ НАРОДНОЇ РЕСПУБЛІКИ

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Abstract. *This article analyzes the concept of economic diplomacy in the foreign policy of the People's Republic of China (PRC) and its systemic role in expanding Beijing's global and regional geopolitical influence. The theoretical framework integrates Joseph Nye's concept of soft power and 'co-optation', John Mearsheimer's theory of offensive realism and hegemonic power, L. Poulsen's theory of bounded rationality, and the discourse on debt-trap diplomacy. The authors investigate how China deploys a hybrid foreign policy model that combines the attractive rhetoric of mutually beneficial cooperation under the Belt and Road Initiative (BRI) with coercive economic instruments and targeted sanctions, drawing on cases like rare earth export controls to Japan and trade suspensions with Lithuania. The research examines the regional dimensions of China's economic diplomacy, focusing on South Asia and the Middle East. In South Asia, the study explores the strategic creation of alternative energy and logistical routes to bypass the Malacca Strait, China's infrastructure investments in Gwadar (Pakistan) and Hambantota (Sri Lanka), and its policy of reducing India's regional dominance by drawing states like the Maldives, Nepal, and Myanmar into its orbit. In the Middle East, the paper analyzes China's 'business first' approach, its energy security investments (CNPC, SINOPEC), and its growing diplomatic role as a mediator between Saudi Arabia and Iran. It also deconstructs the 'debt trap diplomacy' narrative, contrasting it with empirical perspectives on debt restructuring and refinancing in Pakistan, Angola, and Ethiopia. The article concludes that China's economic diplomacy is a highly effective, multifaceted instrument that successfully transforms economic capabilities into strategic, military, and geopolitical advantages on a global scale.*

Keywords: *economic diplomacy, foreign policy of the People's Republic of China, Belt and*

Road Initiative, geopolitical influence, economic coercion, debt trap diplomacy, South Asia, Middle East.

Анотація. *Ця стаття присвячена системному аналізу концепції економічної дипломатії у зовнішній політиці Китайської Народної Республіки (КНР) та її ролі у розширенні геополітичного та геоекономічного впливу Пекіна на глобальному та регіональному рівнях. Методологічна та теоретична основа дослідження інтегрує концепцію «м'якої сили» та кооптації Джозефа Ная, теорію «наступального реалізму» та прагнення до регіональної гегемонії Джона Міршаймера, теорію «обмеженої раціональності» Л. Поулсена, а також сучасний дискурс щодо «дипломатії боргової пастки». Автори досліджують гібридний характер китайської зовнішньополітичної моделі, яка успішно поєднує привабливу риторику взаємовигідного співробітництва в межах Ініціативи «Пояс і шлях» (BRI) з інструментами прихованого економічного примусу та точкових санкцій (на прикладі обмеження експорту рідкоземельних металів до Японії та призупинення торгівлі з Литвою). Проаналізовано регіональні виміри економічної дипломатії КНР у Південній Азії та на Близькому Сході. У Південній Азії приділено увагу створенню альтернативних логістичних маршрутів для подолання залежності від Малаккської протоки, інвестиціям у глибоководні порти Гвадар (Пакистан) і Хамбантота (Шрі-Ланка), а також стратегії витіснення Індії як традиційного регіонального лідера шляхом кооптації Мальдівів, Непалу та М'янми. На Близькому Сході розкрито зміст прагматичної стратегії «бізнес насамперед», інтереси енергетичної безпеки КНР (діяльність корпорацій CNPC та SINOPEC) та зростаючу посередницьку роль Пекіна у врегулюванні відносин між Саудівською Аравією та Іраном. Особливу увагу приділено деконструкції концепту «боргової пастки» на основі порівняльного аналізу практик реструктуризації та списання боргів у Пакистані, Анголі та Ефіопії. Зроблено висновок, що економічна дипломатія виступає ключовим фактором трансформації фінансової потужності КНР у стратегічний, військовий та публічний капітал у багатополярному світі*

Ключові слова: *економічна дипломатія, зовнішня політика КНР, Ініціатива «Пояс і шлях», геополітичний вплив, економічний примус, дипломатія боргової пастки, Південна Азія, Близький Схід.*

Introduction. Economic diplomacy is an important foreign policy tool for modern states, including the People's Republic of China (PRC), which uses it to expand its geopolitical influence and develop regional relations. The economic growth of the PRC has had a decisive impact on strengthening the geopolitical position of the PRC at both the regional and global levels. This article analyses the concept of economic diplomacy from the perspective of the PRC's foreign policy, its impact on it and its role in the development of China's relations with other countries, particularly in Asia, Africa and the Middle East.

Considering the definition of economic diplomacy, according to O. Sharov, economic diplomacy is a branch of diplomatic activity that uses economic instruments and methods to achieve a state's foreign policy goals, promoting its integration into the global economy (Sharov, 2019). It influences the regulation of global trade and investment, using economic levers to achieve both economic and non-economic (political, military) goals (Sharov, 2019). Economic diplomacy can also be seen as a strategic tool that combines economic resources with diplomatic efforts to promote national interests, as Okano-Heijmans points out. Okano-Heijmans (2011) defines economic diplomacy as a bridge between economic and foreign policy, promoting cooperation and competition at the global stage (Okano-Heijmans, 2011). In the case of China, examples of economic diplomacy include initiatives such as the Belt and Road Initiative (BRI), which uses infrastructure investment to strengthen regional ties and expand China's global influence (Shambaugh, 2013).

Analysing the role and key functions of economic diplomacy in shaping a state's foreign policy, among the main functions of economic diplomacy is the provision of timely and reliable

information to national leadership on economic events abroad, the foreign economic policies of foreign governments, and the activities of international organisations. At the same time, economic diplomacy seeks to create favourable conditions for the effective integration of the country into the global economic system (Sharov, 2019). These goals are achieved through a range of tools and methods, including formal negotiations, international agreements, informal arrangements, policy recommendations, and ongoing engagement with government officials, business circles, and civil society representatives. Such instruments are a key component of diplomatic practice carried out by a state's foreign policy institutions (Sharov, 2019).

Literature review. While working on this research, with a view of forming a methodological and theoretical framework, the authors analysed O. Sharov's work "Economic Diplomacy: Fundamentals, Problems and Prospects" (Sharov, 2019), in which he defined economic diplomacy as a direction of diplomatic activity that uses economic instruments and methods to achieve the foreign policy goals of the state and its integration into the global economy. This approach is complemented by the research of M. Okano-Heijmans, who in the study "Conceptualising economic diplomacy" (Okano-Heijmans, 2011) described economic diplomacy as a bridge between economic and foreign policy that promotes cooperation and competition at the international stage.

Exploring the theoretical foundations of China's strategy, the authors examined Joseph Nye's concept of "soft power" (Nye, 1990) in contrast to John Mearsheimer's theory of "offensive realism" set out in his work "The Tragedy of Great Power Politics" (Mearsheimer, 2001), which explains the aggressive pursuit of regional hegemony by states. Analysing the Chinese approach, K. Koh, in his article "Chinese modernisation backed by Chinese wisdom" (Koh, 2025), analysed how Beijing uses the Belt and Road Initiative (BRI) and the Global Civilisation Initiative to promote the idea of modernisation based on historical traditions as a paradigmatic alternative to Western models. Meanwhile, H. Xiong of the Brookings Institution, in his study "Beijing's sanctions dilemma: Chinese narratives on economic coercion" (Xiong, 2024), provided a thorough analysis of how Beijing is shaping the architecture of economic coercion and increasingly using targeted sanctions to protect its political interests.

Regarding the practical implementation of Chinese initiatives, the authors analysed the concept of "debt trap diplomacy", first formulated by B. Chellaney in the article "Debt-trap diplomacy" (Chellaney, 2017), who argued that China deliberately provides excessive loans to countries in order to extort strategic concessions. In response to this criticism, Po Yu Chi, in the article "Demystifying the debt trap diplomacy fallacy in China's Belt and Road Initiative" (Chi, 2025), critically reassessed this view, using empirical data to prove that China does not systematically seize strategic assets and that the debt problems of partner countries are more often related to their internal structural weaknesses. In addition, L. Poulsen's work "Bounded rationality and economic diplomacy" (Poulsen, 2015) helped to understand the logic behind decisions in developing countries, explaining why they agree to potentially risky deals with China.

The purpose of this article is to analyse the concept of economic diplomacy from the perspective of China's foreign policy, its impact on it and its role in the development of China's relations with other countries, particularly in Asia, Africa and the Middle East. This study will enable a more detailed analysis of how China uses the instrument of economic interdependence to achieve its own strategic geopolitical and foreign policy goals.

Main results of the research. From a theoretical and practical point of view, considering the foreign policy activities and strategic interests of the PRC, several levels and methods of implementing economic influence and economic diplomacy can be identified. First and foremost, it is necessary to highlight "co-optation". This approach is based on Joseph Nye's concept of soft power - the ability of a state to shape a favourable image and attractiveness through cooperation rather than coercion (Nye, 1990). A key example in this regard is the official rhetoric of the Chinese state regarding the Belt and Road Initiative (BRI), which emphasises "mutually beneficial cooperation between states" in order to demonstrate the soft power and attractiveness of Chinese economic opportunities. However, it is important to note that the Chinese model of soft power differs from Nye's original concept, which placed greater emphasis on the role of non-state actors

and cultural appeal, while the Chinese conception of soft power is rather state-centric and directly linked to China's economic system and model.

China is actively promoting the Global Civilisation Initiative (GCI) as a refutation of the long-held assumption that modernisation necessarily equates to Westernisation. Drawing on the narrative of "Chinese modernization", Beijing presents its development model as rooted in a 5,000-year-old civilisational tradition that combines economic growth with social justice, environmental sustainability and the rule of law. By emphasising concepts such as people-centred development, harmony among nations, and balance between humanity and nature, China frames its path to modernisation as culturally rooted and normatively distinct from Western liberal models. In this sense, the GCI promotes the idea that countries can modernise in accordance with their historical traditions and governance philosophies, rather than adopting a single Western template, thus creating a paradigmatic alternative and an attractive example for other countries and regions, particularly among the Global South (Koh, 2025). Importantly, China uses the specific outcomes of the Belt and Road Initiative (BRI) not only as instruments of soft power, but also as empirical confirmation of its development paradigm. Large-scale infrastructure projects, such as railways, ports and energy networks, are presented as tangible evidence that economic transformation and interconnection can be achieved while preserving civilisational characteristics. Through this narrative, Beijing challenges Western universalism by arguing that modernisation is pluralistic and that alternative paths based on national culture and sovereignty are viable and effective (Koh, 2025).

The next way for the state to exert economic influence is through coercion: a method of economic state policy that focuses on the coercive use of economic instruments (primarily sanctions). Since 2010, China has significantly expanded its use of economic sanctions, especially in response to threats to its sovereignty, national security or political legitimacy. According to G. Xiong, Beijing's approach is shaped both by its historical experience as a target of US sanctions and by its careful study of the US sanctions architecture. Chinese strategists often refer to unilateral sanctions as hegemonic and illegitimate, but China is increasingly using similar tools, especially targeted import restrictions implemented through regulatory or administrative measures. Cases such as the control of rare earth exports to Japan and the suspension of trade with Lithuania illustrate how Beijing uses economic leverage primarily in a reactive mode, often as a result of disputes over territorial or politically sensitive issues (Xiong, 2024)

A defining feature of China's coercive economic policy is the preference for targeted measures over comprehensive sanctions. Chinese analysts consider targeted sanctions to be more effective because they minimise economic damage to China and leverage the size of the Chinese market to pressure foreign companies into lobbying their governments. At the same time, Beijing's policy implementation style is often informal and opaque, relying on administrative directives rather than clearly codified sanctions regimes. While this ambiguity provides plausible deniability and flexibility, internal debates increasingly emphasise the need for a more institutionalised legal framework. Recent legislation, including the Countering Foreign Sanctions Law and the Unreliable Entity List provisions, suggests that China may be moving toward a more formalised and potentially proactive use of economic coercion as part of its broader foreign policy toolkit (Xiong, 2024).

Another approach in the context of implementing a state's economic diplomacy is the so-called hegemonic (Mearsheimer's offensive realism). This approach is based on J. Mearsheimer's theory of offensive realism, which argues that countries that gain geopolitical influence and weight will aggressively seek hegemony at the regional level in order to ensure their own security in an anarchic system (Mearsheimer, 2001). From this point of view, the aforementioned BRI is a global strategy aimed at creating a Chinese sphere of influence, reformatting the Eurasian continent, and challenging the dominance and influence of the United States, particularly at the regional level in the Pacific region, especially in terms of supply routes and logistics, which are, in fact, the cornerstone of this initiative (Mearsheimer, 2001).

The next theoretical approach within the framework of implementing state economic policy is the theory of bounded rationality. L. Poulsen's theory of "bounded rationality" in economic diplomacy helps to understand why developing countries agree to deals and possible loans (such as

within the framework of the BRI) that may initially seem disadvantageous (Poulsen, 2015). According to this theory, politicians who act on the basis of incomplete information and cognitive biases often overestimate the benefits of possible agreements while ignoring the possible risks (Poulsen, 2015). This is important in the context of narratives about co-optation or coercion, as the main focus in this context is on decision-making processes in countries that receive or may receive external assistance, in this context from the PRC.

Overall, the economic and geopolitical model of China's state policy can be characterised as a hybrid model that simultaneously uses soft power (Nye) to promote hard hegemonic goals (Mearsheimer). The Belt and Road Initiative is a striking example of this hybrid approach: the official rhetoric of the BRI is focused on 'soft power,' while certain actual results, such as the debt dependence of recipient countries and the loss of control over strategic assets, correspond to Mearsheimer's "offensive realism". Poulsen's concept of "bounded rationality" also explains the actions and logic of recipient countries, focusing not only on China but also on the states receiving aid from China (Poulsen, 2015). Therefore, in general, it can be concluded that among the above-mentioned methods and instruments of economic influence, Beijing uses a certain combination of co-optation and hegemony methods, combining the key characteristics of both approaches in order to achieve China's increased influence at the economic and geopolitical levels in the international arena. While analysing the role of economic diplomacy and its impact on the foreign policy of the People's Republic of China, it is worth noting that over the past three decades, China's average GDP growth rate has exceeded 10%, making it the world's second largest economy (Zreik, n.d.). Rapid economic growth has allowed China to reorient its foreign policy towards protecting and promoting economic interests, in particular through economic diplomacy.

The PRC's persistence in achieving its declared strategic goal of creating a harmonious society is reflected in the country's economic diplomacy. Through its policies, it has created a favourable environment in which countries can interact at both the bilateral and multilateral levels to cooperate in various areas, including the economy, technology, industry, infrastructure development (Laila et al., 2024). Beijing is an active member of many multilateral formal and informal groups, such as the G20, G77 plus China, BRICS and FOCAC (Forum on China-Africa Cooperation), which shows the success of its diplomacy. These multilateral groups aim to promote economic and diplomatic interaction between member countries (Laila et al., 2024). China's role as a mediator between Saudi Arabia and Iran is another example of Beijing's interest in promoting regional stability and prosperity. The PRC is the largest trading partner of both Iran and Saudi Arabia. Beijing imports 40% of its oil from the Middle East. The Middle East also gains enormous trade and investment opportunities under the BRI, while China has also demonstrated its willingness to share its experience in areas such as telecommunications, artificial intelligence and other high-tech fields (Laila et al., 2024). In the first 10 years (2013-2023) of the BRI's existence, the PRC has invested a huge amount of money in various projects under this initiative - US$1 trillion. It clearly defines how Beijing is making huge investments in more than 154 countries, following its desire for prosperity and development on Earth (Laila et al., 2024).

However, in this context, from an economic point of view, it is also worth analysing the so-called "debt trap diplomacy", first formulated by B. Chellaney, which argues that China deliberately provides excessive loans to countries in order to lure them into a trap, and then demand strategic concessions from China in the event of non-fulfilment of their obligations (Chellaney, 2017). A striking example is the example of Sri Lanka, which was forced to transfer control of the aforementioned Hambantota port to China on a 99-year lease due to its inability to meet its debt repayment deadlines. Critics therefore perceive China's economic activity as a "carrot and stick" or "debt trap" approach, characterising it as a "pseudo-coercive" strategy rather than benevolent diplomacy (Siyam, 2024). This criticism suggests that although Chinese loans and aid may appear to be normal diplomatic gestures, they serve as a means of financial destabilisation and control over recipient countries. This dynamic calls into question Nye's concept of a positive-sum game based on cooperation and is more in line with Mearsheimer's realistic perspective, which presents international relations as a struggle for hegemony, potentially at the expense of other states,

inevitably leading to a zero-sum game (Siyam, 2024).

However, there is an opposing view on this issue: in an article by Po Yu Chi, the widespread view that China's Belt and Road Initiative (BRI) is “debt trap diplomacy” is critically re-evaluated, arguing that this view oversimplifies the complex realities of development finance and global political economy. It is argued that although the BRI has raised concerns about sovereign debt sustainability, empirical evidence does not support the claim that China systematically provides loans with the aim of deliberately capturing strategic assets. Instead, the article considers the BRI in the broader context of development finance, highlighting its role in addressing infrastructure challenges in more than 140 participating countries. Drawing on examples from Pakistan, Angola, and Ethiopia, as well as data from institutions such as the World Bank and the Rhodium Group, the study shows that debt problems in partner countries are more often linked to internal structural weaknesses, macroeconomic instability, and external shocks than to deliberate coercion by China. Moreover, China often engages in debt restructuring, refinancing and loan write-offs rather than asset seizures, which calls into question the basic assumptions of the “debt trap” (Chi, 2025). Thus, China's transformation into a global economic superpower has had a tangible impact on the change in the PRC's foreign policy discourse, where economic diplomacy serves as one of the main tools for strengthening China's economic and geopolitical influence.

Regional dimension. While characterising China's economic diplomacy, M. Zreik highlighted three main characteristics: first, it participates in commercial and trade operations without interfering in the internal affairs of other countries. Second, it uses political and diplomatic tactics to support economic expansion abroad, using business contacts to gain diplomatic support on issues such as human rights, Taiwan and Tibet in some regions, often using political measures to achieve economic goals in the Arab world. For example, throughout the 21st century, China's foreign policy in the Middle East and North Africa has focused on expanding export markets and investment opportunities. Thirdly, there is an emphasis on infrastructure development as part of the Belt and Road Initiative (Zreik, n.d.). China has invested billions of dollars in Belt projects and signed agreements with more than 100 countries, including many in the MENA region. Through this initiative, China seeks to expand its economic and strategic influence while addressing excess domestic capacity and providing Chinese firms with access to foreign markets (Zreik, n.d.).

The development of economic cooperation at the regional level is extremely important for China in terms of successful economic diplomacy. One of the centres of Chinese influence is South Asia, where the PRC currently dominates most South Asian countries. All this has been made possible by a strategic approach to the use of its economic resources and geopolitical influence (Siyam, 2024). China's foreign investment strategy is primarily aimed at ensuring the security of fuel supplies, which is a critical component of the country's economic stability. Currently, approximately 85% of the fuel supplied to China via the Strait of Malacca to the port of Shenzhen on the east coast comes mainly from the Middle East, as the country's west coast has no access to the sea. This dependence on a single sea route creates significant risks due to geopolitical tensions and potential disruptions (Siyam, 2024). To reduce this risk, China is actively implementing projects to create alternative access points.

In South Asia, China is achieving dominance through economic resources. According to D. Shambaugh, China's investments in South Asia, particularly under the Belt and Road Initiative, have changed the regional dynamics by reducing India's traditional influence (Shambaugh, 2013). Projects such as the Gwadar Port in Pakistan, the Hambantota Port in Sri Lanka, and the Padma Bridge in Bangladesh (US$2.6 billion), in addition to fulfilling a strategic goal in terms of facilitating imports and exports, are also being carried out by Chinese companies, which returns a significant portion of the investment to China (Siyam, 2024). Moreover, the biggest share of this funding takes the form of loans with high interest rates, which means that a significant portion of the borrowed funds is returned to China, albeit at significantly inflated rates. According to the Associated Press, many developing countries have large debts to China, as up to 50% of their external loans come from Chinese sources, and a significant portion of government revenues is directed towards servicing these debts (Siyam, 2024).

In addition to direct economic benefits, these projects provide strategic and military advantages, in particular through the creation of seaports that provide China with convenient access to the Indian Ocean for both commercial and, at times, military purposes (Siyam, 2024). Given the Indian Ocean's key role in global trade and commerce, with one-third of all trade passing through its waters, it has become an arena of intense competition not only between regional powers such as India and China, but also between global players such as the United States. The use of ports in various South Asian countries accelerates the People's Liberation Army (PLA) of China's critical access to the Indian Ocean, thus challenging the dominance of its rivals in the region (Siyam, 2024). Moreover, many argue that Chinese economic diplomacy aims to reduce India's influence in South Asia while promoting a 'China-centric' approach. India has traditionally been the dominant regional power in South Asia, with Pakistan as its main military rival, but unable to challenge India's influence in other South Asian countries, with the possible exception of Afghanistan. However, the emergence of China has significantly changed this dynamic (Siyam, 2024). Countries such as the Maldives, Nepal, Sri Lanka and Myanmar, which were previously considered to be under India's strong influence, are now witnessing a significant influx of Chinese investment. As a result, they have not only left India's sphere of influence, but in some cases have taken an anti-Indian stance (Siyam, 2024). China's approach in this regard is consistent with Mearsheimer's theory of "offensive realism", which argues that states aggressively seek power in order to weaken their rivals and reduce potential threats. By expanding its influence in South Asia through economic means, China is not only challenging regional leaders such as India, but also asserting its dominance in strategically important regions, in line with the principles of offensive realism (Siyam, 2024). China's use of economic resources in South Asia is a striking example of this principle: through skilful manoeuvring, China has not only used its economic power to accumulate economic might, but has also developed military, strategic and soft power.

Chinese economic diplomacy is not uniform and is based on a strategic philosophy of 'business first,' which prioritises economic growth. In diplomatic relations with Arab countries, commercial rather than security issues are prioritised (Zreik, n.d.). Amid the ongoing Arab uprisings, China has taken a pragmatic approach aimed at maximising economic benefits with minimal political risks. Since the early 2000s, China's economic diplomacy has shifted its focus from industrialised countries to developing countries, particularly the energy-rich Arab states. Compared to developed economies, the resource-rich Arab countries of the Persian Gulf and North Africa offer potential new markets for China's surplus capital and industrial goods (Zreik, n.d.). Undoubtedly, an extremely important factor in China's involvement in the region is energy, namely stable and uninterrupted access to energy resources at prices favourable to the PRC. Chinese national oil companies such as CNPC and SINOPEC play a significant role in China's economic diplomacy in the Arab world, investing heavily in oil fields in Iraq, Sudan and Saudi Arabia, aligning their strategies with China's globalisation goals (Zreik, n.d.). Overall, China's approach in the Middle East from a geopolitical and economic point of view can be characterised as positioning the PRC as a reliable, predictable and influential partner focused on regional stability, given the predictable and favourable economic and trade conditions between the PRC and the states of the region.

Conclusions. Thus, it is essential to highlight the role of economic diplomacy as one of the key factors in the economic rise of the People's Republic of China, as well as the growth of Beijing's geopolitical influence at both the regional and global levels. From a conceptual point of view, it can be concluded that China uses economic instruments to achieve its own strategic goals in foreign policy, with the help of which the PRC strengthens its position both at the regional level (South Asia) and at the global level (the Middle East and the world as a whole). Throughout the 21st century, China has effectively used economic diplomacy to strengthen economic and political cooperation with other countries. A striking example of this is the Belt and Road Initiative, through which China has not only strengthened its position in various regions of the world from an economic point of view, but has also enhanced the level of diplomatic and foreign cooperation at the bilateral and multilateral levels. That is why economic diplomacy can be considered one of the factors

strengthening the geopolitical status and influence of the People's Republic of China.

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CYBER DIPLOMACY AS AN INSTRUMENT OF COGNITIVE WARFARE IN CYBERSPACE

КІБЕРДИПЛОМАТІЯ ЯК ІНСТРУМЕНТ КОГНІТИВНОЇ ВІЙНИ У КІБЕРПРОСТОРІ

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Abstract. *This article examines the systemic transformation of cyber diplomacy from a conventional instrument of cyberspace regulation and rule-making into an active mechanism of cognitive warfare. The study investigates how cyberspace has evolved beyond technical and legal domains into a primary theater for meaning-based and narrative confrontation. Methodologically grounded in Alexander Wendt's constructivist paradigm of international relations, the theory of strategic narratives (systemic, identity, and issue-based), and case studies, the authors characterise cyber diplomacy as an instrument of the narrative construction of reality. The research demonstrates that due to institutional stagnation at multilateral platforms like the United Nations (the UN GGE process) and profound value-based divergences between democratic and autocratic regimes, the public attribution of cybercrimes has transitioned from a legal procedure into a strategic weapon of perception management. To illustrate this shift, the paper analyzes the geopolitical discourse surrounding the Volt Typhoon campaign, France's public attribution of decade-long cyber espionage to Russia's APT28, and the Czech Republic's May 2025 standalone attribution of MFA cyberattacks to Chinese-linked groups, which triggered an unprecedented condemnation of China by NATO. It also explores the rise of artificial intelligence and generative 'slopaganda' as force multipliers in manipulating collective consciousness, and details NATO's newly developed cognitive warfare defensive framework (2021-2025). The article concludes with practical recommendations for states, emphasizing the need to institutionalize rapid and persuasive cyber attribution mechanisms while actively building societal cognitive resilience to protect democratic decision-making.*

Keywords: *cyber diplomacy, cognitive warfare, diplomatic attribution, strategic narratives,*

international relations, cyberspace, interstate confrontation.

Анотація. *У статті досліджено системну трансформацію кібердипломатії з традиційного інструменту регулювання та кодифікації норм відповідальної поведінки держав у кіберпросторі на дієвий механізм ведення когнітивної війни. Кіберпростір концептуалізується не просто як технічне середовище чи сфера правового регулювання, а як первинний театр воєнних дій, де боротьба ведеться за людську свідомість і смисли. Методологічну основу дослідження сформовано на основі конструктивістського підходу Александра Вендта («анархія — це те, що держави з неї роблять»), теорії стратегічних наративів (системних, ідентичнісних та проблемних), а також прикладного аналізу кейсів (case-study). Автори доводять, що в умовах інституційної стагнації на таких міжнародних майданчиках, як ООН, та глибокого ціннісного розколу між демократичними та авторитарними режимами, публічна та дипломатична атрибуція кіберзлочинів перетворилася на потужну зброю управління сприйняттям. Проаналізовано геополітичний дискурс навколо кампанії Volt Typhoon, офіційне звинувачення Францією групи APT28 та Росії у багаторічному шпигунстві, а також безпрецедентну публічну атрибуцію Чехією у травні 2025 року кібератак на своє МЗС китайським хакерам, що призвело до засудження КНР з боку НАТО. Досліджено нові технологічні виклики, зокрема використання генеративного штучного інтелекту та концепт «слопаганди» (slopaganda) як множників сили у маніпулюванні масовою свідомістю. Детально розкрито структуру оборонної концепції НАТО з когнітивної війни (2021-2025) та її три захисні функції, включаючи послаблення спроможностей супротивника, покращення людського та технологічного розуміння й розбудову когнітивної стійкості. Сформульовано рекомендації для держав щодо інституціоналізації швидкої атрибуції кібератак та побудови стійкої ціннісної рамки для захисту democratic decision-making від когнітивних загроз у міжнародній політиці.*

Ключові слова: *кібердипломатія, когнітивна війна, дипломатична атрибуція, стратегічні наративи, міжнародні відносини, кіберпростір, міждержавне протиборство.*

Introduction. Cyberspace security has become a crucial priority for states in the twenty-first century. It benefits both governments and their citizens by enabling the development of advanced technologies and digital innovation.

Many scholars conceptualise cyber diplomacy as an instrument for regulating and institutionalising relations among actors in international relations within the diplomatic arena. However, the growing divergence among states regarding the regulation and functioning of cyberspace calls into question the role of cyber diplomacy – particularly amid geopolitical confrontation in cyberspace between a group of states led by Russia and China and Western countries.

Given the inability to resolve conflicts in cyberspace or to reach agreements on its regulation through diplomatic negotiations, states increasingly resort to public cyber attribution – the process of tracing and identifying the perpetrator of a cyberattack or other cyber operation. In the course of attribution investigations, security analysts seek to identify the tactics, techniques, and procedures employed by malicious actors, as well as to determine who is responsible for the attack and why it was carried out. The majority of public accusations have been directed at the Russian Federation and the People's Republic of China.

Holding perpetrators of cybercrime accountable is complicated by the possibility of anonymous interference in a state's cyberspace and the use of proxy hacker groups that may lack an explicit link to the aggressor state. These circumstances compel victim states to engage in narrative communication to present their own version of events and mobilise support from allies. At the same time, states accused of aggression attempt to deny involvement by presenting what they claim is "irrefutable" evidence of their non-participation. Consequently, cyber conflict shifts from the technical domain into a cognitive dimension, where victory depends not on truth or justice, but on the persuasiveness of the narrative.

Thus, the shift of cyber diplomacy from norm development to narrative construction underscores its growing importance as a tool of cognitive confrontation, emphasizing its relevance for international relations and security.

Particular attention is paid to the role of diplomatic attribution as a mechanism of narrative communication aimed at shaping international legitimacy and mobilising allies in the context of interstate confrontation. The article also examines how competition between normative approaches to cyberspace regulation transforms cyber diplomacy from an instrument of institutionalising cooperation into a component of broader cognitive strategies in contemporary conflicts.

The purpose of the arcticle is to characterise cyber diplomacy as an instrument for the narrative construction of reality by actors in international relations.

Literature Review. Contemporary scholarship demonstrates a shift from the study of cyber norms as a process of rule-making toward the analysis of their ongoing contestation. The origins of these debates are associated with the UN GGE process and the codification efforts of 2015 (United Nations, 2015), as well as with the legal systematisation of the application of international law to cyber operations in the Tallinn Manual 2.0 (Schmitt, 2017). At the same time, recent approaches conceptualise cyber diplomacy as a process of "diplomatization" – can institutional and political arena of contestation in which norms are shaped through struggles over legitimacy and positioning (Barrinha, 2024; Broeders & van den Berg, 2020).

Kurawska (2019) emphasises that the Western-centric perspective on the development of international law increasingly encounters resistance from Eastern states. The theory of strategic narratives illustrates how power in cyberspace is exercised through the construction of identities and meanings (Miskimmon et al., 2013). At the practical level, public attribution has become an instrument of strategic communication that states use to signal resolve and mobilise support, balancing deterrence with the risk of escalation (Egloff & Smeets, 2023; IISS, 2025). Debates surrounding the Volt Typhoon case further demonstrate that norm interpretation depends on struggles over narrative credibility (IISS, 2026).

Overall, scholars indicate that cyberspace is increasingly defined not only by legal frameworks but also by communicative narratives and the dynamics of cognitive confrontation in the international arena.

Main results of the research. Traditionally, cyber diplomacy has been understood as a mechanism for regulating international relations in cyberspace through the development of legal instruments, the formulation of norms of responsible state behaviour, and the establishment of multilateral platforms to counter cybercrime and hold perpetrators accountable. In this context, states and international organisations seek to institutionalise rules of conduct in cyberspace. However, despite prolonged negotiation processes, a substantial consensus has yet to be achieved.

Cyber diplomacy is closely intertwined with cybersecurity, yet the two perform distinct functions. Cybersecurity focuses on preventing unauthorised access and hacker attacks on computer systems. It concentrates on the technical aspects of cyberspace governance, whereas cyber diplomacy addresses the political dimension of cyber threats (Radanliev, 2025).

The emergence of cyber diplomacy began with the integration of digital communication tools and the Internet into diplomatic practice. The first recorded use of digital methods in diplomacy was an email sent on February 4, 1994, by Swedish Prime Minister Carl Bildt to U.S. President Bill Clinton. Bildt congratulated Clinton on lifting the embargo against Vietnam and noted that Sweden, as a leading technology nation, considered it appropriate to be among the first to use the Internet for political contacts and global communication (Tom Fletcher, 2016).

The use of social media, online platforms, and digital tools for diplomatic engagement is associated with the phenomenon of "digital diplomacy" or "Diplomacy 2.0," which aims to engage and communicate with international audiences (Radanliev, 2025). Several scholars note that during the 2000s, cyber diplomacy was widely understood as the application of digital tools for diplomatic communication. In 2010, the EastWest Institute emphasised in an analytical report that cyber diplomacy should be regarded as a distinct branch of diplomatic activity designed to address the international dimensions of cyber policy and cybersecurity. The authors stressed the importance of

moving beyond a narrow focus on cyber defence or cyber warfare and instead developing diplomatic mechanisms of engagement in cyberspace (Gady & Austin, 2010). Thus, cyber diplomacy increasingly came to be understood as an instrument for developing cyber norms among states to regulate cyberspace.

Accordingly, digital diplomacy concerns the implementation of digital communication tools in diplomatic practice, while cyber diplomacy functions as an instrument for regulating relations in the cyber domain among actors in international relations.

This evolution of cyber diplomacy was significantly influenced by Russia's 2007 cyberattacks against Estonia (Ottis, n.d.). Prior to this event, states and intergovernmental organisations did not treat cybersecurity and cyberspace as strategically important domains of diplomacy. The Estonian precedent prompted NATO and the European Union to take their first institutional steps. In 2008, the NATO Cooperative Cyber Defence Centre of Excellence (CCDCOE) was established in Tallinn, while the European Union began developing its own cyber incident response mechanisms, which later materialised in the CSIRT network and the NIS Directive (CCDCOE Centre, 2026).

In recent years, key international actors – particularly the United Nations, the United States, and the European Union – have significantly intensified their cyber diplomatic efforts. The regulation of international relations is impossible without international law. Western states have sought to regulate cyberspace through existing legal frameworks. The first such instrument was the Council of Europe Convention on Cybercrime – the Budapest Convention – adopted in 2001, which became the first universal international legal instrument aimed at combating cybercrime (The Budapest Convention on Cybercrime, 2023). Another important document facilitating the application of international humanitarian law to cyberspace is the Tallinn Manual, which affirms that the fundamental principles governing state conduct during armed conflicts also apply to cyber operations. Consequently, the use of cyber weapons is subject to the same legal restrictions as traditional means of warfare (Schmitt, 2017).

On the other hand, Russia and the People's Republic of China advocate a different vision of cyberspace governance. In 1998, the Russian Federation initiated a United Nations General Assembly resolution on "developments in the field of information and telecommunications in the context of international security" (UN, 1998), linking ICTs to threats to international peace and emphasising the risk of an "information arms race." From the outset, the Russian approach favoured the creation of a specific international treaty on information security grounded in a strict interpretation of sovereignty.

China, in parallel with Russia, has advanced the concept of "cyber sovereignty," which combines a normative dimension (the right of states to determine their own model of internet governance) with a material dimension (data localisation and infrastructure control). At the international level, Beijing supports an intergovernmental governance model and criticises the multistakeholder approach as a form of concealed hegemony (Hung, 2025).

At first glance, the primary obstacle to consensus is the fundamental divergence in legal approaches to cyberspace governance. However, behind this legal debate lies a deeper political and value-based conflict. Proponents of applying existing international law seek to preserve the openness, interoperability, and global character of cyberspace, whereas advocates of a separate regulatory regime aim to institutionalise control, fragmentation, and informational sovereignty.

Although the United Nations was expected to serve as the principal diplomatic arena for resolving disputes in cyberspace, it has struggled to fulfil this role effectively. The first Group of Governmental Experts (GGE) failed to produce a consensus report due to disagreements among the UN Security Council's permanent members. The fourth GGE (2014–2015) succeeded in formulating a package of eleven voluntary norms of responsible state behaviour, including the prohibition of attacks on critical infrastructure, protection of supply chains, the inviolability of CERT/CSIRT entities, and respect for human rights (UN GGE, 2015).

Simultaneously, in 2011 and 2015, Russia, China, and their Shanghai Cooperation Organisation partners promoted an International Code of Conduct for Information Security, which institutionalised the principle of "cyber sovereignty." Western states rejected this initiative as

legitimising censorship. The fifth GGE (2016–2017) reached an impasse. In 2018, Russia initiated the Open-Ended Working Group (OEWG), which adopted a consensus report in 2021 reaffirming previously agreed norms and subsequently replaced the GGE as the primary institutional platform. In December 2024, the UN General Assembly adopted a new Convention against Cybercrime – the first global treaty in this field since the Budapest Convention (United Nations Convention against Cybercrime, 2024).

Nevertheless, the confrontation between the West and the Russia–China bloc does not fully capture the architecture of contemporary cyberspace competition. Countries of the Global South– such as India, Brazil, South Africa, and ASEAN member states–have emerged as influential actors. Romanian scholar Daria-Elena Popescu (2025) argues that this group increasingly articulates a position of "digital non-alignment."

The roots of digital non-alignment can be traced back to the Cold War and to countries like India's reluctance to become entangled in superpower rivalry. Today's cyberspace confrontation has revived this logic. States in the Global South are hesitant to fully embrace the Western multistakeholder model, as they perceive risks to their own security. However, they also remain cautious of the rigid digital authoritarianism promoted by Moscow and Beijing. For these states, the priority is to develop their own technological capacities while preserving sovereignty without becoming isolated from the global economy.

Accordingly, the struggle for their support has become a central task of cyber diplomacy. Legitimacy will ultimately belong to the actor whose strategic narrative of cyberspace governance proves more inclusive and adaptable.

Researcher Xymena Kurowska argues that contemporary cyber norm politics is at a deadlock because the strategic construction of norms by a Western-led "like-minded" coalition is increasingly perceived as lacking legitimacy and provokes normative resistance (Kurowska, 2019). Without incorporating alternative narratives into the rule-making process, even formally agreed documents risk remaining fragile compromises rather than foundations of a stable cyber order.

From a theoretical perspective, the shift from legal regulation to narrative confrontation is best explained through the constructivist paradigm of international relations. Unlike neorealism or neoliberalism, which prioritise material factors, Alexander Wendt argues that socially shared ideas and knowledge shape the international system. According to Wendt's well-known thesis, "anarchy is what states make of it" (Mengshu, 2020). Under such conditions, the dynamics of international relations depend on which shared ideas states can institutionalise. Consequently, the actor that dominates the narrative surrounding a cyber incident gains the power to construct the very nature of international cybersecurity and to define roles such as "victim," "aggressor," or "ally" for other actors.

A fundamental challenge of the cyber diplomatic process lies in the attribution of cyberattacks – the process of identifying individuals, criminal groups, or state actors responsible for conducting a cyber operation. Technical uncertainty, evidentiary ambiguity, anonymity, and the use of proxy actors make attribution one of the most complex issues in cybersecurity (Rogndokken et al., 2025). In such circumstances, establishing the factual truth of aggression often becomes secondary to the struggle over defining "what happened," "who is the aggressor," and "what response is legitimate."

These political realities reshape the understanding of cyber diplomacy – from a diplomatic strategy for resolving cyberspace-related issues into an increasingly explicit arena of narrative contestation. States seek not only to prove technical responsibility for an incident, but also to consolidate their version of events through diplomatic attribution publicly. Attribution processes may last for years, and for both accusing and accused states, it is crucial to present their own "story" and persuade others of its credibility.

On the political stage, adversaries construct strategic narratives. According to Alister Miskimmon and Ben O'Loughlin (2017), strategic narratives are a means by which political actors attempt to shape a shared understanding of the past, present, and future of international politics in order to influence the behaviour of domestic and international audiences. The authors distinguish three types of narratives: systemic (about the international order), identity (about who the actors

are), and issue narratives (about specific policy questions). Publicly assigning responsibility for a cyberattack thus becomes an instrument of cognitive influence aimed at shaping international perception, legitimising countermeasures, and consolidating allies.

As a result, in contemporary interstate confrontation, diplomatic attribution increasingly transforms into a tool of perception management through which strategic narratives are constructed. The primary objective is no longer solely to hold perpetrators legally accountable for cybercrime, but rather to shape target audiences' consciousness and convince partners of one's legitimacy. Diplomacy thereby shifts from a mechanism of compromise-seeking to a strategic arena of cognitive warfare, where new rules of dominance are formed.

The concept of cognitive warfare is not new. In the fifth century BCE, Sun Tzu described methods of warfare, stating: "If you know the enemy and know yourself, you need not fear the result of a hundred battles. If you know yourself but not the enemy, for every victory gained, you will also suffer a defeat. If you know neither the enemy nor yourself, you will succumb in every battle" (Giles, 2013). This emphasis on managing perception and information as a condition of victory remains highly relevant in today's cyberspace.

Contemporary scholars define cognitive warfare as a concept whereby one state seeks to influence another through manipulation aimed at weakening, subordinating, or even destroying it. This includes psychological tactics, information manipulation, and cognitive strategies designed to influence the emotions, beliefs, perceptions, and behaviour of individuals, groups, or entire populations. In this context, cyber diplomatic attribution functions as one of the mechanisms for achieving these objectives in the international arena.

NATO has taken the threat of cognitive warfare seriously. In 2020, NATO's Innovation Hub, under Allied Command Transformation, launched research into cognitive warfare as a new form of conflict. It proposed the recognition of a sixth operational domain–the "Human Domain" (Cognitive Warfare, 2025). In June 2021, France hosted NATO's first scientific meeting dedicated to cognitive warfare. Researchers and practitioners have since noted the gradual institutionalisation of cognitive warfare as a field of study. NATO experts conceptualise cognitive warfare as a dimension of confrontation that integrates psychological operations, influence operations, and cyber tools, complemented by advances in psychological science. It emerges at the intersection of two previously relatively autonomous domains: on the one hand, PSYOPS and mechanisms of "soft power," and on the other, cyber operations targeting or degrading information infrastructure (Claverie & Cluzel, 2021). This intersection creates an interdisciplinary framework for analysing how technology affects human perception, behaviour, and political agency.

From the perspective of cognitive confrontation, the case of the Chinese-linked hacking group Volt Typhoon is illustrative. In May 2023, Microsoft released a report alleging a direct connection between Volt Typhoon and the People's Republic of China (Microsoft Threat, 2023). In 2024, official Beijing responded by asserting that Volt Typhoon was an international ransomware group and that U.S. accusations of links to the Chinese government were unfounded (Bruss, 2026).

This case demonstrates that justice and the technical aspects of attribution may become secondary to the more persuasive effort to construct, disseminate, and prevail through competing narratives in cognitive confrontation.

Columbia University researcher Virpratap Vikram Singh offers a similar assessment. According to him, France deliberately issued its first direct public attribution, linking a decade of malicious cyber activity to the APT28 group and Russia, to raise public awareness in French society about broader Russian threats. In May 2025, the Czech Republic publicly attributed cyber espionage activities within its Ministry of Foreign Affairs to a Chinese-linked group. This marked Prague's first standalone public attribution against China. The disclosure aimed to inform the public about threats emanating from China while simultaneously demonstrating determination to counter them. It quickly generated statements of support, including an unprecedented condemnation of China by NATO (Virpratap, 2026).

Conclusions. This article has examined cyber diplomacy as a potential instrument of cognitive confrontation among states in cyberspace and compared this perspective with the

conventional understanding of cyber diplomacy. The study demonstrates that the inability to regulate cyberspace effectively through international platforms such as the United Nations contributes to growing tensions among states – tensions that diplomacy is not always capable of resolving. Under such conditions, public attribution of cybercrime and the construction of reality through narrative become more significant than achieving consensus or ensuring justice. Consequently, cyber attribution becomes an important political act that shapes international perceptions and mobilises allies.

The analysis of several cyber incident cases, including Volt Typhoon, supports this argument and illustrates that the struggle concerns not only the establishment of responsibility, but also the right to define the interpretation of reality itself.

Cyber diplomacy is transforming an instrument of institutional cooperation into a mechanism of strategic communication. On the one hand, this shift enables states to articulate their own interpretation of events through narrative framing and to strengthen their positions on the international stage. On the other hand, it reveals that achieving justice and mutual understanding among international actors in cyberspace currently appears increasingly unrealistic.

For states to effectively employ all dimensions of cyber diplomacy, they should:

1. Institutionalise attribution mechanisms. States must learn not only to respond technically to cyber threats, but also to expose aggressors rapidly and convincingly. This requires coordination among government bodies, intelligence agencies, and diplomatic institutions. Attribution should become a systematic instrument of deterrence and international signalling.
2. Enhance societal resilience to cognitive threats. Cyber diplomacy increasingly operates within a cognitive dimension where perception management is central. It is essential not only to counter disinformation campaigns but also to build a coherent, value-based narrative framework actively. This will reduce the influence of adversarial actors on state institutions and consolidate society in the face of cyber threats.
3. Develop multilateral cyber alliances. Given the stagnation of the UN framework and the growing divergence between democratic and authoritarian approaches to cyberspace governance, greater emphasis should be placed on forming coalitions of like-minded states. Joint and coordinated attribution of cyber incidents – such as solidarity statements by NATO or EU member states – significantly enhances the legitimacy of the narrative advanced. Such collective action generates stronger political and reputational pressure on violator states than isolated démarches.
4. Engage non-state actors in the cyber diplomatic process. Technology companies such as Microsoft, Google, and others often possess greater resources and expertise than many states. They are frequently the first to detect cyber threats and to develop defensive measures. Public–private partnerships could substantially strengthen interstate alliances and help build robust cyber defence systems equipped with advanced detection mechanisms for cybercriminal activity.

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HYBRID INFLUENCE OF THE RUSSIAN FEDERATION IN GERMANY DURING THE RUSSO-UKRAINIAN WAR (2014-2026): INSTRUMENTS, EVOLUTION, AND COUNTERMEASURES

ГІБРИДНИЙ ВПЛИВ РОСІЙСЬКОЇ ФЕДЕРАЦІЇ В НІМЕЧЧИНІ ПІД ЧАС РОСІЙСЬКО-УКРАЇНСЬКОЇ ВІЙНИ (2014-2026): ІНСТРУМЕНТИ, ЕВОЛЮЦІЯ ТА ЗАХОДИ ПРОТИДІЇ

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Abstract. *The article provides a comprehensive and systematic analysis of the evolution, main instruments, and effectiveness of the Russian Federation's hybrid influence operations in Germany from 2014 to 2026, as well as the countermeasures developed by Germany and its European Union and NATO partners. Germany, as the largest economy in the EU, a crucial supporter of Ukraine, and a key actor in sanctions policy, is a primary target of Russia's coordinated multi-domain pressure. The study is methodologically based on a combination of chronological, typological, and network analysis, tracing the transition from long-term structural influence (such as energy dependence and political-business contacts before 2022) to highly aggressive, operationally dense hybrid warfare following the full-scale invasion of Ukraine. The authors identify and classify the main instruments of Russian hybrid activity across the informational, cyber, economic, intelligence, and physical domains. Particular attention is devoted to foreign information manipulation and interference (FIMI) ecosystems, such as cloned media campaigns (Doppelgänger), pro-Russian media platforms (Voice of Europe), and synthetic deepfake content (Storm 1516), which stoke social polarization, anti-sanctions fatigue, and fear of war escalation. In the cyber and physical spheres, the paper examines high-frequency cyber espionage by APT28, infrastructure sabotage, and the strategic recruitment of low-cost "disposable" agents to disrupt military supply chains. The article concludes with practical policy recommendations, emphasizing the need for robust institutional coordination, auditable public-private data-sharing, mandatory cybersecurity standards for political organizations, and infrastructural surveillance in logistics to protect Germany's democratic resilience and national security.*

Keywords: *hybrid influence, FIMI, cyber operations, sabotage, Russia, Germany, APT28, disinformation, energy coercion, security policy.*

Анотація. *У статті здійснено комплексний, системний аналіз еволюції, ключових інструментів та ефективності операцій гібридного впливу Російської Федерації в Німеччині у період з 2014 по 2026 роки, а також оцінено заходи протидії, впроваджені німецьким урядом, інституціями Європейського Союзу та партнерами по НАТО. Німеччина, як найбільша економіка ЄС, один із провідних донорів військової та фінансової допомоги Україні та центральний суб'єкт санкційної політики, виступає першочерговою мішенню для координованого багатодоменного тиску з боку Москви. Методологічну основу дослідження побудовано на поєднанні хронологічного, типологічного та мережевого аналізу, що дозволило простежити історичний перехід від довгострокового структурного тиску (енергетична залежність, лобізм та політико-бізнесові контакти до 2022 року) до відкрито ворожої, операційно насиченої гібридної війни після початку повномасштабного вторгнення Росії в Україну. Автори ідентифікують та класифікують основні інструменти російської гібридної активності в інформаційній, кібернетичній, економічній, розвідувальній та фізичній сферах. Особливу увагу приділено екосистемам іноземного втручання в інформаційну сферу та маніпулювання (FIMI), зокрема кампаніям клонованих медіаресурсів (Doppelgänger), проросійським медіаплатформам (Voice of Europe) та штучно згенерованому контенту (Storm 1516), які спрямовані на розпалювання соціальної поляризації, антисанкційної втоми та страху перед ескалацією війни. У кібернетичній та диверсійній площинах досліджено високоінтенсивне шпигунство з боку угруповання APT28, спроби саботажу об'єктів критичної інфраструктури та стратегію вербування дешевих «одноразових» агентів через Інтернет для блокування військово-промислових ланцюгів постачання. Сформульовано практичні рекомендації для політиків, наголошуючи на необхідності посилення координації між спецслужбами, розробки прозорих законодавчих рамок для обміну даними між державним та приватним секторами, впровадження обов'язкових стандартів кібербезпеки для політичних партій та фондів, а також захисту логістичної інфраструктури від гібридного саботажу з боку РФ.*

Ключові слова: *гібридний вплив, FIMI (іноземне втручання в інформаційну сферу та маніпулювання), кібероперації, саботаж, Росія, Німеччина, APT28, дезінформація, енергетичний примус, безпекова політика.*

Introdcution. The transformation of hybrid threats in Europe, particularly after the escalation of the Russo-Ukrainian war in 2022, has significantly altered the nature of external influence on democratic states. Germany, as one of the central political, economic, and security actors within the European Union, has become a primary target of Russian hybrid operations. The relevance of this study is обусловлена the increasing complexity, adaptability, and multi-domain nature of these operations, which combine information warfare, cyber intrusions, economic leverage, and covert sabotage activities.

Hybrid influence is no longer limited to traditional propaganda or espionage. Instead, it operates as an integrated system of coordinated actions aimed at destabilizing political systems, shaping public opinion, and undermining institutional trust. The German case is particularly illustrative due to its historical energy dependence, political weight in EU decision-making, and role in supporting Ukraine.

The aim of this study is to systematically analyze the evolution, instruments, and effectiveness of Russian hybrid influence in Germany between 2014 and 2026, as well as to evaluate the countermeasures implemented by Germany, the EU, and their partners.

The objectives of the study include:

- to conceptualize hybrid influence within the contemporary security framework
- to identify and classify the main instruments of Russian hybrid activity in Germany
- to analyze key incidents and their operational logic
- to assess the effectiveness of hybrid influence tools across different domains
- to evaluate countermeasures and propose policy recommendations

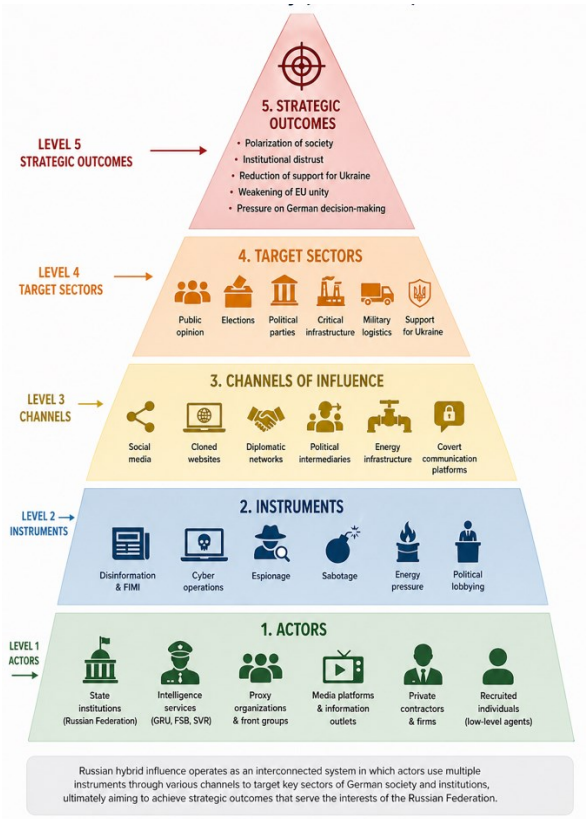
Main results of the research. Hybrid influence in the context of Russian activity against

Germany should be understood not as a single method of pressure, but as a coordinated system of political, informational, cyber, economic, intelligence and physical instruments used to affect the internal stability and foreign policy choices of a target state. In the German case, this influence has been especially significant because Germany combines several strategic characteristics that make it valuable for Russian pressure: it is the largest economy in the European Union, one of the key supporters of Ukraine, an important NATO member, a central actor in EU sanctions policy, and historically one of the European states most exposed to Russian energy dependence. Therefore, hybrid influence against Germany has not been accidental or episodic. It has developed as a long-term strategic practice aimed at weakening Germany's political will, fragmenting public opinion, complicating support for Ukraine, and creating distrust toward democratic institutions.

The concept of hybrid influence includes both open and covert instruments. Open instruments may include public diplomacy, media messaging, political narratives, energy policy, lobbying and cultural communication. Covert or semi-covert instruments may include cyber intrusions, intelligence operations, proxy networks, disinformation campaigns, sabotage preparation, illicit financing and recruitment of low-level agents. The specific danger of hybrid influence lies in the fact that these instruments rarely operate separately. A cyberattack can support a disinformation campaign. A disinformation campaign can prepare the public environment for political pressure. Energy dependence can amplify fear-based narratives. Sabotage can be accompanied by online manipulation intended to confuse responsibility or shift blame. This integrated character makes hybrid influence difficult to identify, attribute and counteract.

Figure 1

The analytical Scheme of Russian Hybrid Influence in Germany (2014-2026)



The methodological logic of the study is based on the combination of chronological, typological and network analysis. Chronological analysis makes it possible to trace the transition from long-term structural influence before 2022 to more aggressive and operationally intensive hybrid activity after Russia's full-scale invasion of Ukraine. Typological analysis allows the

classification of instruments into informational, cyber, economic, intelligence and physical domains. Network analysis helps identify how different actors, platforms and operational channels are connected. The evaluation of countermeasures makes it possible to determine which responses are more effective and which remain limited by legal, institutional or technological constraints.

The evolution of Russian hybrid influence in Germany can be divided into two broad phases. The first phase, from 2014 to 2021, was dominated by structural influence, especially energy dependence, political and business contacts, media narratives, disinformation and selective cyber operations. During this period, Russian influence relied on long-term vulnerabilities within the German political and economic environment. The most important structural vulnerability was energy dependence. In 2021, Russian gas accounted for approximately 55 percent of Germany's gas imports, which created not only an economic dependency but also a political and psychological vulnerability during debates on sanctions, energy security and relations with Moscow.

The second phase began after 2022 and is characterized by a more openly hostile and operationally dense form of hybrid influence. Russia's full-scale war against Ukraine changed the strategic environment. Germany became not only a political opponent of Russia's aggression but also a logistical, military, economic and diplomatic supporter of Ukraine. As a result, the focus of hybrid operations shifted toward undermining Germany's support for Ukraine, intimidating political elites, influencing elections, disrupting military and industrial supply chains, and creating insecurity among the population. During this phase, cyber operations, FIMI campaigns, sabotage planning, espionage and recruitment of disposable agents became more visible.

Table 1

Evolution of Russian Hybrid Influence Instruments in Germany

Period	Dominant instruments	Main targets	Operational characteristics	Examples of manifestation	Strategic objective
2014-2016	Disinformation, media amplification, diplomatic pressure, early cyber activity	Public opinion, migrant communities, political debate, democratic institutions	Use of emotionally charged narratives, rapid amplification through Russian-language media, exploitation of social divisions	Lisa case, Bundestag cyberattack attributed later to APT28	Testing influence channels, undermining trust, identifying vulnerabilities
2017-2021	Energy leverage, lobbying, cyber espionage, information influence	Energy policy, political parties, business networks, public debate	Long-term structural pressure, influence through economic interdependence, selective use of cyber tools	Nord Stream 2 debates, continued concern over Russian disinformation, APT28-linked cyber activity	Preserving political leverage and reducing resistance to Russian interests
2022-2023	Energy coercion, sanctions circumvention attempts, intensified propaganda, intelligence	German government, society, energy market, Ukraine support infrastructure	Crisis exploitation, fear narratives, pressure through energy insecurity and inflation	Energy shock after reduction of Russian supplies, anti-sanctions narratives	Weakening support for Ukraine and increasing domestic pressure on German authorities

	activity				
2024-2026	Cyber operations, FIMI, sabotage planning, recruitment of low-level agents, deepfake campaigns	Political parties, logistics, critical infrastructure, elections, military support chains	High-frequency operations, use of proxies, online recruitment, technical sophistication, plausible deniability	APT28 campaign against SPD and other targets, disposable agents, Storm 1516, parcel-related sabotage investigations	Destabilization, disruption of support for Ukraine, erosion of democratic resilience

Disinformation and foreign information manipulation and interference represent one of the most adaptive and persistent components of Russian hybrid influence. Modern disinformation is not limited to the distribution of false claims. It functions as an ecosystem in which narratives, platforms, artificial amplification, pseudo-media and political actors reinforce one another. The European External Action Service identifies FIMI as a major security threat and emphasizes the use of bots, manipulated behavior, AI-generated content and coordinated influence infrastructure.

In Germany, Russian disinformation has repeatedly targeted emotionally sensitive issues such as migration, economic insecurity, distrust of elites, fear of war escalation, fatigue from support for Ukraine and skepticism toward NATO. The purpose of such campaigns is not always to persuade the entire population of one fixed narrative. More often, the goal is to create confusion, produce emotional exhaustion, intensify polarization and undermine confidence in reliable information sources. This is why disinformation should be understood not only as false content but also as a method of cognitive overload.

The Lisa case remains an important example because it demonstrated how a local incident could be transformed into a political and diplomatic crisis. The operational logic was relatively simple but effective: a local criminal allegation was amplified by Russian media, emotionally framed as evidence of state failure, spread among Russian-speaking communities, and then used to create pressure on German institutions. Later campaigns became more technologically complex. Doppelgänger relied on cloned websites and imitation of legitimate media brands. Voice of Europe showed how influence could be directed toward political and electoral environments. Storm 1516 demonstrated the increasing role of pseudo-investigative formats, fabricated sources and deepfake-style manipulation. Germany and France have been identified among countries regularly targeted by localized campaigns in the EEAS FIMI threat reporting.

Table 2

Main Types of Disinformation and FIMI Instruments Used Against Germany

Instrument	Mechanism of operation	Target audience	Intended effect	Typical indicators	Level of risk
Cloned media websites	Copying the design and style of legitimate media outlets and publishing manipulated content	General public, politically active users, undecided voters	Confusion between reliable and false information, erosion of trust in journalism	Similar domain names, copied layouts, emotionally manipulative headlines	High
Bot	Coordinated	Social media	Creating the	Repetitive	Medium-

amplification	artificial spread of posts, hashtags and comments	users, journalists, political communities	illusion of mass opinion and social pressure	wording, synchronized posting, suspicious account behavior	high
Pseudo-investigative platforms	Presentation of fabricated materials as journalistic investigation	Politically skeptical audiences, anti-establishment groups	Delegitimization of Ukraine, NATO, EU or German institutions	Anonymous sources, unverifiable documents, selective emotional framing	High
Deepfake and AI-generated content	Use of synthetic voices, images or video fragments	Broad public, especially during elections or crises	Emotional shock, reputational damage, rapid viral spread	Visual or audio inconsistencies, lack of original source, rapid cross-platform spread	High
Russian-language media narratives	Framing events for Russian-speaking communities in Germany	Diaspora groups, migrant communities	Mobilization, alienation from German institutions, identity-based polarization	Repetition of Kremlin narratives, victimization framing	Medium
Political influence media	Use of media outlets or platforms connected to pro-Russian political narratives	Voters, party supporters, ideological groups	Electoral influence and normalization of pro-Russian positions	Selective interviews, one-sided framing, links to sanctioned networks	High

The policy response should therefore move from reactive crisis management to permanent resilience. First, Germany needs stronger institutional coordination between intelligence services, police, cyber agencies, ministries and private operators. Hybrid threats cross institutional boundaries, while democratic systems often separate responsibilities for legal reasons. This separation is necessary for the rule of law, but it should not create operational blind spots. Clear legal frameworks, auditable data-sharing mechanisms and parliamentary oversight can help balance security and legality.

Second, counter-recruitment must become a stable part of national security communication. The disposable-agent model depends on ignorance, financial vulnerability and online manipulation. Therefore, prevention should focus not only on punishment but also on early warning, public education and anonymous reporting channels. The message should be clear: small tasks offered online may be part of a foreign intelligence operation and can lead to serious criminal liability.

Third, cybersecurity for political parties, foundations and election-related institutions should be treated as a national security priority. Political organizations are attractive targets because they often possess sensitive information but may lack the resources of state agencies. Minimum cybersecurity standards, independent audits, secure communication practices and crisis response plans should become mandatory for actors involved in democratic competition.

Fourth, anti-FIMI policy should focus less on individual false statements and more on

infrastructure. Removing one false post is insufficient if the same network controls dozens of domains, advertising channels, bot accounts and proxy media assets. Effective response requires mapping the entire influence supply chain: domain registration, hosting, payment flows, content farms, amplification networks and political intermediaries.

Fifth, critical infrastructure protection must include logistics, aviation, railways, military supply routes, energy assets and communication nodes. The parcel-related sabotage cases show that hybrid threats can exploit ordinary commercial infrastructure. Therefore, cooperation with private logistics companies is essential. Detection of suspicious packages, GPS trackers, incendiary devices or unusual routing patterns should become part of a broader security protocol.

Conclusions. The analysis demonstrates that Russian hybrid influence in Germany has evolved from long-term structural pressure into a more complex and operationally aggressive system. Before 2022, the strongest instruments were energy dependence, political influence, disinformation and selective cyber activity. After 2022, the operational center of gravity shifted toward cyber campaigns, FIMI ecosystems, sabotage preparation and recruitment of disposable agents. This does not mean that older instruments disappeared. Rather, they were integrated into a broader hybrid architecture.

The German case shows that hybrid influence is most dangerous when different instruments reinforce one another. Disinformation weakens trust. Cyber operations collect data and enable further pressure. Energy narratives exploit economic fear. Sabotage creates insecurity. Disposable agents lower the cost of covert action. Together, these tools create an environment in which democratic decision-making becomes more vulnerable to manipulation and disruption.

Germany and the EU have achieved important progress, especially in energy diversification, cyber attribution and sanctions policy. Yet the threat remains adaptive. The next stage of counter-hybrid policy must focus on networks, not only incidents; infrastructure, not only content; prevention, not only punishment; and resilience, not only reaction. Only such an integrated approach can reduce the effectiveness of Russian hybrid influence and protect democratic stability in Germany and Europe.

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GREENLAND IN THE US NATIONAL DEFENCE STRATEGY 2026

ГРЕНЛАНДІЯ У НАЦІОНАЛЬНІЙ ОБОРОННІЙ СТРАТЕГІЇ США 2026 РОКУ

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Abstract. *The article provides a comprehensive analysis of the strategic conceptualisation of Greenland in the US National Defence Strategy 2026. It examines the transformation of the United States' approach to the Arctic region in the context of growing geopolitical competition, increased military activity by the Russian Federation and the strengthening of the economic presence of the People's Republic of China. It has been established that Greenland is institutionalised in the strategy as a 'key terrain,' guaranteed access to which is considered a component of US territorial defence and an element of continental security in the Western Hemisphere, aligning with the "Trump Corollary to the Monroe Doctrine". Using qualitative and quantitative content analysis of the strategy text, it was determined that the island is mentioned five times in the document in the context of ensuring military and commercial access to strategically important areas. This indicates that Greenland has been established as a structural element of modern American defence planning, particularly involving critical assets like the Pituffik Space Base (formerly Thule Air Base) for early warning systems. Particular attention is paid to the international consequences of this approach. The reaction of the Kingdom of Denmark, the European Union and NATO to the strengthening of the island's strategic status has been analysed. It has been found that Denmark responded by asserting its sovereign control and significantly boosting its Arctic defense spending by 12–15 billion DKK (over $1.6 billion USD) in 2026, aimed at modernizing infrastructure such as adapting civilian airports in Nuuk to support F-35 fighter jets. It is concluded that the rethinking of Greenland's role in 2026 reflects a broader process of integrating the Arctic space into national and collective security systems, which is shaping a new configuration of strategic interests in the North Atlantic.*

Keywords: *Greenland, National Defence Strategy 2026, United States, Denmark, European Union, NATO, Arctic geopolitics.*

Анотація. *У статті здійснено комплексний аналіз стратегічної концептуалізації Гренландії у Національній оборонній стратегії США 2026 року. Досліджено трансформацію підходів Сполучених Штатів до Арктичного регіону в умовах зростання геополітичної конкуренції, активізації військової діяльності Російської Федерації на Крайній Півночі, а також посилення економічної та інфраструктурної присутності Китайської Народної Республіки. Встановлено, що у стратегії Гренландія інституціоналізується як "key terrain" (ключова територія), гарантований доступ до якої розглядається як невід'ємна складова захисту території США та елемент континентальної безпеки Західної півкулі, що узгоджується із новою геополітичною доктриною – так званим «доповненням Трампа до доктрини Монро» (Trump Corollary to the Monroe Doctrine). Методом якісного та кількісного контент-аналізу тексту стратегії визначено, що острів згадується у стратегічному документі п'ять разів у контексті забезпечення військового й комерційного доступу до стратегічно важливих просторів та контролю над критичною інфраструктурою, зокрема Космічною базою Пітуффік (Pituffik Space Base, колишня авіабаза Туле), яка є найважливішим елементом раннього попередження про ракетний напад у межах NORAD. Окрему увагу приділено міжнародним наслідкам такого підходу. Проаналізовано реакцію Королівства Данії, Європейського Союзу та НАТО на посилення стратегічного статусу острова. З'ясовано, що у відповідь на американські прагнення Данія у 2026 році наголосила на суверенному контролі над островом та суттєво збільшила власні арктичні оборонні витрати на 12-15 млрд данських крон (понад 1,6 млрд дол. США), спрямовані на модернізацію інфраструктури Арктичного командування в Нууку та адаптацію цивільних аеропортів для прийому винищувачів п'го покоління F-35. Зроблено висновок, що переосмислення ролі Гренландії у 2026 році відображає ширший процес інтеграції арктичного простору до системи національної та колективної безпеки, що формує нову конфігурацію стратегічних інтересів у Північній Атлантиці та на північному фланзі НАТО*

Ключові слова*. Гренландія, Національна оборонна стратегія 2026, США, Данія, Європейський Союз, НАТО, арктична геополітика.*

Introduction. In the contemporary context of global security environment transformation, the Arctic region occupies an increasingly significant place in the strategic planning of the world's leading powers. Growing geopolitical competition, the intensification of the Russian Federation's military activities in the High North, and the strengthening of the economic and infrastructural presence of the People's Republic of China necessitate a revision of approaches to regional security and the role of Arctic space in the global system of international relations.

In this context, particular attention is drawn to Greenland as an autonomous territory within the Kingdom of Denmark, which possesses a unique geostrategetic position between North America and the Arctic. Its territory, airspace, and adjacent maritime waters play an important role in early warning, monitoring, and transatlantic security systems. Simultaneously, the island's resource potential and its location near key Arctic routes amplify its significance amidst intensifying competition for control over critically important spaces.

The US National Defence Strategy 2026 reflects the institutionalization of this approach, delineating Greenland as one of the key terrains within the security architecture of the Western Hemisphere. This document demonstrates a reorientation of United States defense planning toward ensuring guaranteed military and commercial access to strategically important spaces, which indicates the strengthening of the Arctic dimension in contemporary American strategic discourse.

At the same time, such conceptualization has a broader international resonance, as it directly relates to the US allied commitments within NATO and affects the balance of responsibility in the North Atlantic. For the European Union, which views Greenland as a partner in sustainable development and strategic resources, the strengthening of the military dimension in the region actualizes the issue of aligning security and economic priorities. Thus, the Arctic direction is increasingly integrated into the joint transatlantic agenda, combining national, European, and collective security interests.

The relevance of the study is driven by the necessity of scientific understanding of Greenland's place in the new configuration of US defense policy 2026, as well as the determination of its role in shaping the contemporary security architecture in the Arctic region and the transatlantic space as a whole.

The purpose of the study is to analyze the strategic conceptualization of Greenland in the US National Defence Strategy 2026 and its impact on US-Danish relations, EU policy, and the NATO security architecture.

Literature Review. The issues of the Arctic's strategic significance and its place in the United States' defense planning have been reflected in the works of Ukrainian and foreign researchers who analyze the transformation of American security policy in the context of growing geopolitical competition. The transformation of US foreign policy priorities under Trumpism has been the subject of research by I. S. Marchenko, who examines the reorientation of the strategic guidelines of American policy and changes in approaches to national security (Marchenko, 2025). His conclusions establish a conceptual foundation for understanding the logic of contemporary US strategic discourse.

A separate group of sources consists of strategic documents, in particular, the US National Defence Strategy 2026, which defines the priorities of American defense policy and outlines approaches to ensuring access to strategically important territories (National Defense Strategy, 2026). The analysis of this document makes it possible to identify new emphases in the conceptualization of the Arctic space and its integration into the US homeland defense system.

The issues surrounding the politico-legal status of Greenland and its autonomous position within the Kingdom of Denmark are examined in the works of A. V. Hubinko, who focuses on matters of sovereignty, autonomy, and potential scenarios for the development of relations between Denmark and the United States (Hubinko, 2025). M. P. Zan investigates Greenland as an ethnic territorial autonomy, analyzing the mechanisms of self-government implementation and the specifics of its institutional functioning (Zan, 2025).

Essential for understanding the European dimension of the issue are the regulatory and policy documents of the European Union, in particular, the Multiannual Indicative Programme for Greenland 2021–2027, which outlines the economic and institutional aspects of the island’s development (European Commission, 2021).

Despite the existence of studies on US strategic policy and the legal status of Greenland, the issue of its conceptualization specifically in the US National Defence Strategy 2026 and the analysis of the international implications of such institutionalization remain insufficiently explored, which necessitates further scientific analysis.

Main results of the research. From the perspective of the United States of America, the strategic significance of Greenland has a deep historical foundation and has evolved in line with changes in the international security environment. During World War II, following the occupation of Denmark by Nazi Germany in 1940, the United States assumed responsibility for the defense of the island based on the 1941 agreement between the US and the Danish government-in-exile (*Agreement Relating to the Defense of Greenland, 1941*). This decision was aimed at preventing the use of Greenland's territory as a staging ground for potential attacks in the North Atlantic and laid the foundation for a long-term American military presence (Tamnes, 1991).

During the Cold War, the strategic importance of the island increased significantly. The establishment of Thule Air Base (now Pituffik Space Base) transformed it into a vital element of the missile early warning and space surveillance system within NORAD (U.S. Space Force; NATO, 2022). The island's geographical location between North America and the Arctic provided control over northern air and maritime routes, which was of key significance for transatlantic security (Brady, 2017). Thus, Greenland gradually integrated into the strategic defense architecture of the United States and NATO.

In the 21st century, the island's significance has acquired new dimensions. Climate changes causing the melting of the ice sheet open up new Arctic maritime routes and increase the accessibility of previously hard-to-reach territories (IPCC, 2021; Arctic Council, 2021). In addition

to its geostrategic location, Greenland possesses substantial resource potential. Its territory hosts deposits of rare earth elements (including neodymium, dysprosium, and yttrium) that are of critical importance for the defense industry, high-tech electronics manufacturing, and the development of renewable energy. The island also contains reserves of uranium, iron ore, zinc, lead, nickel, cobalt, copper, and titanium, as well as promising deposits of graphite and lithium, which play a key role in shaping global supply chains of critical raw materials (U.S. Geological Survey, 2023; European Commission, 2023).

The prospects for developing offshore oil and natural gas deposits, despite environmental and political constraints, further amplify the strategic attention of external actors to the region. Coupled with the expansion of the Russian Federation's military activity in the High North and the economic presence of the People's Republic of China in the Arctic space, this actualizes for the United States the issue of guaranteeing access to strategically important territories and resources. It is within this context that the provisions of the US National Defence Strategy 2026 must be analyzed, where Greenland is outlined as one of the key territories of modern defense policy.

In the introductory section of the US National Defence Strategy 2026, Greenland is mentioned in the very first paragraphs of the document as one of the so-called "key terrains"—territories where access is of critical importance for the national security of the United States. Specifically, it states that upon the inauguration of US President Donald Trump in January 2025, US access to "key terrains, such as the Panama Canal and Greenland, was increasingly in doubt" (National Defense Strategy, 2026, p. 2).

The use of the term "key terrain" carries a distinct military-strategic meaning. In US military doctrine, this concept refers to territories or assets whose control or guaranteed access provides a significant operational or strategic advantage (U.S. Department of Defense, 2001). In a theoretical dimension, such conceptualization can be interpreted through the lens of securitization theory, developed by representatives of the Copenhagen School of international relations. According to this theory, security emerges not merely as a reaction to objective threats, but as a result of a discursive process within which political actors, by declaring a certain issue to be an existential threat, move it into the realm of security and legitimize the application of exceptional measures (Buzan, Wæver, & de Wilde, 1998). In this context, defining Greenland as "key terrain" in a top-level strategic document can be seen as an act of securitization that integrates the Arctic space into the US national security system and justifies the expansion of military-strategic instruments in the region.

This approach aligns with the threat assessment outlined in the strategy, particularly the rising military activity of the Russian Federation in the Arctic and the economic presence of the People's Republic of China in the region (National Defense Strategy, 2026, p. 2). The strategy directly links the growing influence of competitors in the North Atlantic and the Arctic to the risk of restricting US access to strategically important spaces, which shapes a new configuration of the regional balance of power. In this interpretation, Greenland appears not merely as a geographical object, but as an element of a deterrence system aimed at preventing external actors from establishing a foothold in key locations of the Western Hemisphere.

Further analysis of the strategy demonstrates that the issue of Greenland is not limited to the rhetoric of the introductory section, but is integrated into the primary mission of the Department of Defense to defend the U.S. homeland (Defend the U.S. Homeland). The corresponding section emphasizes the need to guarantee military and commercial access to key territories "from the Arctic to South America," explicitly highlighting Greenland alongside the Panama Canal and the Gulf of Mexico (National Defense Strategy, 2026, p. 3). This formulation demonstrates that the Arctic direction is integrated into a broader logic of continental defense, where control over strategic spaces is viewed as a prerequisite for ensuring national security.

Thus, for the first time, the Arctic space is so clearly integrated into the logic of Western Hemisphere defense, where guaranteeing access is viewed as an element of deterring competitors and preserving a strategic advantage. The document explicitly emphasizes the intention to prevent the loss of influence over "key terrain" and to ensure that the president has "credible military options" to protect US interests in the region (National Defense Strategy, 2026, p. 3). This indicates

the growing role of military-political instruments in the Arctic dimension of American strategy.

Of particular significance is the reference to the so-called "Trump Corollary to the Monroe Doctrine," which effectively updates the traditional concept of US dominance in the Western Hemisphere. In this interpretation, Greenland is viewed not merely as an Arctic region, but as part of a broader system of continental security, in which control or guaranteed access to strategic spaces serves as an instrument to prevent external influence and maintain geopolitical balance (National Defense Strategy, 2026, p. 3). Consequently, the inclusion of Greenland in the priorities of the homeland defense mission demonstrates its institutionalization as an element of the Western Hemisphere's defense architecture and confirms the trend toward rethinking the Arctic as a component of the domestic, rather than merely external, security of the United States. The quantitative component of the content analysis of the National Defence Strategy 2026 text further confirms this trend: Greenland is explicitly mentioned in the document five times, especially in the context of key provisions regarding guaranteeing military and commercial access to strategically important territories. Such frequency of mention in a top-level strategic document indicates the consolidation of the island as a structural element of modern American defense planning.

The institutionalization of Greenland as "key terrain" in the US National Defence Strategy 2026 has direct implications for the Kingdom of Denmark as a sovereign state, of which the island's autonomous territory is a part (National Defense Strategy, 2026). Although the American military presence in Greenland is based on the 1951 Defense Agreement between the US and Denmark (*Agreement Relating to the Defense of Greenland, 1951*), Washington's new strategic rhetoric in 2026 has heightened the political sensitivity surrounding sovereignty and security cooperation formats.

In 2026, official Copenhagen emphasized that the status of Greenland is determined solely by the constitutional mechanisms of Denmark and the provisions of the island's self-government; any changes in military cooperation with the US are possible only within the framework of existing bilateral agreements and in agreement with the Government of Greenland. Thus, Denmark's reaction was aimed at reaffirming sovereign control over the autonomous territory and preventing interpretations that could call into question its territorial integrity (Reuters, 2025).

Parallel to diplomatic statements, Denmark activated its own defense policy in the Arctic direction. In 2026, the government announced a significant increase in defense spending on Greenland's security; according to Danish media reports, the volume of funding is approximately 12–15 billion Danish kroner (over $1.6 billion USD) (Reuters, 2025). The planned measures include expanding the personnel of the Joint Arctic Command in Nuuk, modernizing infrastructure, and adapting one of the main civilian airports to receive fifth-generation F-35 fighter jets. Government representatives noted that during previous years, the Arctic direction had not received a sufficient level of investment, and the new decisions aim to strengthen national presence and defense capabilities in the region (Ministry of Defence of Denmark, 2023).

The European Union's response to the strengthening of US strategic rhetoric regarding Greenland in 2026 was focused on emphasizing the principles of sovereignty and stability in the Arctic region. EU institutions stressed the need to respect the territorial integrity of member states and adhere to international law in matters of security and defense. Within the Multiannual Indicative Programme for Greenland 2021–2027, the island is viewed primarily as a partner in sustainable development, education, green transformation, and strategic raw materials, rather than as an object of military-political rivalry (European Commission, 2021). Thus, the EU's approach differs from the security-centric logic of the American strategy, emphasizing multilateral governance and economic partnership as the basis for stability in the Arctic.

NATO's reaction to the strengthening of US strategic attention to Greenland in 2026 was characterized by a desire to preserve Alliance unity and avoid internal friction among allies. Since Greenland is part of the Kingdom of Denmark, a NATO member state, the issue of expanding the US military presence on the island automatically acquires a collective defense dimension. In the NATO 2022 Strategic Concept, the Arctic region is defined as a space of growing strategic competition, particularly due to the military activity of the Russian Federation (NATO, 2022).

Consequently, the North Atlantic is viewed as a critically important direction for transatlantic logistics, maritime deterrence, and air defense.

At the same time, the institutionalization of Greenland as “key terrain” in the US national strategy potentially creates tension between Washington's national defense logic and the mechanisms of collective decision-making within NATO. The Alliance operates on the basis of consensus, which requires aligning strategic moves among all member states (NATO, 2022). If the rhetoric regarding guaranteeing control over strategic territories is perceived as a unilateral initiative, it could raise concerns about maintaining the balance of powers and collective planning procedures.

A separate aspect is the risk of further militarization of the Arctic space. In 2024–2026, NATO increased its attention to the northern flank following the accession of Finland and Sweden to the Alliance, which significantly altered the geostrategetic configuration of the region (NATO, 2023). Strengthening defense capabilities in Greenland, combined with Russian activity, could lead to growing strategic competition in the North Atlantic. For NATO, this implies the need to simultaneously strengthen deterrence and prevent escalation, which complicates the balance between demonstrating force and maintaining regional stability.

Conclusions. The conducted analysis demonstrates that in the US National Defence Strategy 2026, Greenland is for the first time explicitly institutionalised as a "key terrain"—a strategically vital territory where control or guaranteed access is viewed as a prerequisite for ensuring the national security of the United States. This conceptualisation integrates the Arctic space into the logic of US homeland defence and expands the conventional understanding of continental security within the Western Hemisphere.

Greenland's strategic status is determined by a combination of its geographical location, military-infrastructural significance, and substantial resource potential. Climate change, the expansion of the Russian Federation's military activities in the Arctic, and the economic presence of the People's Republic of China intensify US focus on guaranteeing access to critically important territories. In this context, Greenland emerges not as a peripheral region, but as a structural element of the system of deterrence and preservation of strategic advantage.

At the same time, the institutionalisation of the island as part of the US defence architecture has multi-dimensional international implications. For Denmark, this implies the necessity of balancing allied commitments with the protection of the autonomous territory's sovereignty. For the European Union, it means aligning security and economic approaches to Arctic development. For NATO, it requires adapting collective defence to the new geostrategic configuration of the North Atlantic amid intensifying great power competition.

Thus, the transformation of Greenland's strategic status in 2026 reflects a broader process of rethinking the Arctic as a space where national, allied, and global security interests intersect. Further developments will depend on the ability of key actors to combine military-strategic priorities with the principles of international law and multilateral governance.

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THE EVOLUTION OF COGNITIVE WARFARE STRATEGIES IN THE FACE OF TECHNOLOGICAL PROGRESS

ТРАНСФОРМАЦІЯ СТРАТЕГІЙ КОГНІТИВНОЇ ВІЙНИ ПІД ВПЛИВОМ ТЕХНОЛОГІЧНОГО ПРОГРЕСУ

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Abstract. *Information and psychological influence have long been effective means of exerting non-traditional forms of foreign policy pressure in contemporary international relations. The latest technologies of influence are increasingly being integrated into state strategies as key instruments for advancing national interests. They are becoming high-precision weapons that paralyze the ability of democracies to mount effective resistance. Information and psychological influence operate in the intangible, cognitive dimension and are not constrained by territorial borders. World leaders have identified information and psychological warfare as a distinct pillar of foreign policy, in which information security has become a critical component of national security. The latest influence technologies are being actively integrated into state strategies as key tools for advancing national interests. Rapid technological development enables information operations on an unprecedented scale, with unprecedented speed and stealth. Due to technological progress, societies around the world have become more vulnerable to attempts at hostile influence.*

This article examines international information warfare through the lens of the concept of "cognitive warfare." It explores the conceptual foundations of cognitive warfare. The authors focus on examining the key differences between the mechanisms of information warfare and cognitive warfare. Particular attention is paid to examining the evolution of cognitive warfare due to the development of the latest information and communication technologies and technological progress. The article analyzes the key aspects of NATO's current concept of cognitive warfare and measures to counteract the negative, often unpredictable, consequences of cognitive warfare.

Key words*: cognitive warfare, information and psychological operations, propaganda, slopaganda, disinformation, cutting-edge technologies, information security, NATO.*

Анотація. *Інформаційно-психологічні впливи вже давно є ефективними засобами*

нетрадиційних форм зовнішньополітичного тиску у сучасних міжнародних відносинах. Новітні технології впливу дедалі активніше інтегруються у державні стратегії як ключові інструменти реалізації національних інтересів. Вони перетворюються на високоточну зброю, котра паралізує здатність демократій до ефективного опору. Інформаційно-психологічні впливи діють у нематеріальному, когнітивному вимірі та не потребують обмежень територіальних кордонів. Світові лідери виокремили інформаційно-психологічне протиборство у самостійний вектор зовнішньої політики, де інформаційна безпека стає вагомим елементом національної безпеки. Новітні технології впливу активно інтегруються у державні стратегії як ключові інструменти реалізації національних інтересів. Стрімкий технологічний розвиток забезпечує безпрецедентну масштабність, швидкість та прихованість інформаційних операцій. Завдяки технологічному прогресу суспільства у всьому світі стали більш вразливими до спроб ворожого впливу.

У статті розглядається міжнародне інформаційне протиборство через призму концепції «когнітивної війни». Розкриваються концептуальні основи когнітивної війни. Автори зосереджуються на дослідженні ключових відмінностей між механізмами інформаційної та когнітивної війни. Особлива увага приділяється дослідженню еволюції ведення когнітивної війни завдяки розвитку новітніх інформаційно-комунікаційних технологій та технологічному прогресу. Аналізуються акценти сучасної концепції когнітивної війни НАТО та заходи протидії негативним, часто непередбачуваним наслідкам когнітивної війни.

Ключові слова: *когнітивна війна, інформаційно-психологічні впливи, пропаганда, слопаганда, дезінформація, новітні технології, інформаційна безпека, НАТО.*

Introduction. In today's information-driven world, virtual and psychological factors of influence are gaining momentum, often pushing the traditional military component into the background. Dominance in the information environment allows an aggressor to manipulate decision-making processes while avoiding direct intervention until the target is completely disorganized. Although cognitive warfare techniques are not a new phenomenon, modern technologies have enabled an unprecedented level of ease, speed, stealth, and low cost in the dissemination of manipulative content. This makes it possible to effectively manipulate the political sentiments of the masses, making it virtually impossible to control access to these tools of influence. Modern interstate conflicts have evolved from struggles over territory to struggles over consciousness. Cognitive warfare creates the conditions for armed conflict by disorienting society and undermining the will to resist, and thanks to technological progress, societies around the world have become more vulnerable to attempts at hostile influence.

Humanity's technological advances are transforming cognitive warfare into a science aimed at undermining people's perceptions, beliefs, and views. While propaganda used to target what we think, new technologies make it possible to influence how we think, perceive reality, and respond to various influences and threats.

This requires states to move beyond simply debunking misinformation to creating technological and educational systems of cognitive defense.

The purpose of this article is to conduct a comprehensive study of the transformation of cognitive warfare strategies under the influence of rapid technological progress, particularly artificial intelligence, big data, and modern means of communication. The authors aim to analyze the paradigm shift in modern conflicts, where the human mind becomes the primary theater of operations, and to justify the need to transition to a model of societal responsibility to strengthen the national resilience of democratic states. Based on an analysis of NATO's concept of cognitive warfare and contemporary security challenges, approaches to building systemic resilience in a democratic society are proposed.

Literature review. The theoretical foundation of this work is based on the writings of domestic and foreign scholars who laid the groundwork for the study of cognitive warfare and cognitive transformations. In particular, the conceptual frameworks developed by C. Walker and J.

Ludwig enable the identification of methods used by authoritarian regimes to infiltrate democratic societies through the manipulation of the information space (Walker & Ludwig, 2017).

The works of M. Castells are essential for understanding the nature of the "information age"; he noted that virtual reality acts as an intermediary between the mass media and the masses, constructing a self-referential reality that is perceived by the individual as primary reality (Kastels, 2006).

A detailed study by Claverie D. and Cluzel F. has made it possible to view the human brain as a new battlefield, where digital technologies are being used to undermine a nation's cognitive sovereignty. The researchers also emphasize that the development of NBIC technologies (nano-, bio-, info-, and cognitive technologies) opens up opportunities for creating "enhanced soldier," turning the human mind into the ultimate battlefield. Since cognitive attacks are often invisible and global in scope, the authors stress the critical importance of building cognitive resilience and shifting from a reactive to a proactive defensive posture (Claverie & Cluzel, 2021).

Dean Hartley and Kenneth Jobson examine cognitive warfare through the lens of achieving strategic advantage through technology. They introduce the concept of "cognitive superiority." In their work, they analyze how the integration of artificial intelligence, big data, and neuropsychology enables the management of collective intelligence and allows one to outpace the adversary in the speed and quality of decision-making (Hartley & Jobson, 2021).

Among Ukrainian scholars, Georgy Pocheptsov is considered the founder of communication theory in Ukraine. His research focuses on the transition from information wars to meaning-based (cognitive) wars. Georgy Pocheptsov argues that cognitive warfare aims to change an individual's worldview, and that victory is achieved not through physical destruction, but through the erosion of identity and the imposition of foreign narratives that are perceived as one's own (Pocheptsov, 2019; Pocheptsov, 2021).

Dmytro Dubov is one of Ukraine's leading researchers who examines cognitive warfare through the lens of national security and strategic communications. He defines the primary goal of cognitive aggression as "paralysis of the will" to resist, where, through manipulation of consciousness, an entire society or a state's leadership becomes incapable of responding adequately to challenges. The researcher also emphasizes that modern technologies (social media, AI algorithms) enable cognitive influence with unprecedented precision and scale, creating "information bubbles" and exacerbating internal social divisions (Dubov, 2014; Dubov, 2015; Dubov, 2014;)

O. Moroz examines in detail the issue of "information bubbles" and changes in Ukrainians' behavior under the influence of manipulation. The author notes that an individual's immersion in closed digital ecosystems leads to the atrophy of critical thinking, which creates fertile ground for the transmission of hostile narratives through products of mass culture (Moroz, 2020).

The practical aspects of the struggle for truth and methods for countering misinformation in the digital environment are outlined in the works of D. Kuleba, who views media tools as instruments for long-term change in public consciousness (Kuleba, 2019).

O. Zaporozhets analyzes the phenomenon of hybrid warfare and defines it as a complex form of conflict in the 21st century. The researcher argues that hybrid conflicts exhibit characteristics of nonlinearity and asymmetry, and their primary effect is the creation of a parallel reality that disorients the target and undermines its ability to mount a timely counterattack (Zaporozhets, 2017).

Main results of the research. "Cognitive warfare" refers to the transformation of war into a phenomenon that is more difficult to define, study, and analyze than conventional warfare. And it is not a means or method of waging war–it is war itself (Kaarkoski, 2026).

Cognitive warfare makes it possible to avoid physical confrontation on the battlefield or the seizure of territory. It is believed that the enemy's primary objective is to wage cognitive warfare without direct armed conflict, to exert influence, and to remain in a relatively safe "gray zone" (NATO ACT, 2023).

Modern wars are no longer confined to traditional theaters of military conflict. Human consciousness and perception are becoming a new battlefield, on par with land, sea, air, space, and

cyberspace. And the struggle for cognitive superiority is emerging as a new form of conflict (Hartley & Jobson, 2021). Cognitive warfare aims to shape people's intentions, beliefs, and actions in a way that benefits the manipulator. Alongside disinformation, which is a fundamental element of cognitive warfare, propaganda, political rhetoric, information and psychological operations, and technologies designed to influence individual or societal identity play an active role.

In general, several components of influence on consciousness and the perception of objects of influence can be identified: the cognitive sphere–influence on changes in knowledge and beliefs; the emotional sphere–changes in the emotional state of an individual or society; the motivational sphere–changes in motivation and behavior (Anisimovych-Shevchuk, 2022).

The aim of influencing the cognitive sphere is to deeply interfere with decision-making and information-processing processes. Cognitive warfare differs from traditional information warfare in that it seeks to control not only the information environment but also mental processes–that is, how the target audience reacts to information. Cognitive warfare is based on an understanding of psychological and neurobiological processes, whereas information warfare takes place primarily at the level of communication and information transmission (Kaarkoski, 2026).

Unlike information warfare, which seeks to control the information environment and the media landscape, the goal of cognitive warfare is to control the mental processes and reactions of the target audience to the information presented (Bernal, Carter , Singh , Cao & Madreperla, 2020). The enemy is undermining the traditional mechanisms of national self-identification by imposing a deliberately constructed framework of values and behavioral norms, thereby eroding the agency of entire societies and elites (Anisimovych-Shevchuk, 2022).

The key distinction of cognitive warfare lies in its latent nature: it persists for years in peacetime, remaining unnoticed. Its cumulative effect becomes apparent only during a crisis, when it becomes clear that society has lost its ability to unite and resist collectively (Pocheptsov, 2019). There are many examples from around the world where cognitive warfare has lasted not for years, but for decades. The particular danger lies in the fact that, under such prolonged manipulation, those being targeted are unaware of the threat and are in no way able to defend themselves or resist these dangerous and destructive influences.

It is also important to pay attention to the targets of influence in cognitive warfare. In the system of international relations, the targets of influence may include not only decision-makers–heads of state, diplomats, political leaders, and military officials–but also entire societies or nations. Cognitive warfare is characterized by its scale, which pertains to both the prolonged duration of the timeframe and the unlimited number of targets of influence.

In addition to the effects of concealment and invisibility, cognitive warfare has an extremely dangerous objective, which consists of replacing the target's value system, penetrating their worldview, and imposing a worldview that will ensure the desired type of social and political behavior (Anisimovych-Shevchuk, 2022).

The emotional sphere is the most vulnerable target. The psychological mechanism of informational and psychological influence is based on the fact that, when a person is in an emotionally unstable state, only perception and memory function, while critical thinking is sharply reduced (Saienko, 2015). The manipulation of emotions–such as fear, anger, or outrage–is designed to suppress logic: a person overcome by strong emotions loses the ability to think critically. The main tactic here is to saturate the information environment with narratives that blur the line between reality and fiction, creating a state of cognitive overload and uncertainty (Kaarkoski, 2026). A society that has been intimidated, succumbing to the influence of misinformation and frightening facts, becomes helpless and apathetic, and its will to resist is paralyzed (Saienko, 2015). The ultimate goal of these informational and psychological influences is to systematically change the behavior of the targets. At the level of state institutions and elites, this leads to a decline in governance effectiveness, the instigation of flawed decisions, and the discrediting of the government in the eyes of the public and on the international stage. Targeted information attacks provoke an erosion of trust in democratic institutions and science (Kaarkoski, 2026). At the societal level, informational and psychological influence fosters internal fragmentation, polarization, and social

divisions. Using reflective governance techniques, the aggressor state implants artificial conflicts into the public consciousness, stokes hostility, and instigates acts of civil disobedience (Anisimovych-Shevchuk, 2022).As a result of prolonged cognitive pressure, widespread demoralization, disorientation, and neurotization of society occur, leading to the paralysis of its defensive functions, a decline in its mobilization potential, and, consequently, the erosion of its identity (Semenenko, 2025).

The mechanism of spiritual and psychological abuse is designed to distort the perception of reality in such a way that the victim perceives the distorted information as their own beliefs and acts accordingly. To achieve this goal, a comprehensive approach is used, aimed at triggering cognitive biases, stereotypes, and deep emotional reactions (Saienko, 2015).

Stereotyping is no less important. Information conveyed through the mass media always undergoes a process of categorization, simplifying complex phenomena into simplistic narratives. Stereotypes are viewed as a kind of social reflex: trigger words such as “fascists,” “threat to the West,” and so on automatically evoke a predetermined behavioral and emotional response in the public consciousness without critical reflection (Saienko, 2015).

The rapid development of information and communication technologies, which has led to sweeping transformations in all spheres of human life, has also fundamentally altered the nature of international conflicts and turned the information space into a full-fledged theater of operations. In the modern system of international relations, the effectiveness of information and psychological influence directly depends on the technological means of its dissemination. The technological dimension provides an unprecedented scale, speed, and stealth to information operations, allowing aggressor states to manipulate the cognitive sphere of the populations of other countries without crossing their physical borders (Kuchmii & Frolova, 2023).

Due to technological advances, societies around the world have become more vulnerable to attempts at hostile influence (NATO ACT, 2023). From a historical perspective, information warfare has undergone dramatic changes: from the spread of rumors and leaflets to the use of AI technologies. Cognitive warfare actively employs cutting-edge technologies to saturate the information environment with streams of narratives that undermine emotional stability or impair the ability to critically perceive reality. It is precisely humanity’s technological development that is radically changing the possibilities for influence and significantly increasing their effectiveness. In light of the development of information and communication technologies in the context of cognitive warfare, it is worth highlighting a new strategy for influencing the decision-making ability of individuals or society–“slopaganda.” This term is a neologism, but the scientific community is actively developing a conceptual analysis of this phenomenon.

“Slopaganda” refers to a combination of traditional propaganda and AI-generated slop. The term “slop” was coined as recently as 2024 to describe unwanted content generated by AI–junk news. By combining these concepts, researchers define “slopaganda” as unwanted AI-generated content disseminated with the aim of manipulating beliefs to achieve specific goals. Thanks to the development of AI, the ability to manipulate people’s minds has increased exponentially (Klincewicz, Alfano & Fard, 2025).

Despite significant similarities with propaganda in terms of their shared goal of influencing views or ideology, “slopaganda” does have certain differences. “Slopaganda” opens up new possibilities, such as targeting specific audiences and taking a personalized approach, whereas traditional media are by nature universal. (Saul, 2024). “Slopaganda” differs from traditional propaganda in terms of scale, reach, and speed of dissemination through the use of social bots and algorithmic mechanisms.

Slopaganda opens up new possibilities because it has more subtle ways of penetrating the brain. Thanks to the use of artificial intelligence, the ability to control people's minds has increased many times over (Pocheptsov, 2026). The nearly limitless possibilities offered by AI technologies–such as the repeated dissemination of manipulative narratives, disinformation, the reinforcement of stereotypes, and the manipulation of perceptions–have significantly amplified the effectiveness of cognitive warfare. We are already seeing this effect today, in contemporary examples and in modern

international relations, but we do not yet fully grasp the long-term consequences, as cognitive warfare is particularly dangerous in shaping future scenarios that are difficult to predict.

The characteristics of the concept of "cognitive warfare," its mechanisms, tools, methods, and consequences have been thoroughly researched and substantiated by scholars. Theorists often serve as the driving force, which other actors in international relations eventually join, adopting the ideas and initiatives put forward. As a result, effective collaboration takes place between theorists and practitioners at various levels, leading to effective solutions and countermeasures. Cognitive warfare as a phenomenon has existed for a very long time; research on the concept has also generated a substantial body of analytical material. At the national level, there are agencies or departments whose functional responsibilities include issues related to information and cognitive warfare. However, at the international level, within international organizations, there is a certain delay or pause in observing the realities on the ground. For example, NATO began developing the concept of cognitive warfare in 2021, and it was finalized in 2025. The aim of this concept was to establish a common understanding of the paradigm of cognitive warfare and to identify ways to enhance NATO's resilience and capabilities in countering the dangerous consequences of cognitive influence. The North Atlantic Treaty Organization considers international conflicts from the perspective of the concept of "cognitive warfare."

NATO defines the concept of cognitive warfare as an issue that affects every individual and society as a whole, not just the military (Deppe & Schaal, 2024).

NATO's concept of cognitive warfare places particular emphasis on the impact of new technologies and technological changes, which have provided the adversary with new and more effective tools that can be combined with scientific knowledge about how individuals, groups, and societies function, as well as how their behavior can be manipulated.

The Chief Scientist Research Reports (CSRRs) on cognitive warfare, in addition to analyzing the concept's essence, objectives, and targets, explore how cognitive warfare differs from traditional tools (PSYOPs, propaganda). The report states that although cognitive warfare employs elements of psychological operations, information operations, and strategic communications, it is significantly broader in scope than these. One of the key differences is its focus on fundamentally changing human behavior through advanced technologies, even without precise knowledge of the ultimate outcome of that change. Furthermore, cognitive warfare may not have a clearly defined target audience or a specific mission, but may be designed to create chaos and disruption below the threshold of open armed conflict (in peacetime). Such warfare creates a cognitive battlefield through massive interference and manipulation. The report highlights the significant role of cutting-edge technologies and acknowledges the rapid development of AI, machine learning, neurobiology, biotechnology, and social media, which act as a force multiplier (Blatny & Søndergaard, 2025).

The most important aspect of The Chief Scientist Research Reports is the identification of three main defense functions. However, it should be noted that NATO approaches cognitive warfare exclusively from a defensive standpoint and identifies the following key countermeasures:

–Weakening the adversary's capabilities. Reducing the enemy's ability to influence the behavior of allies, thereby ensuring NATO's freedom of decision-making and cognitive advantage.

–Enhancing human and technological understanding. Raising one's own cognitive capabilities (of both military leaders and data analysis systems) above the current baseline.

–Ensuring resilience. The ability of societies and armies to withstand cognitive attacks, recover quickly, and remain operational under the pressure of threats (Blatny & Søndergaard, 2025).

Countering cognitive warfare cannot be the sole responsibility of the armed forces, as cognitive warfare poses a threat to both military personnel and civilians. NATO emphasizes the need for a whole-of-government and whole-of-society approach. This requires the combined efforts of the government, civil society, academia, industry, and other stakeholders to protect democratic values. The concept emphasizes the need for a whole-of-society approach, where responsibility for safeguarding citizens' worldviews and behavior is shared among all state and civil society institutions (Kaarkoski, 2026).

Conclusions. The current framework of information policy is undergoing fundamental

changes driven by rapid scientific and technological progress and the active integration of the latest ICTs. This digital transformation is bringing about global shifts across all sectors of society, requiring a critical reassessment of current challenges and security threats. Large-scale digitalization not only transforms social processes but also creates a new risk environment, forcing state institutions to rethink traditional approaches to protecting society (Kuchmii & Frolova, 2025).

Based on an analysis of expert opinions and reports from national and international institutions, it can be concluded that countermeasures can vary significantly depending on the perspectives and worldviews of the parties involved: ranging from soft countermeasures to moderate and radical ones. Alternatively, countermeasures can be categorized by sphere: regulatory, technical, and humanitarian.

When developing recommendations to counter the negative, often unpredictable consequences of cognitive warfare, one must take into account its modernization through the use of the latest information and communication technologies, artificial intelligence, and social media. The authors offer their perspective on the implementation of priority countermeasures.

First, countering cognitive warfare requires a systematic, comprehensive approach. One-off, ad hoc measures or a focus on individual components–such as countering only fake news or disinformation–will be ineffective.

Second, although the key word in the phrase is "war," the development of strategies, measures, and countermeasures cannot be limited solely to the responsibility of the armed forces, since an armed conflict may not actually occur. Society as a whole must be involved in countermeasures.

Third, the overall level of public literacy is critically important; this can be achieved through public awareness campaigns, media literacy and digital literacy, and the development of critical thinking and emotional intelligence skills. Such efforts should begin at the national level as early as middle school; higher education institutions should review the list of required courses for graduation, promote and ensure access to specialized courses, seminars, professional development programs, etc. Particular attention must be paid to the qualifications and level of training of individuals working in the fields of information policy, information security policy, countering information influence, strategic communications, and so on.

Fourth, fostering social cohesion is a key, yet often overlooked and underestimated, task. Social cohesion is a state in which every member of society feels a shared sense of responsibility, trust, and belonging to a single community. Social unity should not be formed situationally, reactively, or spontaneously–for example, in the face of a common threat or danger. Social unity must be achieved and shaped through a combination of shared values, civic culture, justice, and trust in institutions, as well as through mutual cooperation and the pursuit of social justice.

Information and psychological influences have gradually evolved into the most comprehensive tool of foreign policy and global confrontation, whose paradigm has shifted from the physical destruction of the enemy to influencing the enemy's consciousness. Cognitive warfare has become a specific and dangerous weapon that operates in the intangible cognitive dimension. Its success is based on a deep understanding of the mechanisms of the human psyche, while the development of information and communication technologies, artificial intelligence, and social media has, in turn, radically changed the architecture of cognitive warfare. It is precisely rapid technological development that ensures the unprecedented scale, speed, and stealth of information operations. Thanks to technological progress, societies around the world have become more vulnerable to attempts at hostile influence. The consciousness of society and individual decision-makers has become the primary theater of operations, which accordingly requires democratic states to radically rethink their approaches to national security, build a resilient digital infrastructure, and ensure a high level of informational, emotional, and cognitive resilience among their own populations.

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THE MULTILEVEL ARCHITECTURE OF EU-CELAC POLITICAL DIALOGUE: INSTRUMENTS OF INTERACTION IN THE LATIN AMERICAN DIMENSION

БАГАТОРІВНЕВА АРХІТЕКТУРА ПОЛІТИЧНОГО ДІАЛОГУ ЄС-CELAC: ІНСТРУМЕНТИ ВЗАЄМОДІЇ НА ЛАТИНОАМЕРИКАНСЬКОМУ НАПРЯМІ

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Abstract. *Background. Interregional cooperation has become an increasingly important mechanism for political coordination, policy alignment and the articulation of shared interests in a more fragmented international environment. The EU-CELAC framework is a particularly illustrative case because it combines summit diplomacy, intergovernmental coordination, parliamentary interaction, expert support and the engagement of EU member states. Purpose. The article examines the multilevel architecture of political dialogue between the European Union and CELAC and identifies the principal instruments through which the EU advances its Latin American policy. Methods. The study combines institutional, structural-functional and comparative analysis with qualitative content analysis of official EU-CELAC documents, EU policy papers and relevant academic literature. Results. EU-CELAC dialogue is shown to operate through interregional, intergovernmental, supranational, parliamentary and expert-platform levels whose functions are mutually reinforcing. Summits, joint declarations, roadmaps, ministerial consultations, EuroLat, the EU-LAC Foundation, Global Gateway and Team Europe are systematised according to their political functions. The analysis also demonstrates that Spain, Portugal, France and Germany shape the intensity and thematic priorities of the partnership. Conclusions. EU-CELAC should be understood as a flexible multilevel model in which strategic framing, institutional continuity, representative legitimation and analytical support interact. Its durability depends less on any single institution than on coordination across levels and on the capacity to link political declarations with operational instruments.*

Keywords: *interregionalism; political coordination; interparliamentary interaction; EU*

foreign policy; Latin America; Global South; strategic partnership.

Анотація. *Вступ (Background). Міжрегіональні формати співпраці набувають дедалі більшого значення як механізми політичної координації, узгодження позицій і просування спільних інтересів у дедалі більш фрагментованому міжнародному середовищі. Показовим прикладом є формат ЄС-CELAC, який поєднує самітну дипломатію, міжурядову координацію, парламентську взаємодію, експертний супровід та участь держав-членів ЄС. Мета (Purpose). Статтю присвячено аналізу багаторівневої архітектури політичного діалогу між Європейським Союзом і CELAC та визначенню основних інструментів реалізації латиноамериканського напряму політики ЄС. Методи (Methods). Поєднано інституційний, структурно-функціональний і порівняльний методи з якісним контент-аналізом офіційних документів ЄС-CELAC, матеріалів інституцій ЄС та наукової літератури. Результати (Results). Встановлено, що діалог ЄС-CELAC функціонує через міжрегіональний, міжурядовий, наднаціональний, парламентський та експертно-платформний рівні, функції яких взаємно доповнюються. Систематизовано саміти, спільні декларації, дорожні карти, міністерські консультації, EuroLat, EU-LAC Foundation, Global Gateway і Team Europe за їхнім політичним призначенням. Показано, що Іспанія, Португалія, Франція та Німеччина впливають на інтенсивність і тематичні пріоритети партнерства. Висновки (Conclusions). Формат ЄС-CELAC доцільно розглядати як гнучку багаторівневу модель, у якій взаємодіють стратегічне рамкування, інституційна тяглість, представницька легітимація та аналітичний супровід. Його стійкість залежить передусім від узгодженості між рівнями та здатності пов'язувати політичні декларації з операційними інструментами.*

Ключові слова: *інтеррегіоналізм; політична координація; міжпарламентська взаємодія; зовнішня політика ЄС; Латинська Америка; Глобальний Південь; стратегічне партнерство.*

Introduction. In contemporary international relations, interregional cooperation has become increasingly prominent because it enables political dialogue, the coordination of interests and the development of common approaches to global and regional challenges. Its significance is growing as the international environment becomes more complex and traditional bilateral mechanisms are often no longer sufficient to sustain stable interaction between states and integration groupings. Interregional ties are therefore increasingly regarded not merely as an auxiliary diplomatic instrument but as a distinct level of political communication in which intergovernmental, supranational, parliamentary and expert mechanisms interact (Lavenex & Schimmelfennig, 2009).

One of the clearest examples of such a format is the political dialogue between the European Union and the countries of Latin America and the Caribbean. Its present configuration emerged gradually through a long evolution of interregional contacts, from general political interest to a more structured partnership. The establishment of CELAC was an important stage in this process, making it possible to present Latin American and Caribbean interests in a more consolidated manner in relations with the European Union (Gardini & Ayuso, 2015; Sanahuja, 2015). Since then, EU-CELAC has developed into a political platform that brings together summits, ministerial consultations, interparliamentary mechanisms, sectoral dialogues and expert forums.

The relevance of this issue has increased markedly in recent years. Intensifying global competition for influence in the Global South, the European Union's search for new models of external positioning, and changes in energy, trade and technological interdependence have renewed interest in Latin America as an important political and strategic partner. The new agenda for EU relations with Latin America and the Caribbean emphasises not only economic cooperation but also the need to deepen political dialogue, strengthen institutional coherence and consolidate long-term mechanisms of interregional interaction (European Commission, 2023). The resumption of EU-CELAC summitry in 2023 and the adoption of the 2023–2025 Roadmap demonstrated that this dimension had regained practical importance in the European Union's external strategy (Council of the European Union, 2023a, 2023b).

The purpose of the study. This article analyses the multilevel architecture of political dialogue between the European Union and CELAC and identifies the principal instruments of interaction within the Latin American dimension of EU policy.

To achieve this purpose, the study pursues four objectives: to clarify theoretical and conceptual approaches to interregional political interaction; to identify the principal levels of institutional organisation of EU-CELAC dialogue; to systematise the key instruments of political interaction within this framework; and to assess the role of individual EU member states in shaping the Latin American dimension of the Union's foreign policy.

Literature review. EU relations with Latin America have been studied extensively, but the literature tends to approach them either through the general theory of interregionalism or through specific dimensions of cooperation, including trade, normative influence, institutions and geoeconomics. A substantial body of research addresses the strategic partnership between the two regions, the evolution of their relations and the place of Latin America in EU foreign policy (Müller et al., 2017; Ayuso & Gratius, 2015). Other studies focus on the EU's normative influence, the balance between value-based and pragmatic foundations of its policy, and the transformation of political cooperation formats with countries of the region (Schwarzkopf, 2017). Yet the multilevel architecture of EU-CELAC political dialogue itself–that is, the system of interconnected levels, mechanisms and instruments through which the partnership operates–has not received sufficiently integrated treatment.

The research problem therefore lies in the fact that political dialogue between the European Union and CELAC is most often analysed through individual institutions, events or policy documents, while its internal architecture as an integrated multilevel system remains insufficiently systematised. This leaves several questions underexplored: how the different levels of political interaction relate to one another; what functional roles specific instruments of dialogue perform; and how supranational and intergovernmental elements are combined within a common partnership model. The role of individual EU member states is equally important: they operate within the Union's common external policy while retaining their own historical, political and economic interests in Latin America.

A theoretically grounded analysis of the multilevel architecture of EU-CELAC political dialogue is therefore relevant in both conceptual and applied terms. It helps to explain the mechanisms of contemporary interregionalism, reveal the organisational logic of interregional interaction, and assess how political dialogue can become an instrument for the long-term advancement of European Union interests in Latin America.

Research methods. The methodological framework combines institutional, structural-functional and comparative methods with qualitative content analysis. Applied together, these methods make it possible to examine EU-CELAC political dialogue not as a set of isolated diplomatic practices but as an integrated multilevel system comprising distinct formats of political coordination, institutional mechanisms and instruments of interaction. This methodological choice reflects the subject of the study, because the architecture of interregional dialogue requires analysis not only of individual political events and official documents but also of the relationships among levels, actors and mechanisms of cooperation.

The institutional approach provides the analytical foundation of the study. It was used to identify the organisational and political mechanisms through which interaction between the European Union and CELAC is conducted. This enabled the principal structural elements of the system to be distinguished, including EU-CELAC summits, ministerial meetings, interparliamentary mechanisms, EuroLat, the EU-LAC Foundation, and sectoral and expert formats. The approach was used not merely to describe these elements but to determine their place and function within the broader architecture of political dialogue.

The structural-functional method was applied to identify the internal configuration of the EU-CELAC multilevel model and the functional responsibilities of its individual components. It made it possible to trace how the strategic level of political agreements is connected with intergovernmental coordination, parliamentary dialogue, sectoral mechanisms and expert-analytical

support. The method therefore shifts the analysis from a description of separate elements to an explanation of the principles governing their interaction within a single model of interregional partnership.

The comparative method was employed in two dimensions. First, it was used to compare the levels of political dialogue within the EU-CELAC framework and thereby identify differences in their operation and degrees of interdependence. Second, it supported an assessment of the role of individual EU member states in shaping the Latin American dimension of EU foreign policy. This comparison shows that the multilevel architecture of dialogue is formed not only by the Union's supranational structures but also by the foreign-policy priorities of particular member states, especially Spain, Portugal, France and Germany.

Qualitative content analysis of official documents and analytical materials served as the principal empirical method. The source base includes joint declarations of EU-CELAC summits, the 2023–2025 Roadmap, European Commission communications, conclusions of the Council of the EU, European Parliament documents, and academic studies of interregionalism and contemporary EU-Latin America relations. Analysis of this corpus was used to identify the main instruments of political interaction, determine their functional purposes and trace changes in the substantive content of interregional partnership at the current stage.

At the final stage, a method of synthesis and generalisation was used to formulate conclusions regarding the structure of EU-CELAC political dialogue, the specific features of its organisation and the tendencies of its further development. Taken together, the selected methods link theoretical analysis of interregional interaction with the examination of current documentary evidence and provide an integrated understanding of the multilevel architecture of political dialogue between the European Union and CELAC.

Main results of the research. Under contemporary conditions, EU-CELAC political dialogue can be interpreted as a multilevel process of policy alignment in which several formats of interregional communication operate simultaneously. Its distinguishing feature is that interaction is not confined to periodic high-level diplomatic contacts but unfolds across several interrelated arenas. This configuration gives the EU-CELAC framework a degree of resilience and allows political engagement to continue even when summit diplomacy loses intensity or the international environment makes agreement more difficult.

Unlike bilateral models of cooperation, in which political dialogue is usually concentrated in governmental channels, EU-CELAC interaction has a broader institutional scope. Summit-level engagement, intergovernmental coordination, supranational support from EU institutions, interparliamentary interaction and continuing expert communication coexist within the same framework. The result is not an occasional venue for political consultation but a relatively integrated system in which different levels perform distinct yet complementary functions.

The interregional level occupies a leading position because it establishes the political framework for relations between the two regions. EU-CELAC summits, joint declarations and agreed roadmaps do more than signal political affinity; they also define the direction of subsequent cooperation. At this level, common approaches to major international issues are articulated, areas of cooperation are identified and the overall partnership agenda is set. Its primary function is therefore strategic orientation, while the practical content of the dialogue is supplied by other mechanisms.

The intergovernmental level performs the function of ongoing political coordination. Through ministerial meetings, diplomatic consultations and other working formats, the parties specify agreements reached at higher levels and adapt them to the current international environment. If summits provide the broad vision of the partnership, intergovernmental interaction supplies its operational continuity. In this way, EU-CELAC dialogue remains continuous rather than being reduced to declaratory statements.

The supranational level of the European Union also plays a substantial role in sustaining the model. EU institutions provide continuity in the Latin American dimension even where member states have different national priorities. Through policy communications, coordination procedures and strategic documents, the supranational level maintains the consistency of the dialogue and links

it to the Union's wider foreign-policy priorities. Multilevel interaction is thus reinforced by institutional continuity.

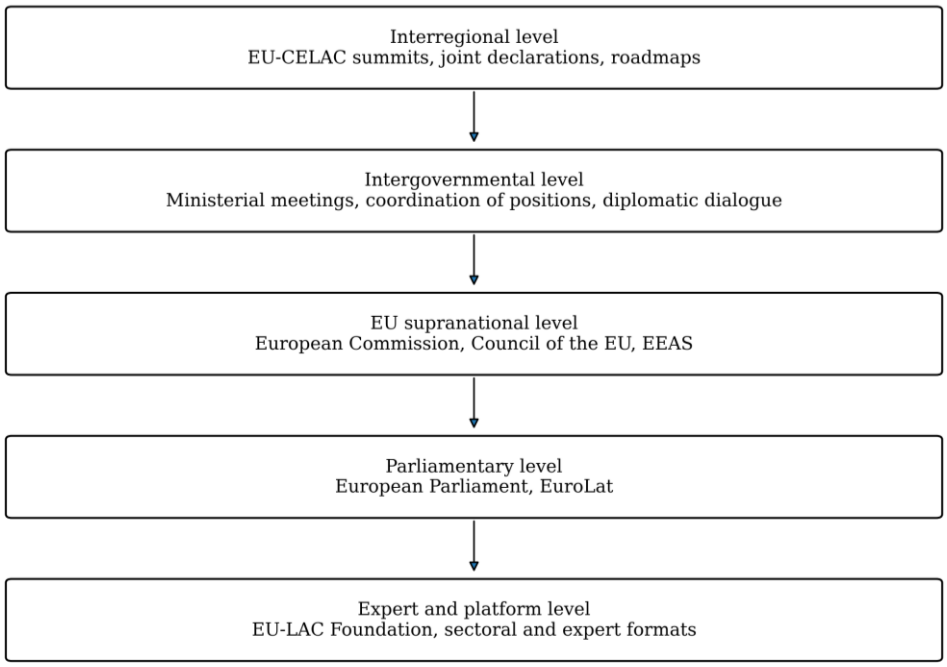
The parliamentary level performs a distinct function by broadening the political content of interregional interaction. The involvement of the European Parliament and the Euro-Latin American Parliamentary Assembly (EuroLat) brings issues of democracy, human rights, social development, environmental policy and institutional accountability onto the agenda alongside interstate coordination. This makes the dialogue more representative and provides additional political legitimacy. In this sense, the parliamentary dimension does not duplicate executive diplomacy; it complements it by widening the political reach of the partnership.

The expert and platform level is equally significant because it provides the intellectual, analytical and communicative basis for interregional dialogue. The EU-LAC Foundation, thematic platforms and expert forums facilitate continuous exchange of assessments, the preparation of analytical materials and conceptual support for the political process. This level helps preserve substantive continuity across political cycles and gives interregional interaction a more durable character.

EU-CELAC political dialogue therefore operates as a system in which strategic framing, ongoing coordination, institutional continuity, parliamentary representation and expert-analytical support are not isolated from one another but interact. Their combined operation gives the partnership structural coherence and turns it into a relatively stable mechanism of political interaction. The overall architecture is presented in Figure 1.

Figure 1

Multilevel architecture of EU-CELAC political dialogue



The multilevel model shown in Figure 1 acquires practical content through a system of institutional mechanisms that ensure continuity, coherence and political effectiveness in interaction between the European Union and CELAC. This involves more than individual EU bodies or formal channels of cooperation. Rather, it is a functionally connected set of mechanisms through which strategic orientations are developed, positions are coordinated, interregional communication is maintained, and representative and analytical support is provided.

The first functional contour concerns the strategic orientation of policy. It involves defining the general framework of EU relations with Latin America and the Caribbean, locating this

dimension within the Union's broader system of foreign-policy priorities, and politically affirming a willingness to deepen interregional interaction. At this level, the Latin American dimension is integrated into the wider logic of EU external action, including relations with countries of the Global South, strategic autonomy, the energy transition and global governance. The institutions operating within this contour set the general political direction and the overarching vision of partnership development.

The second contour comprises mechanisms of political coordination through which the approaches of member states and EU supranational institutions are aligned. Their importance is heightened by the uneven distribution of interest in Latin America within the Union. For some member states, the region is traditionally close for historical, linguistic, economic or political reasons; for others, it is a lower priority. Under these conditions, coordination mechanisms perform not only a technical but also a political function by reconciling different national interests with a common EU line within the EU-CELAC framework.

The third contour concerns programmatic and diplomatic support. It encompasses the institutional capacities through which the EU formalises regional priorities, translates political agreements into programme documents, maintains continuous dialogue with partners and preserves continuity between summits. This prevents EU-CELAC dialogue from remaining at the level of general declarations and gives it procedural, substantive and diplomatic follow-through. Particularly important within this contour is the link between EU strategic initiatives, day-to-day foreign-policy coordination and sustained communication with countries of the region.

A separate contour is the representative and legitimising dimension of the dialogue. It is formed by parliamentary mechanisms that broaden political representation, extend interregional interaction beyond executive diplomacy, and bring democratic development, human rights, social policy, environmental responsibility and institutional accountability into the agenda. The participation of the European Parliament and EuroLat strengthens the public and political character of interaction and contributes to the legitimacy of the interregional partnership.

Another important dimension consists of analytical and platform mechanisms that sustain political dialogue beyond summit and intergovernmental formats. Through the EU-LAC Foundation, expert forums, thematic platforms and analytical initiatives, the partnership receives intellectual support, substantive proposals and a permanent channel of communication between the regions. This contour allows common experience to accumulate, long-term approaches to be developed and strategic continuity to be preserved even during periods of political turbulence.

Accordingly, the institutional mechanisms supporting EU-CELAC political dialogue can be understood as an interconnected system of strategic orientation, political coordination, programmatic and diplomatic support, representative legitimation and analytical support. Together, these contours give coherence to interregional interaction and help explain why the EU-CELAC framework retains political viability in a changing international environment. The main institutional mechanisms are summarised in Table 1.

Table 1

Institutional mechanisms supporting EU-CELAC political dialogue

Institutional mechanism	Main role	Functional dimension	Significance for EU-CELAC dialogue
European Council	Defines the general political orientations of EU foreign policy	Strategic orientation	Establishes the overarching framework for EU relations with Latin America and the Caribbean

Institutional mechanism	Main role	Functional dimension	Significance for EU-CELAC dialogue
Council of the European Union	Coordinates member-state positions and develops a common political line	Political coordination	Aligns national interests with common EU policy within the EU-CELAC framework
European Commission	Develops strategic initiatives, communications and cooperation programmes	Programmatic and policy support	Gives the Latin American dimension substantive direction and operational content
European External Action Service	Maintains diplomatic interaction and day-to-day foreign-policy coordination	Diplomatic support	Ensures continuity of political dialogue between the EU and CELAC
European Parliament	Provides political representation and parliamentary scrutiny	Representative and legitimising	Strengthens the public and political legitimacy of the interregional partnership
EuroLat	Provides interparliamentary discussion of shared political and societal issues	Representative and legitimising	Broadens the political content of dialogue and maintains a permanent interparliamentary channel
EU-LAC Foundation	Provides analytical, communication and expert support for cooperation	Analytical and platform support	Preserves substantive continuity and provides an intellectual foundation for dialogue

Within this system of institutional support, EU-CELAC political dialogue is implemented through a set of specific instruments that differ in level, content and functional purpose. Whereas institutional mechanisms provide continuity and organisational structure to the interregional partnership, the instruments of political interaction determine the concrete forms through which positions are coordinated, a common agenda is developed and the political priorities of the parties are advanced. It is through these instruments that the multilevel EU-CELAC framework acquires practical expression.

EU-CELAC summits occupy the central place in this system because they define the overall political horizon of the interregional partnership. Within the summit format, the parties not only demonstrate their willingness to cooperate but also articulate common approaches to key international issues, identify priority areas of interaction and establish a strategic vision for the future of the relationship. Summits perform a political-framing function by setting the general direction of the partnership, but their significance extends beyond symbolism: they create the political basis for subsequent coordination mechanisms.

Joint declarations are the next major instrument. They consolidate agreements reached by the parties and reflect the degree of political consensus between the European Union and CELAC countries. Their importance lies in their simultaneous political, normative and communicative functions. Declarations give interregional dialogue an officially recorded substantive basis and turn agreed positions into publicly articulated reference points. In this sense, they contribute to the stability of the partnership by maintaining continuity between different stages of political

interaction.

Roadmaps are more operational in character. They translate broad political agreements into more specific mechanisms for subsequent interaction. Their core function is to operationalise the interregional agenda by specifying events, areas of activity and forms of coordination that sustain dialogue between summits. Roadmaps therefore create procedural continuity and reduce the risk that interregional commitments will remain at the level of declaratory intent.

Ministerial meetings and diplomatic consultations play an important role in maintaining day-to-day dialogue. Unlike summit-level interaction, which sets the strategic framework, these formats provide regular political contact, the alignment of approaches to international and regional issues, and adaptation of the partnership to changes in the external environment. They give interregional interaction an operational dimension and ensure continuity of political dialogue outside high-level meetings.

Interparliamentary interaction, particularly through EuroLat, adds a distinct instrumental dimension. Its importance lies not only in broadening the representative component of the partnership but also in incorporating a wider range of political and societal issues into the interregional agenda. Parliamentary dialogue gives EU-CELAC interaction additional legitimacy and moves the partnership beyond purely governmental coordination. In this way, the parliamentary instrument strengthens the public dimension of interregional dialogue.

Expert-analytical and platform instruments, especially those associated with the EU-LAC Foundation, are equally important. They help preserve substantive continuity in the partnership, develop analytical approaches, accumulate expert knowledge and create a communication environment for regular exchange of assessments. These instruments support the strategic continuity of dialogue and provide an intellectual basis for subsequent political decisions.

Under contemporary conditions, the EU's toolkit in Latin America is also complemented by broader strategic initiatives, notably Global Gateway and Team Europe. Although neither is confined to the EU-CELAC framework, in practice they reinforce interregional interaction by linking political dialogue with programmatic, investment and infrastructure cooperation. They should therefore be regarded as part of the contemporary instrumental environment in which political coordination is increasingly connected to long-term practical projects.

Taken together, EU-CELAC instruments of political interaction form a multicomponent system in which strategic framing, normative consolidation of agreements, ongoing diplomatic coordination, parliamentary representation and expert-platform support are mutually reinforcing. This functional differentiation allows the partnership to combine political visibility, procedural continuity and substantive depth. The principal instruments and their functions are summarised in Table 2.

Table 2

Instruments of EU-CELAC political interaction and their functions

Instrument of interaction	Political content	Primary function	Significance within EU-CELAC
EU-CELAC summits	Articulate shared political priorities and strategic orientations	Strategic framing of interregional dialogue	Set the overall direction of relations between the two regions
Joint declarations	Provide normative and political consolidation of agreed positions	Formalisation of agreements	Reflect the level of political consensus and the priorities of cooperation

Instrument of interaction	Political content	Primary function	Significance within EU-CELAC
Cooperation roadmaps	Specify subsequent steps, events and thematic areas of interaction	Operationalisation of the interregional agenda	Ensure procedural continuity of political dialogue between summits
Ministerial meetings and diplomatic consultations	Coordinate current approaches to international and regional issues	Maintenance of continuous political coordination	Enable the partnership to adapt to changes in the international environment
EuroLat	Provides interparliamentary discussion of political, social and societal issues	Representative broadening of political dialogue	Gives the partnership additional political legitimacy
EU-LAC Foundation	Provides expert-analytical and communication support for interregional interaction	Intellectual and platform support for the partnership	Promotes substantive continuity and the development of common approaches
Global Gateway	Connects the EU's political, economic and infrastructure initiatives towards the region	Strategic renewal of EU engagement instruments in Latin America	Strengthens the practical dimension of cooperation and links dialogue to long-term projects
Team Europe	Coordinates the resources of EU institutions and member states in external action	Greater coherence of joint action	Links political dialogue with programme and investment cooperation

An important element of the multilevel architecture of EU-CELAC political dialogue is the role of individual EU member states. This dimension demonstrates that the Latin American strand of EU policy is shaped not only by supranational institutions and interregional mechanisms but also by the national priorities, historical ties and foreign-policy strategies of individual European states. Multilevel dialogue therefore refers not only to the coexistence of different institutional levels but also to the interaction between common EU policy and the national diplomatic, economic and political agendas of its members (Müller et al., 2017; Sanahuja, 2015).

Spain has traditionally played the most visible role in developing the Latin American dimension. This reflects not only its historical, cultural and linguistic ties with most countries in the region but also Madrid's long-standing ambition to act as one of the principal intermediaries between Latin America and European institutions. Spain has for many years been among the strongest advocates of a more intensive interregional dialogue, thereby giving the Latin American dimension of EU policy additional political weight. Within EU-CELAC, its role is particularly evident in sustaining the political visibility of the partnership, keeping Latin America on the EU-wide agenda and promoting interregional formats of cooperation (Gardini & Ayuso, 2015; Ayuso & Gratius, 2015).

Portugal also makes a significant contribution, although of a somewhat different character. Whereas Spain's engagement rests on broad historical and cultural ties with the region as a whole, Portugal attaches particular importance to Brazil and to maintaining political and economic links

across the Portuguese-speaking world. Portuguese participation in the Latin American dimension of EU policy is therefore often more selective but remains strategically important. It strengthens intra-European support for interregional dialogue and helps maintain EU interest in cooperation with key Latin American actors (Sanahuja, 2015).

France occupies a distinct position by linking its interest in Latin America to a broader conception of its global role. French policy in the region does not possess the same historical depth as that of Spain or Portugal, but it is informed by a strategic understanding of Latin America's relevance to multipolarity, climate policy, security and cooperation with countries of the Global South. France's presence in the Caribbean constitutes an additional factor shaping this interest. As a result, Paris tends to view EU-CELAC dialogue not merely as a regional policy track but as part of a wider strategy for Europe's external positioning (Müller et al., 2017; European Commission, 2023).

Germany follows a more pragmatic approach. Its interest in Latin America is associated primarily with economic cooperation, technological modernisation, access to raw materials, the energy transition and prospects for partnership in the green economy and digital transformation. German engagement does not always carry the same political symbolism as Spain's, yet it has an important influence on the substantive agenda of contemporary EU-CELAC dialogue. Through Germany's priorities, interregional interaction is increasingly connected with investment, technology, energy and strategic economic interdependence (European Commission, 2023; Heldt, 2023).

Other EU member states also contribute to the Latin American dimension, although their roles are generally less system-shaping. They support particular areas of bilateral or sectoral cooperation and participate in parliamentary, economic or thematic formats without setting the overall political tone of the partnership. This uneven pattern of engagement is characteristic of EU policy towards the region: Latin America is not equally important to all member states, and the development of the interregional relationship therefore depends to a considerable extent on actors with a direct interest in sustaining it (Müller et al., 2017; European Parliamentary Research Service, 2025).

The interaction between national and supranational dimensions is therefore of particular significance. Member states do more than complement EU policy with their own initiatives; they influence the dynamics of interregional dialogue by promoting specific issues, sustaining the political relevance of Latin America within the Union and bringing concrete foreign-policy interests into the common framework. At the same time, supranational institutions provide a degree of coherence to this plurality of interests by incorporating them into a common EU policy towards Latin America. The multilevel architecture of EU-CELAC dialogue is thus sustained not only by vertical interaction among levels of governance but also by the horizontal combination of member states' national foreign-policy trajectories (Lavenex & Schimmelfennig, 2009; Müller et al., 2017).

Accordingly, the role of EU member states in the Latin American dimension is not limited to participation in the Union's common policy; they also shape its political dynamics, thematic priorities and intensity. The activism of individual states provides additional momentum to EU-CELAC relations and makes the multilevel architecture more flexible and adaptive. Member states should therefore be regarded not as peripheral actors but as one of the system-forming elements of contemporary political dialogue between the European Union and CELAC.

The role of selected EU member states in developing the Latin American dimension of Union policy is summarised in Table 3.

The analysis as a whole supports the conclusion that EU-CELAC political dialogue functions as a multilevel system whose durability depends not on a single instrument or institution but on their combination. Interaction among strategic direction, ongoing political coordination, programmatic and diplomatic support, the parliamentary dimension and expert-analytical platforms creates a model of interregional partnership capable of maintaining its viability in a changing international environment (Gardini & Ayuso, 2015; Müller et al., 2017).

Table 3

Role of selected EU member states in developing the Latin American dimension of EU policy

EU member state	Main vector of engagement	Key political priorities	Significance for EU-CELAC
Spain	Political mediation between the EU and Latin American countries	Maintaining high political visibility of the region on the EU agenda and deepening interregional dialogue	Acts as one of the principal advocates of the Latin American dimension within the European Union
Portugal	Cooperation with Brazil and the Portuguese-speaking world	Sustaining strategic EU interest in key regional actors and supporting political and economic interaction	Strengthens intra-European support for the interregional partnership
France	Links regional interest to a broader global strategy	Climate policy, security, cooperation with the Global South and the Caribbean dimension	Treats EU-CELAC as part of a broader strategy of European external positioning
Germany	Pragmatic engagement focused on economic and technological issues	Investment, energy transition, green economy, digital transformation and access to raw materials	Provides the EU-CELAC dialogue with economic and technological substance
Other EU member states	Sectoral or episodic participation in bilateral and thematic formats	Support for selected political, parliamentary, economic or thematic areas of cooperation	Complement common EU policy but do not determine the overall dynamics of the interregional framework

A distinctive feature of EU-CELAC is that it cannot be reduced to classical intergovernmental diplomacy. In contrast to narrower models of foreign-policy interaction, the political process unfolds simultaneously along vertical and horizontal dimensions. The vertical dimension encompasses interaction among summit, intergovernmental, supranational, parliamentary and expert levels. The horizontal dimension arises from the interaction between common EU policy and the national foreign-policy interests of member states, which assign different levels of importance to Latin America in their own international strategies (Lavenex & Schimmelfennig, 2009; Sanahuja, 2015).

The multilevel architecture consequently displays several defining characteristics. First, it is functionally differentiated: different levels and instruments perform distinct tasks and complement rather than duplicate one another. Second, it combines institutional continuity with political flexibility, allowing the partnership to adapt to changing international circumstances. Third, it rests on the interaction of supranational and national dimensions, which preserves not only the formal structure but also the political dynamism of EU-CELAC relations. These features distinguish it from less structured forms of interregional interaction.

At the same time, the analysis shows that the effectiveness of this architecture depends on the parties' ability to maintain connections among the different levels of dialogue. Where strategic decisions are not followed by coordination, parliamentary, sectoral and expert mechanisms, the partnership risks remaining largely declaratory. By contrast, institutional continuity, sustained member-state interest and substantive follow-through allow EU-CELAC to function both as an instrument for advancing EU interests in Latin America and as a platform for developing common

responses to global challenges (European Commission, 2023; Council of the European Union, 2023a, 2023b).

The findings therefore support an understanding of EU-CELAC political dialogue as an integrated multilevel structure combining strategic framing, institutional provision, instrumental diversity and the political involvement of member states. Together, these factors shape the contemporary model of interregional interaction between the European Union and the countries of Latin America and the Caribbean and influence its prospects for further development.

Conclusions. The study demonstrates that, under contemporary conditions, political dialogue between the European Union and CELAC extends beyond traditional intergovernmental diplomacy and operates as a complex multilevel model of interregional interaction. Whereas much of the literature examines EU-Latin America relations through individual institutions, foreign-policy documents or specific political initiatives, the present analysis shows the value of treating EU-CELAC as a system that combines strategic framing, political coordination, parliamentary representation, expert-analytical support and member-state participation in a common political process. In this respect, the findings are consistent with broader theoretical approaches to interregionalism and external governance while refining them through the analysis of a specific interregional framework (Lavenex & Schimmelfennig, 2009; Gardini & Ayuso, 2015).

One issue remains open to debate: the extent to which the multilevel architecture of EU-CELAC dialogue is a source of strength and the extent to which it complicates interregional interaction. On the one hand, several interconnected levels provide resilience during periods of political turbulence. If one level temporarily loses intensity, other mechanisms can preserve continuity of communication; this helps explain the relative viability of EU-CELAC even during periods when summit diplomacy was less active. On the other hand, multilevel interaction creates greater dependence on coherence among the components of the system. If strategic commitments, intergovernmental coordination, parliamentary dialogue and practical instruments become disconnected, the partnership may acquire a predominantly declaratory character (Müller et al., 2017; Council of the European Union, 2023a).

The findings also clarify the role of institutional mechanisms in the operation of the framework. These mechanisms should not be viewed merely as a collection of structures engaged in political interaction but as a functionally differentiated system in which each contour performs a distinct task. This is one of the defining characteristics of EU-CELAC dialogue: it is sustained not by a single centre of decision-making but by a network of interconnected mechanisms. Such a model enhances adaptability but simultaneously raises the requirements for political coordination and substantive follow-through. This is particularly important as EU-Latin American relations increasingly encompass not only political dialogue in a narrow sense but also energy, digital transformation, infrastructure, climate policy and global governance (European Commission, 2023; Heldt, 2023).

The role of EU member states also deserves particular attention. EU policy is often conceptualised primarily as a supranational process, yet EU-CELAC shows that national foreign-policy strategies continue to matter. Spain, Portugal, France and Germany not only attach different degrees of importance to Latin America but also contribute different political content to the interregional partnership. The architecture is therefore formed simultaneously from above, through EU institutions, and from below, through member-state activism. This dual logic is a major source of the framework's flexibility (Sanahuja, 2015; European Parliamentary Research Service, 2025).

The analysis further supports a broader conclusion: EU-CELAC retains strategic value for both sides because it combines symbolic and practical dimensions. The symbolic dimension is expressed through summits, declarations and public reaffirmations of partnership. The practical dimension is sustained by roadmaps, ministerial formats, parliamentary mechanisms, expert platforms and strategic initiatives that connect political coordination with investment and programme cooperation. When these dimensions become disconnected, the interregional format loses part of its political effectiveness; when they remain linked, the partnership can serve not only as a venue for diplomatic dialogue but also as an instrument of long-term EU foreign-policy

positioning in the region (Council of the European Union, 2023b; European Commission, 2023).

The study therefore establishes that EU-CELAC political dialogue is best understood as a multilevel system in which interregional, intergovernmental, supranational, parliamentary and expert-platform levels interact. Their combination creates an integrated model of political interaction that gives the partnership between the European Union and the countries of Latin America and the Caribbean a degree of continuity and stability.

The institutional mechanisms that support this dialogue perform complementary rather than isolated functions. Some provide strategic direction; others coordinate positions, ensure diplomatic continuity, contribute political legitimation or supply analytical support. The effectiveness of EU-CELAC therefore depends less on the activity of any single institution than on the coherence among different elements of the system.

The instruments of political interaction within EU-CELAC are also functionally differentiated. Summits, declarations, roadmaps, ministerial consultations, EuroLat, the EU-LAC Foundation, and contemporary initiatives such as Global Gateway and Team Europe create a complex instrumental environment combining symbolic, normative, coordination and practical dimensions of cooperation.

EU member states remain one of the system-forming factors in the development of the Union's Latin American policy. Their involvement goes beyond formal participation in the common foreign policy and affects the intensity, thematic priorities and political dynamics of the interregional partnership. EU-CELAC can therefore be understood as a model in which supranational and national dimensions do not oppose one another but jointly shape the architecture of dialogue.

The practical significance of the findings lies in the systematisation of contemporary mechanisms of EU political interaction with the countries of Latin America and the Caribbean. They can inform further research on interregionalism, EU foreign policy and the transformation of the Union's relations with the Global South. A promising direction for future research is the assessment of the effectiveness of individual EU-CELAC instruments in specific sectors of cooperation, particularly energy, digital policy, the climate agenda and investment.

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PANDA DIPLOMACY IN SINO-AMERICAN RELATIONS

ПАНДА-ДИПЛОМАТІЯ У КИТАЙСЬКО-АМЕРИКАНСЬКИХ ВІДНОСИНАХ

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***Abstract**. The term "panda diplomacy" refers to an international practice in which China gifts or leases giant pandas to foreign nations. Panda diplomacy is evaluated as an instrument of the PRC's soft power and public diplomacy. The study employed methods of content analysis, institutional analysis, and trend analysis. The establishment of regulatory norms for panda hunting allowed China to implement "panda diplomacy" for the first time in modern history at the end of 1941. The development of Sino-American relations has acted as a driver for the evolution of panda diplomacy. In 1972, on the occasion of the first high-level meeting between the leaders of the USA and the PRC, animals were exchanged as gifts, resulting in pandas settling in Washington for the first time. In the 2010s, tensions in relations between the PRC and the USA began to grow, which led to delays in decisions by the Chinese side regarding the extension of panda leases. China transformed its approach, focusing even more on subnational diplomacy. The cases of New York and California serve as examples of the transformation in the approach to actualizing panda diplomacy in American politics. The deterioration of relations at the interstate level caused the early recall of pandas from Washington; instead, the Chinese government emphasized relations with the state of California by leasing pandas to the San Diego Zoo. Prior to the 2024 US presidential election, China sent two pandas on lease to the capital's zoo. The intensification of political competition at the national level between the USA and the PRC has led to the repurposing of panda diplomacy into a tool of subnational diplomacy. The 2024 US presidential elections demonstrated that China's choice of panda placement within a single country is politically motivated and aims to encourage local stakeholders to support cooperation with mainland China, regardless of the state of relations at the interstate level.*

***Keywords**: panda diplomacy, giant pandas, subnational diplomacy, paradiplomacy, public diplomacy, track II diplomacy, Sino-U.S. relations, PRC.*

***Анотація**. Термін «панда-дипломатія» слугує для позначення міжнародної практики,*

за якої Китай дарує або надає в оренду гігантську панду іноземній державі. Панда-дипломатія оцінюється як інструмент м'якої сили та публічної дипломатії КНР. У процесі дослідження були застосовані методи контент-аналізу, інституційного аналізу та трендового аналізу. Встановлення регуляційних норм полювання на панд дозволило Китаю вперше у новітній історії реалізувати «панда-дипломатію» наприкінці 1941 року. У 1972 році з нагоди першої зустрічі високого рівня між лідерами США та КНР відбувся обмін тваринами як подарунками, у результаті чого у Вашингтоні вперше оселились панди. У 2010-х роках напруга у відносинах між КНР та США почала зростати, що вплинуло на затягування рішень китайською стороною про продовження оренди панд. Китай трансформував свій підхід, ще більше зосереджуючись на субнаціональній дипломатії. Прикладами трансформації підходу до актуалізації панда-дипломатії в американській політиці виступають кейси Нью-Йорка та Каліфорнії. Погіршення відносин на міждержавному рівні спричинило дострокове відкликання панд із Вашингтона, натомість китайський уряд зроби акцент на відносинах із штатом Каліфорнія, надавши в оренду панд для зоопарку Сан-Дієго. До президентських виборів у США 2024 року Китай відправив в оренду дві панди для столичного зоопарку. Розвиток китайсько-американських відносин виступив драйвером еволюції панда-дипломатії. Загострення політичної конкуренції на національному рівні між США та КНР призвело до перепрофілювання панда-дипломатії в інструмент субнаціональної дипломатії. Президентські вибори 2024 року у США продемонстрували, що обрання Китаєм місця розміщення панд в межах однієї країни є політично вмотивованим і має на меті заохочення місцевих стейкхолдерів до підтримки співпраці з материковим Китаєм, незалежно від стану відносин на міждержавному рівні.

***Ключові слова**: панда-дипломатія, гігантські панди, субнаціональна дипломатія, парадипломатія, публічна дипломатія, дипломатія «другого треку», китайсько-американські відносини, КНР*

Introduction. Giant pandas inhabit exclusively the mountainous bamboo forests of central China, rendering the species unique to the rest of the world. The term 'panda diplomacy' refers to an international practice whereby China gifts or leases giant pandas to foreign nations. The leasing or return of a panda is regarded as a diplomatic gesture that reflects Beijing's assessment of the current state of bilateral relations. Consequently, panda diplomacy is regarded as an instrument of the People's Republic of China's (PRC) soft power and public diplomacy. The relevance of studying this phenomenon is reinforced by the global trend toward expanding the network of leased pandas. The significance of panda diplomacy for U.S.-China relations is further underscored by the fact that the leasing of "bamboo bears" are included in the agendas of heads of state.

The purpose of the article is to trace the evolution of the methods employed by the Chinese state in utilizing giant pandas within its diplomatic relations with the United States. Additionally, this paper seeks to determine the contemporary role of panda diplomacy in PRC-U.S. relations, both at the interstate level and within the framework of subnational diplomacy between regions.

Literature Review. In 2013, environmentalists from the University of Oxford (*Buckingham et al., 2013*) concluded that, beyond the interests of conserving the giant panda species, panda diplomacy is implemented to achieve strategic political objectives. The aforementioned authors argue that panda lease agreements can be understood as a manifestation of *guanxi* in China's bilateral relations with countries that have signed free trade agreements with the PRC or contracts for the supply of natural resources and technology to the Middle Kingdom. The shared stewardship of this unique species is intended to strengthen ties by elevating them to a personalized level characterized by trust, loyalty, and long-term cooperation.

The economic impact of panda diplomacy on bilateral trade has been a subject of scholarly investigations. Notably, a comprehensive statistical study by Jin, Kang, and Lu (*2022*) titled "China's Panda Diplomacy: The Panda Effect on International Trade" which demonstrates a significant correlation between the commencement of a panda lease and a subsequent surge in exports from Sichuan Province to the host country. The findings reveal a distinct sequence in this

trade expansion: the growth is initially driven by Chinese state-owned enterprises (SOEs), followed by a gradual increase in exports from private sector firms. A similar conclusion is reached by Mattia Longhi and Caterina Morelli (*2025*) in their study, "The Role of Chinese Panda Ambassadors in International Trade". They argue that Chinese exports to a host country experience a notable surge following the birth of a panda cub. This event serves as a powerful signal of successful cooperation in species conservation, which, in turn, fosters a substantial strengthening of bilateral ties and economic exchange.

Roi Nan (*2026*), in the article 'From pandas to palaces: A soft power analysis of China's cultural diplomacy through panda diplomacy and television drama,' argues that panda diplomacy serves as a core component of China's broader soft power strategy. Nan asserts that the primary objective of this practice is to construct a national identity centered on trustworthiness and a commitment to peace. In this regard, Aranceta-Reboredo (*2022*) advocates "What About the Animals? A Case Study Comparison Between China's Panda Diplomacy and Australia's Koala Diplomacy" for a paradigm shift in "non-human" diplomacy, calling for a transition from viewing animals as mere diplomatic objects, whose inherent interests are often ignored, to treating them as diplomatic subjects.

To date, no specific studies by Ukrainian authors dedicated to the issue of panda diplomacy have been identified.

Methods. The methodological framework of this study is grounded in the prism of soft power within international relations. The research employs the following methods: content analysis of historical sources, official statements, and public speeches by high-ranking officials responsible for foreign policy decision-making, aimed at reconstructing public discourse and identifying political priorities inherent in state actors' strategies; institutional analysis to assess the activities of organizations and institutions responsible for Sino-American relations; and trend analysis to track modifications made by the Chinese side to the mechanisms of panda diplomacy practices.

Main results of the research. In the 1930s, the hunting of pandas in their natural habitats within the mountainous regions of the Chinese provinces of Sichuan, Shaanxi, and Gansu remained entirely unregulated. This lack of oversight was exploited by missionaries from the United States and Europe, who sought to profit from the sale of these exotic bears to Western zoos. The first panda from China arrived in the United States in 1936, housed at the Chicago Zoo. A year later, the zoo's collection was augmented by another black-and-white bear; subsequently, two more pandas were acquired by the Bronx Zoo in New York. However, the lifespan of these pandas in captivity did not exceed a few years; Mei Mei, in Chicago, lived the longest, surviving until 1942. In 1940 and 1941, both giant pandas at the Bronx Zoo passed away, prompting the zoo's administration to seek new specimens. By that time, however, China's ruling party, the Kuomintang, had issued a ban prohibiting foreigners from hunting pandas.

The establishment of regulatory norms enabled China to implement "panda diplomacy" for the first time in modern history. Madame Chiang Kai-shek (Soong Mei-ling), the wife of the Kuomintang leader, gifted two pandas to the United States as a diplomatic gesture of solidarity between the two nations amidst the backdrop of World War II. To capture the pandas in their natural habitat, a team of seventy hunters and forty hunting dogs was assembled; within six weeks, they successfully captured two panda cubs (*1941 Graham's Giant Panda Hunt*). In late 1941, an official presentation ceremony was held at the Bronx Zoo, where the two Chinese bears were gifted in the presence of the Chinese Consul, Dr. Tsune-chi Yu

In May 1958, press attention was captured by the U.S. State Department's decision to deny the entry of a panda purchased for the Bronx Zoo by Austrian animal dealer Heini Demmer and New Jersey animal importer Frederick Zeehandelaar. The purchase price was set to be the highest the zoo had ever paid ($25,000, which, adjusted for purchasing power, is equivalent to over $260,000 as of 2026). Despite the intervention of CIA Director Allen Dulles to facilitate the matter, the panda was denied entry onto American soil due to a U.S. Treasury Department ban on the import of any goods from the People's Republic of China, aimed at preventing communist China from accessing American currency. Writing for The New York Times, journalist Murray Schumach noted

with slight irony that the Bronx Zoo "is clinging to a hope that the State Department may concede that the admission [of the panda Chi Chi] would not be a victory for international communism" (*Schumach, 1958*). However, the State Department, led at the time by John Foster Dulles, brother of Allen Dulles, upheld the Treasury Department's position (*CIA and Panda Diplomacy, 2015*).

Ultimately, the female Chi Chi embarked on a European tour through Frankfurt, Copenhagen, and Berlin, finally settling in London, where she lived until her natural death in 1972 without producing offspring. During her time in the British capital, Chi Chi was chosen as the model for the World Wildlife Fund emblem (*WWF's History…*)

In February 1972, U.S. President Richard Nixon and First Lady Pat Nixon conducted a landmark visit to the PRC, symbolizing the end of Communist China's international isolation. Among other gifts for the Chinese side, the Nixons brought two musk oxen named Milton and Matilda from the San Francisco Zoo (*2 Musk Oxen…, 1972*). In turn, as part of the visit's itinerary, the First Lady visited the giant pandas at the Beijing Zoo. According to the Richard Nixon Foundation, during a formal dinner with PRC Prime Minister Zhou Enlai, the First Lady commented on photos of the pandas, saying, "Aren't they cute? I love them" to which her counterpart responded by promising to gift some (*50 Years of "Panda-monium", 2022*). Ironically, the gifted pandas arrived in the United States less than two months later via the airport named after John Foster Dulles, the very man who had blocked the import of Chi Chi during his lifetime. The Nixons personally selected the Smithsonian National Zoological Park in Washington, D.C., as the home for Ling-Ling and Hsing-Hsing. On April 16, 1972, an official welcoming ceremony was held at the zoo, featuring consecutive translation into Chinese and attended by over 20,000 visitors. In his speech, the Chinese Consul noted that the pandas served as a "symbol of friendship between the peoples of the PRC and the U.S." (*First Lady Pat Nixon…, 2022*). During the first year, over one million Americans visited the zoo to see the pandas.

The pandas' offspring did not survive. Ling-Ling passed away in 1992, followed by Hsing-Hsing in 1999. The fate of the musk oxen was more complicated and briefer: in the warm climate of Beijing, the animals, accustomed to a naturally cold environment, developed health issues, leading to their presumed death three years later in 1975. The United States learned of Milton's death following a personal visit to the Beijing Zoo on March 16, 1975, by the U.S. Envoy to China, George H.W. Bush. In his 1976 correspondence, Bush inquired whether it was true that "Matilda the Musk Ox has joined Milton in heaven?" (*Bush, 2014, pp. 220-255*).

In 1982, China abolished the practice of gifting pandas, replacing it with a leasing framework. The first panda lease agreement was reached in 1984: Yong Yong and Ying Xin from the Beijing Zoo resided at the San Francisco Zoo for three months during the Olympic Games hosted by the United States (*Beyond 'panda diplomacy'…, 2013*). Subsequently, this pair toured for more than four years, appearing as guests at 14 zoos.

In 1993, under pressure from international conservation organizations, relevant Chinese associations adopted a new model for overseas panda leases. The terms of the agreement required a ten-year duration, during which local scientists and their Chinese counterparts would conduct joint research on the species. Under this model, the pandas and any subsequent offspring remain the property of the People's Republic of China. Furthermore, the host country is required to pay an annual fee of $1 million to support species conservation within its natural habitat, and any cubs born in captivity are to be repatriated to China at the age of four to participate in breeding programs.

The first long-term lease under these regulations was granted to the San Diego Zoo (California) in 1996. The turn of the century was marked by difficult challenges in bilateral relations that threatened to terminate the practice of panda diplomacy. In 1999, following the NATO airstrike on the PRC Embassy in Belgrade, the Chinese side suspended negotiations regarding panda leases for zoos in Atlanta and Washington, D.C. However, both agreements were eventually finalized: Atlanta welcomed giant pandas for the first time, and Washington, after a nearly two-year hiatus, received its new residents, Mei Xiang and Tian Tian.

In the 2010s, rising tensions in Sino-U.S. relations began to impact the Chinese side's timelines, leading to delays in decisions regarding panda lease extensions. Furthermore, China

transformed its approach by increasingly focusing on subnational diplomacy and seeking "advocates" for panda hosting among regional political elites. In 2010, the parties initiated the High-Level Consultation on People-to-People Exchange (CPE). That same year, the U.S.-China Governors Forum was established as a platform to deepen relations between American governors and the leadership of Chinese provinces. Simultaneously, the U.S.-China Initiative on City-Level Economic Cooperation was launched (*Lawrence, 2013*).

The cases of New York and California serve as examples of this transformed approach to actualizing panda diplomacy within American politics. Since 2014, Carolyn Maloney, a Congresswoman representing a district in New York, has been an active advocate for housing pandas in New York City. According to her, during a meeting with Chinese officials following the aforementioned 1999 incident, she was able to defuse tensions by pivoting the conversation toward a discussion of pandas. In 2014, the Congresswoman visited a panda reserve in China (*Burns, 2016*).

Cui Tiankai, the PRC Ambassador to Washington, informed Maloney that the Chinese side was prepared to engage in preliminary negotiations and would "consider the formal initiation of cooperation when conditions are mature" (*Burns, 2016*). Maloney met with Li Xiaolin, President of the Chinese People's Association for Friendship with Foreign Countries (CPAFFC), and attended the 'Panda Night' event featuring the Chinese Ambassador. Having secured support from the city's business elite, specifically billionaires Maurice Greenberg and John Catsimatidis, the Congresswoman obtained the consent of Mayor Bill de Blasio, whose endorsement was one of China's key prerequisites for granting a panda lease.

Both billionaires maintain significant interests in the PRC. For instance, in 2018, Maurice Greenberg was honored at a ceremony in Beijing with a "friendship" medal for fostering business ties with the People's Insurance Co. of China. Since 1975, the billionaire has made annual business trips to China, and Starr Companies, which he headed, was the first foreign firm to receive a license to provide insurance services in the PRC. Among Maurice Greenberg's other accolades are "honorary citizen" keys and honorary citizenships from numerous Chinese cities (*Heping, 2018*).

A charitable event organized to raise funds for leasing pandas for New York City collected $127,000 of the required $50 million. Observers noted that hosting the event at an expensive hotel was counterproductive, as the organizational costs potentially exceeded the amount raised. A notable detail regarding the chosen venue, the Waldorf-Astoria Hotel, is its ownership by a Chinese insurance company (in 2014, the U.S. State Department advised President Barack Obama to refrain from staying at this hotel). The event's sponsors included China Construction America and China Merchants Bank, with Zhang Qiyue, the PRC Consul General in the Big Apple, occupying a seat at the head table.

Congresswoman Maloney also participated in the announcement of Hainan Airlines' inaugural flights from New York to Hainan Province. The politician's initiative was further publicly endorsed by Yue-Sai Kan, a New York-based businesswoman with close ties to the PRC. Notably, Ms. Kan contributed $23,000 to Carolyn Maloney's campaign fund (*Bredderman, 2022*). Furthermore, Maloney was even supported by a Republican, former Speaker of the House Newt Gingrich, who wrote: "Surely the greatest American city ought to have pandas" (*Burns, 2016*).

However, fundraising events for the New York panda lease were met with protests from animal welfare advocates and animal rights activists opposing the "import" of Chinese bears. In 2022, Carolyn Maloney lost her Congressional re-election bid to fellow Democrat Jerry Nadler, whose platform included the slogan "No to Pandas in Captivity", effectively ending Maloney's years-long effort to secure pandas for New York City (*Moss, 2022*).

Dr. Han Yin Li, an Associate Professor at the Institute of International Strategy of Tokyo International University, described this case as emblematic of Chinese diplomacy: "In recent years, China has attempted to promote its soft power and national image overseas, while the means are mixed with non-governmental, semi-official or track II channels with the coordination of the Chinese embassies overseas. And definitely the Chinese public diplomacy targets individuals and particular persons with political influence in the targeted countries through exchanges, sponsorship and recognition" (*Bredderman, 2022*).

In 2020, the State Department under Mike Pompeo compiled a list of six Chinese organizations (including the CPAFFC) linked to the Chinese Communist Party and held responsible for spreading propaganda abroad (*Pompeo, 2020*). Simultaneously, the U.S. government withdrew from the 2011 Memorandum of Understanding, stating that the "CPAFFC's actions have undermined the Governors Forum's original well-intentioned purpose" (U.S. designates Chinese body a foreign mission…). A spokesperson for the Chinese Foreign Ministry commented on the U.S. government's decisions, labeling them as phenomena of "neo-McCarthyism" and rejecting all allegations made by the U.S. State Department (*Foreign Ministry Spokesperson…*).

Furthermore, even under the Joe Biden administration, the course toward limiting vulnerable cooperation with China remained steadfast. In 2022, Congress passed the CHIPS and Science Act and the Inflation Reduction Act (IRA), designed to protect technological sovereignty and maintain leadership in semiconductors and green energy, such as electric vehicles (*Sullivan, 2026*).

In November 2023, China responded, notably by recalling Mei Xiang and Tian Tian, along with their three-year-old cub Xiao Qi Ji, from the Washington Zoo to mainland China. The pandas departed for home via the same Dulles Airport on a special Boeing 777F aircraft named the "FedEx Panda Express" (*The History of Giant Pandas…*).

In contrast, during the same month, the People's Republic of China announced the return of pandas to California. The importance of this region is underscored by both its economic capabilities and its ties with China. As early as 1993, in an article for Foreign Affairs, James O. Goldsborough defended California's right to conduct an autonomous foreign policy, citing the state's GDP (which ranked eighth in the world at the time, ahead of the PRC) and its population (31 million, making it the most populous U.S. state) (*Goldsborough, 1993*). Furthermore, California is home to the largest Chinese diaspora in the United States, and the Federal Reserve Bank of San Francisco is responsible for relations with Asian nations.

In November 2023, on the sidelines of the APEC summit in San Francisco, a high-level meeting took place between the leaders of the U.S. and China. This was preceded by California Governor Gavin Newsom's visit to China, during which he met with President Xi Jinping (marking the first visit by a U.S. governor to the PRC since the United States withdrew from the Governors Forum) (*What Governor Newsom's Trip to China Accomplished…*). Notably, the announcement regarding the return of the pandas was made neither during the press conference nor in the official remarks following the leaders' meeting (despite Joe Biden previously signaling his intent to raise the issue). Instead, it was delivered at a dinner for business and political leaders at the Hyatt Regency later that day (according to The New York Times, the White House administration had not been pre-notified of this announcement). The high profile of the event was underscored by its guest list, which included Elon Musk, Tim Cook, Secretary of Commerce Gina Raimondo, California State Treasurer Fiona Ma, and others (*Li, 2023*).

In his speech, Xi Jinping shared that he had "also learned that the San Diego Zoo and the Californians very much look forward to welcoming pandas back. Pandas have long been envoys of friendship between the Chinese and American peoples. We are ready to continue our cooperation with the United States on panda conservation, and do our best to meet the wishes of the Californians so as to deepen the friendly ties between our two peoples". The PRC President also further his vision that the strength of Sino-American relations lies "exchanges at subnational levels. I welcome more U.S. governors, Congressional members, and people from all walks of life to visit China" adding: "I also hope that California and San Francisco will continue to take the lead on the journey of growing China-U.S. friendship!" (*Full text of Xi's speech…, 2023*).

Thus, the leader of the PRC deliberately chose a formal gala to announce the new panda lease, avoiding comments on the decision following his meeting with the U.S. President, thereby emphasizing the importance of subnational ties between China and California. In doing so, Xi Jinping framed his decision as a unilateral act rather than a reaction to his American counterpart's request, presenting it as a symbolic gesture of friendship toward the region rather than an indicator of relations at the national level.

San Francisco Mayor London Breed seized upon this announcement to raise the issue of

hosting new pandas in her city. She personally presented her proposal to the PRC leader before his departure for Beijing. On December 1, 2023, the Mayor reiterated her request in an official letter addressed to Xi: "I propose, as I did on the runway when bidding your farewell, that we establish a partnership in which our San Francisco Zoo will host your cherished diplomats – Giant Pandas". In turn, the Mayor referenced Xi's speech regarding San Francisco and California's leadership in Sino-American relations. In her letter, London Breed highlighted the sister-city relationship between San Francisco and Shanghai (the first such partnership between Chinese and American cities, established in 1979), along with an October 2013 Memorandum of Understanding between the respective cities' zoos, which established a "sister zoo relationship" between the institutions (*Breed, 2023*).

The beginning of 2024 was also marked by the continued presence of pandas on the high-level agenda. In January, during a formal ceremony in Beijing celebrating the 45th anniversary of the establishment of diplomatic relations between the USA and the PRC, Chinese Foreign Minister Wang Yi stated that the parties "should ensure peaceful coexistence, with effective management of disagreements as the top priority" promising that giant pandas would return to the United States by the end of the year (*Wang Yi…, 2024*).

In February, California Governor Gavin Newsom stated that "California and China share deep cultural and economic ties, and we look forward to the opportunity to again welcome these iconic bears to the Golden State," while commenting on the news of a lease agreement reached between the San Diego Zoo and the Chinese side (*Giant Pandas…, 2024*).

In April 2024, London Breed, accompanied by thirty public officials and entrepreneurs, made a visit to Shanghai, during which she visited the pandas at the local wild animal park (*Mayor Breed, 2024)*. However, as of April 2026, the San Francisco Zoo has not yet been able to host the coveted desired. Conversely, the San Diego agreement took effect on July 27, 2024, with the arrival of a giant panda pair from Shandong Province.

The proximity to the renewal of the electoral cycle also prompted official Beijing to relaunch panda diplomacy at the national center. In May 2024, U.S. First Lady Jill Biden participated in a video announcement regarding the return of pandas to the Washington Zoo (*The Pandas Are Coming…, 2024*). Three weeks before the U.S. presidential election, the "FedEx Panda Express" Boeing 777F completed a flight to deliver giant pandas Qing Bao and Bao Li to the United States.

It is further worth noting that Bao Li is the son of Bao Bao, who was born at the National Zoo in the American capital in 2013. Thus, as emphasized by the Chinese Ambassador to Washington, Bao Li descends from a family that has resided in Washington since 2000, representing the third generation of his lineage to inhabit the Smithsonian National Zoological Park (*Bao Bao…, 2017*).

As part of the analysis of panda relocation and placement sites, the article's authors found that as of the U.S. Presidential Election on November 5, 2024, no pandas were hosted in the traditionally Republican-leaning states of Tennessee and Georgia (due to the death of the last male in Memphis in 2023 and the repatriation of the panda from Atlanta to China on October 12, 2024, respectively). In contrast, zoos in the Democratic-leaning jurisdictions of California and the District of Columbia received new arrivals (on June 27 and October 15, 2024, respectively).

On April 24, 2026, just weeks prior to the announced high-level meeting between U.S. President Donald Trump and PRC President Xi Jinping, China announced the lease of two giant pandas to the Atlanta Zoo (*Kurt, 2026*), a region that traditionally votes for the Republican candidate (*Tsivatyi, 2026*).

Conclusions. The results of this article reveal that the development of Sino-American relations has served as the primary driver behind the evolution of panda diplomacy. American public interest in Chinese bears during the 1930s prompted China to ban panda hunting for foreigners while simultaneously utilizing the animals for diplomatic purposes, specifically through the gifting of pandas in 1941. It was President Richard Nixon's geopolitical "pivot" toward the PRC, the presidential couple's gift of musk oxen, and the First Lady's fascination with the black-and-white bears that spurred Communist China to gift pandas to a Western Bloc nation for the first time. The subsequent compromise between species conservation interests and diplomatic objectives led to the transition toward a leasing model. As political competition intensified at the national level between

the U.S. and the PRC, panda diplomacy was repurposed into a tool of subnational diplomacy. Despite the United States' withdrawal from the 2011 Memorandum of Understanding, this practice gained new momentum in 2023. The 2024 U.S. Presidential election demonstrated that China's selection of panda placement sites within a single country is politically motivated, aimed at incentivizing local stakeholders to support cooperation with mainland China, regardless of the state of intergovernmental relations.

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THE DIGITALISATION OF THE DIPLOMATIC SERVICE AS A FACTOR IN A COUNTRY'S SUSTAINABLE DEVELOPMENT IN THE CONTEXT OF GLOBALISATION: THE EXPERIENCE OF UKRAINE AND ESTONIA

ЦИФРОВІЗАЦІЯ ДИПЛОМАТИЧНОЇ СЛУЖБИ ЯК ЧИННИК СТАЛОГО РОЗВИТКУ ДЕРЖАВИ В УМОВАХ ГЛОБАЛІЗАЦІЇ: ДОСВІД УКРАЇНИ ТА ЕСТОНІЇ

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Abstract. *The article examines the impact of globalisation and the development of information and communication technologies on the transformation of the diplomatic service as a key institution for the implementation of a state's foreign policy, and demonstrates the importance of digitalisation as a factor in enhancing the efficiency, transparency and resilience of state institutions.*

The aim of this article is to conduct a comprehensive study of the digitalisation of the diplomatic service as a strategic factor in the sustainable development of the state, in particular by analysing its impact on the transformation of diplomatic institutions, assessing the current state of digitalisation in Ukraine, and comparing it with Estonia's experience. The research objectives include defining the theoretical foundations of digitalisation, analysing the practical aspects of its implementation, identifying key problems, and justifying approaches to their resolution.

The methodological framework comprises general scientific and specialised research methods, in particular comparative, systemic and analytical approaches.

The study found that the digitalisation of Ukraine's diplomatic service is at a stage of active development, but is characterised by a number of structural constraints, including the fragmentation of digital solutions, insufficient system integration and a lack of digital skills. It has been demonstrated that Estonia's experience attests to the effectiveness of comprehensive digital transformation based on integrated platforms, electronic document management and a high level of cybersecurity.

Based on the results of a comparative analysis, practical recommendations have been formulated regarding the standardisation of electronic document management, the development of integrated digital platforms, the enhancement of cybersecurity, and staff training.

Keywords: *digitalisation; diplomatic service; digital diplomacy; sustainable development; globalisation; public administration; electronic document management; international cooperation.*

Анотація. *У статті розкрито вплив глобалізаційних процесів і розвитку інформаційно-комунікаційних технологій на трансформацію дипломатичної служби як ключового інституту реалізації зовнішньої політики держави та обґрунтовано значення цифровізації як чинника підвищення ефективності, прозорості та стійкості державних інституцій.*

Метою статті є комплексне дослідження цифровізації дипломатичної служби як стратегічного чинника сталого розвитку держави, зокрема через аналіз її впливу на трансформацію дипломатичних інституцій, оцінку сучасного стану цифровізації в Україні та порівняння з досвідом Естонії. Завдання дослідження передбачають визначення теоретичних засад цифровізації, аналіз практичних аспектів її впровадження, виявлення ключових проблем та обґрунтування напрямів їх вирішення.

Методологічну основу становлять загальнонаукові та спеціальні методи дослідження, зокрема порівняльний, системний та аналітичний підходи.

У результаті дослідження встановлено, що цифровізація дипломатичної служби України перебуває на етапі активного розвитку, проте характеризується низкою структурних обмежень, зокрема фрагментарністю цифрових рішень, недостатньою інтеграцією систем та дефіцитом цифрових компетентностей. Доведено, що досвід Естонії свідчить про ефективність комплексної цифрової трансформації, заснованої на інтегрованих платформах, електронному документообігу та високому рівні кібербезпеки.

За результатами порівняльного аналізу сформульовано практичні рекомендації щодо уніфікації електронного документообігу, розвитку інтегрованих цифрових платформ, підвищення рівня кіберзахисту та професійної підготовки персоналу.

Ключові слова: *цифровізація; дипломатична служба; цифрова дипломатія; сталий розвиток; глобалізація; державне управління; електронний документообіг; міжнародне співробітництво.*

Introduction. The realities of modern globalisation, the rapid development of information and communication technologies, and the growing role of digital tools in public administration are driving a profound transformation of the diplomatic service as a key institution for the implementation of a state's foreign policy. The digitalisation of diplomatic processes today represents not only a technological upgrade, but also a strategic factor in enhancing the effectiveness, transparency and resilience of state institutions in the global environment.

Against a backdrop of intensifying international competition, hybrid threats and growing challenges to national security, digital diplomacy is taking on particular significance as a tool for operational communication, managing information flows and shaping a positive international image of the state. At the same time, the digitalisation of the diplomatic service is directly linked to the achievement of sustainable development goals, as it promotes the rational use of resources, the streamlining of bureaucratic procedures, the reduction of environmental impact and the enhancement of the institutional capacity of government bodies.

The purpose of this article is to conduct a comprehensive study of the digitalisation processes within the diplomatic service as a strategic factor in ensuring the sustainable development of the state in the context of globalisation, in particular through an analysis of the impact of digital technologies on the transformation of diplomatic institutions, assessing the current state and challenges of the digital transformation of Ukraine's diplomatic service, as well as conducting a comparative analysis with Estonia's experience in order to substantiate practical recommendations for adapting effective European digital practices to the national context.

Literature review. The issue of the digitalisation of public administration and the diplomatic service in the context of globalisation and sustainable development is the subject of active academic research within both domestic and international scholarly discourse. In particular, the works of

O. Akhmedovoi and A. Pomaza-Ponomarenko (2025) argue that digitalisation is a key factor in enhancing the effectiveness of public administration, ensuring transparency, accountability and the optimisation of management processes. A similar position is held by S. Bobko and K. Dehtiar (2025), who view digitalisation as a tool for transforming management systems in the context of sustainable development, emphasising the need to integrate innovative technologies into the activities of organisations.

The theoretical foundations of digitalisation in the field of public administration are explored in a study by S. Chornoho (2022), which defines the essence of digital transformation as a comprehensive process encompassing not only technological changes but also the transformation of management approaches and communications. At the same time, L. Popova (2025) and N. Krasnostanova, T. Yakymenko (2023) emphasise the interconnection between digitalisation and the achievement of sustainable development goals, in particular through improving resource efficiency, developing inclusive services and stimulating economic growth.

A separate area of research concerns digital diplomacy and the transformation of international relations. For instance, M. Okladna and V. Stetsenko (2020) define digital diplomacy as a key instrument of modern foreign policy, ensuring the efficiency of communication and expanding a state's capacity to influence an international audience. In turn, T. Poda (2020) focuses on the development of 'network diplomacy', which is shaped by globalisation processes and involves the engagement of new actors and digital platforms in international interaction. Research by R. Nuguid (2025) confirms that digital diplomacy opens up new opportunities for states, whilst simultaneously creating additional challenges related to cybersecurity and information risks.

Thus, an analysis of academic sources shows that the digitalisation of the diplomatic service is viewed as a complex, multidimensional process that combines technological, managerial and social aspects. At the same time, despite a significant body of research in the field of the digitalisation of public administration and digital diplomacy, insufficient attention has been paid to a comparative analysis of the digital transformation of diplomatic services in different countries, particularly Ukraine and Estonia, in the context of ensuring sustainable development, which underlines the relevance of this study.

Main results of the research. For Ukraine, the issue of the digital transformation of the diplomatic service is becoming particularly relevant in the context of European integration, the need to adapt to EU standards, and the challenge of operating under conditions of prolonged hybrid aggression. In this regard, the experience of Estonia is of considerable interest – a country that is consistently implementing digital solutions in the fields of public administration and diplomacy, demonstrating a high level of integration of technology, security and the principles of sustainable development.

Digitalisation is one of the key components of the transformation of modern state institutions in a globalised world, significantly influencing the organisation of public administration and the activities of diplomatic services. Digitalisation is understood as a comprehensive process of integrating digital technologies into all aspects of the functioning of state bodies and services, which is not limited to the technical automation of processes, but involves a change in the very nature of interaction, decision-making, communications and engagement with target audiences. In public administration, digitalisation is strategic in nature and aims to enhance the efficiency, transparency and accountability of state institutions, as well as to optimise interaction between government bodies, citizens and businesses through modern digital services and tools – in particular e-ID, big data, blockchain and artificial intelligence – which are transforming traditional models of governance and diplomatic communication (Chornyi, 2022).

In the context of sustainable development, digitalisation expands the capacity of public institutions to achieve the Sustainable Development Goals (What are the Sustainable Development Goals?, n.d.) (Table 1). In particular, the use of digital technologies helps to improve resource efficiency, reduce environmental risks, enhance social integration, improve access to services, and create inclusive platforms for citizen participation in public processes. It is important that digital tools can be used not only to automate service delivery procedures, but also to create conditions for

innovative development, stimulate economic growth and expand access to global information markets, which together create the conditions for the sustainable development of society at national, regional and global levels (Popova, 2025).

Globalisation has become a multidimensional process of integration across the economic, political, informational and cultural spheres of the global community, leading to significant changes in the nature of international relations and the role of state institutions. In particular, the diplomatic service, which has traditionally been focused on bilateral inter-state negotiations and closed channels of communication, is forced to adapt to the conditions of an open information space and rapid transnational data flows. In such an environment, diplomacy ceases to be an exclusively privileged sphere of activity for state apparatuses and transforms into a multifunctional political instrument operating simultaneously in many public and non-state spheres (How Globalization Has Disrupted the Actors, the Place, and the Timeline of Diplomacy, n.d.).

Table 1

The digitalisation of the diplomatic service in the context of globalisation and sustainable development

	Digitalization content	Key digital tools	Impact on the diplomatic service	Connection with sustainable development
Institutional	Integration of digital technologies	e-ID, electronic document management, big data, AI	Improving governance efficiency, transparency and accountability	SDG 16 – Peace, justice and strong institutions. Strengthening institutional capacity and resilience
Administrative	Optimization of decision-making processes	Analytical platforms, automated management systems	Reducing bureaucratic procedures, increasing the efficiency of decisions	SDG 12 – Responsible consumption and production. Rational use of resources, effective management
International (globalization)	Integration into global information networks	Online collaboration platforms, digital diplomacy	Strengthening interstate interaction and network forms of cooperation	SDG 17 – Partnerships for the Goals. Promote global partnerships and international coordination
Socio-economic	Expanding access to information and services	Digital services, innovative platforms	Increasing the openness of diplomatic processes	SDG 8 – Decent work and economic growth. Social inclusion, economic growth
Strategic	Digitalization as a long-term development resource	Complex digital ecosystems	Building institutional resilience of the diplomatic service	Achieving the Sustainable Development Goals

Source: provided by the authors

The first key change is the expansion of the range of actors involved in the diplomatic process. Alongside traditional diplomatic missions, non-state actors – international organisations, global corporations, expert networks, civil society initiatives and digital platforms – are gaining significant importance, actively influencing the shaping of international policy and representing their interests in the global information space. This democratisation of the diplomatic environment is directly linked to globalisation, as the boundaries for communication, mobility and the exchange of information have become significantly blurred, and access to a global audience has become virtually unhindered. As a result, national diplomatic institutions are forced to rethink their functions and mechanisms for engaging with these new actors (How Globalization Has Disrupted the Actors, the Place, and the Timeline of Diplomacy, n.d.).

The second significant transformation is the shift from closed, hierarchical diplomacy to an open, network-based approach, characterised by the rapid exchange of information, the integration of digital communications, and active participation in global discussions. Networked forms of diplomacy, including digital platforms, social media and online communications, are transforming the traditional format of diplomatic negotiations and enabling states to influence an international audience directly in real time. This, in turn, alters the temporal and spatial frameworks of diplomatic

work, as diplomacy is no longer confined to physical locations (embassies, conference halls) but operates actively within the virtual space of information networks (Poda, 2020).

Globalisation is also placing greater demands on diplomatic institutions in terms of transparency, responsiveness and flexibility. In today's world, international crises, economic challenges and social changes are unfolding at a rapid pace, rendering outdated bureaucratic procedures ineffective. As a result, diplomatic services are adopting new approaches to communication, planning and response, actively using digital technologies to monitor global events, produce rapid analytical assessments and develop international communication strategies.

At the international level, the digitalisation of diplomacy facilitates the integration of national processes into global information networks, thereby enhancing the effectiveness of communication with other states, international organisations and the public (Nuguid, 2025). The use of digital channels, such as electronic document management platforms, social media and data analytics systems, enables states to respond swiftly to global challenges, including economic crises and environmental threats, which is key to sustainable development.

Estonia's experience shows that the comprehensive digitalisation of the diplomatic service enables a state not only to improve the efficiency of its internal administration, but also to project an image of a technologically advanced and transparent state on the international stage. Estonia's digital governance system includes electronic document management within the Ministry of Foreign Affairs and consulates, which helps to reduce the paper burden and cut resource costs, thereby supporting the environmental aspect of sustainable development.

For Ukraine, the digitalisation of the diplomatic service is a prerequisite for enhancing institutional resilience and competitiveness on the international stage. The introduction of electronic document management systems and digital communication channels facilitates more efficient decision-making, reduces corruption risks and increases public trust in state institutions.

The digitalisation of the diplomatic service is becoming a key tool for enhancing the efficiency, transparency and resilience of state institutions in the context of globalisation and governance transformations (Okladna & Stetsenko, 2020). The introduction of electronic document management enables the optimisation of administrative processes, reduces the expenditure of time and resources, and ensures rapid access to information, which is critically important for diplomatic missions and foreign ministries (Bobko & Dehtiar, 2025).

In Ukraine, the digitalisation of the diplomatic service is currently in a phase of active development, which includes the integration of electronic document management systems, qualified electronic signatures and platforms for internal coordination. The main objectives are to improve management efficiency, ensure information security and comply with international standards. Despite the achievements made, Ukraine faces challenges in implementing digital solutions regarding process standardisation, human resources and adapting the regulatory framework to digital technologies (Popova, 2025).

Estonia's experience demonstrates the effective integration of digital tools into high-level diplomatic activities. The Estonian model of digital governance is characterised by the complete digitisation of document management, the use of electronic signature systems, and online services for communicating with citizens and international partners.

A comparative analysis shows that the main differences between Ukraine and Estonia lie in the level of integration of digital technologies and the scale of their use. The Ukrainian diplomatic service is gradually moving towards EU standards, but requires a comprehensive approach to digitalisation, including the development of a regulatory framework, staff training and the implementation of modern electronic document management systems (Krasnostanova & Yakymenko, 2023). The Estonian experience demonstrates that digitalisation contributes not only to management efficiency but also to strengthening institutional resilience and supporting sustainable development in a global context.

Despite the positive trends, the digitalisation of the diplomatic service in Ukraine is accompanied by a number of challenges. Firstly, there is insufficient integration of modern digital platforms into internal processes, which often leads to duplication of functions, delays in the

transmission of information, and a lack of efficiency in communication between departments (Popova, 2025). Secondly, there is a shortage of qualified staff capable of effectively using new digital tools, which complicates the implementation of innovations and reduces the efficiency of electronic document management.

An important element of the digitalisation of the diplomatic service is the Diplomatic eArchive (n.d.), which is responsible for the preservation, management and use of documents relating to foreign policy activities. The transition to electronic archiving is of strategic importance, as it ensures the preservation of the diplomatic heritage, rapid access to information, a reduction in the risk of document loss and the optimisation of archival processes. At the same time, the digitisation of the diplomatic archive in Ukraine is still in its infancy and faces challenges such as the fragmentation of digital solutions, limited compatibility of information systems, and the need to ensure a high level of protection for confidential and personal data.

The introduction of the "E-Consul" information system (e-Consul, n.d.) plays a key role in the digital transformation of Ukraine's diplomatic service; it is designed to automate consular services and optimise the state's interaction with citizens abroad. The "E-Consul" programme enables the digitisation of processes for submitting applications, processing requests, maintaining consular records and internal document flow, which helps to increase transparency, reduce bureaucratic procedures and shorten the time taken to provide consular services. At the same time, its effective operation requires further integration with other state registers and information systems, as well as continuous improvement of the technical and regulatory framework.

The process of digitalising diplomatic bodies is also significantly hampered by insufficient funding, fragmented strategic planning and an inadequate regulatory framework, which complicates the systematic implementation of digital solutions and undermines their long-term effectiveness. The absence of a single, coordinated digital transformation strategy leads to the uneven development of information systems and a reduction in their interoperability. In these circumstances, the issue of cybersecurity and personal data protection becomes particularly relevant, as any breaches of information security can pose significant risks to the confidentiality of diplomatic communications, the stability of state information resources, and the state's international reputation.

Estonia is one of the world's most striking examples of successful digital transformation in the public sector, which has a direct impact on the effectiveness of the diplomatic service. As a "digital state", the country has managed to implement comprehensive digital solutions that not only optimise internal processes but also form the basis for modern digital diplomacy and the sustainable development of the state.

Firstly, Estonia has achieved virtually complete digitalisation of public services: all government services are available online, which not only facilitates effective governance but also helps to create a positive image of the country on the international stage, where such tools are regarded as an element of foreign policy and diplomacy in the digital age. This is the result of a targeted policy of digital state-building, which was defined in the early stages of independence and further developed in strategic documents, notably the Digital Agenda 2030. Its implementation involves strengthening the digital state, improving the quality of citizens' digital experience and the security of the digital environment, which is of strategic importance for the diplomatic sector as well, where confidentiality and trust are critical (Digital Agenda 2030, n.d.).

Secondly, the state has established a well-developed data interoperability infrastructure, notably the X-Road platform – a key technological infrastructure of Estonia's digital state that ensures secure data exchange between public and private information systems (X-Road – Interoperability services, n.d.). This enables the automation of document processing and maintains a high standard of electronic document management and information exchange between ministries and overseas missions. In this context, digital solutions facilitate the integration of electronic document management into the administrative procedures of the diplomatic service and enhance the speed of decision-making.

The use of the X-Road system enables Estonian consulates abroad to: access all key state registers, including the population register, the document register, the tax register, the civil status

register and the business register; provide online consular services, including the issuance of certificates, identity verification, document verification and the provision of extracts from registers; facilitate digital voting abroad (i-Voting); and work with the e-Residency programme (X-Road Technology: A digital backbone of Estonia's Cyber security and DPI, n.d.).

Estonia's diplomatic missions operate via X-Road, which enables them to provide digital consular services to citizens in any country worldwide, ensure cyber security, integrate cross-border services and develop a digital model of diplomacy that is now being emulated by other countries.

The digitalisation of the diplomatic service is a critical factor in enhancing the efficiency, transparency and sustainability of state institutions in the context of globalisation. Estonia's experience demonstrates a high level of integration of electronic document management and digital platforms into the work of diplomatic bodies, enabling the optimisation of management processes, a reduction in administrative costs and faster decision-making (Popova, 2025).

In Ukraine, the process of digitising the diplomatic service is proceeding more slowly due to the fragmented nature of the regulatory framework and the insufficient integration of modern IT solutions within government bodies (Akhmedovoi & Pomaza-Ponomarenko, 2025). An analysis of international experience shows (Table 2) that the successful digitalisation of the public sector requires a comprehensive approach, which includes the adaptation of electronic document management, the development of digital infrastructure and the assurance of cybersecurity.

Table 2

A comparison of digitalisation indicators in Ukraine and the EU

Parametr	Ukraine	EU (average)	Lagging behind
Level of digitalisation	45%	78%	33%
Number of e-services	130	320	190
User experience	6.2/10	8.1/10	1.9
Cybersecurity	5.8/10	7.9/10	2.1
Interoperability	40%	75%	35%

Джерело: (European Commission, 2022).

The Digital Quality of Life Index covers 117 countries for which data is available, representing 92% of the world's population. Each country is assessed according to five principles:

1. Internet affordability – how many hours people need to work to afford a stable internet connection.
2. Internet quality – how fast and stable the internet connection is in the country and how much it is improving.
3. Digital infrastructure – how well-developed and inclusive the country's existing digital infrastructure is.
4. Digital safety – how safe and secure people feel in the country.
5. Digital government – how developed and digitised the country's public services (Krasnostanova & Yakymenko, 2023).

In recent years, Ukraine has made significant progress in developing digital public services at the national level. According to the findings of the UN study "UN E-Government Survey – Accelerating Digital Transformation for Sustainable Development", Ukraine ranked 30th out of 193 countries in 2024 on the overall e-government index, a rise of 16 places compared to 2022 – evidence of substantial progress in the digital transformation of the public services sector. Ukraine also topped the E-Participation Index, which measures the extent to which citizens engage with public services online – this position is important to consider when assessing the potential for applying such approaches in the diplomatic service, where digital participation and access to information are critically important (Ukrainian GovTech ranks among the world's best, n.d.).

Unlike Ukraine, Estonia has achieved virtually complete digitalisation of public services with a very high level of coverage. According to data from 2025, almost 100% of public services are available to citizens online, including tools that can be adapted for inter-agency document management and international communications. Such comprehensive digitalisation not only

enhances the efficiency and transparency of interaction between partners, but also creates the infrastructure for effective digital diplomacy (Estonia: 100% digital government services, with divorce as the final step, n.d.).

The digitalisation of public services is a key factor in enhancing the efficiency and transparency of the diplomatic service. A comparative analysis of Ukraine and Estonia reveals significant differences in their approaches to the implementation of digital technologies and electronic document management.

The analysis shows (Table 3) that Ukraine is demonstrating rapid development of digital services in response to internal challenges, whilst Estonia offers a strategically integrated and systematic model of digitalisation, enabling the effective implementation of electronic document management and inter-agency digital interaction. It is recommended to adapt Estonian practices to enhance the efficiency and transparency of Ukraine's diplomatic service, in particular:

- the development of comprehensive digital platforms;
- the integration of electronic document management into international communications;
- strengthening cybersecurity and data protection;
- increasing the coverage of digital identification for diplomatic staff.

Table 3

A comparative analysis of the digitalisation of the diplomatic services of Ukraine and Estonia

Indicator	Ukraine	Estonia	Impact on sustainable development
Availability of electronic document management	Gradual implementation, partial digitalisation of ministries	Full integration across all diplomatic departments	Reduction in paper usage, resource savings, environmental efficiency
Accessibility of digital services for citizen	Limited, partly via the Ministry of Foreign Affairs' web portals	High, thanks to a single e-Government platform	Enhanced social inclusion, access to services
Transparency and accountability	Partial, limited monitoring systems	High, automated monitoring and reporting systems	Reduced corruption risks, improved trust in institutions
Integration with international platforms	Partial, limited data exchange	Fully integrated with the EU and global networks	Enhancing the effectiveness of international cooperation and the speed of response to global challenges
Environmental impact	Partial, reduced paper usage in certain departments	Almost complete elimination of paper documents	Reducing emissions, conserving natural resources, promoting green governance

Source: compiled from data (Popova, 2025), (Nuguid, 2025).

Based on this analysis, the following recommendations can be made regarding the development of digitalisation within Ukraine's diplomatic service:

1. Unification and standardisation of electronic document management across all departments of the Ministry of Foreign Affairs and diplomatic missions abroad.

2. Development of an integrated digital platform that will ensure centralised access to documents, automation of internal processes and transparency of interaction between structural units.

3. Strengthening of cybersecurity and data protection, which is critical for safeguarding state and diplomatic information.

4. Training and professional development of staff on the use of modern digital technologies in diplomatic practice.

5. Adaptation of international experience (in particular that of Estonia), taking into account the specific nature of the Ukrainian diplomatic service and resource constraints.

Thus, the implementation of these recommendations will contribute to enhancing the efficiency, transparency and sustainable development of Ukraine's diplomatic service, laying the foundation for the country's integration into the global digital environment.

Conclusions. The digitalisation of the diplomatic service is a strategic factor in the transformation of state institutions in a globalised world, enhancing the efficiency, transparency and institutional resilience of diplomatic bodies. The introduction of electronic document management, digital platforms and analytical tools helps to optimise administrative processes, reduce information processing times, enhance cybersecurity and minimise the negative impact on the environment.

Globalisation is driving a shift in diplomacy from a traditional, closed model towards open, networked forms that incorporate digital communications, social media platforms and active participation in global debates. This places new demands on staff competence, the integration of information systems and the development of standards for engagement with international and non-state actors.

Estonia's experience demonstrates effective, strategically integrated digitalisation of diplomatic processes, which ensures the full digitisation of document management, cyber security, access to national registers and international services, and helps to foster the image of a transparent and technologically advanced state. Ukraine is actively developing digital services for the diplomatic service, including the "E-Consul" platform and the "Diplomatic E-Archive", but faces problems of insufficient system integration, a shortage of qualified personnel and fragmented regulatory and legal frameworks.

A comparative analysis shows that adapting Estonian practices will enable Ukraine to improve the effectiveness of the digitalisation of its diplomatic service. Priority measures include the standardisation of electronic document management, the development of integrated digital platforms, the enhancement of cybersecurity, staff training, and the adaptation of international experience to national circumstances. The implementation of these recommendations will contribute to strengthening institutional capacity, the sustainable development of diplomatic institutions, and Ukraine's integration into the global digital environment.

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STATE-LOCAL GOVERNMENT RELATIONS AND ITS EFFECT ON GRASS ROOTS GOVERNANCE IN NIGERIA

ВІДНОСИНИ МІЖ УРЯДАМИ ШТАТІВ І МІСЦЕВИМ САМОВРЯДУВАННЯМ ТА ЇХНІЙ ВПЛИВ НА ВРЯДУВАННЯ НА НИЗОВОМУ РІВНІ В НІГЕРІЇ

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Abstract: *The Intergovernmental association of the Local Governments and the states in Nigeria is inevitable by virtue of the diverse composition of the people and by virtue of federal system of governance practiced. The paper examined the governance power at the grass roots and the abuse of power over them by the state governments in which such abuse is militating against the Local Governments that were established to bring benefit of democracy to the masses at the grass roots. The paper relied on judicial decision and statutory provisions establishing and empowering the government at the grass roots to function and provide for the people at the grass roots. It also relied on secondary data such as text books, periodicals, magazines, and internet materials which were all subjected to explanatory analysis. The study discovered that the autonomy needed by the local governments especially the power to receive and expend its fund to develop the grass roots has been fettered by the power abused by the State Governments against the Local Governments. The fiscal interaction between them is still being abused despite the intervention of the Supreme Court upholding and strengthening Local Government autonomy. Several months after the decision of the Supreme Court, some states in the country are yet to release the States' allocation. They are yet to implement it by transferring certain percentage of their allocations to the state government. The paper concluded that true federalism is still not being practiced in Nigeria. Invariably, the Local Governments that were saved by the Supreme Court's decision can only continue to exist and function effectively only if the decision of the Supreme Court is implemented.*

Keywords: *Federalism, Grass roots, Implementation, Interaction, Power,*

Анотація. *У статті досліджується система міжурядових відносин між урядами штатів та органами місцевого самоврядування в Нігерії в умовах федеративного устрою. Проаналізовано проблему зловживання владою з боку керівництва штатів щодо муніципального рівня врядування, що обмежує автономію місцевих рад та перешкоджає наданню базових публічних послуг населенню на низовому рівні. Метою дослідження є комплексний аналіз політичної, фінансової та конституційно-правової взаємодії між*

штатами та органами місцевого самоврядування в Нігерії, оцінка наслідків фінансової залежності для низового врядування та визначення шляхів забезпечення реальної автономії місцевого самоврядування у світлі прецедентного рішення Верховного суду Нігерії 2024 року. Застосовано пояснювальний аналіз (explanatory research design), якісний контент-аналіз нормативно-правових актів Нігерії (зокрема Конституції 1999 року зі змінами), судових рішень (включаючи справу AG of the Federation v. AG of Abia State & 35 others), а також порівняльно-правовий аналіз моделей міжурядових відносин (партнерської, принципал-агентської та подвійної) крізь призму теорії структурного функціоналізму. З'ясовано, що між урядами штатів та місцевими радами Нігерії домінує принципал-агентська модель («патрон-клієнт»), за якої штати систематично відчужують фінансові надходження місцевих рад через механізм «Спільного рахунку штату та місцевого самоврядування» (State Joint Local Government Account), а також порушують демократичний принцип формування рад, призначаючи лояльні тимчасові адміністрації (caretaker committees). Доведено, що рішення Верховного суду Нігерії 2024 року щодо надання прямого бюджетного фінансування та повної автономії муніципалітетам стикається з активним супротивом місцевих політичних еліт штатів (на прикладі суперечливого законодавства штату Анамбра 2024 року). Для подолання системної кризи низового врядування Нігерія має перейти від принципал-агентської до партнерської моделі міжурядових відносин. Обґрунтовано необхідність неухильного виконання рішення Верховного суду щодо прямого бюджетного фінансування органів місцевого самоврядування, проведення конституційної реформи для усунення правових двозначностей та гарантування регулярного проведення вільних місцевих виборів.

Ключові слова: *федералізм, місцеве самоврядування, низове врядування, міжурядові відносини, фінансова автономія, Верховний суд Нігерії, принципал-агентська модель, публічне адміністрування.*

Introduction. The Local Government in Nigeria commenced with enactment of Native Authority Act in 1916 during the indirect rule applied by the colonial rulers. The Macpherson Constitution of 1951 introduced regional autonomy. Consequent upon the discontinuation of Nigerian first democratic governance and the first regime of the Military, the composition and operation of the Local Government were affected. It was the reform of the Nigerian Local Government in 1976 that established a uniform operation of Local Government throughout Nigeria. The Local Government did not achieve up to expectation up till the second republic despite the 1976 reform. The present position of this tier of government reveals that it is yet to produce positive impact on the development of the nation at the grass roots despite the constitutional power enshrined in the constitution. (Ayaegbunam, 2014)

Section 7 Nigerian constitution provides for its functions, founding, composition, structure, and finance. The purpose of its constitutional birth was to enable the people in an area to know, understand and govern themselves. They are to earnest local talents, provide some essential services, execute community projects and contribute to the national development of the nation. (Oyewo, 2012) Unlike their counterparts in United States of America and Britain, the Local Governments in Nigeria do not have administrative and financial autonomy. It is treated as a segment of the state Government. Unlike Nigeria, the Local Governments in Britain and United States of America are efficient in the delivery of services and provision of public goods to the people at the grass root. (Adah, 2022)

The Local Governments in Britain and the United States are greatly assisted by the State Governments. About 40% of state expenditure goes to the Local Governments whereby State Governments provide grants for road projects, education, social welfare, hospital, public health and public safety. Meanwhile the local Governments have their own sources of income (Alao etal, 2015 as cited in Adah, 2022)

Literature review. The theoretical grounding of this study is anchored in Structural Functionalism, pioneered by Almond and Coleman (1960) and further developed by Almond and

Powell (1966). Structural functionalism posits that every political system consists of specific institutional structures designed to perform essential functions necessary for system integration, stability, and development. Within a federal polity, local government represents the primary institutional structure responsible for performing localized administrative, developmental, and service-delivery functions at the grassroots level (Adah, 2022; Jamo, 2012). Applying structural functionalism to Nigerian intergovernmental relations implies that for municipal governance to function effectively, local structures must possess constitutional autonomy, administrative authority, and independent fiscal resources. When higher-level structures, such as state governments, usurp the constitutional functions and financial resources of local councils, structural dysfunction occurs, leading to systemic failure in public service delivery and democratic decay at the grassroots level (Nwankwo, 2001; Obi, 2018).

Intergovernmental relations refer to the complex network of legal, financial, administrative, and political interactions among different tiers of government within a sovereign state (Ali, 2019; Okoli & Onah, 2010). In federal systems, intergovernmental arrangements typically manifest in three primary structural models: the Partnership Model, characterized by coordinate and mutually respectful relationships between tiers of government enjoying constitutional autonomy and fiscal independence (Adedire, 2014); the Dual Model, featuring complete separation of powers and distinct functional spheres (Ali, 2019); and the Principal-Agent Model, defined by a strict administrative hierarchy wherein the state government acts as the dominant principal and the local government functions merely as a subservient agent executing higher-level directives (Fatile et al., 2017; Obi, 2018). Scholarly consensus highlights that while federal constitutions nominally advocate a Partnership or Dual model, developing federal states frequently regress into an abusive Principal-Agent pattern (Adamolekun, 2002; Aransi, 2017).

The evolution of modern municipal governance in Nigeria is historically rooted in the 1976 Local Government Reform, which established local councils as a unified third tier of government (Adamolekun, 2002), a status formally codified in Section 7(1) of the 1999 Constitution of the Federal Republic of Nigeria (Anyaegbunam, 2014). However, empirical literature underscores a persistent contradiction between constitutional provisions and administrative reality. A major focal point of scholarly critique is Section 162(5–8) of the 1999 Constitution, which established the State Joint Local Government Account. Scholars argue that the State Joint Local Government Account mechanism transformed fiscal decentralization into an instrument of executive coercion, allowing state governments to routinely withhold statutory federal allocations, make arbitrary deductions, and starve local councils of funds (Ikechukwu, 2014; Nwogwugwu & Olusesi, 2015; Fatile et al., 2017). Furthermore, political scientists have documented the widespread erosion of local democracy through the unconstitutional appointment of caretaker committees by state governors, systematically disenfranchising grassroots communities and turning municipal chairmen into political appointees beholden to state executives (Aransi, 2017; Obi, 2018; Hazan, 2020).

While existing literature extensively documents the historical constraints of the State Joint Local Government Account and general executive interference prior to 2024 (Ikechukwu, 2014; Ali, 2019), there remains a critical research gap regarding how state governments adapt their control mechanisms in the immediate aftermath of landmark judicial interventions. Specifically, limited scholarly attention has been directed toward analyzing state-level legislative countermeasures enacted to circumvent Apex Court decisions. This study addresses this gap by evaluating contemporary intergovernmental dynamics through the lens of the 2024 Supreme Court autonomy judgment and subsequent legislative resistance.

The purpose of this article. The period of democratic governance in Nigeria has been a period where the local Government is facing serious difficulties in the performance of its functions. It has not been able to provide health services, water, education services among others. The infrastructural facilities being maintained in the past are in poor condition. Weakness of the institutions and extreme corruption are part of the reasons for the decline in the performance of the system. The original intention of bringing governance closer to the people has been defeated. Its election has not been regular. It has been the trusted candidates of the Governor that are appointed

to govern the system being governed by caretaker administrators instead of conducting elections regularly. The contract of the governments at the grass root has been mostly awarded to the loyalists of the Governors of the state. Meanwhile, the contracts are either poorly executed or not executed at all. The Local Government's major challenge is monetary. The allocated fund by the federal government to it are not getting to its treasury as shared while what is expected to be granted to the government by the state has not been regular. (Hazan, 2020)

Some top officials in the administration of the Local Government are seconded to the Local Government while some Councilors do not even understand their roles. The Chairman and few officials hijack the council's functions. Some time ago in Kaduna State It was on record that the statutory monthly allocation of a Local Government was shared in a Hotel outside the Local Government among the Chairman, the Director of Personnel and the Treasurer/Auditor.(Jamo, 2012) The recent Supreme Court decision in *Attorney General of the Federation V Attorney General of Abia State and 35 others (2024*) ought to have solved the lingering problems by granting full autonomy to the Local Government but the contrary is still being experienced problems on it because there are still abuse of the situation.

The specific objectives of this research include:

1. To examine the impact of local-state government political interaction on governance at the grass root.
2. To assess the consequence of ill financial rapport of state and local government on governance at the grass root.

Methodology. The paper adopted explanatory research design relying heavily on secondary sources of data such as textbooks, journal articles, internet materials, magazines, newspapers and other periodic publications. It also rely on legal statute and judicial decisions. These sources of data collection were employed for the purpose of harvesting sufficient reliable data to dissect the issue of state-local government relations and its effect on grass root government in Nigeria.

Main results of the research. The empirical assessment of intergovernmental relations in Nigeria reveals a profound structural distortion across fiscal, political, and service-delivery dimensions, turning the third tier of governance into a functionally constrained appendage of state executives. The monetary relationship between state governments and local councils in Nigeria has historically operated under a master-servant paradigm rather than an equal developmental partnership (Fatile et al., 2017). Under Section 162 of the 1999 Constitution of the Federal Republic of Nigeria, statutory allocations from the Federation Account were mandated to pass through the State Joint Local Government Account. This institutional mechanism created absolute fiscal dependency, as state governors routinely diverted, delayed, or selectively disbursed these funds, leaving local councils unable to cover basic administrative overheads, let alone finance capital infrastructure projects (Ikechukwu, 2014; Togun, 2010). Consequently, fiscal decentralization was effectively transformed into an instrument of executive coercion, undermining the financial viability of municipal administration across the federation (Nwogwugwu & Olusesi, 2015).

Alongside fiscal subjugation, state governments have systematically subverted municipal political autonomy, directly violating Section 7(1) of the 1999 Constitution which explicitly guarantees a democratically elected local government system (Anyaegbunam, 2014). State governors frequently refuse to conduct regular municipal elections, choosing instead to dissolve elected councils and appoint unconstitutional caretaker committees composed of political loyalists (Obi, 2018). This executive practice deprives local communities of genuine political representation and forces municipal council chairmen to prioritize loyalty to the state governor over democratic accountability to their grassroots electorate (Aransi, 2017; Hazan, 2020). As a doorstep government constitutionally tasked with primary healthcare, basic education, rural road maintenance, and water sanitation, local councils have been crippled by this dual financial and political starvation (Nwankwo, 2001). Municipal leaders are reduced to administrative subordinates who attend political meetings at state capitals while local infrastructure severely degrades, defeating the constitutional objective of bringing governance closer to the people (Ali, 2019).

From a theoretical perspective, intergovernmental interaction can follow a Partnership Model

based on equal legal standing, a Dual Model featuring distinct functional spheres, or a Principal-Agent Model defined by strict administrative hierarchy (Adedire, 2014; Ali, 2019). The empirical findings of this study confirm that intergovernmental relations in Nigeria operate strictly under an abusive Principal-Agent Model, wherein the state government acts as the dominant principal and the local council functions as a subservient agent executing higher-level directives (Fatile et al., 2017; Obi, 2018). Applying structural functionalism (Almond & Powell, 1966), this structural imbalance creates systemic dysfunction: when higher-level state institutions expropriate the functional space and financial resources of local councils, the municipal tier loses its capacity to perform societal stabilization and development functions at the grassroots level.

A major legal turning point in reversing this structural dysfunction occurred in the landmark suit Attorney General of the Federation v. Attorney General of Abia State and 35 others (2024). Delivering a decisive ruling aimed at dismantling the state governments' financial stranglehold, the Supreme Court of Nigeria affirmed that local government councils constitute a distinct, constitutionally recognized third tier of government possessing inherent legal personality and fiscal independence (A02Law, 2024). The Apex Court explicitly ordered that federal statutory allocations belonging to local councils must be remitted directly into their individual institutional bank accounts, bypassing the state-controlled State Joint Local Government Account. Furthermore, the Court declared it unconstitutional for state governors to dissolve elected local councils or to disburse public funds to unconstitutionally appointed caretaker administrators, thereby establishing a firm judicial mandate for direct municipal funding and governance autonomy (A02Law, 2024).

The judicial protection of local officials against executive victimisation is further illustrated by recent legal precedents protecting whistleblowers within the municipal administration. A prominent case involved Wale Adedayo, the former elected Chairman of Ijebu East Local Government in Ogun State, who publicly exposed the systematic withholding of municipal statutory allocations by the state governor in 2023. Following his public disclosures, Adedayo was illegally impeached by seven loyalist councilors under executive pressure. In December 2025, the Ogun State High Court officially nullified the impeachment, declaring the action unconstitutional and awarding ₦30 Million in damages in Adedayo's favor (Adedayo, 2025; Bankole, 2025; Ogunsanya, 2025). This judicial outcome reinforced the Supreme Court's stance by establishing that local council chairmen cannot be arbitrarily removed for asserting their constitutional fiscal rights against state executive interference.

Despite these clear judicial pronouncements, the practical implementation of complete local government autonomy faces aggressive resistance from state political elites who exploit constitutional ambiguities to preserve executive control. A primary manifestation of this resistance is state-level legislative circumvention, exemplified by the Anambra State Local Government Administration Law 2024. This state law mandates local councils to deposit a specified percentage of their directly received federal allocations back into a state-managed pool, thereby legally reinstating state fiscal control in direct defiance of the Apex Court (A02Law, 2024). Similarly, several state governors continue to pressure local council chairmen into signing joint spending agreements under threat of administrative sanctions, prompting the Federal Government through the Attorney General of the Federation to initiate threats of contempt-of-court charges against non-compliant governors. Consequently, while the judicial arm has constructed a robust legal framework for municipal independence, institutionalizing genuine grassroots governance in Nigeria remains locked in an ongoing structural struggle between Apex Court directives and state-level executive resistance.

Conclusions. This research has discovered that Principal/Agent Model of Intergovernmental Relation exists between government of the state and that of the Local Government. However, the model is disadvantageous to grass root governance. The Local Government as the third tier of government needs the statutorily granted autonomy for it to exist and perform its constitutional functions. The intervention of the judicial arm of government through its decisions solving the lingering autonomy issues should be respected by all the state governments in Nigeria. For the original intention for creating the Local Governments to be achieved and to achieve true federalism,

the decision of the Apex Court on Local Government autonomy should be fully implemented.

It is recommended that the Local Government to function effectively, Partnership Model should be adopted to enhance cordial relationship among Intergovernmental bodies in lieu of Master-Servant relationship that is militating against the advancement of the people at the grass roots.

The Supreme Court decision on Local Government autonomy should be implemented.

The constitution should be reviewed towards fostering the autonomy of the Local Government in Nigeria and isolate it from being an appendage of the State Government.

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PROSPECTS OF DIGITALIZATION OF TRANSITIONAL JUSTICE IN UKRAINE AND IMPLEMENTATION OF EU STANDARDS: OPPORTUNITIES, RISKS, AND ECONOMIC IMPLICATIONS

ПЕРСПЕКТИВИ ЦИФРОВІЗАЦІЇ ПЕРЕХІДНОГО ПРАВОСУДДЯ УКРАЇНИ ТА ВПРОВАДЖЕННЯ СТАНДАРТІВ ЄС: МОЖЛИВОСТІ, РИЗИКИ ТА ЕКОНОМІЧНІ НАСЛІДКИ

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Abstract. *The article examines the prospects of digitalization of transitional justice in Ukraine and the implementation of EU standards as key factors for enhancing the efficiency of the legal system and stimulating economic development. It explores the transformation of Ukrainian institutions' approaches to digitalizing judicial processes, the use of electronic platforms, automation of case management, and the integration of European standards into transitional justice practices. It is noted that initial experiments and local initiatives have gradually been replaced by systematic digitalization and harmonization with EU norms, aimed at increasing transparency, accelerating case proceedings, reducing corruption risks, and improving the investment climate.*

Based on the analysis of legislative acts, digitalization strategies, official EU documents, and statistical data, the study demonstrates that the implementation of digital solutions in transitional justice creates conditions for the effective functioning of institutions, enhancing the trust of international partners and attracting investments. The significant role of compliance with EU

standards is emphasized, as it facilitates Ukraine's integration into the European legal and economic space and strengthens the legitimacy of state reforms.

The study demonstrates that interaction among state authorities, international institutions, and the business community forms a new model of legal and economic development, in which digitalization and European standards act as mechanisms for ensuring stability and transparency. Modern digitalization of transitional justice combines tools for electronic document management, analytics, monitoring of judicial processes, and harmonization with European norms, creating conditions for long-term positive economic and institutional outcomes. The results of the study have scientific and practical significance for developing recommendations to improve the justice system in Ukraine, enhance the effectiveness of the investment environment, and promote the integration of the Ukrainian legal system into the European space.

Keywords: *digitalization of justice, transitional justice, EU standards, economic implications, risks, investment climate, legal efficiency*

Анотація. *У статті досліджено перспективи цифровізації перехідного правосуддя України та впровадження стандартів ЄС як ключові чинники підвищення ефективності правової системи та стимулювання економічного розвитку. Розкрито трансформацію підходів українських інституцій до цифровізації судових процесів, застосування електронних платформ, автоматизації розгляду справ та інтеграції європейських стандартів у практику перехідного правосуддя. Зазначено, що початкові експерименти і локальні ініціативи поступово трансформувалися у системну цифровізацію та гармонізацію з нормами ЄС, спрямовану на підвищення прозорості, прискорення розгляду справ, зменшення корупційних ризиків та покращення інвестиційного клімату. На основі аналізу законодавчих актів, стратегій цифровізації, офіційних документів ЄС та статистичних даних показано, що впровадження цифрових рішень у перехідне правосуддя створює передумови для ефективної роботи інституцій, підвищення довіри міжнародних партнерів і залучення інвестицій. Підкреслено значну роль відповідності стандартам ЄС, що сприяє інтеграції України у європейський правовий та економічний простір і підвищує легітимність державних реформ. Доведено, що взаємодія між державними органами, міжнародними інституціями та бізнес-спільнотою формує нову модель правового та економічного розвитку, у якій цифровізація та європейські стандарти виступають механізмом забезпечення стабільності та прозорості. Визначено, що сучасна цифровізація перехідного правосуддя поєднує інструменти електронного документообігу, аналітики, моніторингу судових процесів та гармонізації з європейськими нормами, що створює передумови для довгострокових позитивних економічних і інституційних наслідків. Результати дослідження мають науково-практичне значення для розроблення рекомендацій щодо вдосконалення системи правосуддя в Україні, підвищення ефективності інвестиційного середовища та сприяння інтеграції української правової системи у європейський простір.*

Ключові слова: *цифровізація правосуддя, перехідне правосуддя, стандарти ЄС, економічні наслідки, ризики, інвестиційний клімат, правова ефективність*

Introduction. The digitalization of transitional justice in Ukraine and the implementation of EU standards represent a promising direction for reforming the legal system, producing significant economic and institutional effects for the state. Currently, the issue of transitional justice in Ukraine is primarily strategic in nature, although certain elements are already being implemented amid the ongoing armed aggression. At the initial stage, the digitalization of the legal system was limited to isolated initiatives and experimental platforms for handling court cases and monitoring legal processes. Such a gradual approach was обусловлено необхідністю оцінки технічних, організаційних і правових ризиків, а також адаптації українського законодавства до стандартів ЄС.

In recent years, there has been increasing attention to the systemic digitalization of justice and

the integration of European standards, aimed at enhancing transparency, improving the efficiency of judicial procedures, reducing corruption risks, and creating a favorable investment climate. The use of digital tools and the implementation of European practices can provide the necessary conditions for the development of institutional stability and economic efficiency after the end of the full-scale war and the restoration of control over the entire territory of the country.

The analysis of opportunities for digitalization and the harmonization of Ukrainian justice with EU standards makes it possible to assess potential economic, investment, and legal consequences, as well as to identify strategies for integration into the European legal and economic space. The relevance of this topic is driven by the need for scientifically grounded planning of reforms and the development of recommendations for public institutions, international partners, and civil society regarding the implementation of digital solutions and EU standards in Ukraine's transitional justice system after de-occupation.

Thus, the study of the prospects for digitalization and the integration of European standards into transitional justice is of significant importance for the formation of an effective, transparent, and economically stable legal system in the future. In this context, the digitalization of the judicial system is considered not only as a technological modernization, but primarily as a tool for ensuring access to justice, especially under conditions of martial law and limited physical access to courts.

The purpose of the study. The purpose of this research is to provide a comprehensive analysis of the prospects for the digitalization of transitional justice in Ukraine and the implementation of EU standards, as well as to assess their potential economic, institutional, and investment impacts following the de-occupation of temporarily occupied territories. The study is aimed at identifying the role of digital tools and European standards in enhancing transparency, efficiency, and stability of the legal system, as well as in creating a favorable environment for business development and international partnership.

The methods. A combination of theoretical and empirical methods was applied in the study. The research analyzes scholarly and regulatory literature on the digitalization of justice, EU standards, and transitional justice in order to generalize contemporary approaches to legal system reform. A comparative method was used to examine European standards and digitalization practices of judicial processes across different countries.

A systemic approach was employed to comprehensively assess the potential impact of digitalization and the implementation of EU standards on institutional efficiency, transparency, and economic performance in Ukraine. The method of expert evaluation was used to assess possible economic and investment outcomes. In addition, a content analysis of official documents, justice digitalization strategies, and recommendations of the European Union, international organizations, and academic publications was conducted.

An interdisciplinary approach was also applied, enabling the integration of legal, economic, and political aspects in the study of the digitalization of transitional justice.

Main results of the research. This study is based on an interdisciplinary theoretical framework that combines the institutional approach, the theory of the rule of law, concepts of transitional justice, as well as approaches to digital governance (e-governance). Such a theoretical framework makes it possible to comprehensively analyze the transformation of legal institutions under the influence of digitalization and European integration processes (Bushchenko, A. & Hnatovsko, M. (Eds.). 2017; Bohatchuk D., 2015; Brunova-Kalisetska I., Kyselova T. & Martynenko O., 2020).

The study of existing practices of transitional justice in Ukraine shows that certain elements are currently being implemented; however, a unified political and regulatory framework governing these processes is still lacking (V Ukraini vzhe realizuiut elementy perekhidnoho pravosuddia, 2026; Luzan T., 2021). Ukrainian scholars emphasize the importance of adapting international experience and a criminological approach to the de-occupation of temporarily occupied territories, which involves integrating elements of transitional justice into national legislation (Lutsenko B., 2023; Cherviakova O., 2023). Of particular importance in this context is the concept of the digital state, which envisions the integration of information technologies into all areas of public

administration, including the judicial system, thereby promoting greater transparency, accountability, and efficiency in justice (Zhama A., 2024; Manko D., 2024; Sinehubov O., Bortnik O. & Chernenko O., 2024). Electronic justice, the automation of case proceedings, and digital platforms for communication between judicial bodies and citizens contribute to the optimization of processes and the reduction of corruption risks (Bohatchuk D., 2015; Haidu S., Martyniuk O., 2025; Tkachenko E., Radchenko Ya. & Kyrychenko V., 2024).

At the same time, the digitalization of justice is accompanied by potential risks related to cybersecurity, unequal access to digital services, and the need for personnel training (ShI u pravosuddi, 2026). The implementation of EU standards, particularly in the context of Regulation Règlement (UE) 2024/792, creates opportunities for harmonizing the national justice system with European practices and stimulates economic development by enhancing investment attractiveness and the efficiency of the legal environment (Règlement (UE), 2024).

Thus, a comprehensive analysis of the literature demonstrates that the prospects for the digitalization of transitional justice in Ukraine are shaped by both the potential benefits in terms of transparency and efficiency, as well as by risks that require careful regulation and the integration of European standards into national legislation (Bushchenko, A., & Hnatovsko, M., 2017).

Despite a large number of studies covering the theoretical and practical aspects of transitional justice and the digitalization of judicial processes, insufficient attention has been paid to a comprehensive analysis of the integration of digital tools into the national legal system in accordance with European standards, as well as to the assessment of the economic and social impacts of such reforms. This creates opportunities for further interdisciplinary research combining legal, technological, and economic approaches.

It is important to distinguish key concepts that are frequently used in the context of digital reforms. Digitalization (or digitization) refers to the change in the quality of information, manifested in its transition from analog to digital format or in the initial creation of data in a digital environment. Digitalization of processes (digitalization in a broader sense) encompasses actions and processes aimed at implementing digital solutions into specific tools or services, enriching the digital environment with the capabilities of technological devices, and digitizing necessary information. Digital transformation is a global process whose main goal is to achieve full digitalization through qualitative changes in tools and methods of data transmission, including the creation of digital content and the integration of technologies into all processes of the functioning of state institutions (Manko, D., 2024).

Such distinctions allow for a clearer understanding of the role of digital tools in transitional justice, their impact on the transparency, efficiency, and accessibility of judicial processes, as well as on the integration of EU standards into the national legal system. Contemporary studies emphasize that the digitalization of legal processes serves not only as a tool for optimizing court proceedings but also as an element of forming a new model of public administration focused on openness, accountability, and integration into international legal structures.

Despite significant scholarly developments, the digitalization of transitional justice in Ukraine remains extremely relevant, particularly in the context of the full-scale invasion. It gains special importance during the de-occupation of territories and the restoration of state institutions, requiring strategic planning and phased preparation. Modern digital solutions ensure the continuity of the judicial system even under conditions of military threats, contributing to the preservation of the rule of law and state stability.

For a deeper understanding of current transformations, it is useful to consider the evolution of the concept of transitional justice in global practice. The notion of transitional justice emerged against the backdrop of the collapse of authoritarian regimes and armed conflicts in Latin America, Africa, and Eastern Europe in the 1990s, providing practical experience in addressing the consequences of severe human rights violations (Tkachenko, E., Radchenko, Ya. & Kyrychenko, V., 2024). To date, more than one hundred countries have undergone transitions from authoritarianism to democracy or from war to peace, which has provided valuable experience in addressing the consequences of serious violations of human rights and international humanitarian

law (Brunova-Kalisetska, I., Kyselova, T. & Martynenko, O., 2020). The concept of transitional justice was first proposed by N. Kratz from the United States Institute of Peace (USIP) in 1995, while a significant contribution to its development was made by the French diplomat L. Jouannet, who in 1997 presented to the UN Commission on Human Rights 42 principles aimed at preventing impunity for violations of civil and political rights and the laws of armed conflict (Cherviakova, O., 2023). These principles encompass the right to justice, the right to know the truth, the right to guarantees of non-repetition of violations, and the right to reparation (Bushchenko, A. & Hnatovsko, M., 2017).

Thus, the modern concept of "transitional justice" is reflected in numerous UN and EU documents and encompasses a set of judicial and non-judicial mechanisms aimed at ensuring accountability, delivering justice, restoring victims, and implementing institutional reforms to achieve justice and reconciliation in society (Perekhidne pravosuddia, 2025).

The issue of implementing transitional justice in Ukraine has a long history – its first elements emerged after the beginning of Russian aggression in 2014, and following the full-scale invasion in 2022, their number has increased significantly (Luzan, T., 2021). Although certain elements of transitional justice are already being implemented in Ukraine, there is still a lack of a comprehensive state policy in this area, creating the need for a systemic approach (V Ukraini vzhe realizuiut elementy perekhidnoho pravosuddia, 2026).

Under such circumstances, the implementation of modern tools capable of ensuring the effectiveness, transparency, and systemic application of transitional justice mechanisms becomes particularly important, with digitalization occupying a key role. In the context of the full-scale invasion, digital technologies have become an essential instrument for implementing the principles of transitional justice, as confirmed by European standards and the Ukraine Facility initiative (Règlement (UE), 2024). This reform involves the modernization of the Unified Judicial Information and Telecommunication System, improving the efficiency of IT infrastructure management, and ensuring compatibility with state registries. Such measures align with EU recommendations for enhancing the functioning of the judiciary and provide a foundation for the further development of electronic justice in Ukraine. In particular, these steps are consistent with the principles of digital transformation of justice outlined in EU strategic documents, which include the development of e-Justice, ensuring system interoperability, and protecting personal data. The implementation of digital solutions in the justice system is also directly linked to the process of adapting to EU standards and integrating into the European legal space, which is identified as one of the key directions for reforming Ukraine’s judicial system (Sinehubov, O., Bortnik, O. & Chernenko, O., 2024).

The digitalization of the judicial system takes on strategic importance, as it enhances the transparency, efficiency, and accessibility of justice, particularly under conditions of martial law. At the same time, it is viewed as a mechanism for increasing public trust in the judiciary, as it ensures procedural transparency, predictability of decisions, and openness of judicial activities. Digital tools improve process oversight and enable rapid responses to emerging challenges, which is especially relevant during military threats.

The use of modern digital technologies, such as video conferencing, electronic document management, and digital registries, ensures the continuity of court proceedings even under difficult conditions. This not only optimizes budgetary expenditures and increases procedural efficiency but also facilitates the future documentation of human rights violations, which is crucial for restoring justice (see Table 1). Moreover, the digitalization of justice has a systemic economic impact on the business environment. It contributes to reducing transaction costs for economic actors, shortening the duration of commercial dispute resolution, and increasing the predictability of judicial decisions, which collectively support economic stability and the country’s investment attractiveness. As a result, a more stable environment is formed, serving as a key factor for attracting foreign investment and developing small and medium-sized enterprises. For the business sector, this translates into shorter dispute resolution times, lower legal support costs, and enhanced protection of property rights, which are critically important for the effective functioning of a market economy.

Table 1

Comparative Characteristics of Digital Tools in the Transitional Justice System

Tool	Function	Benefits	Examples of Use in the EU	Potential Benefits for Ukraine
Video Conferencing	Conducting court hearings remotely	Ensures continuity of proceedings, saves time and resources	Germany, Estonia	Enables court sessions during wartime, allows participation of witnesses and suspects without risk
Electronic Document Management	Online exchange of court documents	Reduces paper usage, accelerates judicial processes	France, Spain	Provides quick access to case materials, optimizes court workflow
Digital Registries of Victims/Suspects	Tracking participants in proceedings	Ensures transparency and data accuracy	Lithuania, Poland	Forms a database for restoring victims' rights and documenting violations
Analytical Platforms	Assessing the effectiveness of judicial processes	Forecasting, statistical analysis	Sweden, Netherlands	Supports strategic planning and data-driven decision-making

Source: Compiled by the authors

A practical example of digitalization is the implementation of subsystems within the Unified Judicial Information and Telecommunication System, including the «Electronic Court», the electronic user portal, and the video conferencing system, which enable remote interaction between the court and participants in proceedings. Thus, it can be noted that the practical experience of European countries demonstrates the effectiveness of judicial digitalization (ShI u pravosuddi, 2026). In particular, the implementation of the e-Justice system in Estonia has significantly reduced the duration of case proceedings and ensured fully electronic document management. This experience is especially relevant for Ukraine, as it can be adapted to the conditions of war and the need for the rapid restoration of the legal system after de-occupation. (Lutsenko, B., 2023).

Digital tools significantly enhance the efficiency and transparency of transitional justice processes, ensure the continuity of court proceedings, and serve as a key element in ensuring access to justice under conditions of armed conflict (Haidu, S. & Martyniuk, O., 2025). These tools enable the prompt documentation of human rights violations, the restoration of victims' rights, and the maintenance of transparency in decision-making. At the same time, research shows that for the successful integration of EU standards, digitalization must be combined with a comprehensive approach that includes three key components: government decisions on judicial system reform, technical and financial support from international partners, and active engagement of civil society. (Martynenko, O. & Semiorkina, O., 2020). Effective management of these risks creates opportunities for establishing a resilient digital justice ecosystem, which can ensure not only the continuity of court proceedings but also long-term institutional stability. The experience of European countries demonstrates that the use of digital platforms in justice increases process transparency, reduces corruption risks, and provides an effective mechanism for monitoring the enforcement of decisions, which is crucial for the development of transitional justice institutions and the strengthening of public trust in state authorities.

For clarity, these key components of EU standards integration are presented in Table 2, showing the responsible actors and potential risks associated with each component.

Table 2

Components for the Successful Integration of EU Standards into the Digitalization of the Judicial System

Component	Description	Responsible Actors	Potential Risks
Government Decisions	Reforming legislation and the judicial system	Ministry of Justice, Supreme Court	Non-compliance with international standards, delays in implementation
Technical and Financial Support	Provision of equipment, software, and funding	EU, international donors	Insufficient coordination, dependence on external resources
Civil Society	Monitoring, participation in implementation, training	NGOs, expert centers	Low engagement or lack of qualifications

Source: Compiled by the authors

Thus, the integration of EU standards requires a balanced combination of government decisions, international support, and active civil society participation, which ensures the coherence of reforms and minimizes the risks of their ineffective implementation. At the same time, the digitalization of transitional justice is accompanied by a number of risks, among which the key ones are cybersecurity threats, personal data leaks, unequal access to digital technologies across regions, and insufficient digital literacy among participants in judicial processes. Ignoring these challenges may reduce the effectiveness of reforms and affect public trust in the legal system (Zhama, A., 2024).

In the long term, the digitalization of transitional justice becomes not only a technical tool but also a strategic mechanism capable of strengthening Ukraine's institutional capacity, enhancing investment attractiveness, and facilitating effective integration into European security and legal frameworks. An important factor remains active public support for such changes, which reinforces the legitimacy of reforms and promotes transparency in the implementation of justice (Bohatchuk, D., 2015).

To practically demonstrate the role of digitalization in ensuring the effective functioning of transitional justice, Table 3 presents how traditional mechanisms can be transformed through digital technologies and the resulting impact on the accessibility and transparency of processes.

Table 3

Transitional Justice Mechanisms and the Role of Digitalization

Mechanism	Traditional Implementation	Digital Implementation	Expected Effect on Accessibility and Transparency
Judicial Prosecution	Physical hearings, paper case files	Video conferencing, electronic case files	Increased access to courts and enhanced security stability
Compensation and Reparations	Paper registries, lengthy procedures	Digital registries of victims, automated applications	Faster payments and improved accountability
Documentation of Violations	Physical records and archives	Digital databases, analytical platforms	Preservation of evidence, reliability, and transparency
Institutional Reforms	Manual legislative changes	Digital data management, electronic reform planning	Increased efficiency and monitoring of reform

			implementation

Source: Compiled by the authors

For example, in the process of documenting human rights violations in de-occupied territories, digital platforms can be used to collect testimonies, verify them, and store them in secure databases, significantly simplifying subsequent judicial prosecution and ensuring a proper evidentiary base. In this way, digital mechanisms of transitional justice provide rapid, transparent, and efficient functioning of all key processes, while also enabling systematic assessment of their economic and social impacts. In practical terms, this involves the implementation of specific tools, such as a unified digital platform for recording victims, integrated registries of court decisions, automated case allocation systems, and the use of artificial intelligence for analyzing judicial practice and predicting outcomes.

The research results demonstrate that comprehensive digitalization of transitional justice, combined with EU standards and active citizen participation, can become a key factor in restoring law and order, stabilizing state institutions, and integrating Ukraine into the European legal space after de-occupation. In this context, Ukraine can be seen as a unique case of combining post-conflict transformation with the digital modernization of the legal system (Brunova-Kalisetska et al., 2020). This process will contribute to the formation of a new legal reality, where technologies, standards, and public participation act as interconnected elements in ensuring effective and transparent justice. From a practical standpoint, the implementation of digitalization in transitional justice in Ukraine can be carried out in phased stages (Brunova-Kalisetska, I., Kyselova, T. & Martynenko, O., 2020). At the first stage, it is advisable to ensure the modernization of technical infrastructure and the integration of existing state registries. At the second stage, it is important to implement unified digital standards for judicial proceedings in accordance with EU requirements. At the third stage, training personnel and increasing the digital literacy of participants in judicial processes should be ensured.

Conclusions. The digitalization of transitional justice in Ukraine is a strategic direction for reforming the legal system, combining technological innovation with the implementation of EU standards. The study has shown that the use of digital tools contributes to increased transparency, efficiency, and accessibility of justice, while also creating the conditions for improving the investment climate. The integration of European standards ensures the harmonization of Ukraine's legal system with EU norms and enhances the trust of international partners. At the same time, the success of digitalization depends on the state's ability to minimize cyber risks, provide adequate technical infrastructure, and improve the digital competencies of process participants. In the long term, the digitalization of transitional justice may become a key factor in Ukraine's post-war recovery and sustainable development.

Regarding further research, attention should be focused on studying the effectiveness of digital tools in different regions of Ukraine, assessing the impact of digitalization on the accountability and transparency of judicial processes, and developing methodologies for integrating international standards into the national transitional justice system. Particular emphasis should be placed on analyzing the economic and social consequences of digitalization, enhancing the qualifications of judges, court staff, and civil society actors for working with digital platforms, as well as creating integrated databases for restoring victims' rights and documenting violations. The results obtained can be used in shaping state policy in the field of judicial digitalization and adapting European standards in the context of post-war recovery.

It should also be noted that the digitalization of justice is an integral element in strengthening the rule of law, as it contributes to improving the efficiency of judicial procedures, the transparency of court operations, and the accessibility of justice for citizens.

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THE EU COMMON FOREIGN AND SECURITY POLICY: BALANCING NATIONAL INTERESTS AND COLLECTIVE RESPONSE

СПІЛЬНА ЗОВНІШНЯ ТА БЕЗПЕКОВА ПОЛІТИКА ЄС: ПОШУК БАЛАНСУ МІЖ НАЦІОНАЛЬНИМИ ІНТЕРЕСАМИ ТА КОЛЕКТИВНОЮ ВІДПОВІДДЮ

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Abstract. *This article examines the evolution and current functioning of the European Union's Common Foreign and Security Policy (CFSP) in the context of transformations in the European security environment caused by Russia's full-scale aggression against Ukraine.*

The research methodology is based on systemic, institutional, and comparative approaches, as well as the analysis of EU founding treaties, strategic documents, and practical instruments for the implementation of foreign and security policy. The study analyzes the role of key EU institutions, including the European Council, the Council of the European Union, the High Representative of the Union for Foreign Affairs and Security Policy, and the European External Action Service, in shaping coordinated external actions.

The results demonstrate that the CFSP remains characterized by a significant level of intergovernmentalism, which preserves Member States' sovereignty in the field of foreign and security policy but simultaneously limits the effectiveness and promptness of collective decision-making. Russia's war against Ukraine has intensified political consolidation within the EU, strengthened sanctions mechanisms, expanded military and financial assistance to Ukraine, and stimulated the further development of defense cooperation initiatives, including the European Peace Facility and Permanent Structured Cooperation (PESCO). However, the unanimity principle continues to create structural obstacles to the rapid implementation of joint foreign policy decisions.

The scientific novelty of this research lies in substantiating the dual nature of the CFSP as a mechanism balancing national strategic priorities and supranational coordination under conditions of geopolitical instability. The practical significance of the study is determined by the possibility of using its findings to assess prospects for institutional reform of EU foreign and security policy and the strengthening of the Union's strategic autonomy.

Keywords: *European Union, Common Foreign and Security Policy, European security, Russia's war against Ukraine, national interests, collective response, strategic autonomy, sanctions policy, defense integration, European External Action Service, PESCO.*

Анотація. *У статті розглядається еволюція та сучасне функціонування Спільної зовнішньої та безпекової політики (СЗБП) Європейського Союзу в контексті трансформацій європейського безпекового середовища, спричинених повномасштабною агресією Росії проти України.*

Методологія дослідження базується на системному, інституційному та

порівняльному підходах, а також на аналізі установчих договорів ЄС, стратегічних документів та практичних інструментів реалізації зовнішньої та безпекової політики. У дослідженні аналізується роль ключових інституцій ЄС, включаючи Європейську Раду, Раду Європейського Союзу, Високого представника Союзу з питань закордонних справ та політики безпеки та Європейську службу зовнішніх дій, у координації та формуванні зовнішньої політики.

Результати демонструють, що СЗБП характеризується значним рівнем міжурядовості, що з одного боку захищає суверенітет держав-членів у сфері зовнішньої та безпекової політики, але одночасно з цим обмежує ефективність та оперативність колективного прийняття рішень. Війна Росії проти України поглибшила політичну консолідацію в рамках ЄС, посилила механізми санкцій, розширила військову та фінансову допомогу Україні та стимулювала подальший розвиток ініціатив у сфері оборонної співпраці, включаючи Європейський фонд миру та Постійне структуроване співробітництво (PESCO). Однак принцип одностайності продовжує створювати структурні перешкоди для швидкої реалізації спільних зовнішньополітичних рішень.

Наукова новизна дослідження полягає в обґрунтуванні подвійної природи СЗБП як механізму балансування національних стратегічних пріоритетів та наднаціональної координації в умовах геополітичної нестабільності. Практичне значення дослідження визначається можливістю використання його висновків для оцінки перспектив інституційної реформи зовнішньої та безпекової політики ЄС та зміцнення стратегічної автономії Союзу.

Ключові слова: *Європейський Союз, Спільна зовнішня та безпекова політика, європейська безпека, війна Росії проти України, національні інтереси, колективна відповідь, стратегічна автономія, санкційна політика, оборонна інтеграція, Європейська служба зовнішніх дій, PESCO.*

Introduction. The relevance of this study stems from the sweeping changes in European and global security brought about by the Russian Federation's full-scale war against Ukraine. For the first time in decades, the European Union has been forced to respond to classic interstate aggression, accompanied not only by military threats but also by a wide range of hybrid challenges–from energy and information security to migration crises. This situation has brought into sharp focus the effectiveness of the Common Foreign and Security Policy (CFSP) as one of the key mechanisms for ensuring the EU's stability and strategic autonomy.

The CFSP aims to play a fundamental role in the European Union's current security architecture by combining the foreign policy dimension with elements of defense cooperation. Through it, the EU seeks to act as a unified actor on the international stage, coordinate the positions of member states, and formulate collective responses to global security challenges. In this sense, the war against Ukraine has served as a catalyst for deepening cooperation within the CFSP, but at the same time has revealed its limitations, stemming from divergences between the national interests of member states.

The problem of reconciling the national interests of individual states with the EU's collective strategic goals remains a key challenge for the functioning of the CFSP. For the countries of Central and Eastern Europe, Russia's war against Ukraine has become a direct existential threat, driving their active stance on strengthening sanctions and providing military support to Ukraine. At the same time, a number of Western European states, which have deeper economic ties with Russia or are traditionally cautious on military policy issues, tend toward a more moderate approach. This creates a structural dilemma for the CFSP: how to achieve an effective collective response without losing unity or undermining the principles of solidarity.

The **purpose** of **this article** is to highlight the contradictions between the national interests of EU member states and the collective response within the framework of the Common Foreign and Security Policy against the backdrop of current challenges to European security.

Literature review. The issues surrounding the formation and development of the European

Union's Common Foreign and Security Policy are the subject of active research by both Ukrainian and foreign scholars. In contemporary academic literature, the main focus is on the institutional mechanisms for implementing the CFSP, the relationship between the national interests of member states and supranational foreign policy instruments, as well as the transformation of EU security policy under the influence of new geopolitical challenges.

Among Ukrainian researchers, V. Shatun, V. Solovykh, and O. Moskalenko have made significant contributions to the study of the evolution of EU security policy, analyzing the process of shaping the European security architecture and the EU's interaction with international security structures. Their works emphasize that the development of the CFSP is taking place amid increasing global instability and requires the coordination of member states' foreign policy positions.

Foreign scholars have made significant contributions to CFSP research. In particular, K. Smith views EU foreign policy as a complex system of multilevel governance that combines intergovernmental and supranational decision-making mechanisms. J. Howorth analyzes the development of the EU's defense component and emphasizes that the formation of a common security policy depends to a large extent on the willingness of member states to delegate part of their sovereign powers to supranational institutions. S. Biscop focuses on the concept of the European Union's strategic autonomy, linking it to the need to strengthen the EU's military-political capacity to act as an independent global actor. N. Tocci has made an important contribution to the study of the institutional aspects of the CFSP, emphasizing the role of strategic planning and the EU Global Strategy in shaping the Union's contemporary foreign policy.

At the same time, current research does not pay sufficient attention to the problem of balancing the national interests of EU member states with the need to formulate an effective collective response to contemporary security challenges, especially in the context of the Russia-Ukraine war, which underscores the relevance of further academic research in this area.

Main results of the research. The Common Foreign and Security Policy is one of the key pillars of European integration, shaping the foreign policy and security dimension of the European Union. It has developed gradually, responding to changes in the international system and internal challenges facing the EU, and has become an important instrument through which the Union seeks to act as a unified actor on the global stage.

The Foundations of the CFSP's Operations According to the Founding Treaties

At the Intergovernmental Conference on Political Union and the Maastricht European Council, heated debates took place regarding the CFSP due to concerns about its compatibility with NATO. France and Germany sought to achieve comprehensive common defense, while the United Kingdom advocated for the implementation of a simplified version of a common defense policy (Le Monde diplomatique, 1992). Ultimately, a compromise was reached in the form of a common defense policy that would eventually evolve into full collective defense. These objectives became part of an expanded framework for cooperation in foreign policy, which began in 1970(Davignon Report, 1970) and was reinforced by the Single European Act on February 17, 1986, in Luxembourg and February 28 in The Hague, which provided for consultations among member states.

Thus, the Treaty on European Union includes a "pillar" on the common foreign and security policy, which is purely intergovernmental in nature. Its objectives are to "protect the Union's common values, fundamental interests, and independence" and to "strengthen the security of the Union and its Member States in every respect." It also aims to "preserve peace and strengthen international security," "promote international cooperation," and "develop and strengthen democracy and the rule of law, as well as respect for human rights and fundamental freedoms."

To achieve these objectives, the Treaty provides for "systematic cooperation among Member States on foreign and security policy." The Committee of Foreign Ministers may unanimously determine a "common position" in areas of mutual interest. Member States must ensure that their foreign policies are consistent with the position adopted by such a Committee. Thus, when Member States have "important common interests," and on the basis of guidelines established by the European Council, the Committee of Ministers may unanimously adopt "joint actions" and define their means and objectives. Only implementing measures may be adopted by a qualified majority,

provided (as stipulated by the United Kingdom) that the Committee has authorized them by a unanimous vote. Given the obvious possibility of blocking through a veto, it is noted that "with regard to decisions requiring unanimity, Member States shall, as far as possible, refrain from blocking a unanimous decision if there is a qualified majority in favor of such a decision." In areas under CFSP jurisdiction, the European Council does not have the right to make proposals on which the Committee must decide. However, it may refer matters to the Committee, just as Member States may. Furthermore, the economic instruments used in the conduct of foreign policy (financial aid, embargoes, and trade negotiations) still fall within its sphere of responsibility. Thus, it participates in the CFSP. Although the European Parliament has the right to be informed, to hold debates on the CFSP, and may submit questions and recommendations to the Committee of Foreign Ministers, the Parliament's role is purely consultative. The European Court of Justice has no jurisdiction, as member states do not participate legally in the CFSP. To implement the CFSP, the European Union, which de facto has no diplomatic representation of its own, must coordinate the diplomatic and consular missions of member states in non-member countries and in various international organizations, particularly the UN Security Council and various bodies of the United Nations. The Member State holding the Council presidency every six months represents the Union on matters relating to the CFSP and is responsible for implementing joint actions. It is assisted by the previous and future presidencies (known as the "trinity" system) to ensure policy coherence.

Further developments were enshrined in the Treaty of Lisbon (2009), which significantly strengthened the institutional capacity of the CFSP. It reorganized the EU's "three-pillar" structure, making the CFSP an integral part of the Union's general legal framework, and provided for the creation of new institutional mechanisms, notably the position of High Representative for Foreign Affairs and Security Policy and the European External Action Service (EEAS). This treaty sought to enhance the coherence and visibility of EU policy on the international stage.

Although the Treaty of Lisbon formally abolished the Union's "pillar" structure, the distinct intergovernmental nature of the Common Foreign and Security Policy (CFSP, including the Common Security and Defense Policy–CSDP) was preserved. This meant that the European Council retained significantly greater direct responsibility for CFSP management than is the case with many other Union policies. Under the Treaty of Lisbon, the European Council is responsible for defining the strategic interests and objectives of the EU's external action in general, and of the CFSP in particular. It is also responsible for establishing general guidelines and adopting the necessary decisions for the implementation of the CFSP, including issues with a defense dimension, defining a common approach to any foreign and security policy issue, shaping the strategic direction of EU policy in response to (extraordinary) international events, and establishing a common defense for the EU. Apart from its direct responsibilities within the CFSP, the European Council has another important function: to conduct regular assessments of the threats facing the Union. This enables the EU and its member states to respond in a timely and effective manner to challenges, particularly those related to terrorism, as well as natural or man-made disasters. Based on the "general guidelines and strategic directions defined by the European Council," the Committee of Foreign Ministers is tasked with adopting the necessary decisions to define and implement the CFSP. The EU High Representative for Foreign Affairs and Security Policy, together with the member states, ensures the practical implementation of the CFSP. In this context, member states are required to "actively and unreservedly support the Union's foreign and security policy in a spirit of loyalty and mutual solidarity" and to "abide by the Union's actions in this field."

The Treaty also requires Member States to "work together to strengthen and develop their mutual political solidarity" and to "refrain from any action contrary to the interests of the Union or likely to undermine its effectiveness as a coherent actor in international relations." Once the EU has defined an approach to a specific issue of a geographical or thematic nature, Member States are required to "ensure that their national policies conform to the Union's positions."

Article 27 of the Treaty on European Union was pivotal in the creation of the European External Action Service, an institution designed to provide the EU High Representative for Foreign Affairs and Security Policy with the necessary tools to carry out his or her mandate. It is to work in

close cooperation with the diplomatic services of the Member States and be staffed from several sources: employees of the General Secretariat of the Council of the EU, the European Commission, and diplomats seconded by national governments. This hybrid structure is designed to combine the EU's institutional framework with the expertise of member states, but at the same time creates a number of challenges in terms of coordination and the division of responsibilities. The organizational principles and rules of operation of the EEAS are determined by a separate Council decision, adopted on the basis of a proposal by the High Representative following consultation with the European Parliament and with the consent of the European Commission.

Along with the establishment of the new institutional model, the creation of the EEAS was accompanied by special declarations (№ 13, 14, and 15) that accompanied the signing of the Treaty of Lisbon. These declarations held political and legal significance, as member states sought to define as clearly as possible the limits within which the Service could operate. These documents emphasized that the creation of new instruments of the Common Foreign and Security Policy in no way alters the existing responsibility of member states for the development and implementation of their own foreign policies. At the same time, it was emphasized that they retain their powers regarding national diplomatic representation in third countries and participation in international organizations, including activities within the UN Security Council.

Particular emphasis was placed on the fact that the new provisions do not affect the specifics of national security and defense policy, which remains the exclusive domain of Member States. Furthermore, it was explicitly stated that the Lisbon Treaty does not grant the European Commission additional powers to initiate decisions in the field of security and defense, nor does it strengthen the role of the European Parliament in this area. This approach demonstrates the member states' desire to retain control over sensitive foreign and security policy issues, while allowing the EU to develop the institutional capacity to act in a coordinated manner on the international stage.

As a result, the European External Action Service emerged as a compromise mechanism: on the one hand, it became an important step toward the institutionalization of European diplomacy, providing the High Representative with more effective tools; on the other hand, its powers were significantly limited so as not to pose a threat to the national sovereignty of member states. The declarations accompanying the Lisbon Treaty effectively curtailed the potential of both the Service itself and the High Representative, transforming them into instruments of coordination and harmonization rather than fully-fledged autonomous decision-making centers in the area of EU foreign and security policy.

One of the defining principles of the CFSP's operation is the principle of unanimity, under which each member state has the right of veto when key decisions are made. This principle reflects the intergovernmental nature of security policy and simultaneously guarantees the preservation of states' sovereignty in the sensitive sphere of defense. In practice, however, it is precisely unanimity that often becomes the main barrier to the CFSP's effectiveness. In the face of deep divisions among member states, it slows down the decision-making process, especially in crisis situations where speed of response is critical. Examples of differing positions on sanctions against Russia, arms support to Ukraine, or relations with China demonstrate that the unanimity mechanism sometimes reflects compromise more than strategic effectiveness. In the current context, there is an increasingly active debate about transitioning to qualified majority voting in foreign policy, at least regarding certain aspects (sanctions policy, human rights protection, humanitarian aid). This could be an important step toward enhancing the effectiveness of the CFSP, although it raises concerns among states that fear a loss of sovereign control.

The Dilemma of National Interests and Collective Response

Russia's war of aggression against Ukraine has highlighted the significant limitations of the Common Foreign and Security Policy (CFSP) governance system established by the Treaty of Lisbon, which has proven insufficiently effective in responding to the new configuration of European security, where the logic of force increasingly prevails over norms and rules. The initial political consolidation of EU member states partially offset the CFSP's structural dysfunctions, allowing the Union to act as a unified actor and become the world's largest donor of aid to Ukraine

(consilium.europa.eu, 2022).

The diversity of national interests and historical memory has led to the formation of different political positions among Western states, which can be broadly divided into three main blocs. The first is the Anglo-Saxon bloc, led by the United States of America, with the United Kingdom as a key European partner; the second is the Eastern European bloc, in which Poland and the Baltic states play a leading role; the third is the Western European bloc, represented primarily by Italy, Germany, and France.

The Anglo-Saxon bloc is primarily focused on limiting Russia's strategic influence and establishing its status as a regional power. At the same time, this goal does not entail a desire to destroy Russian statehood, which distinguishes the position of London and Washington from the approach of the Eastern European bloc. For the U.S. and the U.K., the Russian threat is a matter of geopolitical competition, whereas for Poland and the Baltic states, it is perceived as a matter of national survival. The Kremlin's aggressive policy has led to the strengthening of alliances between states that were once in conflict, and has also contributed to the consolidation of Poland and Ukraine's positions, allowing them to overcome historical differences. A symbolic marker of these differences was the incident involving a missile strike on Polish territory on November 15, which highlighted internal divisions within NATO and demonstrated the readiness of Eastern European states to act more decisively, even at the risk of further escalation. Furthermore, it was Poland and the Baltic states that became the most consistent advocates of severing energy ties with Russia, as historical experience and security considerations carry significantly more weight for them than economic benefits. Poland, which has twice disappeared from the political map of Europe due to its geopolitical position between two great powers, perceives current Russian aggression as an existential threat, a perception that has become particularly acute since the start of the full-scale war against Ukraine.

The Western European bloc, represented by Italy, Germany, and France, is characterized by a high level of economic interdependence with Russia, primarily in the energy sector. The German economic model was largely built on access to cheap Russian energy resources. The bet on Moscow's long-term reliability was based on the concept of "change through rapprochement," which envisaged the Kremlin's gradual integration into strong economic relations with the European Union. This approach was based on the expectation that, following the collapse of the Soviet Union, Russia, as the empire's principal heir, would gradually align with the European sphere of values and norms; however, the events of recent years have demonstrated the illusory nature of these calculations.

Over the past three years, the EU has mobilized unprecedented resources: nearly 140 billion euros in financial and material support, a massive expansion of defense-industrial capabilities– including a threefold increase in annual artillery ammunition production– an increase in defense spending to 326 billion euros, the adoption of 16 packages of sanctions against Russia, and a reduction in Russian gas imports by more than 75 percent. In addition, the EU has provided shelter to nearly 6 million Ukrainian refugees, recorded over 40 million border crossings from Ukraine, and initiated negotiations on Ukraine's membership in the Union (Petrov & Hillion, 2022).

The return of war to the European continent served as a catalyst for deepening integration processes within the CFSP. At the same time, the EU's institutional response to Russian aggression revealed structural limitations: "special rules and procedures" for decision-making, the principle of unanimity, and the lack of accountability mechanisms remain key barriers to developing a swift and coordinated foreign policy.

The intensity of the EU's response gradually diminished. Most key initiatives were implemented in the early stages of the conflict, when the shock of the war helped consolidate the positions of member states. In 2022, the Union adopted the "Strategic Compass," launched the EUMAM UA mission, imposed nine rounds of sanctions, approved six of the seven tranches of the European Peace Facility (EPF), and, for the first time, supplied lethal weapons to Ukraine. However, a number of measures were slowed down by protracted diplomatic negotiations: the approval of the Ukraine Assistance Fund (UAF) and the Ukraine Facility took nine months, while the opening of

negotiations on Ukraine's accession to the EU took 18 months. Sanctions also became more difficult to formulate: only six sanction packages were adopted in 2023–2024. The disbursement of the eighth tranche under the EPF has remained blocked since May 2023 due to a Hungarian veto (Politico, 2023), and both the operational implementation of the UAF and the transfer of €5 billion worth of weapons from member states remain on hold.

The difficulty in reaching consensus reflects the political status quo within the EU. Member states pursue different foreign policy approaches, and the Union is obliged to take into account the "specific nature of the security and defense policies" of Ireland, Austria, Malta, and Cyprus. As demonstrated by an emergency meeting in Paris in February 2025, member states failed to reach a consensus on key issues: the creation of a joint army, defense funding, and the development of military capabilities. Ukrainian President Volodymyr Zelenskyy's call for the formation of a unified European army at the 2025 Munich Conference was rejected by EU leaders (The Kyiv Independent, 2025). The White Paper on the Future of European Defense explicitly excludes centralized EU responsibility for troops, doctrines, and force deployment, merely referring in general terms to the possible creation of a Defense Union (Joint White Paper for European Defense Readiness 2030, JOIN (2025). A similar lack of coordination is evident regarding the creation of a European missile defense shield and the lifting of the veto on the use of EU equipment to strike targets on Russian territory (Foreign Affairs Council, 2024). Member states are also divided over the deployment of troops on Ukrainian territory in the event of a conflict resolution, with France being the main proponent of such a move following signals from the U.S. regarding a lack of support for Ukraine's security. Hungary, in turn, broke with the EU's common position on the international stage by voting against a UN General Assembly resolution condemning Russia's invasion of Ukraine (UN News, 2025).

In addition, Hungary exercised its veto over the European Council's conclusions regarding Ukraine, forcing the EU to publish separate final documents. Slovakia has suspended arms supplies to Ukraine, is considering withdrawing from the EUMAM UA and initiatives of the European Peace Fund, and has threatened to block new sanctions against Russia following the appointment of its prime minister in December 2023 (Politico, 2023). Poland has banned imports of Ukrainian grain, restricted border crossings with Ukraine, and announced a possible suspension of long-term military support until the border crisis is resolved (European Pravda, 2023). Austria, Malta, Cyprus, and Ireland maintain a neutral stance, refraining from supplying lethal weapons.

EU energy policy has also become an area of numerous complications. The inability to reach an agreement on banning imports of Russian oil and petroleum products has left the Union vulnerable to Russian energy blackmail. Although all member states formally agreed to "reduce dependence on Russian gas, oil, and coal as quickly as possible" (Versailles Declaration, 2022), political blockades by Germany, Italy, and Austria persisted for two years, and in early 2025, the EU even increased its purchases of Russian gas (Politico, 2025). As a result, a ban on Russian energy products was gradually introduced, and a price cap on oil was established, which took effect in December 2022 for crude oil and in February 2023 for petroleum products. The 14th package of sanctions against Russian liquefied natural gas, the most profitable segment of the gas market, was not introduced until June 2024, despite opposition from Hungary and Germany (Council Decision (CFSP) 2024/1738, 2024). There is still no general ban on Russian liquefied gas even after three years of war, despite calls from Northern and Eastern European countries.

In addition, the Czech Republic, Slovakia, Hungary, and Bulgaria continued to receive oil from Russia as a "temporary exemption" from EU sanctions, while Croatia remained dependent on gas supplies. As part of the 15th sanctions package, the EU extended this exemption for the Czech Republic regarding petroleum products until June 2025 and for Croatia regarding vacuum gas oil until December 2025 (Council Regulation (EU) 2024/3192, 2024).

Alongside practical difficulties, the very institutional structure of the CFSP significantly complicates decision-making and limits its actual impact. Both the European Peace Fund and the Ukraine Assistance Fund (UAF) are intergovernmental in nature, where the principle of unanimity is the norm, and budgetary decisions are directly linked to the national interests of contributing

member states. As a result, they do not address the structural dysfunctions of the CFSP and are unlikely to accelerate the provision of military support to Ukraine.

Establishing a common EU defense requires a prior unanimous decision by the heads of state or government in the European Council and subsequent ratification by all member states in accordance with their constitutional powers, pursuant to Article 42(2), first subparagraph, of the Treaty on the European Union. The "Strategic Compass" does not provide a solid foundation for the development of a common defense. The implementation of a military mission under the Common Security and Defense Policy (CSDP) by a "coalition of the willing" in accordance with Article 44 of the Treaty on European Union requires the unanimous approval of the Council and remains under its constant supervision throughout its duration. Although the "Strategic Compass" aims to operationalize the provisions of Article 44, it makes a limited contribution to strengthening the EU's role in European security, despite the expansion of the CSDP's toolkit.

Thus, the EU's Common Foreign and Security Policy (CFSP) faces a number of structural, political, and institutional challenges in the context of Russia's war against Ukraine. The lack of unanimity among member states, differences in national interests, and procedural constraints significantly hinder rapid decision-making and reduce the effectiveness of the CFSP. Military support for Ukraine and the imposition of sanctions against Russia have demonstrated the EU's potential to act as a unified bloc; however, numerous exceptions, blockages, and delays underscore that the mechanisms of the EPF and UAF funds do not address the policy's fundamental dysfunctions. Challenges in the energy sector, the lack of a common strategy for collective defense, and the limited role of CSDP instruments and "coalitions of the willing" demonstrate that the CFSP is not yet fully capable of providing a collective response to contemporary threats to European security. These conclusions underscore the need for further reform of institutional mechanisms and enhanced coordination among member states to improve the effectiveness of the EU's foreign and security policy.

Areas for Strengthening the Collective Response

One of the key potential avenues for reforming the CFSP is a gradual move away from the principle of unanimity in foreign policy decision-making, with the introduction of a qualified majority mechanism. The introduction of the qualified majority principle reduces decision-making time, minimizes the risk of blockage by individual states, and enhances the speed of response to crisis situations, including issues of defense, sanctions policy, energy security, and humanitarian aid.

Implementing the qualified majority principle in the CFSP involves several key aspects. Firstly, it is necessary to clearly define the areas where the use of a qualified majority is possible and appropriate, particularly in crisis and operational matters where the speed of decision-making is critical. Secondly, the introduction of this decision-making format requires the development of coordinated procedures to balance national interests with the EU's collective goals, in order to ensure the legitimacy of the decisions adopted and avoid the perception of a restriction on member states' sovereignty.

Additional measures are possible to enhance the effectiveness of the CFSP in the context of implementing the qualified majority principle. These include establishing independent expert groups within the Council of the EU to assess foreign policy proposals, introducing a transparent mechanism for monitoring the implementation of decisions, and a system of prior consultations with member states to minimize potential conflicts. It is also important to combine the qualified majority principle with a more active role for the EEAS: the service can act as a coordinator, ensuring the preparation of expert assessments, the coordination of strategic proposals, and the operational management of the implementation of adopted decisions.

Implementing the qualified majority principle will not only speed up decision-making but also promote greater coherence and predictability in EU foreign policy. This will enable the CFSP to become more flexible, effective, and capable of responding promptly to contemporary challenges, including armed conflicts, energy crises, and hybrid threats, thereby strengthening the Union's collective security and enhancing its strategic autonomy on the international stage.

Strengthening the role of the European External Action Service (EEAS) is one of the key areas for improving the effectiveness of the CFSP. The EEAS is capable of coordinating the activities of member states, ensuring the rapid exchange of information, and formulating coordinated proposals on foreign policy measures. At the same time, the service's current structure is limited in its powers, and its role in implementing strategic decisions often depends on the political will of individual states.

Several reform directions can be proposed to enhance the EEAS's effectiveness. First, its mandate in the area of crisis planning and management should be expanded, including the ability to rapidly formulate proposals on the use of CFSP instruments without the need for prior coordination with all member states. Second, it is important to strengthen the EEAS's analytical capacity by establishing specialized expert groups on regional and sectoral issues, which will enable a faster and more accurate response to threats. Third, it is advisable to introduce a system for monitoring and evaluating the effectiveness of EEAS initiatives, which will ensure transparency of processes and accountability to the European Council and Parliament.

At the same time, these measures will contribute to enhancing the effectiveness of the CFSP as a whole. A more autonomous and well-coordinated EEAS will help reduce delays in decision-making, minimize the impact of diverging national interests, and create the conditions for a rapid collective response to external threats. Integrating its work with initiatives in the areas of defense, sanctions policy, and energy security will enable the CFSP to become more flexible, strategically coherent, and capable of addressing the complex challenges of modern European security.

A separate area of integration involves strengthening defense capabilities through initiatives such as Permanent Structured Cooperation (PESCO) and the European Defense Fund (EDF). These initiatives allow member states to cooperate in developing joint defense capabilities, create joint armaments projects, and enhance the interoperability of their armed forces. Expanding PESCO and effectively utilizing the EDF can not only strengthen the EU's defense capabilities but also stimulate the formation of a single defense space, which is critically important in the context of countering Russian aggression.

Strategic documents such as the "Strategic Compass" and the "European Security Strategy" play a key role in shaping collective foreign and security policy. The "Strategic Compass" defines the key directions and priorities of the CFSP for the coming decade, establishing a framework for planning military operations and developing defense capabilities, while the "European Security Strategy" outlines the EU's long-term security objectives, including cybersecurity, countering hybrid threats, and strengthening partnerships with third countries.

Despite their importance, these documents have a number of limitations that reduce their practical impact. They do not always provide clear mechanisms for monitoring implementation, do not provide for flexible procedures for responding to crisis situations, and take limited account of differences in the national interests of member states. To enhance the effectiveness of the CFSP, strategic documents could be supplemented with concrete implementation roadmaps, clear performance indicators, and monitoring tools that would allow for tracking progress toward achieving set goals. Furthermore, integrating scenario planning and risk analysis will help the documents better adapt to unpredictable threats, such as armed aggression or hybrid attacks, while regularly updating the documents based on lessons learned during crises will ensure their relevance and practical utility for member states.

Such updates to strategic documents will not only improve the speed of decision-making within the CFSP but also promote greater coordination among member states, creating the conditions for an effective collective EU response to contemporary security challenges.

The prospects for CFSP reforms are also closely linked to the EU's further enlargement. An increase in the number of member states in the future could both strengthen the Union's political influence on the global stage and complicate the decision-making process. In this context, it is particularly important to develop coordination mechanisms, enhance the role of institutions capable of ensuring an effective policy, and integrate defense capabilities while taking new members into account. Effective adaptation of the CFSP to an enlarged EU will create a more flexible, coherent,

and capable collective security system, able to respond to contemporary challenges and safeguard the Union's strategic interests amid growing instability in Europe.

Conclusions. An examination of the dilemmas of interests within the framework of the EU's Common Foreign and Security Policy allows for a number of important generalizations. Russia's full-scale war against Ukraine served as a catalyst for intensifying the European Union's collective actions, yet at the same time revealed structural weaknesses and dysfunctions within the CFSP itself. In the short term, the Union has demonstrated the mobilization of significant financial, humanitarian, and military resources, becoming the main donor of aid to Ukraine; however, this success has not masked the fundamental problems that undermine the effectiveness of its foreign policy.

The greatest systemic vulnerability remains the principle of unanimity in decision-making. It is this principle that prevents a rapid response to crisis challenges, causes delays in the adoption of sanctions packages and military programs, and allows individual member states to block key initiatives. As a result, the CFSP proves to be excessively slow and dependent on political compromises, which calls into question its effectiveness in countering acute threats.

Another significant challenge is the deep fragmentation of member states' national interests. Differences in geopolitical orientations, historical experiences, and economic dependencies lead to varying views on the EU's role in the security sphere, which complicates the development of a unified strategy. This is clearly evident in the differing approaches to sanctions policy, energy security, or military support for Ukraine. Such divergence of positions not only slows down decision-making but also erodes trust in the EU as a coherent global actor.

Special attention should be paid to institutional constraints. The European External Action Service lacks sufficient authority to coordinate foreign policy initiatives, and strategic documents (the "Strategic Compass," the "European Security Strategy") remain largely declarative, outlining directions for development but failing to provide adequate mechanisms for implementation and oversight. Thus, even in the presence of common goals and political rhetoric, the real impact of these instruments remains limited.

An additional risk factor is the prospect of further EU enlargement. The accession of new members, particularly Ukraine, could, on the one hand, strengthen the Union's political weight, but on the other, further exacerbate the problem of fragmentation. Without reforming decision-making procedures and strengthening institutional capacity, the EU may face the threat of political paralysis.

Thus, Russia's war against Ukraine has demonstrated both the European Union's ability to mobilize resources and act collectively, as well as the limits of its foreign policy capacity. The main task for the near future is to reform the CFSP: a phased move away from the unanimity principle, expanding the role of the EEAS, transforming strategic documents from declarative to operational, and deepening defense integration through PESCO and the EDF. Only by overcoming institutional dysfunctions and reconciling national and collective interests can the EU become a truly strategically autonomous and effective actor in the European and global security system.

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ОСОБЛИВОСТІ РОЗВИТКУ СВІТОВОГО ГОСПОДАРСТВА ТА МЕВ
TRENDS IN THE GLOBAL ECONOMY AND INTERNATIONAL ECONOMIC RELATIONS

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STRATEGIC FORECASTING OF MERGERS AND ACQUISITIONS IN THE INTERNATIONAL IT SERVICES MARKET: WAVE LOGIC OF CONSOLIDATION AND ANALYTICAL FRAMEWORK FOR INVESTOR BEHAVIOUR

СТРАТЕГІЧНЕ ПРОГНОЗУВАННЯ ЗЛИТТІВ І ПОГЛИНАНЬ НА МІЖНАРОДНОМУ РИНКУ ІТ-ПОСЛУГ: ХВИЛЬОВА ЛОГІКА КОНСОЛІДАЦІЇ ТА АНАЛІТИЧНА РАМКА ПОВЕДІНКИ ІНВЕСТОРІВ

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Abstract. *The article develops an analytical framework for the strategic forecasting of mergers and acquisitions in the international IT services market, treating the wave logic of consolidation as a manifestation of structural regularities that can be operationalised for predictive purposes. The IT services market is characterised by cyclical M&A activity, with successive waves of consolidation triggered by technological shocks that redefine the structure of demand for digital competencies and the configuration of value chains. The article substantiates that consolidation waves in the IT services sector follow a three-phase pattern of technology emergence, consolidation, and integration, which distinguishes this sector from material-oriented industries where merger waves are driven primarily by deregulation or macroeconomic shifts. A multi-factor predictive framework is proposed that integrates target characteristics, investor strategies, sectoral context, and macroenvironmental conditions into a unified analytical system capable of generating probabilistic assessments of M&A activity at the firm, segment, and territorial-cluster levels. Attention is given to the differentiation of three predictive models: target prediction, buyer prediction, and pair matching, each addressing a distinct dimension of the forecasting task. The framework is applied to the analysis of consolidation dynamics in selected segments of the IT services market, including digital engineering, business process outsourcing, IT consulting, and managed services, and demonstrates sector-specific patterns of investor behaviour and the role of valuation multiples as leading indicators of consolidation pressure. The scientific novelty lies in the conceptualisation of technological shock as a sector-specific generator of merger waves and in the integration of behavioural typologies of investors with quantitative parameters of target firms into a single predictive architecture. The framework provides a methodological foundation for empirically verifying forecasting models using segment-level data and lays the groundwork for the development of strategic decision-support tools for participants in cross-border IT services markets.*

Key words: *international IT services market, mergers and acquisitions, strategic forecasting, waves of consolidation, technological shock, arbitration, investment funds, digital engineering, business process outsourcing, investor typology, digital value chains, strategic support, competitiveness, consolidation, integration, macroeconomic environment*

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Анотація. *У статті розроблено аналітичну рамку стратегічного прогнозування злиттів і поглинань на міжнародному ринку IT-послуг, у якій хвильова логіка консолідації трактується як прояв структурних закономірностей, придатних до операціоналізації з прогнозною метою. Ринок IT-послуг характеризується циклічною активністю злиттів і поглинань з послідовними хвилями консолідації, що зумовлюються технологічними шоками, які перевизначають структуру попиту на цифрові компетенції та конфігурацію ланцюгів вартості. Обґрунтовано, що хвилі консолідації у секторі IT-послуг розгортаються за тристадійною схемою технологічної емерджентності, консолідації та інтеграції, що відрізняє цей сектор від матеріально орієнтованих галузей, де хвилі злиттів зумовлюються переважно дерегуляцією або макроекономічними зрушеннями. Запропоновано багатофакторну прогнозну рамку, що інтегрує характеристики компаній-цілей, стратегії інвесторів, секторальний контекст і умови макроекономічного середовища в єдину аналітичну систему, здатну формувати ймовірнісні оцінки активності злиттів і поглинань на рівні фірм, сегментів і територіальних кластерів. Окрему увагу приділено диференціації трьох прогнозних моделей, а саме прогнозуванню компаній-цілей, прогнозуванню покупців і підбору пар «покупець-ціль», кожна з яких розв'язує власне завдання прогнозування. Розроблену рамку застосовано до аналізу динаміки консолідації в окремих сегментах ринку IT-послуг, зокрема в цифровому інжинірингу, аутсорсингу бізнес-процесів, IT-консалтингу і керованих сервісах, що продемонструвало секторально специфічні моделі поведінки інвесторів та роль оціночних мультиплікаторів як випереджальних індикаторів консолідаційного тиску. Наукова новизна полягає у концептуалізації технологічного шоку як специфічного для сектору IT-послуг генератора хвиль злиттів та в інтеграції поведінкових типологій інвесторів з кількісними параметрами компаній-цілей у єдину прогнозну архітектуру. Рамка створює методологічну основу для емпіричної верифікації прогнозних моделей на сегментних даних і формує передумови для розроблення інструментів стратегічної підтримки рішень для учасників транскордонних ринків IT-послуг.*

Ключові слова: *міжнародний ринок IT-послуг, злиття і поглинання, стратегічне прогнозування, хвилі консолідації, технологічний шок, арбітраж, інвестиційні фонди, цифровий інжиніринг, аутсорсинг бізнес-процесів, типологія інвесторів, цифрові ланцюги вартості, стратегічна підтримка, конкурентоспроможність, консолідація, інтеграція, макроекономічне середовище*

Introduction. The international IT services market has entered a phase of structural transformation in which mergers and acquisitions have ceased to be episodic events and have become a permanent mechanism for the redistribution of technological competencies and the reconfiguration of value chains. The global volume of the IT services sector in 2024 is estimated at approximately 1.5 trillion USD, while the annual volume of M&A activity in the information technology segment in North America exceeded 417 billion USD across more than 2,300 transactions *(Livingstone, 2025)*. These parameters indicate that investment dynamics in IT services can no longer be treated as derivative of general macroeconomic conditions and require an independent analytical approach that accounts for the specificity of intangible assets, the cyclicality of technological adoption, and the behavioural regularities of distinct investor types. The current state of the sector displays pronounced heterogeneity. The digital engineering segment grew at an average annual rate of 18.1% between 2020 and 2024, while IT solutions providers grew at only 2.3% *(Livingstone, 2025)*. Such differentiation in growth rates is directly reflected in valuation multiples: the median EV/EBITDA in digital engineering as of December 2024 reached 23.9x, while that of distributors and value-added resellers stood at 8.6x *(Livingstone, 2025)*. The gap in multiples creates structural preconditions for the redistribution of investment capital across segments and determines varying intensities of consolidation pressure, which, in turn, demand differentiated predictive models for each segment.

The relevance of developing an analytical framework for strategic M&A forecasting in IT services is determined by several considerations. The first lies in the fact that classical predictive

models built on financial indicators of material-oriented sectors have limited explanatory power in a market where value is formed by intangible assets and network effects *(Haskel and Westlake, 2018)*. The second concerns the circumstance that the wave dynamics of M&A activity in IT services has a sector-specific nature linked to technological cycles rather than to regulatory or macroeconomic disturbances *(Harford, 2005)*. The third is that the behavioral typologies of investors, including strategic acquirers, private equity funds, and venture capital, have distinct objectives and time horizons, which require separate predictive approaches for each type *(Phillips and Zhdanov, 2013)*.

The purpose of the article is to develop an analytical framework for strategic forecasting of mergers and acquisitions in the international IT services market, integrating the wave theory of consolidation, behavioral investor typologies, and sector-specific factors of the technological cycle. The realisation of this objective entails the conceptualisation of technological shock as a sector-specific generator of consolidation waves; the development of an architecture of predictive models with the differentiation of three levels, namely the prediction of targets, the prediction of buyers, and the matching of pairs; the determination of the role of valuation multiples as leading indicators of consolidation pressure; and the application of the framework to segment-level data for the identification of sector-specific patterns of investor behaviour. The methodological basis of the research combines structural-functional analysis of IT services market segments, comparative analysis of investment logics across investor types, the resource-based view, and elements of econometric modeling of the predictive architecture.

Literature review. The theoretical foundation of M&A forecasting was laid in classical works that treat merger waves as manifestations of industrial or macroeconomic disturbances. According to the concept of Gort (1969), waves are generated by economic shocks that create divergence in asset valuations across different investor categories. Subsequent research has clarified that aggregate M&A activity is driven primarily by industry shocks in the presence of sufficient capital liquidity *(Harford, 2005)*, and that waves are amplified by informational asymmetry regarding the true value of assets *(Rhodes-Kropf and Viswanathan, 2004)*. These propositions provide a basic theoretical framework but require adaptation to the specificity of a sector in which the object of transaction is not a physical asset but a technological competence. The second line of research concerns the micro-level determinants of M&A. The work of *(Bena and Li, 2014)* empirically confirmed that technological compatibility and the potential for synergies are predictors of specific buyer-target pairs, which opens up the possibility of building matching models. It was demonstrated that R&D-intensive firms are more often acquired, which allows innovation activity to serve as a predictive indicator *(Phillips and Zhdanov, 2013).* These results provide a methodological basis for forecasting at the individual-firm level but require supplementation with sector-specific variables, in particular the technology stack structure and position within the digital value chain.

The third line of research reveals the specificity of investment behaviour in intangible-oriented sectors. In the work of *(Nocke and Yeaple, 2007)* it was shown that the intensity of intangible assets makes M&A a more efficient form of cross-border expansion than greenfield investment, which explains the dominance of acquisitions as a mode of entry into markets of technological competencies. The concept of profiting from innovation *(Teece, 1986)* explains the motivation of strategic acquirers through the category of complementary assets, while the resource-based view *(Barney, 1991)* and knowledge-based theory *(Kogut and Zander, 1993)* substantiate the idea that the object of a transaction is a unique combination of competencies. These theoretical propositions form the conceptual apparatus for interpreting investor motives but do not offer directly operational predictive instruments. The theory of internalization *(Buckley and Casson, 1976)*, the eclectic paradigm *(Dunning, 2000)*, and the theory of corporate control *(Manne, 1965)* complete the classical apparatus, while the analysis of stakeholder bargaining power *(Coff, 1999)* draws attention to the appropriability of value created in transactions involving intangible assets.

The fourth line is formed by studies of IT services evolution and technological adoption. The analysis of corporate evolution *(Aithal and Rao, 2024)* demonstrates how large IT companies pass through successive phases of technological renewal, namely from offshore services to digital

transformation, AI platforms, and cloud services, which creates an empirical basis for understanding the trajectories of development of technological competencies and the corresponding investment decisions. The study *(Mastakar and Bowonder, 2005)* shows how the transformation of a service firm into a global provider is accompanied by a sequential change in investment priorities and capital structure. The conceptual development of *(Garud, et al., 2006)* introduces the notion of emergent design as a mechanism combining operational efficiency with the capacity for transformation, which has direct significance for understanding which companies become objects of strategic interest for investors.

The fifth line covers the competitive determinants of the IT sector. The analysis of strategic factors shaping international competitiveness *(Reznikova, Vovk, and Ptashchenko, 2025a) emphasizes* the role of investment attractiveness as a derivative of technological competencies and cyber resilience. The conceptualization of data and information technology markets as a space of strategic competition (Reznikova, Ptashchenko, *and Ptashchenko, 2025)* defines a framework in which investment transactions function as a mechanism for redistributing positions in digital leadership. The competitive determinants in the digital age *(Reznikova, Vovk, and Ptashchenko, 2025b)* shape the context in which M&A becomes an instrument of strategic positioning. Studies of the competitive advantages of the Ukrainian IT sector *(Melnyk and Zavhorodnia, 2023a)*, methodologies for assessing international competitiveness *(Melnyk and Zavhorodnia, 2023b)*, theoretical foundations of competition *(Zavhorodnia and Melnyk, 2023)*, and the state of the IT sector in 2022 *(Melnyk and Zavhorodnia, 2022)* form an empirical base for understanding the investment attractiveness of territorial clusters.

The sixth line concerns the broader context of transformations of the world economy. The geoeconomic dimension of investment processes is analyzed through the lens of civilizational frontiers *(Reznikova and Panchenko, 2023),* while the new normality of the global economy *(Reznikova and Ivashchenko, 2017)* shapes a specific environment for investment behavior in which uncertainty and the speed of technological change elevate the role of strategic forecasting. Human capital as a fundamental intangible asset *(Pryiatelchuk and Naida, 2025)* determines the value of companies and their attractiveness as transaction objects, while the socialization of state and corporate management *(Pryiatelchuk, 2017)* shapes the institutional environment of investment decisions. Digital trade *(Pryiatelchuk, 2023)* and the conceptualization of the digital media market *(Pryiatelchuk and Bekh, 2020)* reveal additional dimensions of demand for IT services that affect investment dynamics. The analysis of competencies in international business *(Vergun, 2020)*, the theory of platforms *(Kenney and Zysman, 2016)*, and data on world investment *(UNCTAD, 2024)* supplement the contextual framework.

Despite the considerable body of research, gaps remain in the literature that underpin the relevance of this article. An integrated predictive framework that would combine the wave theory of consolidation, the behavioural typologies of investors, and sector-specific factors of the technological cycle is absent. The differentiation of predictive models by level of analysis (firm, segment, cluster) has not been sufficiently developed. The role of valuation multiples as leading indicators of consolidation pressure requires systematic justification. Finally, sector-specific patterns of investor behaviour across different segments of the IT services market, from digital engineering to BPO and value-added resellers, have not received systematic comparative analysis.

Main results of the research. The conceptual basis for strategic forecasting of M&A in IT services is the proposition that wave dynamics of consolidation are not random but are subordinated to identifiable structural regularities. These regularities manifest themselves in three dimensions: the temporal (cyclicality of waves linked to technological adoption), the structural (differentiation of investor types by objective function and time horizon), and the spatial (concentration of transactions in particular territorial clusters). The combination of these three dimensions forms a three-dimensional space in which investment behaviour unfolds and within which predictive models can be constructed. In contrast to material-oriented sectors, where merger waves are driven predominantly by deregulation, trade shocks, or macroeconomic shifts, in IT services, the key generator of consolidation is technological displacement that redefines the structure of demand for

digital competencies. Empirical data demonstrate a clear cyclical pattern in M&A activity: in 2021, the global volume of transactions in the North American IT sector reached 620.4 billion USD across 3,954 transactions, while in 2023 these indicators fell to 292.8 billion USD and 2,463 transactions, respectively *(Livingstone, 2025)*. Such dynamics cannot be explained by macroeconomic factors alone and reflect a distinct cycle tied to the phase of technological adoption.

Each technological wave passes through three successive phases that establish different regimes of investment behaviour. During the phase of technological emergence, a significant number of start-ups and mid-sized companies emerge, developing solutions in their respective technological niches. Venture capital actively finances these companies, the market is fragmented, and median valuation multiples are high owing to investor expectations of future growth. In 2021, at the peak of the digitalisation cycle that accompanied the pandemic transformation, the median EV/EBITDA in digital engineering exceeded 35x *(Livingstone, 2025)*. In the consolidation phase, strategic acquirers and private equity funds actively acquire the most successful companies, consolidating competencies and market positions. The number of transactions grows, the average deal size increases, but multiples gradually decline because the focus shifts from growth potential to operational efficiency. In the phase of stabilisation and integration, acquired companies are integrated into the structures of acquirers, the market reaches a new configuration with a smaller number of larger players, and M&A activity declines until the next technological shock. The current cycle, which began in 2023, was initiated by the technological shock of generative artificial intelligence, which created new demand for competencies in AI implementation, MLOps, and the integration of large language models into corporate systems. This shock triggered a new emergence phase, already accompanied by early signals of consolidation: in 2024, the global volume of M&A in the North American IT sector recovered to 417.3 billion USD across 2,388 transactions, with a noticeable share of deals involving companies with AI competencies *(Livingstone, 2025)*. A forecast of the duration of the current cycle, based on historical data from previous waves such as cloud computing in 2010-2017 and ERP in 2000-2007, suggests that the active consolidation phase in the AI services segment will unfold in 2026-2028.

Strategic forecasting of M&A in IT services requires differentiation into three levels of analysis, each corresponding to a separate predictive task and requiring its own methodological basis. The first level is aimed at identifying companies with a high probability of being acquired. Predictive variables include the characteristics of the target company (revenue scale, growth rate, R&D intensity, gross margin, position within the technology stack), the parameters of the segment (phase of the technological cycle, level of fragmentation, dynamics of multiples), and the characteristics of capital structure (presence of venture financing, composition of shareholders, phase of the life cycle of VC and PE investments). The empirical grounds for constructing target-prediction models are provided by several regularities. R&D-intensive firms are more often acquired *(Phillips and Zhdanov, 2013),* as confirmed in IT services by data on transactions in the digital engineering segment, where the average R&D intensity of acquired companies consistently exceeds the segment median. A high growth rate combined with moderate scale is a predictor of acquisition, since companies with revenues in the range of 25-500 million USD and growth rates above 20% per annum form the core of attractive targets for PE funds and strategic acquirers. Gross margins above 35% and EBITDA margins above 15% indicate operational maturity, making a company suitable for integration into platforms. In the digital engineering segment, the average gross margin in 2024 stood at 34.3% and the EBITDA margin at 15.1%, which accounts for the high M&A activity in this segment *(Livingstone, 2025)*.

The second level is aimed at identifying companies with a high probability of becoming acquisition initiators in a particular segment. Predictive variables cover the financial state of the potential acquirer (liquid reserves, access to debt financing, level of capitalisation), its strategic position (expansion versus consolidation strategy, presence of gaps in the technology portfolio), the history of M&A activity (frequency and average size of previous transactions), and the industry position (phase of the life cycle of the core business, competitive pressure). Empirical data demonstrate a clear concentration of the acquirer function: in 2024, among public acquirers alone,

Accenture conducted 33 transactions, IBM 11, NTT Data 8, and Bechtle 6 *(Livingstone, 2025)*. Such concentration provides a basis for constructing lists of the most probable acquirers in each segment. The third level combines the first two and aims to predict specific buyer-target pairs. The empirical confirmation of the link between technological compatibility and the probability of specific pairs *(Bena and Li, 2014)* provides a methodological basis for constructing matching models that assess the distance between the technology stacks of potential participants in a transaction. Additional parameters of matching include geographic complementarity (the acquirer's need for presence in markets where the target operates), client complementarity (the mutual reinforcement of client bases), and the cultural compatibility of organisational practices.

In IT services, valuation multiples serve as a leading indicator of consolidation pressure. The gap in multiples between segments creates a structural incentive for arbitrage strategies on the part of PE funds and strategic acquirers, since a company operating in a segment with low multiples (for example, a value-added reseller with a median EV/EBITDA of 8.6x) can be acquired, repositioned, or integrated into a platform valued at multiples of a higher segment, such as digital engineering at 23.9x *(Livingstone, 2025)*. Such a multiple arbitrage strategy explains a significant share of buy-and-build activity by PE funds and enables the prediction of the direction of consolidation pressure. The dynamic analysis of multiples reveals several regularities. In the BPO segment, median multiples declined from 11-13x in 2022-2023 to 8-10x in 2024, which reflects the impact of automation and AI tools that reduce dependence on human capital and thereby erode the traditional value proposition of BPO providers *(Livingstone, 2025)*. This forecast points to continued consolidation in BPO, with a focus on companies that integrate AI capabilities into traditional outsourcing processes. In the IT solutions provider segment, the gap in multiples between American and Asian players on one side and European players on the other creates an incentive for cross-border transactions in which acquirers from higher-multiple jurisdictions acquire companies in lower-multiple jurisdictions for operational integration.

The jurisdictions for application of the framework to individual segments of the IT services market reveal distinctly different patterns of consolidation. In the digital engineering segment, strategic acquirers from the sphere of large global systems integrators (Accenture, Cognizant, Infosys) predominate, seeking to close gaps in their own portfolios through the acquisition of specialised teams. The Cognizant-Belcan transaction at 1.3 billion USD in June 2024 is a typical example of such a strategy, aimed at expanding competencies in the aerospace and automotive sectors *(Livingstone, 2025)*. In the managed services segment, consolidation under the auspices of PE platforms predominates, with Evergreen Services (led by Alpine Investors) as an illustrative example, having acquired more than 10 managed services providers in 2024 through a buy-and-build strategy. In the IT consulting segment, a mixed model is observed, with large mega-deals (Thoughtworks acquired by Apax for 1.9 billion USD, Perficient acquired by EQT for 2.7 billion USD) alongside numerous add-on acquisitions of platforms. A special place in the sectoral architecture is occupied by the corporate evolution of large IT companies, which act simultaneously as objects and subjects of consolidation. The analysis of the technological adaptation of Infosys *(Aithal and Rao, 2024)* demonstrates how large players use M&A as an instrument of strategic positioning in new technological niches: the acquisition of specialised competencies in AI, cloud services, and cybersecurity allows large integrators to reposition themselves rapidly in new demand segments. This strategy creates structural demand for target companies and shapes a stable flow of consolidation activity that partially offsets the cyclical nature of waves.

The predictive framework must account for macroenvironmental factors that modulate the intensity of consolidation waves without determining their primary nature. Such factors include the cost of capital (the level of interest rates affects the availability of debt financing for PE transactions), exchange rate dynamics (the strengthening of the dollar stimulates American acquirers to expand into Europe, which partially explains the growth of cross-border activity in 2024), regulatory conditions (antitrust scrutiny and restrictions on foreign investment in strategic sectors), and geopolitical factors (sanctions regimes, trade barriers, and restrictions on technology transfer). In 2024, the stabilization of monetary conditions and the recovery of global M&A volume to 3.7

trillion USD across 45,191 transactions created a favorable environment for a new consolidation cycle in IT services *(Livingstone, 2025)*.

Conclusions. In the course of solving the research task, which consisted in developing an analytical framework for the strategic forecasting of mergers and acquisitions in the international IT services market and presupposed the integration of the wave theory of consolidation, the behavioural typologies of investors, and sector-specific factors of the technological cycle, a number of scientific results have been obtained that allow the formulation of the following conclusions.

The wave logic of consolidation in IT services has a sector-specific nature that fundamentally distinguishes this sector from material-oriented industries. While in the classical conception *(Gort, 1969; Harford, 2005)* merger waves are generated by deregulation or macroeconomic shocks, in IT services the key generator is technological displacement that redefines the structure of demand for digital competencies. This proposition has not only theoretical but also predictive significance, as identifying the current phase of the technological cycle allows forming expectations about the intensity and structure of M&A activity in the corresponding segment. Strategic forecasting of M&A in IT services requires differentiation into three levels: predicting targets, predicting buyers, and matching pairs, each of which corresponds to a separate predictive task and rests on its own set of predictors. The prediction of targets draws on the characteristics of the target company (scale, growth rate, R&D intensity, profitability), the prediction of buyers on the strategic position and financial state of the potential acquirer, and the matching of pairs on technological, geographic, and client complementarity. Such an architecture provides a methodological basis for constructing operational predictive instruments.

Valuation multiples in IT services serve as a leading indicator of consolidation pressure. The gap in multiples across segments creates a structural incentive for arbitrage strategies, which account for a significant share of PE funds' buy-and-build activity. The dynamic analysis of multiples enables the identification of segments with the highest consolidation potential and the prediction of directions of investment flows. Sector-specific patterns of consolidation display pronounced heterogeneity: digital engineering is characterized by the dominance of strategic acquirers, managed services by PE platforms pursuing buy-and-build strategies, and IT consulting by a mixed model of mega-deals and add-on acquisitions. Such differentiation requires segment-specific predictive models and cannot be reduced to aggregate indicators of the sector. Macroenvironmental factors, namely the cost of capital, exchange rate dynamics, and regulatory and geopolitical conditions, perform the function of modulators of the intensity of waves but do not determine their primary nature. This proposition allows the structural factors of consolidation to be separated from the cyclical ones and predictive models with different time horizons to be constructed.

The scientific novelty of the research consists in: the conceptualisation of technological shock as a sector-specific generator of consolidation waves, which distinguishes IT services from material-oriented industries; the development of an architecture of predictive models with the differentiation of three levels of analysis (targets, buyers, and matching) and the determination of specific predictors for each level; the substantiation of the role of valuation multiples as leading indicators of consolidation pressure and the identification of multiples arbitrage as a structural mechanism of capital redistribution across segments; the identification of sector-specific patterns of consolidation for digital engineering, managed services, IT consulting, and BPO, which forms a basis for differentiated forecasting; and the integration of macroenvironmental factors as modulators of cyclical dynamics into a single analytical framework.

The prospects for further research include the empirical verification of predictive models on segment-level data using machine learning methods; the development of quantitative indicators of the technological cycle for operational monitoring of the consolidation phase; the construction of matching algorithms based on the analysis of technology stacks and client portfolios; the adaptation of the framework to territorial clusters with different institutional environments; and the integration of ESG factors into predictive models in view of the growing role of sustainable development in investment decisions.

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DIGITALIZATION OF FINANCE AND THE EVOLUTION OF BANKING REGULATION: INSTITUTIONAL REVERSAL FROM THE GLASS-STEAGALL MODEL TO PLATFORM-BASED BANKING

ЦИФРОВІЗАЦІЯ ФІНАНСІВ І ЕВОЛЮЦІЯ БАНКІВСЬКОГО РЕГУЛЮВАННЯ: ІНСТИТУЦІЙНА РЕВЕРСІЯ ВІД МОДЕЛІ ГЛАССА-СТІГОЛЛА ДО ПЛАТФОРМЕННОГО БАНКІНГУ

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Abstract. *The article substantiates the theoretical interpretation of the digitalization of finance as a driver of institutional transformation in banking regulation. It is argued that the regulatory logic embedded in the Glass-Steagall model, based on functional separation, is being gradually replaced by a model of technological convergence grounded in platform-based banking. The study demonstrates that financial innovations, fintech expansion, and artificial intelligence technologies reshape not only the efficiency parameters of financial intermediation but its structural architecture, leading to an institutional reversal. The contradiction between regulatory fragmentation and digital integration is identified as a core driver of transformation in the financial system. It is shown that platform-based banking integrates functions historically separated by regulatory design, thereby reproducing systemic risks in a new digital form. Attention is paid to the implications for financial stability, regulatory policy, and risk distribution, including the transition from activity-based*

regulation to ecosystem-based governance. The paper examines the role of digital finance in transforming investment activity and strategies, including the logic of out-investing, and its impact on sustainable development through ESG integration and green transition financing. It is concluded that the future of the banking sector is determined by competition among financial architectures, in which control over digital platforms becomes a key source of systemic economic power.

Keywords: *regulation, transformation, competition, financial system, banking sector, platform banking, shadow banking sector, shadow economy, financial intermediation, financial services, financial innovation, digitalization of finance, financial instability, risks, threats, fintech companies, digital economy, investment activity, investment strategies, out-investing, sustainable development, ESG*

Анотація. *У статті запропоновано теоретичну інтерпретацію цифровізації фінансів як чинника інституційної трансформації банківського регулювання, що змінює базову логіку організації фінансової системи. Доведено, що регуляторна модель, сформована в межах закону Гласса-Стіголла і заснована на принципі функціонального розмежування, поступово втрачає ефективність під впливом цифрових технологій, які забезпечують інтеграцію фінансових функцій без формального об'єднання інституцій. Обґрунтовано, що розвиток фінансових інновацій, фінтех-компаній і алгоритмічних систем управління призводить до формування платформенного банкінгу як нової архітектури фінансового посередництва, у межах якої різні сегменти фінансового сектору взаємодіють у спільному цифровому середовищі. Встановлено, що суперечність між регуляторною фрагментацією та технологічною конвергенцією формує передумови інституційної реверсії, яка проявляється у відтворенні інтегрованої структури фінансової системи у новій цифровій формі. Показано, що платформенний банкінг забезпечує масштабування фінансових операцій, змінює характер конкуренції та підсилює роль даних як ключового економічного ресурсу. Водночас доведено, що така трансформація супроводжується формуванням нових конфігурацій ризиків, пов'язаних із концентрацією інформації, алгоритмічним прийняттям рішень і зростанням швидкості поширення фінансових шоків у цифровому середовищі. Проаналізовано зміну регуляторних підходів, що проявляється у переході від контролю окремих видів діяльності до управління фінансовими екосистемами. Обґрунтовано, що цифровізація фінансів трансформує інвестиційну діяльність та інвестиційні стратегії, формуючи логіку випереджального інвестування як боротьби за контроль над інфраструктурними вузлами фінансової системи. Зроблено висновок, що ключовим фактором розвитку банківського сектору стає не продуктова конкуренція, а конкуренція фінансових архітектур, у межах якої контроль над цифровими платформами визначає розподіл економічної влади. Наукова новизна полягає у розробці теоретичної рамки аналізу цифровізації фінансів як процесу інституційної реверсії, що дозволяє переосмислити взаємозв'язок між регуляторною фрагментацією та технологічною інтеграцією у фінансовій системі. Запропоновано інтерпретацію платформенного банкінгу не як результату технологічної еволюції, а як форми відтворення інтегрованої архітектури фінансового посередництва у цифровому середовищі без формального демонтажу регуляторних обмежень. Уточнено механізм зміни характеру фінансового посередництва через перенесення функцій інтеграції з інституційного рівня на рівень цифрових платформ, що дозволяє пояснити трансформацію розподілу ризиків і появу нових центрів економічної влади.*

Ключові слова: *регулювання, трансформація, конкуренція, фінансова система, банківський сектор, платформенний банкінг, тіньовий банківський сектор, тіньова економіка, фінансове посередництво, фінансові послуги, фінансові інновації, цифровізація фінансів, фінансова нестабільність, ризики, загрози, фінтех-компанії, цифрова економіка, інвестиційна діяльність, інвестиційні стратегії, випереджальне інвестування, сталий розвиток, ESG*

Introduction. The historical evolution of banking regulation demonstrates that institutional changes in the financial system are reactive, responding to crisis phenomena associated with excessive risk concentration and the functional integration of financial institutions. The Glass-Steagall Act established the principle of structural separation as a basic condition for ensuring financial stability, institutionalizing the separation between commercial and investment banking, and limiting the risk of spillover between financial system segments. This model corresponded to the logic of the industrial economy, in which efficiency was achieved through functional specialization, and stability was ensured through institutional barriers.

The digitalization of finance radically changes this logic, as the development of financial technologies, platform business models, and algorithmic management systems blurs boundaries between financial sectors, forming integrated digital ecosystems. Banks, fintech companies, and non-banking institutions interact within a single infrastructure, where financial services are integrated with non-financial services and financial intermediation takes on a platform character. In such conditions, the regulatory paradigm, based on the principle of separation of functions, is transformed towards technological integration. The contradiction between regulatory fragmentation and digital convergence forms an analytical basis for interpreting modern processes as institutional reversion, i.e., the gradual reproduction of the integrated structure of the financial system in a new technological form without the formal dismantling of regulatory restrictions. This process has fundamental consequences for financial stability, since the integration of functions is accompanied by data concentration, algorithmic decision-making, and an increase in the speed of the spread of financial shocks in the digital environment.

The relevance of the study lies in the fact that financial innovations serve not only to increase efficiency but also to transform the financial system, changing the mechanisms of risk distribution, the nature of financial intermediation, and the logic of interaction between market participants. At the same time, the digitalization of finance creates new challenges for regulatory policy, requiring a transition from controlling individual activities to managing complex financial ecosystems.

The purpose of the article is to substantiate the digitalization of finance as a factor in the institutional reversion of banking regulation and to identify the mechanisms through which the development of platform-based banking changes the functional logic of financial intermediation and the architecture of the financial system. Achieving this goal involves the sequential solution of several analytical tasks, for which appropriate research methods were used. The method of structural-logical analysis was used to identify the relationship between the regulatory fragmentation inherent in the Glass-Steagall model and the technological convergence arising from the digitalization of finance, thereby substantiating the category of institutional reversion as an analytical tool for research. The comparative method was used to compare the industrial model of banking regulation with the modern digital architecture of financial systems, enabling identification of a shift in the principles of organizing financial intermediation from functional separation to platform integration. The method of theoretical generalization was used to develop a holistic concept of the transformation of the financial system, particularly to interpret platform banking as a means of reproducing an integrated structure of financial intermediation in the digital environment. Additionally, elements of the system approach were used to analyze the financial system as a holistic ecosystem in which banks, fintech companies, and digital platforms interact, enabling us to reveal the changing nature of risk distribution and the emergence of new centers of economic power.

Literature review. Modern research on the transformation of financial systems under digitalization emphasizes the growing role of digital technologies, data, and financial innovations as key drivers of structural change, reshaping financial intermediation, expanding access to financial services, and simultaneously generating new forms of asymmetry and systemic risk *(Desyatnyuk & Ptashchenko, 2025a; Desyatnyuk & Ptashchenko, 2025b; Desyatnyuk et al., 2025; Krysovatyy et al., 2024).* Within the framework of analyzing global structural transformations, attention is focused on the reconfiguration of financial intermediation, the erosion of institutional boundaries, and the increasing complexity of financial ecosystems, which are shaped by the interaction of digitalization,

global competition, and regulatory change *(Calomiris & Haber, 2014; Allen et al., 2021; Philippon, 2019).*

A separate strand of research develops the understanding of financial technologies as a systemic factor transforming the architecture of financial markets, where fintech is interpreted not only as a technological tool but as a driver of new models of financial intermediation based on data, digital platforms, and algorithmic decision-making *(Arner et al., 2016; King, 2018; Skinner, 2020).* In this context, digital infrastructures and financial platforms are increasingly viewed as spaces of strategic competition, within which control over data flows, technological standards, and user interfaces determines the positioning of financial institutions and national economies in the global system *(Rochet & Tirole, 2003; Parker et al., 2016).*

At the same time, research on artificial intelligence highlights its transformative role in financial decision-making processes, demonstrating that algorithmic systems increase efficiency and predictive capacity while generating new systemic risks related to opacity, interdependence, and the potential for synchronized failures across interconnected financial networks *(Acemoglu & Restrepo, 2018; Brynjolfsson et al., 2021)*. These processes are accompanied by the emergence of new asymmetries in access to technological infrastructure and data, further complicating the financial sector's regulatory landscape *(Desyatnyuk et al., 2025)*.

The integration of digital transformation with broader economic processes is also reflected in studies linking financial innovation to structural changes in the global economy, where digital technologies are seen as factors that enhance financial stability, enable new investment models, and influence the allocation of financial resources *(Desyatnyuk & Ptashchenko, 2025c)*. At the same time, these approaches reveal the growing interdependence between financial, technological, and regulatory risks, which requires a rethinking of traditional regulatory frameworks.

The combination of these approaches provides a theoretical basis for analyzing digital transformations of the financial system, in which technological change, institutional evolution, and new forms of economic interaction are considered as interrelated factors shaping the restructuring of global financial architecture. However, despite the significant body of research, the existing literature remains fragmented, as studies of fintech, platform economics, and banking regulation are rarely integrated into a unified analytical framework.

This fragmentation limits the ability to explain the systemic consequences of digitalization, particularly the interaction between regulatory fragmentation and technological convergence. In most studies, digitalization is treated primarily as a source of efficiency gains, while its role as a driver of institutional transformation remains insufficiently conceptualized. This creates the need for a theoretical reinterpretation of digitalization as a process of institutional reversal, enabling platform-based banking to be analyzed not merely as a technological outcome but as a reconfiguration of financial intermediation within a digital environment.

Main results of the research. The modern transformation of the financial system should be considered a change in the principles governing the distribution and combination of financial intermediation functions across different types of financial institutions. Within the industrial model of banking regulation, the function of accumulation of savings and lending was assigned to deposit banks, while the functions of underwriting, investment, and securities transactions were carried out by investment institutions, and risk management and derivative financial instruments were concentrated in specialized market segments, which ensured the limitation of risk transfer through institutional delimitation of types of activities. The further development of financial markets led to a gradual blurring of these boundaries, as a result of which there was a combination of previously separated functions within universal banking structures, where one institution simultaneously carried out the accumulation of resources, lending, investment operations, and risk management, which increased the efficiency of activities, but at the same time complicated risk control. The Gramm-Leach-Bliley Act of 1999 legally completed the dismantling of the main restrictions of Glass-Steagall, allowing the creation of financial holding companies with a combination of banking, insurance, and investment activities, while the Volcker Rule, introduced under Section 619 of the Dodd-Frank Act of 2010, restored partial unbundling only in the proprietary trading segment

(Gramm-Leach-Bliley Act, 1999; Dodd-Frank Act, 2010, Section 619). The digitalization of finance forms a new stage of this evolution, within which the specified functions are no longer rigidly tied to separate institutions, but are implemented in a distributed digital environment through platforms and technological infrastructures, which allows them to be integrated without formal institutional unification, changing the very principle of the organization of financial intermediation and creating the prerequisites for institutional reversion *(Calomiris & Haber, 2014; Allen et al., 2021).* Such dynamics are consistent with D. North's view that institutions change incrementally and path-dependently, while technological conditions evolve more rapidly, creating a structural gap between the regulatory logic and the actual organization of economic interaction *(North, 1990).* In terms of O. Williamson's transaction cost theory, the transfer of integration from the level of the banking organization to the level of the digital infrastructure means a change in the way of minimizing the costs of coordinating financial intermediation, in which the market and hierarchy are replaced by a network *(Williamson, 1985).*

A qualitative change is occurring with the digitalization of finance, shifting the integration of functions from the institutional level to the technological infrastructure. If, in previous models, the combination of deposit and credit intermediation, investment operations, and payment services required organizational unification within banking groups, then in the digital environment, these functions can be implemented by different participants and integrated through platforms, digital interfaces, and algorithmic interaction systems. This means that institutional boundaries, which previously served as the main tool of regulatory control, lose their effectiveness, as actual integration occurs outside the formally defined structures. In such conditions, the very nature of financial intermediation changes, ceasing to be tied to a separate institution and acquiring a network character. The functions of attracting, allocating, making payments, and managing risk are distributed among different participants who interact within a single digital environment. This leads to the formation of a new architecture of the financial system, in which the key element is not the bank as an organization but the platform as an infrastructure that coordinates economic interactions and integrates financial services (*Arner et al., 2016; King, 2018*).

Within the framework of such transformation, there is a change not only in the organizational form of financial intermediation, but also in its resource base, as data and the capabilities to process them become key factors. If, in the traditional banking model, information served an auxiliary function, ensuring creditworthiness assessment and risk management, then in the digital economy, it becomes a central resource that determines the ability to make financial decisions and to build competitive advantage. This means that the function of processing financial information extends beyond the bank's internal procedures and becomes an independent segment of activity that can be separated and performed by specialized technological actors. As a result, a new configuration of financial intermediation arises, in which control over data and their processing algorithms becomes more significant than control over capital as such *(Parker et al., 2016).* This shift is conceptualized by S. Zuboff as a transition to a regime in which data on the behavior of economic agents is transformed into an independent resource of accumulation, changing the nature of market relations *(Zuboff, 2019),* while N. Srnicek interprets control over the infrastructure of interaction and the logic of data extraction as the basis of a new business model of platform capitalism *(Srnicek, 2017).*

This shift is changing the coordination mechanisms in the financial system, as decision-making increasingly relies on algorithmic models that integrate large datasets and automate key operations. This applies not only to credit scoring or portfolio management, but also to payment systems, customer identification systems, fraud prevention, and risk monitoring. In such a situation, functions that were previously performed within a single institution are distributed among multiple participants who interact through a digital infrastructure that enables coordinated work. It is this mechanism that creates the prerequisites for the actual combination of financial functions without their institutional merger.

In this context, it is appropriate to discuss institutional reversion as a key analytical principle that helps explain modern changes. We are talking about the reproduction of the integrated model of financial intermediation, characteristic of periods of universal bank dominance, but in a

fundamentally new form, in which integration is implemented through technological mechanisms. Such a reversion is not a simple return to previous states, as it is accompanied by changes in the carriers of functions and in the mechanisms of their interaction. If earlier integration meant the concentration of functions within a single organization, now it means their coordination within a digital platform that ensures interaction between different participants. This, in turn, changes the object of regulatory influence, since traditional approaches that focus on controlling individual activities or institutions are insufficient for managing risks in the networked financial system. Regulation should consider not only the characteristics of individual entities but also the structure of their interaction, data exchange channels, and algorithmic decision-making mechanisms. As a result, there is a need to transition from regulating activities to regulating interaction, which means a fundamental change in the logic of financial policy.

The transformation of coordination mechanisms and the distribution of functions directly affect the nature of systemic risks, which, in the digital economy, acquire a network character. While in the traditional model, risks were tied to the balance sheets of individual institutions and could be localized through regulatory constraints, in the modern financial system, they are formed through interactions among different elements of the digital infrastructure. This means that sources of instability can be not only financial imbalances, but also technological failures, algorithm errors, or disruptions in data flows that can quickly spread through interconnected systems *(Acemoglu & Restrepo, 2018; Brynjolfsson et al., 2021).* The network nature of systemic risks was empirically substantiated by E. Haldane and R. May, who showed that in a closely interconnected financial system, stability is determined by the topology of connections, and not by the balance sheet indicators of individual institutions, and the risks themselves have a nature similar to the propagation of shocks in ecological networks *(Haldane, 2009; Haldane & May, 2011).* This provision, formulated in relation to traditional banking networks, becomes increasingly relevant in the platform architecture of finance, where the density and speed of connections are qualitatively higher.

The change in systemic risks naturally leads to a transformation of competitive dynamics in the financial sector, since it is risks and the methods of their management that determine the market structure and the behavior of its participants. In the traditional model, competition took place between banks as institutions that competed for deposits, borrowers, and access to capital, using price and product instruments. In the digital economy, this logic changes, since control over the infrastructure through which economic agents interact becomes crucial. This means that competition shifts to the plane of financial architectures, where not only the creation of value but also control over the channels of its distribution and access to customers become key (*Allen et al., 2021; Philippon, 2019*). An institutionalized example of such a transformation is the second European Union Payments Directive *(Directive (EU) 2015/2366, PSD2),* which obliged banks to provide licensed third-party providers with standardized access to customer accounts through open programming interfaces and introduced the figures of payment initiation and account information service providers, which perform financial intermediation functions without having the status of a bank *(European Parliament, 2015)*. Regulatory policy itself here acts as a factor in the transfer of intermediation from the level of banking institutions to the level of network interactions, which corresponds to the logic of institutional reversion: integrated functionality is reproduced at the platform level without the formal abolition of prudential separation. In such conditions, platforms that integrate payment services, lending, investment operations, and data processing acquire systemic significance and become new centers of economic power. They determine the rules of market access, establish standards for interaction, and perform coordination functions previously inherent in the banking system. This leads to a shift in the role of banks, which, from being the main organizers of financial flows, become participants in broader ecosystems, where their functions can be partially replaced or supplemented by technological solutions.

The change in competitive logic is directly related to changes in the strategies of economic agents, among which the transformation of investment behavior plays a key role. In the traditional model, investments were considered as a tool for expanding activities or increasing efficiency within the existing market structure. In the digital economy, they increasingly shape this structure, aiming

to create and control infrastructures that determine the market's future configuration. It is in this context that the logic of out-investing emerges, which involves allocating resources to segments that do not yet deliver maximum profit but have the potential to become key elements of future financial ecosystems. This primarily concerns investments in platforms, data processing systems, algorithmic decision-making models, and digital interfaces that enable customer access and financial flows. This approach shifts the focus from optimizing current financial results to ensuring strategic control over the economic interaction environment (*Parker et al., 2016; Philippon, 2019*).

Out-investing involves changing the time horizons of decision-making, as economic agents are willing to accept short-term losses or reduced profitability in exchange for long-term dominance in key segments. This means that the criteria for investment effectiveness are expanding to include not only financial indicators, but also the ability to form dependencies of other market participants, set standards, and control value distribution channels. As a result, investments are turning into a strategic positioning tool that determines the distribution of economic power in the financial system. At the same time, such a transformation of investment activity is accompanied by increased complexity and uncertainty, as it is associated not only with financial risks but also with technological and information risks. Investments in digital infrastructure require consideration of factors related to the reliability of technologies, data security, and the stability of algorithmic systems, which complicates decision-making and increases the need for risk management. This creates additional barriers to entry and contributes to the concentration of resources in the hands of those actors who can combine financial and technological competencies. In essence, the change in the logic of competition and investment activity is an interrelated process that shapes a new architecture of the financial system, in which control over infrastructure, data, and interaction mechanisms becomes a determining factor in development. It is in this plane that institutional reversion manifests itself as the reproduction of an integrated model of financial intermediation in a digital environment, where functions are combined not through institutional consolidation, but through technological coordination.

In parallel with the shift in investment behavior, regulatory approaches are being reoriented to address the inconsistency between traditional instruments and the new financial system structure. Regulation, built on the control of individual activities and institutional boundaries, faces limitations, since in the digital environment, the functions of attracting, allocating, making payments, managing risk, and processing information are implemented in a distributed manner. This means that one and the same financial transaction can include several participants, each of which formally belongs to different market segments, but is part of a single process. In such conditions, there is a need to transition from a regulatory framework focused on individual functions or institutions to one that accounts for the interdependence of the financial system's elements. The object of regulatory influence is not only the activities of individual entities, but also the architecture of their interaction, including digital platforms, data exchange protocols, and algorithmic decision-making mechanisms. This requires expanding the financial policy toolkit to combine elements of prudential supervision with oversight of technological infrastructure.

Within the framework of such transformation, the functional meaning of compliance also changes, ceasing to be an auxiliary tool for ensuring compliance with established norms and becoming an infrastructure mechanism for regulatory coordination. If, in the traditional banking model, compliance was associated with monitoring compliance with requirements in the areas of combating money laundering, terrorist financing, data protection, and sanctions regulation, then in the platform architecture of finance, it is integrated into the process of financial transactions itself through algorithmic monitoring and data processing systems. This means that compliance is transformed into embedded regulation, in which control is exercised not ex post facto but in real time through digital infrastructures that ensure the functioning of financial ecosystems. Such a transformation is directly related to institutional reversion, as it allows the restoration of the integration of control functions without reverting to rigid institutional demarcation. In parallel, the growth of financial intermediation segments operating outside traditional banking regulation reflects the structural market response to the limitations of a model built on institutional boundaries.

Digital technologies lower entry barriers and enable the implementation of individual financial intermediation functions in a distributed manner, contributing to the development of a shadow banking sector in which integration of functions occurs outside the traditional regulatory framework.

In a broader theoretical perspective, this shift can be interpreted through the concept of re-embedding, proposed by K. Polanyi regarding the relationship between economic action and social structure *(Polanyi, 1944)* and developed by M. Granovetter in its application to economic networks *(Granovetter, 1985).* Financial activity, partially freed from the institutional framework of the industrial age, is re-embedded in a new infrastructural fabric formed by digital platforms, data exchange protocols, and algorithmic compliance mechanisms. Empirically, this process is captured in the EU Regulation on the Digital Operational Resilience of the Financial Sector *(Regulation (EU) 2022/2554, DORA),* which entered into full application on 17 January 2025 and for the first time established unified requirements for ICT risk management in twenty categories of financial institutions, as well as introduced direct supervision of critical third-party ICT service providers *(European Parliament, 2022).* The Regulation on Markets in Crypto-Assets *(Regulation (EU) 2023/1114, MiCA),* which is fully applicable from 30 December 2024, integrates the crypto-asset segment and its service providers into a unified regulatory framework *(European Parliament, 2023).* The combination of DORA and MiCA captures the transition from regulation built on functional separation of activities to regulation that encompasses the architecture of the digital financial ecosystem.

The change in regulatory logic is also driven by the need to account for new types of risks arising in the digital financial system. These are risks that are associated not only with financial indicators but also with the technological characteristics of the system, including the stability of digital platforms, the reliability of algorithms, and data security. This means that the regulator must assess not only the financial stability of individual institutions but also their roles within the network structure and potential channels for the spread of shocks through digital infrastructures. (*Acemoglu & Restrepo, 2018; Brynjolfsson et al., 2021*). The issue of concentration of economic power in digital financial ecosystems is of particular importance. Control over platforms and data allows individual actors to determine the conditions of access to financial services, set standards of interaction, and influence the allocation of resources. This creates risks of monopolization and restrictions on competition that cannot be effectively regulated by traditional antitrust instruments focused on market share or price indicators. In the digital environment, the parameters of control over infrastructure and data become key, requiring the adaptation of approaches to assessing market power (*Parker et al., 2016*). The geo-economic dimension of the transformation of the financial system manifests in competition for control over global digital financial infrastructure. States and large corporations are investing in developing their own technological platforms, payment systems, and data exchange standards to ensure autonomy and reduce dependence on external solutions. This leads to the formation of alternative centers of influence and to the fragmentation of the global financial system, in which different regulatory regimes and technological ecosystems coexist and compete (*Allen et al., 2021; Philippon, 2019*).

Within such processes, the interaction between banks and fintech companies takes on new characteristics, combining competition and cooperation. Banks, on the one hand, retain access to financial resources and client bases; on the other hand, they are forced to adopt technological solutions to remain competitive. Fintech companies, in turn, use flexibility and technological specialization to quickly scale and enter different segments of the financial market. This forms a complex system of interdependencies, in which none of the participants can fully control the processes, yet each seeks to consolidate key positions within the digital infrastructure. These changes indicate that the financial system is moving to a state in which its functioning is determined not so much by the institutional structure as by the configuration of interactions between various actors within the digital environment. It is this configuration that determines the distribution of risks, access to resources, and the nature of economic power, which makes it the central object of both scientific analysis and regulatory policy.

The shift of the object of regulatory influence to the level of interactions and digital

infrastructures necessitates a review of the instruments and principles of financial policy, since traditional mechanisms focused on balance sheet indicators and the activity standards of individual institutions do not adequately account for the network nature of the modern financial system. In the digital environment, the parameters of relationships, the speed of information exchange, the degree of dependence between participants, and the architecture of data flows that form new channels of risk and impact transmission become key. This means that regulatory policy must consider not only the individual characteristics of subjects, but also their position in the system of relationships, which determines the potential for the emergence and spread of shocks. A change in analytical focus leads to the development of approaches that treat the financial system as a complex adaptive ecosystem, in which the behavior of individual elements is determined not only by their internal parameters but also by their interactions with other elements. In such a system, stability is not a static characteristic but is formed through constant interaction, which requires new approaches to ensuring it. The regulator is forced to consider not only the probability of risks, but also the mechanisms of their spread, which are associated with the topology of network connections and the nature of information flows (*Acemoglu & Restrepo, 2018*).

In parallel, the structure of financial services is becoming more complex, increasingly integrated with non-financial services within digital platforms. This means that financial activity is no longer an autonomous sphere and is embedded in broader economic processes related to e-commerce, social networks, digital identification systems, and other types of online interaction. As a result, the boundaries of the financial sector are blurring, and regulation must account for cross-industry interactions, increasing the complexity and multidimensionality of regulatory decisions. The growth of digital platforms' role in the financial system is accompanied by increased reliance on technological standards and protocols that govern interaction among participants. Control over such standards allows you to set the conditions for market access and build long-term competitive advantages, underscoring the importance of the infrastructure level of the economy. This means that competition between economic agents is increasingly taking place over the opportunity to determine the architecture of interaction, rather than just to offer financial products (*Parker et al., 2016*). In this context, the nature of interaction between national regulatory regimes is also changing, as digital financial infrastructures are transnational and can operate independently of individual jurisdictions' borders. This creates a situation in which regulatory decisions in one country can affect others, and the effectiveness of national policies depends on the possibility of international coordination. At the same time, differences in regulatory approaches and technological standards can lead to fragmentation of the global financial space and the formation of alternative centers of development (*Allen et al., 2021; Philippon, 2019*).

The deepening of these processes is changing the role of banks in the financial system, with banks increasingly functioning as elements of broader digital ecosystems rather than as autonomous institutions. Their competitiveness is determined by the ability to integrate into such ecosystems, use data and technological solutions, and adapt their business models to new conditions. This means that traditional sources of competitive advantage, such as asset scale or access to capital, are gradually being supplemented or replaced by factors related to technological capabilities and network position. The change in the role of banks and the nature of financial intermediation completes the formation of a new logic of the functioning of the financial system, within which the determining factor is not the institutional form, but the way in which the interaction between the functions of attracting resources, their placement, making payments, risk management, and information processing is organized. It is this organizational approach that determines the distribution of economic power, the structure of risks, and the direction of the financial sector's development, allowing us to consider digitalization as a key factor in its institutional transformation.

In this logic, *out-investing* is not a separate episode, but a mechanism through which economic agents consolidate their positions in the new architecture of the financial system. It is about changing the content of investment activity from placing capital to generate income to forming control over the nodes of the digital infrastructure through which financial intermediation is carried out. As a result, investments are directed primarily into platforms, interaction interfaces, data processing

systems, algorithmic risk assessment models, and channels of access to client bases that determine the rules of the market and the possibilities of participation in it. This logic assumes that investment decisions are made not so much on current profitability indicators but rather on the potential to control future value flows. This means a shift in investment rationality from optimizing profitability to ensuring a strategic position in the system of interactions. In this sense, *out-investing* is associated with the creation of infrastructural advantages that enable long-term influence over resource allocation and access to financial services (*Parker et al., 2016; Philippon, 2019*).

An important characteristic of this approach is the change in investment time horizons, as economic agents are willing to accept short-term losses or reduced profitability in exchange for future control over key market segments. This creates a new configuration of incentives, in which investments are used to shape the market structure rather than just maintain it. As a result, competition between financial and technological actors takes on the character of a struggle for dominance in strategically important elements of the digital infrastructure. *Out-investing* also changes the nature of the interaction between banks and fintech companies, as both groups of participants use investments to consolidate their positions in digital ecosystems. Banks invest in technological solutions to maintain customer access and expand the functionality of their services, while fintech companies use investments to scale their platforms and create alternative channels of financial intermediation. This leads to the formation of a complex system of competitive-cooperative relations, within which the boundary between competition and cooperation is determined by the strategic goals of the participants.

The growth of the role of *out-investing* also has a geoeconomic dimension, as control over digital financial infrastructure becomes an object of competition not only between companies but also between states. Investments in payment systems, digital currencies, data processing infrastructure, and technological standards are used to ensure economic sovereignty and influence global financial processes. This leads to the formation of alternative financial ecosystems that operate under different technological and regulatory approaches *(Allen et al., 2021)*. Changing the logic of investment activity completes the formation of a new architecture of the financial system, in which control over infrastructure, data, and interaction mechanisms determines the distribution of economic power. In this context, *out-investing* acts not only as a tool of economic strategy but also as a key mechanism of institutional transformation, ensuring the transition from an institutionally organized to a platform model of financial intermediation.

The deepening of the outlined processes means that the financial system is moving into a state in which its structural characteristics are determined not so much by a set of institutions as by the configuration of the connections between them. In such a system, the functions of attracting, allocating, making payments, managing risk, and processing information are no longer rigidly assigned to individual entities, but are implemented in a distributed environment where interaction is ensured by digital platforms and technological protocols. This means that the financial system acquires the properties of an infrastructure network, in which the parameters of interaction, the speed of information exchange, and the structure of data access become key. A change in how financial functions are organized leads to the formation of a new logic of the distribution of economic power, determined by the ability to control not only resources but also the channels of their circulation. Control over platforms, algorithms, and data flows enables you to influence decision-making by other market participants, set access rules, and establish interaction standards. As a result, economic power is concentrated among actors occupying key positions in the network structure, regardless of their formal status in the financial system.

The functional role of banks is also being transformed, as they increasingly evolve from institutions providing a full cycle of financial intermediation into components of broader digital ecosystems. Their role is increasingly determined by their ability to integrate into such ecosystems, use data, and interact with other participants. This means the boundary between the banking and non-banking sectors is becoming less clear, and the financial system is becoming hybrid in structure. The change in interaction between financial market participants is accompanied by the complication of coordination mechanisms, which are increasingly based on algorithmic solutions and automated

processes. This increases operational efficiency and the speed of information processing, but at the same time creates dependence on technological systems, thereby creating a new type of vulnerability. Risks depend not only on financial parameters but also on the quality of technological infrastructure and the stability of digital networks. Within this logic, regulatory policy must consider that the object of influence is not an isolated institution, but a system of interactions that forms the financial ecosystem. It is considered necessary to develop approaches to monitor and manage network effects, analyze data concentration, and assess the role of individual platforms in maintaining system stability. This approach allows us to move from reactive regulation to preventive regulation focused on preventing systemic failures. The completion of this analytical circuit allows us to consider the digitalization of finance as a process that changes not only the instruments but also the institutional logic of the financial system's functioning. It determines how functions are combined, the structure of interactions, the nature of risks, and the distribution of economic power, thereby forming a new architecture of financial intermediation. In this architecture, integration is carried out through technological mechanisms, competition unfolds in the infrastructure plane, and investment activity is aimed at controlling key nodes of the system, reflecting the essence of institutional reversal as a basic process in the modern development of the financial sector.

The digitalization of finance within the process of institutional reversion changes not only the way financial intermediation functions are combined, but also the principles for directing financial resources, as evidenced by the transformation of financing mechanisms for sustainable development. If, in the regulatory model shaped by functional separation, the consideration of environmental, social, and governance parameters was mainly an external add-on to financial decisions, then in the platform architecture, these parameters are integrated into the decision-making process itself through algorithmic models and digital infrastructures. This means that ESG criteria cease to function as a post-facto assessment tool and become an internal element of digital financial intermediation, determining access to financial resources through algorithmic selection. In this context, green transition financing acquires an infrastructural character, since its effectiveness depends on the architecture of the platforms through which resources are distributed, thereby connecting it to the transformation of banking regulation from a model of institutional separation to one of technological integration. Within this logic, control over digital financial infrastructures means control over the mechanisms for directing investment flows, which turns sustainable development financing into an element of competition in financial architectures, while algorithmic project selection creates new risks of asymmetric access to financing that cannot be explained within traditional regulatory approaches and requires taking into account the network nature of the financial system.

Conclusions. The study reveals the transformation of banking regulation in the context of the digitalization of finance as a process of institutional reversion, within which the combination of the functions of attracting resources, their allocation, making payments, risk management and information processing is transferred from the institutional level to the level of digital infrastructure, which allows us to explain the discrepancy between formal regulatory fragmentation and the de facto integrated organization of financial intermediation. The change in the way these functions are integrated forms the network architecture of the financial system, in which the configuration of interactions between participants, control over platforms and data flows determine access to resources, the nature of competition and the distribution of economic power, which is increasingly concentrated in those actors that occupy key positions in the digital infrastructure, while banks transform their role and function as elements of broader digital ecosystems. In this context, institutional reversion manifests itself as the reproduction of an integrated model of financial intermediation in a new technological form, where functions previously separated for risk limitation are combined through platforms and algorithmic mechanisms, which changes the place of integration, transforms the channels of risk transfer, and defines a new logic of regulatory influence. The network nature of the financial system shapes the transformation of systemic risks arising from interactions among platforms, algorithms, and data flows, underscoring the importance of technological factors in ensuring financial stability and necessitating the regulation of

interdependencies within financial ecosystems.

The shift of competition to the plane of infrastructure and standards is accompanied by a change in investment behavior, in which the logic of *out-investing* emerges, aimed at ensuring long-term control over key elements of the digital financial infrastructure and shaping the future market structure. The digitalization of finance simultaneously changes the conditions for financing sustainable development, as the efficiency of resource mobilization increasingly depends on mechanisms for distributing resources within digital ecosystems, which expand financing opportunities while also creating risks of asymmetric access to financial infrastructure. The results obtained confirm that the evolution of banking regulation in the digital economy is not a linear deregulation, but reflects an institutional reversion, within which platform banking acts as a form of reproduction of an integrated architecture of financial intermediation, which directly reveals the content of the stated research topic and determines the directions of further transformation of the financial system.

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DETERMINANTS OF THE REAL ESTATE MANAGEMENT MARKET IN EUROPE: PANEL REGRESSION MODEL (2015-2025)

ДЕТЕРМІНАНТИ РИНКУ УПРАВЛІННЯ НЕРУХОМІСТЮ В ЄВРОПІ: ПАНЕЛЬНА РЕГРЕСІЙНА МОДЕЛЬ (2015-2025)

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Abstract. *The purpose of the study is to identify the determinants of the property management market in Europe using Germany, France, Italy and Poland as case studies and to construct a panel regression model covering the period 2015-2025. To this end, the works of domestic and foreign researchers were reviewed and examples of the practical use of real estate market determinants when building the DOLS panel model were analyzed. The method of applying regression analysis and its limitations are described, among which the assumption of linearity of the relationship between independent and dependent variables is highlighted, which is not always relevant for the real estate market. Using Microsoft Excel, a panel regression model was built and its results were interpreted. During the work, it was proven that the created model is adequate and reproduces the data well. It was found that the model has high explanatory power, but requires larger amounts of data to reduce the forecast error. The ANOVA results once again confirmed the adequacy of the model and the existence of a relationship between variables. The interpretation of the variables made it possible to find that the interest rate factor does not have a confirmed impact on the real estate price index within the framework of this model. The results of the study can be used by economists, analysts and independent experts in the field of real estate management to calculate the effect of urbanization and changes in GDP per capita in the context of their impact on the EU real estate price index. The prospects for further research are to expand the model by integrating technological factors into it, such as the EU real estate management market digitalization index. In addition, the constructed model can be modernized or modified to compare the degree of influence of real estate market determinants of individual EU states on the real estate price index for citizens of these states.*

Key words: *real estate, European real estate market, real estate market determinants, management services, real estate price index econometric methods, panel regression model.*

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Анотація. *Метою дослідження є визначення детермінант ринку управління нерухомістю в Європі на прикладі Німеччини, Франції, Італії та Польщі та побудова панельної регресійної моделі за період 2015-2025 рр. З цією метою було розглянуто праці вітчизняних та іноземних дослідників й проаналізовано приклади практичного використання детермінант ринку нерухомості під час побудови панельної моделі DOLS. Описано спосіб застосування регресійного аналізу та його обмеження, серед яких виділено припущення про лінійність зв'язку між незалежними та залежними змінними, що не завжди актуально для ринку нерухомості. За допомогою додатку Excel було побудовано модель панельної регресії та інтерпретовано її результати. В ході роботи було доведено, що створена модель є адекватною та добре відтворює дані. Виявлено що модель має високу пояснювальну здатність, але вимагає більших обсягів даних для зменшення похибки прогнозування. Результати дисперсійного аналізу ANOVA ще раз підтвердили адекватність моделі та існування зв'язку між змінними. Інтерпретація змінних дозволила виявити, що фактор відсоткової ставки не має підтвердженого впливу на індекс цін на нерухомість в рамках цієї моделі.*

Результати дослідження можуть використовуватися економістами, аналітиками та незалежними експертами у сфері управління нерухомістю для підрахунку ефекту урбанізації та зміни показників ВВП на душу населення в контексті їх впливу на індекс цін на нерухомість ЄС. Перспективи наступних досліджень полягають в розширенні моделі шляхом інтеграції до неї технологічних факторів, таких як індекс диджиталізації ринку управління нерухомістю ЄС. Крім того, побудована модель може бути модернізована або видозмінена для порівняння міри впливу детермінант ринку нерухомості окремих держав ЄС на індекс цін на нерухомість для громадян цих держав.

Ключові слова: *Нерухомість, європейський ринок нерухомості, детермінанти ринку нерухомості, управлінські послуги, індекс цін на нерухомість, економетричні методи, панельна регресійна модель.*

Introduction. The property management market plays a key role in the global economy, driving innovation and improving efficiency whilst maximising resources across various sectors of the economy. Statistics show that the size of the property management market has grown over the last two years from USD 16.79 billion in 2025 to USD 18.14 billion in 2026, at a compound annual growth rate (CAGR) of 8.1% *(The Business Research Company, 2026)*. During this period, growth can be attributed to an increase in urban property development, the early adoption of digital property management tools, a surge in demand for outsourced property services, and the expansion of the rental housing market.

The global trend of growth in the property market is also continuing in Europe. Around 1.6 million businesses were active in the EU property sector in 2022, which is 4.1% more than in 2021. In addition, the EU real estate sector generated added value of EUR 275.1 billion in 2022, which is 3.3% more than in 2021 *(Eurostat, 2025)*. Investment activity in the property sector remains concentrated in major European cities such as London, Paris and Munich *(PwC and the Urban Land Institute, 2025)*. Property in smaller cities is also attracting investor interest, highlighting a growing trend towards the implementation of specialised investment strategies in some of the EU's most dynamic property markets.

It should be noted that in order to forecast the future of the EU property management market, it is necessary not only to be aware of the key trends influencing its current state, but also to identify the factors affecting it. The significance of these determinants of the EU property management market is considered as data for the application of econometric methods, one of which is the panel regression model. The relevance of constructing such a model for the period 2015-2025 is determined by the fact that during this period there have been many changes in other sectors of the economy, which have radically altered the principles and rules by which the property market operates. The choice of this decade for constructing the panel regression model is based on the fact that most of the determinants that influenced the property market in 2015-2025 will continue to

influence it in the coming years. In this study, the property management market is analysed using Germany, France, Italy and Poland as case studies. These countries were selected because Germany, France and Italy are among the largest economies in the European Union, whilst Poland is experiencing rapid growth in both its property market and economy. These countries are characterised by varying levels of urbanisation and GDP per capita, which allows for the heterogeneity of development among EU member states to be accounted for in the construction of the panel regression model.

The purpose of the study is to identify the determinants of the property management market in Europe, using Germany, France, Italy and Poland as case studies, and to construct a panel regression model covering the period 2015-2025.

Literature review. The issue of identifying the determinants of the property management market in Europe and assessing its current state has been examined by both Ukrainian and international researchers. The most relevant academic articles on the subject of property management in Europe, selected from the period 2020-2026, will be analysed below. These works were identified using the Google and Google Scholar search engines.

In Zakrevskyy's (2024) article, the EU taxonomy is described as one of the key expert determinants of property management. Zhyruk (2025) identified the overall investment attractiveness of the EU property management sector as a determinant dependent on key macroeconomic indicators of eurozone countries. I. Hanchenko (2023), in her study of trends in the development of the European property market, also highlighted the investment attractiveness of the EU property management sector as one of the determinants of its prosperity. Furthermore, in her view, the EU property market is increasingly influenced by environmental, social and governance (ESG) principles, the spread of which has resulted from the adoption of sustainable development policies in property management practice. Vysochyn (2025) examined compliance with ESG principles as a determinant of the development of the retail property market. In the academic work by Suray et al. (2025), digitalisation is described as one of the determinants of the development of the property market and its management.

Kramer, Nagl, Stang and Schafers (2023) investigated the determinants of residential property values based on data from 81,166 residential properties in Germany's seven largest cities. Cunha and Lobao (2021) analysed the determinants of property prices across the EU as a whole, the 28 EU countries, Portugal and its 25 regions. The results of their paper showed that gross domestic product (GDP) and interest rates are statistically significant determinants of property prices in the EU. Morri et al. (2021) investigated the determinants influencing the performance of European real estate funds during the period 2001-2014. They demonstrated that there is a negative relationship between the returns of real estate funds and redemption fees, performance fees and management fees (PwC, & Urban Land Institute, 2025).

The analysis of the articles reviewed has made it clear that the topic of identifying the determinants of the property management market in Europe is of great interest to researchers. It should be noted, however, that these researchers identify and analyse the determinants of the property management market through the prism of different perspectives on property and within various management contexts. This prompted the author of this article to conduct an independent analysis of the state of the property management market in Europe and to identify the determinants of its development.

Main results of the research. Shiller, winner of the 2013 Nobel Prize, identified the cost of housing construction, population growth trends and interest rates as key economic determinants of the functioning of the property market. He noted that changes in these factors are unable to halt the rise in house prices *(Shiller, 2015)*. In contrast, other researchers and property market experts have identified a positive correlation between inflation and housing prices *(Marinkovic et al., 2024)*. This highlights the potential of property as an effective hedge against inflation. Considering the European property management market in terms of its efficiency, the determinants influencing it should be recognised as management experience, managerial factors and human capital indicators *(Ricciotti et al., 2022)*.

In addition to the statements of leading economists and the views of other researchers on the issue of identifying the determinants of the European property market, it is necessary to consider which determinants were previously identified for the construction of real econometric models. The determinants influencing EU property prices during the construction of the panel model were identified as GDP growth, unemployment, interest rates, construction volume and credit limits *(Aliman & Popa, 2025)*. Another example of selecting determinants for use in the application of econometric methods is the use of the DOLS panel model, where GDP per capita, interest rates, lending and institutional development were chosen as factors influencing housing prices in the real estate market in Central and Eastern Europe (Egert & Mihaljek 2007). Thus, following an analysis of examples of the selection of determinants for the application of econometric methods, the author proposed the use of variables reflecting the economic (GDP per capita) and financial (interest rate) aspects of the EU property market and demand for it (urbanisation).

Regression analysis is used to investigate the relationship between independent and dependent variables and to assess the direction of this relationship. However, it has several limitations. In assessing the impact of individual determinants on the property market, it allows only for the identification of correlations between variables and does not enable the determination of causal relationships. It should account for all factors that may influence the dependent variable, as their omission may lead to biased estimates *(Zhao & Liu, 2023)*. This method is typically based on the assumption of a linear relationship between independent and dependent variables. However, property markets are characterised by non-linear relationships, which may not be adequately captured by regression analysis.

The panel regression model can be described by equation (1):

$$Y_{it} = \alpha_i + \beta X_{it} + \delta_t + u_i + e_{it}, \quad (1)$$

where Y_{it} is the outcome variable (for entity i at time t), α_i is the unknown intercept for each entity, X_{it} is the predictor vector (for entity i at time t), δ_t is the uncertainty coefficient for the time regressors (t), β represents the common effect for all entities, taking into account individual and temporal heterogeneity, u_i is the error term within the entity, and e_{it} is the overall error term *(Torres-Reyna, 2007)*.

Modifying equation (1) for a panel regression model covering the period 2015-2025, the following equation (2) is obtained:

$$HPI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 I_{it} + \beta_3 U_{it} + e_{it}, \quad (2)$$

where HPI_{it} is the house price index (for country i in year t), β_0 is the baseline level of the HPI, GDP_{it} is per capita income, β_1 is the effect for GDP_{it}, I_{it} is the cost of loans/mortgages, β_2 is the effect on I_{it}, U_{it} is the proportion of the urban population, β_3 is the effect on U_{it}, a e_{it} is the model error.

The equation (2) will be used below to calculate the property price index for the period 2015-2025 for EU Member States for which independent variables (GDP per capita, interest rate, % urbanisation) were available. It should be noted that the base value of the HPI for all EU countries in 2015 was 100 (European Union Statistics, n.d.). The choice of data for Germany, France, Italy and Poland is explained by the fact that the first three are the EU's largest economies, whilst Poland is demonstrating positive growth trends in its property market. These countries have different rates of urbanisation and GDP per capita, which allows for the unevenness of development among EU member states to be taken into account when interpreting the results of the regression analysis. The sample selected satisfies the requirement of representing different EU regions, from Western and Southern Europe to Central and Eastern Europe. The values of the dependent and independent variables for Germany, France, Italy and Poland are presented in Table 1.

Table 1

Input data for panel regression

EU member states	Year	Property Price Index	GDP per capita (in US dollars)	Cost of loans (interest rate)	Urbanisation (%)

Germany	2015	100	41911	0	77.2
	2020	171.87	47379	0	77.45
	2021	189.34	52265	0	77.54
	2022	217.43	49686	0.5	77.65
	2023	212.15	54343	2.5	77.77
France	2015	100	36702	0	79.66
	2020	113.87	39169	0	80.98
	2021	120.15	43725	0	81.24
	2022	128.6	41082	0.5	81.51
	2023	132.32	44690	2.5	81.78
Italy	2015	100	30387	0	69.57
	2018	98.6	34746	0	70.44
	2020	99.4	32091	0	71.04
	2021	101.1	36852	0	71.35
	2022	105.7	35635	0.5	71.66
	2023	106.8	39003	2.5	71.97
Poland	2015	100	12673	1.5	60.28
	2016	100	12464	1.5	60.18
	2018	109.48	15658	1.5	60.06
	2019	118.34	15874	1.5	60.04
	2020	131.66	15987	1.5	60.04
	2021	141.16	18635	0.1	60.08
	2022	160.3	18891	2.25	60.13
	2023	169.52	22056	6.75	60.22

Source: compiled based on (Macrotrends, 2026a; Trading Economics, 2026a; Macrotrends, 2026b; Trading Economics, 2026b)

After collecting the data, the author used Excel to construct a panel regression model. For this purpose, an add-in containing a package of analytical models was installed. Subsequently, using Excel's data analysis tool, the overall quality of the model was assessed (Table 2).

Table 2

Overall regression quality

Name of indicator	Value of the indicator
Multiple R	0.74732
R Square	0.558488
Adjusted R Square	0.492261
Standard Error	26.40334
Observations	24

Source: the author's own work

An analysis of Table 2 suggests that the model fits the data well (0.74 – a strong correlation). The model explains 55.8% of the variation in the HPI and is adequate, though not perfect. The latter is due to the fact that the model has several independent variables, and the adjusted R^2 takes their number into account.

The model error amounts to approximately 26 HPI units, which may be critical for low property price index values and insignificant for the highest ones. As a result, the model has high explanatory power but requires larger data sets to reduce forecasting error. Since the difference between $R^2$and $Adjusted\ R^2$is not particularly significant, it can be concluded that the model is not overfitted. After assessing the overall quality of the regression, the key step was taken to verify whether the regression functioned correctly. ANOVA was performed to obtain the relevant data. The

results are shown in Table 3.

Table 3

Results of the analysis of variance (ANOVA)

Variations	df	SS	MS	F	Significance F
Regression	3	17636,76	5878,919	8,432955	0,000805
Residual	20	13942,72	697,1362	-	-
Total	23	31579,48	-	-	-

Source: the author's own work

An analysis of Table 3 has helped to demonstrate the high level of statistical significance of the model. This is because the F-statistic value is 8.43, with a significance level (Significance F) of 0.000805, which is less than 0.01. The sum of squares (SS) reveals a balance between explained and unexplained variations, with the explained variations predominating, which further confirms the quality of the model. Thus, the ANOVA results demonstrate the adequacy of the model and the existence of a relationship between the variables. The final step in the model interpretation process was the interpretation of the variables, the extent of whose influence on the HPI is shown in Table 4.

Table 4

Multiple regression coefficients

Variables	Coefficients	Standard Error	t Stat	p-value	Lower 95%	Upper 95%
Intercept	339.3097	93.71047	3.62083	0.001704	143.8331	534.7863
GDP_{it}	0.004397	0.001059	4.152754	0.000492	0.002188	0.006606
I_{it}	6.526571	4.017429	1.624564	0.119911	-1.85364	14.90678
U_{it}	-5.0975	1.730382	-2.94588	0.007991	-8.70701	-1.48798

Source: the author's own work

In accordance with the general form of the model (Equation 2), the regression will take the following form:

$$HPI_{it} = 339{,}31 + 0{,}0044GDP_{it} + 6{,}53I_{it} - 5{,}1U_{it} \quad (3)$$

Equation 3 shows that a one-unit increase in GDP_{it}will cause an increase of 0.0044 in HPI_{it} whereas an increase in U_{it} results in a decrease of 5.1. In addition, the effect of the I_{it} variable on the model was not statistically significant, since its p-value exceeded 0.05 and the confidence interval [-1,85; 14,91] crossed zero. Therefore, the interest rate factor did not have a statistically significant effect on the housing price index within this model.

An economic interpretation of the results of the proposed model suggests that a one-dollar increase in the GDP per capita of Germany, France, Italy and Poland will lead to a 0.0044 rise in these countries' property price index, whilst a 1% increase in urbanisation would, conversely, reduce the index by 5.1. Germany, as the country with the highest GDP per capita over the period under review, demonstrated the greatest growth in the property price index. Poland ranked second among the countries examined in terms of the property price index, as it has the lowest rate of urbanisation and the highest GDP per capita growth rate, having increased the latter by almost 1.75 times since 2015. France's property price index showed a gradual increase between 2015 and 2023, accompanied by a steady rise in GDP per capita (except in 2022) and a statistically significant level of urbanisation growth (by 2.12%). Italy's property price index grew unevenly between 2015 and 2023, due to periods of falling GDP per capita and a record rate of urbanisation growth, which increased by 2.4%. The most profitable investments over the 2015–2023 period were in German residential property, as it demonstrated better growth dynamics than French, Polish and Italian residential property over the same period.

Conclusions. The property management market is set to continue growing in 2025-2026. The importance of its development stems from the fact that it plays a key role in the global economy and helps to drive technical and managerial innovation. It has been established that numerous researchers examine various factors influencing the state of the property market and substantiate their views on their importance through the application of econometric methods. There are examples of selecting determinants of the property market for constructing a panel model and a DOLS model, which made it possible to identify variables that influence the property price index. A range of economic, financial and social indicators for Germany, France, Italy and Poland for the period 2015-2025 has been compiled.

A panel regression model has been constructed and all key stages of its validation have been completed. It has been demonstrated that the proposed model reproduces the data well, is appropriate, has high explanatory power and allows for the maintenance of relationships between variables. Among the model's shortcomings, a small data set was identified, which negatively affects the forecasting error, as well as the lack of confirmed influence of the interest rate factor on the property price index. Prospects for future research lie in expanding the model by integrating technological factors, such as the EU property management market digitalisation index.

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CYBER THREATS TO TOKENIZED ASSETS IN INTERNATIONAL FINANCE: "REACTIVATION"

КІБЕРЗАГРОЗИ ТОКЕНІЗОВАНИМ АКТИВАМ У МІЖНАРОДНИХ ФІНАНСАХ: «ПОВТОРНА АКТИВАЦІЯ»

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Abstract. *The rapid development of blockchain technologies has led to the emergence of tokenized assets, which is already claiming the title of one of the key innovations in international finance. Although tokenization is a promising direction for the development of the international financial system, it also introduces new cyber risks associated with vulnerabilities in smart contracts. This article examines one of the most influential risks, "reactivation" attacks, and assesses their impact in the context of international financial relations. The study highlights the economic consequences of smart contract vulnerabilities, including financial losses, reduced investor confidence, and systemic risks for global financial markets. Based on the results of the analysis, a list of recommendations has been formed to minimize the likelihood of occurrence and spreading of understanding of the consequences of the "reactivation" vulnerability. The conclusions emphasize the need to improve security standards and spread understanding of the threat to ensure the sustainable development of tokenized financial instruments.*

Keywords. *tokenized assets; smart contracts; reactivation vulnerability; cyber risk; blockchain; international financial relations; digital finance; financial stability; systemic risk; decentralized finance (DeFi); smart contract security; global financial markets*

Анотація. *Швидкий розвиток блокчейн-технологій призвів до появи токенізованих активів, що вже претендує на звання однієї з ключових інновацій в міжнародних фінансах. Хоча токенізація і є перспективним напрямком розвитку міжнародної фінансової системи, вона також вводить нові кіберризики, які пов'язані з вразливостями смарт-контрактів. У цій статті досліджується один із найбільш впливових ризиків, атаки «повторної активації», та оцінюється їх вплив у контексті міжнародних фінансових відносин. У дослідженні висвітлюються економічні наслідки вразливостей смарт-контрактів, включаючи фінансові втрати, зниження довіри інвесторів та системні ризики для світових фінансових ринків. За результатами аналізу сформовано список рекомендацій для мінімізації*

імовірності виникнення та поширення розуміння наслідків вразливості «повторної активації». Висновки підкреслюють необхідність удосконалення стандартів безпеки та поширення розуміння загрози для забезпечення сталого розвитку токенізованих фінансових інструментів.

Ключові слова. *токенізовані активи; смарт-контракти; вразливість «повторної активації»; кіберризик; блокчейн; міжнародні фінансові відносини; цифрові фінанси; фінансова стабільність; системний ризик; децентралізовані фінанси (DeFi); безпека смарт-контрактів; світові фінансові ринки*

Introduction. Trading of financial assets is evolving under the influence of the rapid evolution of technology – from the adaptation of banks to the emergence and spread of the Internet and high-speed mobile communications to the most modern developments – artificial intelligence and blockchain technologies. Tokenized assets – traditional assets represented on a programmable platform – are one such technology.

Asset tokenization is one of modern directions of development of the market for financial assets, which utilizes blockchain technology. Although it is believed that tokenization could reduce the barriers associated with the issuance, circulation, trading, and settlements for certain classes of assets, the process is not perfect (Bank for International Settlements & Committee on Payments and Market Infrastructures, 2024). Despite the fact that tokenized assets are partially protected from the risks inherent in traditional asset circulation, they face no less serious risks inherent to them. Here are just some of these risks: logic imperfections and code errors, incorrect authorization, exploits of protocol's vulnerabilities, dependence of libraries on third parties, exploiting of cross-bridge vulnerabilities, cyberattacks, and others.

Each of the listed risks can take different forms. A clear understanding of their root causes, how they work, and potential losses is essential to ensure the continued safe development of the tokenized assets market. This article examines one of the most serious threats – the "reactivation" vulnerability.

The goal of this article is to develop a list of recommendations to minimize the likelihood of occurrence of the "reactivation" vulnerability and to spread understanding of its consequences. The objectives of this article are: identify the threat of "reactivation" and determine root causes of its occurrence; study the real-world case of the "reactivation" vulnerability; analyse the impact of the threat on tokenized assets; formulate a list of appropriate recommendations

To achieve set objectives and goal, a comprehensive literature analysis was conducted.

Literature review. Asset tokenization and its implications for financial markets is discussed in publications by international organizations and academic studies. In particular, the report by the Bank for International Settlements highlights the potential of tokenization to transform financial systems by increasing efficiency, programmability, and reducing dependence on intermediaries. It also emphasizes the emergence of new operational and technological risks (Bank for International Settlements & Committee on Payments and Market Infrastructures, 2024).

In addition, asset tokenization is being actively explored by companies focused on the development of blockchain technologies, such as Ethereum, as this direction is promising for further development of their technologies and increasing profits. Technical documentation in the Ethereum ecosystem describes "reactivation" attacks as a consequence of incorrect sequence of operations in smart contracts and emphasizes the need for secure design patterns and protection mechanisms (ethereum.org, n.d.).

However, the existing literature has largely focused on the technical aspects of vulnerabilities of smart contracts, while their broader economic implications for international finance remain underexplored. This gap highlights the relevance of further research into cyber-threats to tokenized assets in the context of international finance.

Results. For a comprehensive understanding of the article, it is necessary to define the meanings of key terms employed herein:

1. "Contract," as used in this article, is defined as a set of programmed actions aimed at

performing operations on a tokenized asset, including purchase, sale, transfer, modification of properties, etc.

2. "Liquidity pool" refers to a collective aggregation of cryptocurrencies or tokenized assets that are locked within a smart contract (Chainlink, 2026).

3. "Node" is a participant in a blockchain network that takes part in the formation of new blocks.

4. "Hard fork" is defined as a modification of a blockchain protocol or blocks' structure, implemented with the consensus of a majority of participating nodes that exercise control over the network.

Contract's "reactivation" refers to a state in which the current condition of a contract does not correspond to the instructions received from subsequent stages of the protocol (i.e., downstream contracts). This inconsistency enables an attacker to repeatedly "reactivate" the contract and assume control over it by exploiting the mismatch (LlamaRisk, 2023; Vyperlang Team, 2023). Exploitation of this vulnerability allows the attacker to trigger the "withdraw" function within the contract in a manner that facilitates a so-called "infinite asset issuance," whereby all available funds are drained from the contract until either the victim's balance is exhausted or the attacker's balance required to cover transaction execution fees (commonly referred to as "gas fees") is depleted (Nervos Network, 2025; Ethereum.org, n.d.). This vulnerability is most commonly exploited in asset depositories and liquidity pools.

Below is a schematic representation of how an attack based on contract's "reactivation" is carried out. The contract from which funds are to be extracted is referred to as the "Victim," while the hacker's contract is referred to as the "Attacker." The scheme for exploiting this vulnerability is presented below:

The "Attacker" deposits 1 ETH into the balance of the "Victim" → the "Attacker" submits a request to transfer 1 ETH from the balance of the "Victim" → the "Victim" executes «withdraw()» function and transfers 1 ETH to the "Attacker" → upon receiving 1 ETH the "Attacker" invokes the «fallback()» function, thereby submitting a new request to transfer 1 ETH from the balance of the "Victim" → the "Victim" again executes the «withdraw()» function and transfers 1 ETH to the "Attacker" (ethereum.org, n.d.).

The "Attacker" is able to withdraw all funds from the "Victim's" balance (or the maximum amount for which sufficient gas fees can be covered) before the initial withdrawal request is completed. This occurs because the "Attacker's" balance within the "Victim" contract is not reset to zero prior to the completion of the function's execution; consequently, subsequent withdrawal requests are successfully processed, allowing the same amount to be withdrawn multiple times. Through this mechanism, malicious actors are able to drain all liquidity from liquidity pools or asset depositories.

Multiple options for "reactivation" attacks exist, including cross-contract reentrancy and so-called "view-only" methods, among others. The scheme described above represents a basic model within "reactivation" attack scenarios; however, it is sufficient for identifying the core nature of the threat, determining its root causes, assessing the potential consequences of its exploitation, and formulating appropriate recommendations for mitigating the risk of this type of attacks.

The exploitation of this vulnerability is possible because of imperfections in the execution of the function within the targeted contract. However, such imperfections do not arise from a single error. Rather, multiple factors contribute to the emergence of "reactivation" vulnerabilities, and these factors may affect the contract's susceptibility either collectively or independently. The underlying causes and their descriptions are discussed below.

Imperfect protocol logic. This vulnerability was particularly characteristic of earlier protocols, prior to the point at which "reactivation" became widely recognized among developers. Flawed protocol logic constitutes one of the primary causes that may render contracts susceptible to "reactivation" attacks, as the root of the issue originates at the stage of designing and implementing the protocol's core logic. "Imperfect logic" means an incorrect ordering of contract's operations or interactions as encoded within the protocol. The presence of such flaws creates opportunities for

"reactivation" by enabling the contract to be re-invoked during execution phases that follow the initial activation (i.e., in subsequent stages of the protocol's execution flow) (Solidity Authors, n.d.). As noted above, this vulnerability was more prevalent in early protocols; however, as awareness of the scale and implications of the issue has increased, a growing number of protocols have been designed from the outset with logic intended to mitigate such attacks or their developers have incorporated built-in protective mechanisms against this class of vulnerability. A particularly notable case is the attack on the DAO (Decentralized Autonomous Organization) in 2016, which will be examined in greater detail further.

Absence of dedicated safeguards against "reactivation" attacks. This is another common cause particularly prevalent in earlier protocols, although it remains relevant today. This factor is more specific in scope than imperfect protocol logic. Contemporary protocol developers typically implement protective mechanisms known as "reactivation guards," which are designed to prevent the concurrent or repeated execution of the same function. However, given the wide range of "reactivation" attack variants, developers may fail to anticipate certain specific attack vectors and consequently may not implement appropriate specialized defenses. A notable example of the consequences of insufficient protection is the case of Rari Capital, where approximately $80 million was lost during an attack. Although the attack mechanism was more complex than the basic scheme described above, its underlying principle remained unchanged (CertiK, 2022; REKT, 2022). It should also be noted that this cause is closely related to another factor: *the use of increasingly sophisticated techniques by attackers to circumvent established security mechanisms*. While existing safeguards can effectively protect protocols against many forms of attack, hackers continuously refine their methods to bypass these defenses, as the potential reward from successful exploitation often outweighs the cost associated with discovering and leveraging protocol's vulnerabilities. In light of the rapid growth of the tokenized asset market, where the capitalization of tokenized public equities alone reached approximately $16 million as of March 2025, the incentives for attackers to exploit protocols' vulnerabilities are expected to increase further. This, in turn, will likely drive the development of new attack methods as well as refinement of existing techniques for bypassing protocol security mechanisms (World Economic Forum, 2025).

Code "bugs" that occur during protocol updates. The issue of software bugs is, in itself, a complex and multifaceted problem. For the purposes of this study, it is sufficient to define "bugs" as errors in code that lead to its incorrect or unintended functioning, and they emerge during the development stage when the code is initially written (Britannica, 2026). It is also important to note that "bugs" may occur not only during the initial development phase, but also during subsequent protocol updates. However, their emergence during the update phase is more likely to result in vulnerabilities. This is due to the possibility of altering protocol architecture during updates, particularly through the modification of contract logic using proxy mechanisms. While such functionality enables developers to improve and extend existing systems, it also introduces new risks: newly implemented logic may interact improperly with legacy components that have not been updated, thereby creating vulnerabilities that were not characteristic of earlier protocol versions (OpenZeppelin, 2020). Among these is the "reactivation" vulnerability.

Insufficient testing of protocols. Testing refers to the evaluation of how a protocol functions under both standard operating conditions and scenarios involving non-standard use. Continuous and rigorous testing is one of the key prerequisites for ensuring correct functionality and an adequate level of system security. The execution of comprehensive tests enables early detection of flaws in protocol logic, identification of software bugs, and assessment of vulnerabilities to various forms of attack. However, due to a range of factors, the level of testing may fall short of what is considered optimal, thereby increasing the likelihood of issues, including susceptibility to "reactivation" attacks (ethereum.org, n.d.). Several factors may influence the adequacy of testing, including the completeness of test case design at initial stages, the availability of sufficient time to conduct thorough testing, the alignment between the complexity of tasks and the expertise of testing personnel, etc. Moreover, the required depth and rigor of testing are also contingent upon the incentives faced by potential attackers. The greater the perceived benefits of exploiting a protocol,

the more comprehensive and sophisticated the testing procedures should be. As a project evolves and its user base expands, the complexity and scope of testing should increase accordingly to maintain an appropriate level of protection against malicious activity. Nevertheless, project growth does not always incentivize developers to raise testing standards, which can ultimately result in significant losses.

Having identified the underlying causes of "reactivation" vulnerabilities in protocols, it is appropriate to examine a practical example of the realization of this threat. It should be noted that the case below focuses on a scenario in which a protocol vulnerability was exploited to facilitate the theft of cryptocurrency. However, given that tokenized assets are built on similar or analogous blockchain infrastructures, this example remains relevant for the analysis of risks in tokenized asset systems (World Economic Forum, 2025).

Let us consider the case of the *2016 attack on the DAO*, which led to a split within the Ethereum community and the emergence of Ethereum Classic (ethereum.org, n.d.). This article does not aim to examine the entire context of the DAO breach; rather, it focuses specifically on the aspects related to the exploitation of the "reactivation" vulnerability, the causes of its occurrence, and the consequences of it. A DAO is a form of organizational structure designed to codify governance rules and decision-making processes within smart contracts, thereby eliminating the need for traditional documentation and centralized management. Its objective is to establish a system of decentralized control and automated governance (Siegel, 2023). The operational mechanism of a DAO involves:

- the founders develop a smart contract (protocol) that will govern the organization;
- this is followed by a fundraising period (also referred to as "funding"), during which participants contribute capital to the DAO by purchasing tokens that confer ownership rights or voting power in the operation of the project;
- after the funding period ends, the DAO begins operating;
- people who have invested funds receive the right to make proposals regarding the use of DAO resources (Siegel, 2023).

Understanding how the DAO works is necessary to clearly understand how the protocol breach occurred and its consequences.

In the selected case, the discussion concerns a specific organization developed by the German startup Slock.it, which enabled individuals to share physical assets (e.g., a car) through a decentralized platform conceptually similar to Airbnb, utilizing "smart locks." The founders initiated a fundraising campaign to support the project's development; this funding phase lasted 28 days, beginning on April 30, 2016. As a result, more than $150 million was raised from over 11,000 investors. It is noteworthy that, even during the funding phase, concerns were raised by some participants regarding imperfections in the protocol's code and its susceptibility to attacks. This constitutes a clear indication of one of the previously identified causes of "reactivation" vulnerabilities – namely, *flawed protocol logic*. Furthermore, given that such vulnerabilities were identified not only by the project's developers but also by external observers, it can be inferred that the level of testing conducted during the early stages was insufficient. The issue had already been detected during the fundraising phase, that is, after the completion of the development and testing of the protocol's core logic (Siegel, 2023). Finally, the substantial volume of funds raised served as a strong incentive for an attacker to exploit the identified vulnerability within the protocol.

Following the completion of the fundraising phase, discussions started regarding whether the identified vulnerabilities should be addressed prior to the full operational launch of the DAO. In particular, Stephan Tual, one of the creators of the DAO, announced on June 12, 2016, that a "recursive call bug" (another term for "reactivation") had been identified in the software. Nevertheless, he asserted that "DAO funds are not at risk." However, on June 18, 2016 – immediately after the conclusion of the fundraising phase – while developers were still attempting to mitigate the protocol's vulnerabilities, attackers had already succeeded in extracting approximately 3.6 million Ether, which at that time was valued at around $60 million. This was achieved precisely through the exploitation of the aforementioned vulnerability, the operational mechanism of which has been described earlier (Siegel, 2023).

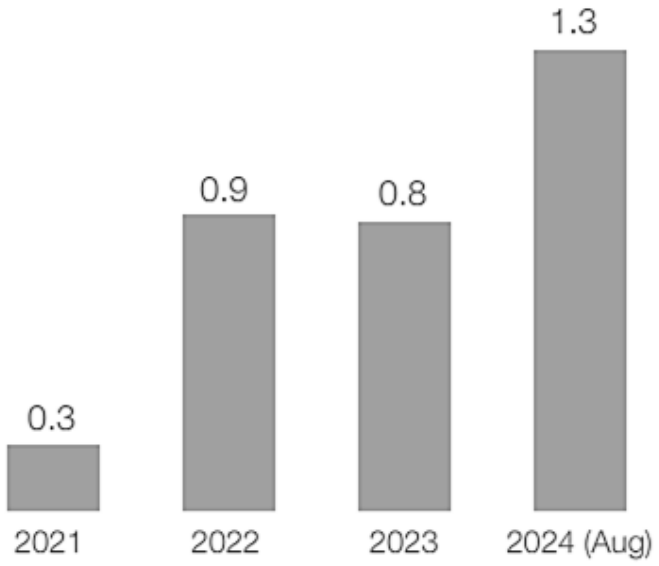
The outcome of the attack on the DAO was the temporary loss of investor funds. The majority of these funds were eventually recovered as a result of implementing a hard fork initiated by the Ethereum Foundation in 2016. However, this decision led to a division within the Ethereum community and the emergence of Ethereum Classic, as not all network participants agreed with the execution of a hard fork. A portion of the community maintained that the blockchain should remain immutable, even in cases involving significant attacks. It is important to emphasize that modifying any block within a blockchain requires the consensus of more than 50% of participants responsible for validating and adding new blocks. Consequently, it would be imprudent to assume that every instance of a protocol attack can be mitigated through rewriting blockchain history.

The relevance of this case for the domain of tokenized assets lies in the fact that, although the example examined does not directly involve an attack on tokenized assets, the analysis of the underlying cause that enabled the exploit, as well as its consequences, provides valuable insights for preventing similar incidents in this field. This is particularly important given that certain tokenized equities are built on the Ethereum blockchain (xStocks, n.d.), which implies a potential risk of companies replicating similar design flaws when developing their own protocols. Accordingly, the set of recommendations presented at the conclusion of this study has been formulated with the aim of reducing the likelihood of such vulnerabilities and ensuring more secure implementation of tokenized asset systems.

Given the increasing momentum in the issuance of tokenized assets – particularly tokenized bonds, as illustrated in Figure 1 – it is essential for issuers to understand the cybersecurity threat posed by “reactivation” in order to ensure the secure operation of tokenized securities within the framework of international finance.

Figure 1

Global bond issuance in blockchain systems, billion euros



Note. (World Economic Forum, 2025)

An illustrative example of how an issuer of tokenized assets may encounter a similar situation can be outlined as follows. Company "A," based in Ukraine, decides to issue tokenized shares instead of pursuing a traditional initial public offering, with the aim of expanding its pool of potential investors. However, without adequately analysing the case of the DAO, the company develops a protocol that contains a comparable flaw in its logic. As a result, investors from multiple jurisdictions incur financial losses following a “reactivation” attack. As noted previously, it would be unrealistic to assume that a majority of blockchain nodes would agree to implement another hard

fork to compensate affected investors. In such a scenario, investors' funds would not be recovered, while the company's financing prospects and reputation would be severely compromised. Moreover, widespread publicity surrounding the incident could foster scepticism regarding the reliability of tokenized assets, potentially slowing the development of the sector and disrupting international investment processes. Considering that the outcome of the DAO attack was a division within the Ethereum community – which, at the time in 2016, was significantly smaller than it is today – the recurrence of similar attacks affecting issuers with a substantially larger base of stakeholders could generate even greater controversy and reduce the predictability of potential resolution mechanisms. An alternative to a hard fork is the implementation of a soft fork – effectively isolating the wallet to which the stolen assets were transferred (Siegel, 2023). However, in such a case, investors would still be unable to recover their invested funds.

Based on the results of the analysis, a list of recommendations was formed, which is presented in Table 1 below.

Table 1

Recommendations for preventing the "reactivation" vulnerability for tokenized assets

Cause of occurrence	**Prevention recommendations**
Imperfect protocol logic.	Ensure the correct design of protocol logic at the development stage, in which any modification of the contract balance occurs prior to any possibility of external "reactivation", in accordance with the Checks-Effects-Interactions principle.
Absence of dedicated safeguards against "reactivation" attacks and the use of increasingly sophisticated techniques by attackers to circumvent established security mechanisms.	Implement multilayered security mechanisms, such as restrictions on repeated function calls and additional contract state validations. It is also essential to ensure the regular updating of security systems in order to address emerging attack vectors.
Code "bugs" that occur during protocol updates.	Implement rigorous update management procedures, including testing contracts within isolated environments, as well as employing staged deployment mechanisms for updates.
Insufficient testing of protocols.	Ensure comprehensive testing, including the use of automated analysis tools and the engagement of independent auditors to assess protocol's security prior to deployment.

The recommendations outlined above provide guidance on measures that can help mitigate the risk of "reactivation" vulnerabilities in tokenized assets within the context of international finance. By addressing identified causes, these measures contribute to enhancing the security, stability, and reliable integration of tokenized assets into the global financial system.

Discussion and Conclusions. To sum up, the causes underlying the emergence of threats related to "reactivation" in tokenized assets include the following:

- imperfect protocol logic
- absence of dedicated safeguards against "reactivation" attacks and the use of increasingly sophisticated techniques by attackers to circumvent established security mechanisms
- code "bugs" that occur during protocol updates
- insufficient testing of protocols

The aforementioned factors may give rise to "reactivation" vulnerability either independently or in combination. The article examines the example of the attack on the DAO, the causes of which included flawed protocol logic, an insufficient level of testing, and the significant attractiveness of the exploit for hackers seeking substantial financial gain. The outcome of the attack was the theft of cryptocurrency, followed by its subsequent restitution to rightful owners through the

implementation of a hard fork – effectively a rewriting of the blockchain's transaction history. The importance of analysing this event for issuers of tokenized assets lies in the fact that such assets may be deployed on similar or analogous blockchain infrastructures, thereby increasing the likelihood of replicating comparable vulnerabilities.

Ensuring an adequate level of cybersecurity in protocol design constitutes a necessary precondition for the integration of tokenized assets into the global financial system. The set of recommendations developed and presented in the "Results" section is aimed at mitigating the risk of "reactivation" vulnerability affecting tokenized assets in international markets, thereby supporting their secure operation within the sphere of global finance. Failure to adhere to these recommendations (and, accordingly, to address identified risks) may result in capital losses, disruptions to international investment processes, and a deceleration in the digitalization of the global financial system.

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GREEN TRANSITION AND THE RESTRUCTURING OF ECONOMIC RATIONALITY: THE ROLE OF ENVIRONMENTAL CONTAINMENT

ЗЕЛЕНИЙ ПЕРЕХІД І ТРАНСФОРМАЦІЯ ЕКОНОМІЧНОЇ РАЦІОНАЛЬНОСТІ: РОЛЬ ЕКОЛОГІЧНОГО СТРИМУВАННЯ

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Abstract. *The purpose of the article is to provide theoretical substantiation of environmental containment as a systemic factor in transforming economic rationality amid the structural transformation of the world economy and the strengthening of environmentally conditioned institutional constraints. The green transition is interpreted not merely as a sectoral programme of decarbonisation but as a structural transformation of the institutional environment of economic activity that, particularly in the context of the European Green Deal, the Carbon Border Adjustment Mechanism (CBAM), and the EU Taxonomy on sustainable activities, transforms the very logic of economic rationality and determines the conditions of participation of economic agents in global production and financial networks. The study clarifies the economic content of environmental containment, determines its role in changing the criteria of rational choice, and identifies the mechanisms through which environmental standards, regulatory regimes, and resource constraints influence the behavior of economic agents and the structure of the competitive environment. The article reconsiders the classical understanding of economic rationality, which has traditionally been based on the maximization of benefits and the minimization of costs under given resource and price parameters. It is substantiated that the transformation of the world economy towards climate neutrality, resource efficiency, and technological decarbonisation alters the determinants of economic choice by integrating environmental requirements into the structure of rational calculation. It is shown that environmental parameters are gradually shifting from the category of external constraints into internal determinants of economic behaviour, defining access to markets, financial resources, technologies and institutional support.*

The article distinguishes between environmental restraint as the voluntary integration of environmental criteria into the structure of economic choice and environmental containment as an institutionally conditioned system of constraints defining the boundaries of permissible economic behaviour. It is demonstrated that environmental containment shapes the institutional boundaries of economic activity and serves as a mechanism for selecting development strategies, thereby establishing a system of constraints and incentives that structures the behavior of producers, investors, and states. Under such conditions, economic rationality acquires a preventive character oriented towards long-term conformity with environmental standards and regulatory regimes that determine the conditions of participation in global production and financial networks. The role of green neoprotectionism in consolidating new rules of market access and shaping a normatively conditioned competitive environment is revealed, within which environmental compliance becomes a condition of economic expediency. It is shown that environmental containment intensifies

differentiation among economic agents and creates a new configuration of the competitive space in which the capacity to meet environmental requirements determines the possibility of participation in global economic processes. It is concluded that environmental containment acts as a system-forming factor in the transformation of economic rationality, shaping a new logic of economic behaviour in which environmental compliance becomes integrated into the structure of economic choice, investment and development strategies.

Keywords: *international economics, global economy, green transition, environmental containment, environmental regulation, standardization, economic rationality, institutional environment, green economy, competitiveness, sustainable competitiveness, green competitiveness, green neoprotectionism, sustainable development, EU, CBAM*

Анотація. *Мета статті полягає у теоретичному обґрунтуванні екологічного стримування як системного чинника трансформації економічної раціональності в умовах структурної перебудови світової економіки та посилення екологічно зумовлених інституційних обмежень. Зелений перехід інтерпретується у статті не лише як секторальна програма декарбонізації, а як структурна трансформація інституційного середовища економічної діяльності, що, особливо у контексті Зеленого курсу ЄС, механізму вуглецевого коригування на кордоні (CBAM) та Таксономії ЄС зі сталих видів економічної діяльності, переналаштовує саму логіку економічної раціональності й визначає умови участі економічних агентів у глобальних виробничих і фінансових мережах. Дослідження уточнює економічний зміст екологічного стримування, визначає його роль у зміні критеріїв раціонального вибору та виявляє механізми впливу екологічних стандартів, регуляторних режимів і ресурсних обмежень на поведінку економічних агентів і структуру конкурентного середовища. У статті здійснено переосмислення класичного трактування економічної раціональності, що традиційно ґрунтувалося на максимізації вигод і мінімізації витрат за заданих ресурсних і цінових параметрів. Обґрунтовано, що трансформація світової економіки у бік кліматичної нейтральності, ресурсної ефективності та технологічної декарбонізації змінює структуру факторів економічного вибору, інтегруючи екологічні вимоги у функцію раціонального розрахунку. Показано, що екологічні параметри поступово переходять із категорії зовнішніх обмежень у площину внутрішніх детермінант економічної поведінки, визначаючи доступ до ринків, фінансових ресурсів, технологій і інституційної підтримки. У статті розмежовано екологічне самообмеження як добровільну інтеграцію екологічних критеріїв у структуру економічного вибору та екологічне стримування як інституційно зумовлену систему обмежень, що визначає межі допустимої економічної поведінки. Доведено, що екологічне стримування формує інституційні межі економічної діяльності та виступає механізмом селекції стратегій розвитку, задаючи систему обмежень і стимулів, які структурують поведінку виробників, інвесторів і держав. Раціональність набуває превентивного характеру і орієнтується на довгострокову відповідність екологічним стандартам і регуляторним режимам, що визначають умови участі у глобальних виробничих і фінансових мережах. Розкрито роль зеленого неопротекціонізму у закріпленні нових правил доступу до ринків і формуванні нормативно зумовленого конкурентного середовища, у межах якого екологічна відповідність стає умовою економічної доцільності. Показано, що екологічне стримування посилює диференціацію між економічними агентами і формує нову конфігурацію конкурентного простору, де здатність відповідати екологічним вимогам визначає можливості участі у глобальних економічних процесах. Зроблено висновок, що екологічне стримування виступає системоутворюючим фактором перебудови економічної раціональності та формує нову логіку економічної поведінки, у межах якої екологічна відповідність інтегрується у структуру економічного вибору, інвестицій і стратегій розвитку.*

Ключові слова: *міжнародна економіка, глобальна економіка, зелений перехід, екологічне стримування, екологічне регулювання, стандартизація, економічна раціональність, інституційне середовище, зелена економіка, конкурентоспроможність,*

стала конкурентоспроможність, зелена конкурентоспроможність, зелений неопротекціонізм, сталий розвиток, ЄС, CBAM

Introduction. The green transition increasingly functions not merely as an environmental modernization agenda but as a structural mechanism for transforming the criteria, boundaries, and institutional conditions of economic rationality. In the contemporary world economy, environmental parameters are increasingly embedded in the logic of investment decision-making, technological competitiveness, market access, and the distribution of financial resources. The combination of decarbonisation policies, climate standards, carbon pricing mechanisms, and sustainable finance instruments creates a regulatory environment in which environmental compliance becomes a prerequisite for participation in global production and trade systems. Under such conditions, economic rationality is no longer determined exclusively by price signals, production costs, and short-term profitability, since environmental risks, carbon intensity, and regulatory compliance increasingly influence the viability of economic activity itself (*Network for Greening the Financial System, 2024*). The contemporary green transition encompasses processes far broader than technological decarbonisation or the replacement of fossil fuels with renewable energy sources. It reflects a multidimensional transformation of economic systems involving structural industrial change, institutional restructuring, social adaptation, and the reconfiguration of development priorities. The transition increasingly affects labour markets, regional development models, social protection systems, and the distribution of costs and benefits associated with climate policy. Within this framework, the concept of a just green transition emphasizes the need to combine ecological modernization with social inclusiveness, equitable burden-sharing, and institutional mechanisms to reduce asymmetries generated by climate transformation processes (*Berisha et al., 2026*).

Simultaneously, the green transition is associated with the formation of new systems of environmental governance in which sustainability criteria become embedded into mechanisms of market coordination and economic regulation. Contemporary approaches to just green transitions underscore that environmental transformation cannot be understood solely through technological or ecological categories, as it fundamentally alters the institutional logic of economic interaction and the normative principles underlying economic organisation (*Cedergren et al., 2022*). The transition toward climate neutrality, therefore, entails not only changes in production technologies and energy systems but also the restructuring of economic rationality itself, since ecological criteria increasingly determine the conditions under which economic behaviour is recognized as efficient, competitive, and institutionally legitimate.

Within classical and neoclassical economic theory, rational economic behaviour has traditionally been interpreted as the capacity of economic agents to maximize utility, minimize costs, and optimize resource allocation under existing technological and institutional conditions. Environmental factors were predominantly treated as externalities or as supplementary regulatory constraints that did not alter the internal structure of rational choice. However, the expansion of carbon border adjustment mechanisms, sustainable finance taxonomies, climate disclosure requirements and green industrial policies has transformed the institutional environment in which economic decisions are made. Environmental parameters increasingly influence capital costs, market access, investment attractiveness, and technological competitiveness, thereby becoming internal determinants of economic rationality rather than external limitations imposed upon it. The institutionalisation of environmental criteria has generated a regulatory architecture in which compliance with ecological standards conditions participation in global production and financial systems. The European Green Deal, the Carbon Border Adjustment Mechanism (CBAM), ESG-based investment screening, and sustainability reporting standards collectively contribute to the emergence of institutional mechanisms that redefine the hierarchy of competitive advantages and reshape global value chains. Under such conditions, green competitiveness emerges not solely from voluntary ecological modernization but also from adaptation to environmentally conditioned restrictions and incentives embedded within systems of international economic governance.

The relevance of the study is determined by the increasing role of environmental containment

in transforming the structure of economic rationality, while its institutional and theoretical foundations remain insufficiently conceptualized within contemporary economic literature. Existing approaches mainly interpret environmental transformation through the categories of regulation, sustainability, or ecological modernization, whereas the mechanisms through which environmental constraints restructure the logic of rational economic behaviour remain underexplored. Environmental containment becomes a systemic factor that alters the boundaries of economic viability, modifies the structure of incentives and constraints, and transforms the institutional conditions under which economic choice is formed.

The purpose of the article is to provide theoretical substantiation of environmental containment as a factor in transforming economic rationality during the green transition. The study aims to clarify the economic content of environmental containment, identify the institutional mechanisms through which environmentally conditioned constraints and incentives reshape economic behaviour, and determine the relationship between green competitiveness, ecological conditionality, and the restructuring of the contemporary world economy. The methodological basis of the research combines structural-functional analysis, comparative analysis, and theoretical generalization for interpreting the transformation of economic rationality under conditions of ecological and regulatory restructuring.

Literature review. The transformation associated with the green transition has increasingly become one of the central themes within contemporary studies of technological change, institutional restructuring and sustainable development. Existing approaches interpret the green transition not merely as a process of ecological modernization but as a large-scale reconfiguration of techno-economic systems, industrial trajectories and models of economic coordination. Within the literature on deep transitions and techno-economic paradigms, environmental transformation is analyzed as a long-term restructuring process that alters technological trajectories, systems of innovation, institutional configurations and mechanisms of accumulation (*Freeman & Louçã, 2001; Nelson & Winter, 1982; Schot & Kanger, 2018; Lema & Perez, 2024*). Within evolutionary and institutional economic approaches, rationality is increasingly interpreted not as a fixed characteristic of economic behaviour but as a historically and institutionally conditioned form shaped by technological paradigms, systems of coordination and structural constraints. Studies devoted to sustainability transitions and environmental innovation additionally emphasize that ecological transformation progressively affects regional development models, systems of industrial specialization and the institutional conditions of competitiveness formation (*Truffer & Coenen, 2012; Van den Bergh & Growdy, 2000; Clift & Wright, 2000*).

A separate direction of contemporary research concerns the institutional and socio-economic dimensions of the green transition. The literature on just green transitions interprets ecological modernization through the prism of social adaptation, distributive asymmetries and differentiated capacities of countries and economic agents to adapt to climate-related restructuring (*Berisha et al., 2026; Cedergren et al., 2022*). Simultaneously, studies devoted to green finance and climate-related macroeconomic transformation demonstrate that environmental criteria are increasingly becoming embedded into systems of financial regulation, investment allocation and risk assessment, thereby influencing the structure of economic decision-making itself (*Network for Greening the Financial System, 2024*). These tendencies indicate that environmental transformation is increasingly taking on the characteristics of broader institutional restructuring, affecting the logic of market coordination and economic rationality.

Theoretical approaches to technological systems and institutional change additionally demonstrate that economic rationality is formed not exclusively through autonomous market interaction but also through institutional environments, regulatory architectures and socially constructed systems of technological coordination (*Bijker et al., 1987; Law & Hassard, 1999; Rip, 1995*). Within this context, environmental standards, sustainability taxonomies, carbon regulation, and climate-related conditionalities increasingly function as mechanisms shaping the boundaries within which rational economic behaviour becomes possible by redistributing access to markets, finance, and technological opportunities. The transformation of the green transition into a system of

institutionalized environmental conditionality, therefore, requires moving beyond interpretations of environmental policy that treat it exclusively as an ecological correction or voluntary sustainability adaptation.

At the same time, contemporary political economy research increasingly emphasizes the unequal distributional effects of structural transformations and the role of institutional asymmetries in reproducing differentiated development trajectories. Analyses of rentier capitalism, structural dependency and global asymmetries demonstrate that institutional restructuring frequently redistributes access to technological rents, financial resources and strategic advantages in uneven ways across countries and categories of economic agents (*Palma, 2023; Reznikova & Ivashchenko, 2016; Reznikova & Ivashchenko, 2017*). Modern approaches to international economic strategy formation additionally reflect the growing role of environmental risks, standards, and regulatory regimes in shaping the institutional conditions of economic activity and market access (*Panchenko & Reznikova, 2025; Reznikova & Tarasenko, 2024*). Within this context, environmental containment acquires significance not only as a mechanism of ecological regulation but also as a factor restructuring competitive space through systems of environmental conformity, certification, and climate-related conditionality.

Despite the growing body of literature on sustainability transitions, green competitiveness, and climate governance, the transformation of economic rationality under environmentally conditioned institutional restructuring remains insufficiently theorized. Existing studies predominantly focus either on technological modernization, environmental regulation, or sustainable development policy, whereas the mechanisms through which environmental conditionality restructures the institutional logic of rational economic behaviour remain conceptually fragmented. This determines the need to analyze environmental containment as a systemic factor in the transformation of economic rationality within the green transition.

Main results of the research. The transformation of the criteria of rationality manifests itself first and foremost in the behaviour of economic agents operating in an environment of intensified environmental constraints and regulatory requirements. Rational choice is increasingly less reducible to short-term cost minimisation and increasingly tied to the capacity to ensure long-term compliance with standards that determine access to markets, financial resources, and technologies. Under such conditions, economic efficiency is assessed not only through indicators of profitability and productivity but also through resource efficiency, carbon intensity, and environmental conformity of production. Environmental containment, accordingly, forms the institutional boundaries within which choice takes place, since it essentially establishes a system of constraints and incentives that structure the behaviour of producers, investors, and consumers; the integration of environmental criteria into trade regimes, financial standards and technological requirements means that the decisions of economic agents are evaluated according to their conformity with these criteria (*Panchenko & Reznikova, 2025*). As a result, rationality acquires a normatively oriented character: a choice that does not consider environmental requirements ceases to be economically justified in the medium- and long-term perspective.

The formation of the green rational economic agent occurs as an adaptation to a new system of incentives. Such an agent integrates environmental parameters into the structure of costs and revenues, evaluates the risks of losing market access in the event of non-compliance with standards, and considers the opportunities for obtaining green financing and technological advantages. Its behaviour is determined not only by the pursuit of profit but also by the necessity to maintain conformity with the institutional requirements that shape the environment of economic activity. It is precisely in this sense that environmental containment performs a structure-forming function: it does not merely restrict traditional models of production but also sets directions for investment and technological development. An economic agent operating under such conditions formulates strategies considering long-term environmental imperatives, which transforms environmental compliance into a fundamental condition of rational economic choice, and the historical trajectory of the inclusion of environmental standards in international trade and production practices indicates that this is not a localized regulatory shift but the latest stage of a longer process (*Tsybuliak, 2016;*

Tsybuliak, 2017).

The institutional consolidation of environmental requirements means that the behaviour of an economic agent is increasingly determined not only by the price of resources but also by the regime of access to economic activity. A situation emerges in which access to markets, public procurement, international financing, and technological partnerships depends on conformity with established environmental criteria. Within such a configuration, economic calculation includes the assessment of regulatory risk, that is, the risk of non-compliance with standards that may change more rapidly than technological cycles of production. In this context, environmental constraints act not only as constraints but also as mechanisms for selecting strategies. It eliminates models of behaviour that rely on high resource intensity and the externalization of environmental costs, and stimulates the search for alternative solutions, in line with the broader logic of environmental innovation and sustainability transitions identified in regional and global studies (*Truffer & Coenen, 2012*). A producer who could previously reduce costs through less stringent environmental requirements is now compelled to invest in modernization in order to preserve competitive positions; an investor focused exclusively on financial returns considers the risks of asset value loss in the event of stricter climate policy; a consumer increasingly responds to information about the environmental profile of products, which influences the structure of demand. The very structure of expectations changes consequently: whereas in the classical model the rational agent operated under the assumption of stable rules of the game, today the agent is compelled to forecast the trajectories of environmental standard tightening. Under such conditions, rationality becomes preventive, and consequently, the agent invests in compliance with requirements not only when they have already entered into force but also when their introduction is anticipated. In effect, such behaviour means the internalization of future constraints into the current economic calculation.

The theorization outlined here allows us to speak of the formation of a new type of economic subjectivity. The green rational economic agent operates in environments where environmental compliance is a component of competitive strategy. Its decisions are aimed at minimizing not only production costs but also regulatory risks associated with decarbonisation, the changing of standards, or the introduction of carbon border adjustments, which demonstrates that environmental containment transforms rationality from purely economic into normatively economic, where the boundaries of admissible choice are determined not only by the market but also by institutionally consolidated environmental imperatives. On this basis, environmental containment can be interpreted as an instrument for the formation of a new field of rationality. It does not eliminate freedom of choice but reconfigures it, setting development priorities, investment structure, and directions of technological evolution.

Environmental changes not only alter the motivation of an individual economic agent but also the architecture of the competitive space. The conditions of competition are increasingly determined not exclusively by price parameters but by the capacity to comply with environmental standards and demonstrate low resource intensity. Competitiveness, accordingly, acquires an additional dimension associated with environmental conformity. A producer that does not integrate environmental criteria into its strategy gradually loses market share, even when traditional cost or production-scale advantages are maintained. In such an environment, the differentiation between economic agents intensifies. Some adapt to the new requirements and develop green competitiveness, defined as the capacity to combine economic efficiency with environmental conformity; others maintain relatively *sustainable competitiveness* within traditional sectors but face the risk of gradual marginalization in segments where environmental standards become decisive. This unevenness of adaptation, which is itself a consequence of the asymmetric institutional capacities of different categories of agents, constitutes one of the central distributional dimensions of the contemporary green transition (*Panchenko, Ptashchenko, Reznikova & Karp, 2025*).

A particular role in this process is played by green neoprotectionism. Through standards, certification requirements, supply-chain transparency requirements, carbon border adjustments, and support for environmentally oriented sectors, states formulate new rules for market access. Formally, these measures are justified by the goals of sustainable development; however, they

effectively influence the distribution of competitive advantages. In such an institutional environment, the rational economic agent is compelled to reconsider its behavioural model, since non-conformity with environmental requirements entails the loss of part of the market space. As a result, environmental containment takes on a compelling character: it leaves the economic agent with no neutral position regarding environmental standards. Even if a strategy is oriented exclusively towards short-term gain, the institutional environment adjusts it through a system of permits, sanctions, and incentives. This means that green rationality is formed not only as a voluntary choice but also as an adaptive necessity, and it is precisely in this that the structural role of environmental containment in shaping a new type of economic behaviour consists.

The distinction between sustainable and green competitiveness enables a deeper understanding of the transformation of economic choice rationality under conditions of environmental containment. Sustainable competitiveness is associated with the capacity of an economic agent to ensure long-term operational stability, maintain productivity, and adapt to changes in the market environment; it may be based on production diversification, financial stability, institutional quality, and risk management. Such resilience, however, does not always entail a reduction in the environmental intensity of production or conformity with environmental standards being formed in the global economic environment. Green competitiveness is shaped by a different logic: it is determined by an economic agent's capacity to integrate environmental criteria into the structure of costs, investments, and technological solutions. It is based on the use of resource-efficient technologies, the reduction of carbon intensity, and compliance with transparency and environmental reporting standards (*Chala & Orlovska, 2021*). Such competitiveness ensures access to market segments where environmental conformity becomes a condition of participation; it may, however, be accompanied by increased costs and the need for substantial investments. Therefore, green competitiveness does not always coincide with sustainable competitiveness and at times even comes into short-term contradiction with it.

Environmental containment acts as a mechanism that gradually brings these two dimensions closer together. Through a system of standards, financing requirements, regulatory regimes, and instruments of green neoprotectionism (*Panchenko & Reznikova, 2025*), it stimulates economic agents to integrate environmental parameters into their development strategies. This process unfolds unevenly: some agents build green competitiveness as a source of long-term advantage, while others are compelled to adapt to new requirements without sufficient resources or technological capacity. It is precisely this unevenness that creates a new line of differentiation in the global economy, as under such conditions the rationality of green choice emerges as a response to institutional pressure. Green neoprotectionism, manifested through standards, certification, environmental taxes, subsidies, and controls on market access, creates an environment in which environmental compliance becomes a condition of economic survival. The economic agent changes its self-perception of its own rationality: decisions that were previously considered optimal in terms of costs and profit are now evaluated through the prism of their environmental compatibility with the new rules of the game. Such transformation has a compelling character, since refusal to integrate environmental criteria means the loss of access to resources, financing, and markets.

A new model of economic behaviour thus emerges, in which the green rational economic agent arises from the combination of market incentives and institutional pressure. Environmental containment sets the framework of choice; green neoprotectionism consolidates it in regulatory practice; competition transforms it into a norm of economic rationality. It is precisely in this combination that a new configuration of economic behaviour emerges, defining the trajectories of agent development in the contemporary world economy. The transformation of individual rationality is gradually scaled up to the level of economic systems. If green rational economic agents integrate environmental parameters into their decision-making, then the aggregate of such agents forms a new structure of demand, investment, and technological priorities. Markets begin to respond not only to price signals but also to the degree of environmental conformity of products, the transparency of supply chains, and the level of resource efficiency, where the unequal allocation of environmental costs and benefits along the supply chain generates differentiated incentives at successive stages of

production (*Clift & Wright, 2000*). Therefore, environmental parameters move from the periphery of economic analysis to the center of market conjuncture formation. This process is accompanied by changes in the criteria for assessing efficiency: while previously the logic of short-term profitability dominated, today the capacity of an economic agent to maintain long-term conformity with environmental requirements is acquiring increasing significance. Environmental risks are beginning to be considered as financial, and environmental compliance is treated as a condition of income stability (*Panchenko, Ptashchenko, Reznikova & Karp, 2025*). The cost of capital, access to insurance, lending conditions, and the possibility of participation in international projects increasingly depend on the environmental profile of activity, and in this respect, the contemporary phase of the world economy continues a longer trajectory in which structural constraints progressively reshape the criteria of rational behaviour (*Reznikova et al., 2022*).

In such a configuration, environmental containment becomes the institutional foundation for the formation of a new macro-level economic rationality. States and corporations begin to compete not only for resources and sales markets but also for the capacity to formulate environmental compliance standards and rules. The one who sets the standards effectively determines the parameters of rational choice for other participants in the economic system, and environmental containment is thus transformed into an instrument of structural influence that shapes the behaviour of economic agents even beyond the jurisdictions in which such standards have been introduced (*Ptashchenko & Arkhypova, 2020*). The green rational economic agent, as a result, ceases to be merely an adaptive response to external requirements and becomes a basic unit of a new economic logic. Its behaviour determines the directions of technological evolution, the structure of investments, and the configuration of global production networks, and it is precisely through the change in the rationality of agents that the gradual restructuring of the world economy occurs towards a model in which environmental imperatives are integrated into the fundamental principles of economic activity.

Conclusions. The green transition has emerged as a domain in which the institutional architecture of the world economy is being transformed alongside its technological foundations, and this article examines one of the consequences of that transformation: the restructuring of economic rationality under conditions of environmentally conditioned development. The analysis has demonstrated that the changes associated with the green transition extend substantially beyond ecological modernization or technological decarbonisation and increasingly affect the institutional criteria according to which economic activity is recognized as viable, competitive, and efficient. Within this context, environmental factors cease to function exclusively as external constraints upon economic calculation and progressively become embedded in the structure of rational economic behaviour itself. The transformation of the global economy toward climate neutrality, therefore, alters not only production technologies and resource-allocation systems but also the institutional logic through which economic choices are formed.

The conceptual distinction between environmental restraint and environmental containment enables a more precise interpretation of this transformation. Environmental restraint denotes the voluntary incorporation of ecological criteria into the logic of economic choice, whereas environmental containment characterizes the institutional restructuring of economic space in which access to markets, finance, technologies, and global production networks becomes conditional upon environmental conformity. Restraint, therefore, operates primarily at the level of behavioural adaptation, while containment functions at the structural and institutional level. Their analytical conflation obscures the mechanisms through which the green transition reshapes economic rationality. The transformation occurring under contemporary climate governance cannot be reduced solely to changes in preferences, ethical priorities, or voluntary ecological adaptation. Instead, it increasingly reflects the emergence of institutional architectures that redefine the boundaries within which rational economic behaviour can operate. Environmental containment restructures the configuration of competitive space itself by linking participation in economic systems to conformity with sustainability standards, carbon regulation, certification regimes, and climate-related financial conditionalities. Under such conditions, environmentally conditioned

rationality progressively becomes embedded in the institutional architecture of contemporary economic systems, while the criteria of competitiveness and investment efficiency are increasingly determined not only by productivity and technological scale but also by carbon intensity, environmental compliance, and adaptive capacity within evolving sustainability regimes.

The green transition, therefore, appears not only as a technological and environmental transformation but also as a process of institutional restructuring that alters the logic of global economic coordination. Instruments such as carbon border adjustment mechanisms, green taxonomies, sustainability reporting standards, certification systems, and climate-related financial conditionalities collectively contribute to the formation of a new configuration of competitive space in which environmental conformity functions as a prerequisite for access to markets and financial resources. Within this configuration, green competitiveness increasingly depends upon the capacity of firms, industries, and states to adapt to environmentally conditioned systems of regulation and market access. At the same time, the consequences of environmental containment remain asymmetrical across countries and categories of economic agents. Economies positioned lower in global technological and financial hierarchies face substantially higher adaptation costs and a greater risk of exclusion from emerging systems of green competitiveness. Under such conditions, the strategically meaningful response is not to avoid containment regimes, which increasingly function as structural components of the world economy, but rather to develop institutional, technological, and financial capacities for adaptation to the requirements of the green transition. This includes expanding access to green finance, strengthening environmental certification systems, supporting green industrial modernization, and participating in the formation of international sustainability standards.

The theoretical nature of the study determines several directions for further research. One of them concerns the empirical operationalization of environmentally conditioned rationality at the firm, investment decision, and industrial policy levels, where direct measurement remains methodologically difficult. Another concerns the comparative assessment of the intensity and structural characteristics of environmental containment regimes across jurisdictions, particularly in relation to regulatory asymmetries and differentiated access to sustainable finance instruments. A separate line of inquiry concerns the distributional consequences of environmental containment for developing economies and for countries occupying asymmetrical positions within global production and financial systems. The broader conclusion follows from the preceding analysis with relatively little need for additional qualification. Environmental containment should not be interpreted as a temporary policy instrument associated exclusively with a particular phase of climate policy development. It increasingly functions as a structural feature of the emerging architecture of the world economy and as a system-forming factor in the transformation of economic rationality itself. The categorical apparatus of economic theory, including traditional understandings of competitiveness, efficiency, and rational choice, has not yet fully incorporated these transformations. The analytical task that follows, therefore, consists of rethinking the institutional foundations of economic rationality in accordance with the structural realities generated by the green transition.

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DIGITAL TRANSFORMATIONS AS A DRIVER OF CHANGES IN SOCIO-ECONOMIC DEVELOPMENT: CONTRADICTORY AND ASYMMETRIC CHARACTER OF DIGITAL DEVELOPMENT AND THE DIGITAL RECONFIGURATION OF ECONOMIC SECURITY

ЦИФРОВІ ТРАНСФОРМАЦІЇ ЯК ДРАЙВЕР ЗМІН У СОЦІАЛЬНО-ЕКОНОМІЧНОМУ РОЗВИТКУ: СУПЕРЕЧЛИВИЙ І АСИМЕТРИЧНИЙ ХАРАКТЕР ЦИФРОВОГО РОЗВИТКУ ТА ЦИФРОВА РЕКОНФІГУРАЦІЯ ЕКОНОМІЧНОЇ БЕЗПЕКИ

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Abstract. *The purpose of the article is to substantiate the theoretical interpretation of digital transformations as a contradictory and asymmetric driver of socio-economic development that penetrates all traditional dimensions of economic security and converts digital security and cybersecurity into its constitutive mechanisms, and to demonstrate that the balance between strengthening and undermining economic security is determined not by technologies as such but by the configuration of regulatory and institutional frameworks of digital security, cybersecurity, and antimonopoly policy. The article proposes a conceptual framework that interprets digital transformation not as a linear modernization process but as a permanent multi-vector restructuring that penetrates the food, energy, and financial dimensions of economic security from within, transforming them through digital tools and platforms, with the consequence that traditional*

dimensions of economic security cannot be analytically separated from the digital contour without losing the substance of the analysis. The thesis of the contradictory and asymmetric character of digital development is substantiated, according to which the same technological foundation simultaneously expands the space of market opportunities and produces new forms of concentration of economic power, with benefits concentrated in a narrow circle of actors and risks dispersed across a broad base of participants, which transforms the question of the overall impact of digitalization on socio-economic development into a question of differentiated analysis of distributional outcomes for various groups of actors. Digital competition is analysed as a meta-mechanism of redistribution of economic power through such forms as platform competition, coopetition, escalation model, and algorithmic collusion, which together form a new matrix of threats to economic security and require a fundamental rethinking of antimonopoly policy. Digital stratification is examined as an endogenous factor that undermines economic security from within the national economic space through the erosion of the tax base, labour market, consumer demand, and fiscal capacity of the national state, while digital agents and artificial intelligence are interpreted as a new frontier of systemic risks of economic security that require the formation of international mechanisms of risk management going beyond the traditional regulatory toolkit.

Keywords: *socio-economic development, global transformations, economic security, transformation, digitalization, digital divide, digital inequality, digital security, cybersecurity, digital competition, digital stratification, digital agents, artificial intelligence, coopetition*

Анотація. *Метою статті є обґрунтування теоретичної інтерпретації цифрових трансформацій як суперечливого й асиметричного драйвера соціально-економічного розвитку, що проникає в усі традиційні виміри економічної безпеки й перетворює цифрову безпеку та кібербезпеку на її конститутивні механізми, а також демонстрація того, що баланс між зміцненням і підривом економічної безпеки визначається не технологіями як такими, а конфігурацією регуляторно-інституційних рамок цифрової безпеки, кібербезпеки та антимонопольної політики. У статті пропонується концептуальна рамка, яка інтерпретує цифрову трансформацію не як лінійний процес модернізації, а як перманентну багатовекторну реструктуризацію, що проникає в продовольчий, енергетичний і фінансовий виміри економічної безпеки зсередини, трансформуючи їх через цифрові інструменти та платформи, унаслідок чого традиційні виміри економічної безпеки не можуть бути аналітично відокремленими від цифрового контуру без втрати суттєвості аналізу. Обґрунтовується теза про суперечливий і асиметричний характер цифрового розвитку, згідно з якою одна й та сама технологічна основа одночасно розширює простір ринкових можливостей і продукує нові форми концентрації економічної влади, причому вигоди концентруються у вузькому колі акторів, тоді як ризики розосереджені по широкій базі учасників, що перетворює питання про загальний ефект цифровізації на соціально-економічний розвиток у питання диференційованого аналізу розподільчих наслідків для різних груп акторів. Цифрова конкуренція проаналізована як метамеханізм перерозподілу економічної влади через такі форми, як платформна конкуренція, коопетиція, ескалаційна модель та алгоритмічна колюзія, що разом формують нову матрицю загроз економічній безпеці й потребують фундаментального переосмислення антимонопольної політики. Цифрова стратифікація розглядається як ендогенний чинник, що підриває економічну безпеку зсередини національного економічного простору через ерозію податкової бази, ринку праці, споживчого попиту та фіскальної спроможності національної держави, а цифрові агенти й штучний інтелект інтерпретуються як новий рубіж системних ризиків економічної безпеки, що потребують формування міжнародних механізмів управління ризиками, які виходять за межі традиційного регуляторного інструментарію.*

Ключові слова: *соціально-економічний розвиток, глобальні трансформації, економічна безпека, трансформація, цифровізація, цифровий розрив, цифрова нерівність, цифрова безпека, кібербезпека, цифрова конкуренція, цифрова стратифікація, цифрові агенти, штучний інтелект, конкуперація.*

Introduction. Over the past three decades, digital transformation has evolved from the status of an industry-wide technological process to a fundamental condition for economic reproduction, while simultaneously undergoing a qualitative change in its nature from a tool for increasing productivity to an independent mechanism that determines the trajectory of socio-economic development, the configuration of economic security, and the architecture of international economic relations. As a result, the traditional theoretical apparatus of economic science, formed mainly in the logic of the industrial economy, is increasingly unsuitable for adequately describing the qualitative shifts in the conditions of platform capitalism and the algorithmic economy. Modern research shows that digital transformation has gone far beyond the introduction of individual technologies into production processes and has taken on the character of a systemic structural shift that encompasses all levels of economic organization, from the microlevel of individual enterprises to the megalevel of global production networks and geopolitical relations, and this shift is accompanied by the formation of new types of economic subjectivity, new models of competition, and new forms of economic power that fundamentally modify the mechanisms of socio-economic development *(Panchenko & Oliinyk, 2025a)*. What is fundamentally important in this context is that digital tools have penetrated each of the traditional spheres of economic reproduction, namely food, energy, and finance, transforming them from within and thereby changing the very architecture of economic security, as a result of which none of the traditional dimensions of economic security today can be ensured without a reliable digital circuit, and any failure in this circuit immediately translates into a failure of the entire security architecture of the national economy. The thesis of digital transformation as a universal tool for expanding access to economic opportunities, widespread in public discourse and partly in academic works, is increasingly encountering empirical counterarguments, including the growth of productivity in the digital sector against the backdrop of stagnant median incomes in most developed economies, the concentration of market capitalization within a narrow group of BigTech corporations at historically unprecedented levels, and the polarization of the employment structure between high-paying cognitive-digital positions and low-paid platform employment, which generally indicates the asymmetric nature of the distribution of digital benefits and risks among different groups of actors *(Panchenko & Oliinyk, 2025b; Brynjolfsson, Chandar & Chen, 2025)*. The digital divide, which for a long time was interpreted as a transitional phenomenon that was supposed to be automatically overcome as infrastructure spread, is taking on the features of a stable structural property of the global economy, reproducing and reinforcing traditional forms of inequality in the new technological envelope, and this process is especially clearly manifested in the dimension of intergenerational differences in the perception of new threats to economic security, where the generation that was formed in the conditions of an already formed digital reality demonstrates a qualitatively different matrix of perception of digital risks and digital inequality from previous generations *(Reznikova, Chugaiev, Bulatova & Ptashchenko, 2023)*.

The working hypothesis of the study assumes that digital transformations function not as a neutral driver of socio-economic development, but as a mechanism that, through digital competition and platform dominance, simultaneously expands the space of market opportunities and produces new forms of concentration of economic power, digital inequality, and systemic risks. Moreover, a fundamentally important point in this hypothesis is the proposition that digitalization does not create a separate, parallel dimension of economic security, but penetrates all its traditional dimensions, food, energy, and financial, transforming them from the inside, as a result of which digital security and cybersecurity become not parallel categories, but constitutive mechanisms of economic security as a whole. The specific balance between strengthening and undermining economic security is set not by technologies as such, but by the configuration of the regulatory and institutional frameworks of digital security, cybersecurity, and antitrust policy, and the contradictory and asymmetric nature of digital development means that benefits and risks are distributed unevenly among actors, forming new mechanisms of digital stratification that translate traditional socio-economic inequality into its digital forms and, at the same time, generate fundamentally new axes of stratification that are uncharacteristic of the industrial economy. The study's relevance stems from several interrelated

factors that together justify the need to rethink the conceptual apparatus for analyzing the relationship between digital transformations and economic security. First, the traditional categorical apparatus of economic security, built on the paradigm of the industrial economy with its clear separation of food, energy and financial dimensions, is becoming less and less suitable for assessing the qualitative shifts caused by the digital transformation of traditional dimensions of security, since the digital circuit permeates all these dimensions and unites them into a new systemic integrity, which requires an appropriate methodological design.

Second, traditional instruments of competition policy and social protection demonstrate a decrease in effectiveness in response to new forms of market power, platform dominance, and labor relations in the platform economy, which actualizes the need to form preventive regulatory mechanisms and conceptually new approaches to managing digital competition *(Reznikova, Bulatova, Panchenko & Ivashchenko, 2023)*. Third, the accelerated development of autonomous artificial intelligence systems and digital agents capable of making economically significant decisions independently creates a fundamentally new category of economic security risks that has not yet received adequate theoretical and regulatory formulation and is a focus of modern economic theory and policy. Fourth, Russia's war against Ukraine has demonstrated with unprecedented clarity that cybersecurity of critical infrastructure is not an abstract technological category, but an existential dimension of economic security, closely connected with the energy, financial and food reproduction of the national economy, and the specific Ukrainian experience provides unique empirical material for verifying theoretical propositions about the constitutive role of the digital circuit in the functioning of traditional dimensions of economic security.

The purpose of the article is to substantiate the theoretical interpretation of digital transformations as a contradictory and asymmetric driver of socio-economic development that penetrates all traditional dimensions of economic security and turns digital security and cybersecurity into its constitutive mechanisms, as well as to form a holistic conceptual framework for analyzing a new matrix of threats to economic security that is being formed in the context of digital transformations, digital competition, algorithmic collusion, and autonomous digital agents. The methodological basis of the study is a theoretical and analytical approach, which relies on structural and functional analysis to reveal the contradictory and asymmetric nature of digital development and institutional analysis to study the relationship between technological changes and regulatory and political frameworks, and these approaches are complemented by a comparative and historical method to compare modern digital transformation with previous technological revolutions and identify its qualitative specificity, as well as a systemic approach to describe the relationship between traditional and digital dimensions of economic security within a single conceptual framework.

Literature review. Modern research on digital transformations forms several powerful scientific directions, each of which reveals individual aspects of the multidimensional process and at the same time, leaves room for further theoretical synthesis, and the need for an integrative understanding of the relationship between digital transformation and traditional dimensions of economic security, which so far remains mostly fragmentary and has not formed a coherent conceptual framework, is especially palpable. The first direction is related to the conceptualization of digital transformation as a technological paradigm that redefines the foundations of production, exchange and consumption, with an emphasis on platform business models, network effects and the ecosystem nature of the digital economy, within which it is justified that platformization is not just an organizational innovation, but a fundamental reconfiguration of economic relations, in which digital platforms are transformed into quasi-institutional structures that form the rules of interaction between market participants, control access to information flows and extract a significant part of the value created, while simultaneously functioning as markets, production systems and regulatory authorities, which blurs the traditional analytical boundaries between these categories and requires a rethinking of the very concept of an economic institution *(Panchenko & Oliinyk, 2025a; Panchenko & Oliinyk, 2025c*; *Panchenko & Oliinyk, 2025d; Reznikova, Ptashchenko & Ptashchenko, 2025)*.

An important analytical perspective is also offered by studies of the nature of power in digital capitalism, which demonstrate that the large-scale accumulation of behavioral data by large digital corporations gives rise to a fundamentally new form of economic power, based on the ability to predict and modify user behavior, rather than simply serving their preferences, resulting in a specific asymmetry between data generators and their monetizers, which reproduces the traditional logic of capitalist exploitation in a new technological shell *(Zuboff, 2019)*.

A separate scientific direction focuses on the impact of automation and artificial intelligence on the labor market, incomes, and macroeconomic dynamics, and within this direction, a robust analytical foundation has been established for studying the structural shifts driven by digital transformations *(Acemoglu & Restrepo, 2018)*. The development of this analytical perspective demonstrates that the macroeconomic consequences of AI critically depend on whether existing tasks are largely automated or new productive opportunities are created, which shapes the trajectory of productivity, employment, and income distribution and determines whether the digital transformation leads to inclusive development or increases inequality *(Acemoglu, 2024; Brynjolfsson, Chandar & Chen, 2025; Eloundou, Manning, Mishkin & Rock, 2024; Trammell & Korinek, 2023; Shahidi, Rusak, Manning, Fradkin & Horton, 2025)*. Empirical analyses record a correlation between the spread of generative artificial intelligence and the growth of unemployment in relevant professional groups, which indicates the observed effects of technological substitution in modern labor markets *(Ozkan & Sullivan, 2025)*, while studies of the extreme risks of artificial intelligence in conditions of accelerated progress emphasize the need to form institutional mechanisms for managing these risks, which go beyond the traditional regulatory tools and require international coordination *(Bengio et al., 2024)*.

Digital competition research is another significant academic area directly related to the issue of economic security, since the configuration of competitive relations in the digital age directly determines the distribution of economic power between market players and between jurisdictions, and therefore the configuration of threats and opportunities for national economic security. Conceptual works demonstrate how artificial intelligence affects economic development strategies, income distribution, and global economic dynamics through the prism of international political economy and technological change, emphasizing the specific challenges for developing countries that risk finding themselves in a state of persistent digital dependence in the new technological hierarchy *(Korinek, 2024; Korinek & Stiglitz, 2021; Calvano, Calzolari, Denicolò & Pastorello, 2020)*. Research on the framework for the development of the digital sector focuses on the regulatory, infrastructural and institutional challenges of digitalization, which require a comprehensive approach to digital policy formation *(Assad, Clark, Ershov & Xu, 2024; OECD, 2024; World Economic Forum, 2025b; International Energy Agency, 2025)*. Despite the development of individual research areas, significant theoretical gaps remain in the existing literature, justifying the need for further theoretical synthesis.

Main results of the research. The traditional perception of digital transformation as a technological renewal of production processes turns out to be reductionist and does not correspond to the scale and qualitative nature of the changes taking place, since digital transformation today is a permanent process of fundamental restructuring of economic, social, institutional and cultural practices, which simultaneously encompasses several vectors of movement and does not have a clearly defined end point, as a result of which attempts to describe digital transformation as a completed modernization process encounter the structural impossibility of such a description. The first vector, technological, is associated with the evolution of digital infrastructure through several qualitatively different generations, each of which not only added new tools, but redefined the very structure of economic interactions, moving from static web pages and email through social networks and interactive platforms to decentralized technologies, artificial intelligence systems and autonomous agents, and the pace of technological change within this vector tends to accelerate, which complicates institutional adaptation and forms a permanent gap between technological capabilities and regulatory frameworks.

The second vector, institutional, concerns the transformation of rules, norms, and practices

regulating economic activity, characterized by the interaction of two mechanisms of institutional change, namely bottom-up processes initiated by startups, entrepreneurs, and new services that outpace existing regulatory frameworks, and top-down processes driven by states, supranational regulators, and BigTech corporations that shape standards and rules. The balance between these mechanisms changes across different stages of digital economy development, shifting from the predominance of bottom-up dynamics in the early stages to the strengthening of top-down regulation at more mature stages. The third vector, structural, is manifested in the formation of new sectors of the economy, new types of markets and new business models that gradually replace or transform traditional economic structures, forming a new structural architecture of national and global economies. The fourth vector, anthropological, consists in the transformation of the very nature of the economic subject, since along with traditional individuals and legal entities, digital agents appear, that is, algorithmic systems capable of autonomous economic decision-making, which raises a fundamental question about the limits of economic subjectivity in the algorithmic era *(Shahidi, Rusak, Manning, Fradkin & Horton, 2025)*. Fundamentally important for understanding the socio-economic consequences of digital transformation is that it does not unfold as an external factor in relation to the economy, but penetrates all spheres of economic reproduction, transforming them from the inside, and this nature of penetration leaves no sphere outside the digital contour, and therefore makes it impossible to analyze any aspect of the modern economic system without taking into account its digital dimension.

The central theoretical construct of the study is the concept of the contradictory and asymmetric nature of digital development, the essence of which is that one and the same technological basis simultaneously generates two groups of effects that are in a complex relationship, and do not simply coexist in parallel, and understanding this relationship is a necessary prerequisite for an adequate analysis of the socio-economic consequences of digitalization and the formation of effective economic policy. The inclusive potential of digitalization is manifested in the fact that digital platforms reduce the transaction costs of entering markets, giving small producers, freelancers and small businesses access to a global audience that was unattainable in the pre-digital era, while digital educational resources formally expand access to knowledge, allowing people from resource-limited regions to obtain qualifications, while digital financial services expand financial inclusion for groups traditionally excluded from the banking system, giving the impression of a universal democratizing dynamic of digitalization, which supposedly leads to an automatic reduction of inequality and an expansion of opportunities. However, the same mechanisms also generate exclusionary effects, and not as accidental side effects, but as structural features of the same technological architecture, which fundamentally distinguishes the digital era from previous waves of technological change, in which exclusionary effects could be seen mainly as transitional costs of modernization.

Platforms that lower barriers to entry for small players simultaneously concentrate unprecedented market power in the hands of a few global gatekeepers who dictate the terms of access, pricing, and profit sharing, a concentration that tends to be self-reinforcing through network effects, economies of scale, and first-mover advantages, creating a winner-take-all structure in which even a small initial advantage can turn into absolute dominance. Fundamentally important in this concept is the asymmetric nature of the distribution of digital effects: benefits are concentrated in a narrow circle of actors, while risks and transaction costs are dispersed across a wide base of participants, which means that the contradictions of digital development are realized precisely as an asymmetry of distribution, and not as a symmetric collision of two equilibria in which inclusive and exclusive effects would balance each other. Such structural asymmetry means that the question of the general effect of digitalization for socio-economic development cannot be resolved in a generalized manner and requires a differentiated analysis of different groups of actors, and the specific balance between inclusive and exclusive effects is determined not by technologies as such, but by the configuration of the regulatory, institutional and political-economic frameworks in which digital transformation unfolds, which shifts the focus of economic policy from the technological to the institutional level and raises the question of the adequacy of the existing institutional frameworks

to the challenges of the digital era.

Digital transformations do not create a separate, parallel dimension of economic security alongside the traditional ones, but penetrate each of them, transforming them from within, as a result of which economic security in the digital era is not the sum of the old dimensions plus the new digital one, but is the result of the digital reconfiguration of the traditional dimensions of security themselves, namely food, energy, and financial. Food security in the digital age is mediated by digital harvest aggregation platforms, algorithmic weather forecasting systems, precision agriculture based on the Internet of Things, digital supply chains, and exchange-based pricing algorithms on commodity markets, as a result of which a failure in any of these digital circuits becomes a failure of food security, and a cyber threat to an agricultural holding or algorithmic manipulation on commodity exchanges is not a digital problem in addition to the food problem, but the very form of existence of modern food vulnerability, which fundamentally changes the nature of food sector risks and requires a rethinking of food security tools. Energy security in the digital age even more clearly demonstrates this constitutive role of the digital circuit, as energy systems are managed by dispatching control and data collection systems, smart grids, and algorithmic dispatching, as a result of which an attack on digital energy supply systems is an attack on energy security, and the Ukrainian experience of war demonstrates this with unprecedented clarity, since cyberattacks on critical energy infrastructure have become one of the key tools of economic and military pressure, and energy security today is impossible without cybersecurity of critical infrastructure, and these categories merge to the point of indistinguishable in the practical dimension of ensuring national economic sustainability *(International Energy Agency, 2025)*.

Financial security in the digital age is fully mediated by digital technologies, including online banking, financial technologies, payment systems, algorithmic trading, cryptocurrencies, and artificial intelligence-based risk assessment models. As a result, algorithmic collusion in financial markets, digital manipulation, and cyberattacks on banking systems are not a complement to financial security, but the main channel for its potential destabilization. Moreover, the cross-border nature of digital financial flows means that the financial security of national economies depends on decisions and events beyond national jurisdiction. Such a constitutive role of the digital circuit in the functioning of traditional dimensions of economic security means that digital security and cybersecurity cannot be considered as autonomous technological categories or as a parallel circuit added to economic security, since they are internal mechanisms of the functioning of economic security itself, its constitutive dimensions, without which traditional dimensions of security cannot be ensured in principle, and any failure in the digital circuit immediately translates into a failure of the entire architecture of economic security. A fundamentally important conclusion from this provision is that investments in digital security cease to be technological costs and acquire the status of strategic investments in national economic security, and digital sovereignty, that is, the ability of a country to independently determine the rules for the development of the digital economy on its own territory, becomes a key component of economic sovereignty as a whole, which actualizes the need to form a holistic national digital strategy that integrates economic, security and technological dimensions.

In the context of digital transformations, competition ceases to be one of the elements of economic development along with other mechanisms and turns into a meta-mechanism of redistribution of economic power, which directly affects the configuration of economic security, since structural shifts in the competitive environment of the digital economy directly change the balance of power between actors and between jurisdictions. Digital competition has several fundamental differences from traditional competition that require theoretical understanding in view of their implications for economic security. First, the objects of competition undergo a fundamental change, because if in the industrial economy the main objects were factors of production, market share and price advantage, then in the digital economy data as a strategic resource, consumer attention as a limited resource and innovation as a condition for survival come to the fore, and control over these resources directly correlates with control over the economic security of national economies *(Reznikova, Ptashchenko & Ptashchenko, 2025)*. Secondly, forms of digital competition

are acquiring a fundamentally new character, which requires a separate analysis. Platform competition is a mixed type of interaction in which participants simultaneously cooperate and compete within the same ecosystem, and the boundaries between horizontal and vertical competition, between global and local levels, between competition and cooperation are blurred, which complicates the application of traditional antitrust regulation tools and requires the formation of a new concept of competitive analysis adequate to the ecosystem nature of digital markets. Coopetition, that is, simultaneous competition and cooperation between digital market entities, forms a new model of market behavior in which companies share risks and costs of innovation, jointly enter new markets or adhere to common standards, while maintaining a competitive struggle for the end consumer, and such coopetition strategies are becoming the dominant form of interaction in many segments of the digital economy and are creating new challenges for antitrust policy, since traditional tools are unable to adequately distinguish between pro-competitive and anti-competitive forms of coopetition.

The escalating model of competition is manifested in the fact that digital giants are forced to constantly invest in research and development, marketing and capital expenditures in order to maintain their market position, while the temporal structure of competition is compressed to weeks, and competitive advantage tends to rapidly depreciate without constant innovation, which forms a new type of market dynamics with increased barriers to entry for new participants and structural advantages for players with the largest capital for constant investments. A particularly important form of digital competition from the perspective of economic security is algorithmic collusion, that is, autonomous coordination of pricing and other market strategies between algorithmic systems without explicit programming for collusive behavior, and such a phenomenon arises as an emergent property of machine learning systems and is not reducible to traditional forms of price collusion *(Calvano, Calzolari, Denicolò & Pastorello, 2020; Assad, Clark, Ershov & Xu, 2024)*. Algorithmic collusion constitutes a fundamentally new form of market failure, as it arises not as a result of an explicit conspiracy between economic entities, but as an emergent property of machine learning systems, which complicates its detection and regulation within the framework of traditional antitrust tools and creates a new category of threats to economic security, especially in the financial, energy and food segments, where algorithmic pricing is becoming increasingly widespread. The combination of these forms of digital competition forms a new matrix of threats to economic security, in which the concentration of market power in the hands of digital giants means that the economic security of national economies becomes a function of decisions made outside national jurisdiction, which actualizes the need for the formation of preventive regulatory mechanisms and international coordination of antitrust policy *(Reznikova, Karp & Ivashchenko, 2023)*.

Digital stratification is an endogenous factor that undermines economic security within the national economic space, reproducing and reinforcing traditional forms of socio-economic inequality within the new technological envelope and, at the same time, generating fundamentally new axes of stratification uncharacteristic of the industrial economy. In contrast to the traditional concept of the digital divide with its predominantly binary opposition of access or lack of access, digital stratification describes a multidimensional structure of persistent gaps in the digital sphere, which are translated into socio-economic stratification and are mutually reinforcing, forming a vicious circle of exclusion, which, without targeted institutional intervention, tends to be self-reinforcing. The infrastructural dimension of digital stratification captures unequal access to digital infrastructure, from broadband internet and computing power to data centres and the energy resources to support them, and this gap is evident at all levels, from the international level, with a characteristic concentration of cloud infrastructure in a narrow range of countries, to the intra-national level, with gaps between cities and rural areas. The competence dimension expresses inequality in digital skills, and a feature of this dimension is its cumulative nature, since those who have basic skills have a higher chance of developing advanced ones, while those who do not have access to basic education in the digital sphere risk falling into the trap of being undemanding in the labour market, which forms persistent trajectories of economic exclusion *(World Economic Forum, 2025a)*. The dimension of data control captures the inequality between the subjects who generate

data, i.e. mainly users of digital services, and those who collect, analyze and monetize it, i.e. platforms and corporations, and this dimension is particularly problematic because it reproduces the asymmetry of economic rent, in which the value created through the generation of data by billions of users is concentrated in a narrow circle of digital corporations *(Zuboff, 2019)*. The algorithmic dimension expresses inequalities in the ability to understand, challenge, or influence algorithms that make economically significant decisions, with algorithmic opacity becoming a new form of institutional power, especially over vulnerable groups that lack the resources for algorithmic literacy. The regulatory dimension captures inequalities across jurisdictions in their ability to shape the rules of the game for the digital economy, generating a specific form of regulatory dependency for countries with lower institutional capacity *(Panchenko & Oliinyk, 2025b)*. A separate axis of digital stratification, which is gaining increasing research attention, is the intergenerational dimension, within which different generations demonstrate qualitatively different matrices of perception of digital threats and digital inequality, and generation Z, which was formed in the conditions of an already established digital reality, demonstrates a specific structure of digital vulnerability and digital competencies, which differs from previous generations and gives rise to a specific form of Z-inequality in the context of the formation of a digital society *(Reznikova, Chugaiev, Bulatova & Ptashchenko, 2023)*. Digital stratification undermines economic security through several channels, including the erosion of the tax base due to the exclusion of significant groups from the full digital economy, the destabilization of the labor market due to a structural shift in the demand for competencies, the reduction of consumer demand due to the concentration of digital rents in a narrow circle of actors, the weakening of the fiscal capacity of nation states due to the evasion of global digital corporations from taxation in the jurisdictions of their operations, as well as the formation of a new geography of economic inequality due to the spatial concentration of digital benefits in narrow cores with simultaneous displacement from the periphery, which threatens the territorial integrity of national economic spaces *(Panchenko & Oliinyk, 2025a)*.

Digital agents and artificial intelligence form a new frontier of economic security, which requires a rethinking of the very concept of an economic subject and the category of systemic risks, since the traditional tools of economic theory and regulatory policy did not foresee the existence of autonomous non-biological participants in economic processes capable of independently making economically significant decisions. Along with traditional individuals and legal entities, algorithmic systems are emerging in the economy that are capable of autonomously making economic decisions, ranging from forecasting market conditions and optimizing production processes to independently concluding contracts and managing investment portfolios, and the scale and autonomy of such systems are growing exponentially, forming a fundamentally new configuration of economic relations *(Shahidi, Rusak, Manning, Fradkin & Horton, 2025).* The emergence of digital agents as functional participants in economic processes raises several fundamental questions for the theory of economic security, each of which requires a separate theoretical and regulatory formulation.

First, the issue of attribution of responsibility, since when an economically significant decision is made by an algorithmic system, the problem arises of determining the entity responsible for the consequences of this decision, especially in cases where the consequences turn out to be destructive for individual market participants or for the system as a whole, and the traditional legal categories of attribution of responsibility did not provide for such a situation and require significant adaptation. Secondly, the issue of predictability and controllability: complex artificial intelligence systems, especially those that learn, can exhibit emergent behavior not foreseen by their developers, creating a fundamentally new category of systemic risks that are difficult to address with traditional risk management *(Bengio et al., 2024)*. Third, the issue of the concentration of algorithmic power, as the development and control of the most powerful AI systems are concentrated in a narrow circle of companies and countries, creates an asymmetry of algorithmic influence on the global economy and creates a new axis of international economic dependence that overlaps with and reinforces the existing structures of the global economic hierarchy. Fourth, the issue of labor substitution, as AI-based automation demonstrates the ability to affect a wide range of cognitive professions, which shapes structural shifts in labor markets and requires a rethinking of social protection instruments

and employment policies *(Acemoglu, 2024; Brynjolfsson, Chandar & Chen, 2025; Eloundou, Manning, Mishkin & Rock, 2024)*. A common feature of the risks posed by digital agents and artificial intelligence for economic security is their systemic and cross-border nature, since a failure or abuse in artificial intelligence systems can have cascading consequences that spread through the digital infrastructure to all sectors of the economy regardless of national borders, and such cross-border nature limits the effectiveness of national regulatory instruments and highlights the need to form international mechanisms for managing artificial intelligence risks, which so far remain fragmented and do not form a coherent architecture of global digital security.

Conclusions. The conducted research allows us to substantiate several fundamentally important theoretical propositions that form a holistic conceptual framework for the analysis of digital transformations as a driver of socio-economic development and a factor in the reconfiguration of economic security, and these propositions together form an integrative theoretical model that combines the economic, institutional and security dimensions of digitalization. First, digital transformations constitute a permanent multi-vector process that encompasses technological, institutional, structural and anthropological dimensions that are in a complex relationship and cannot be reduced to any of them separately, and this process does not unfold as an external factor in relation to the economy, but penetrates into all spheres of economic reproduction, transforming them from the inside, which makes it impossible to analyze any aspect of the modern economic system without taking into account its digital dimension. Secondly, digital transformations have a contradictory and asymmetric nature, which is not a transitional characteristic, but a built-in structural property of digital development, since the same technological basis simultaneously expands the space of market opportunities and produces new forms of concentration of economic power, with benefits concentrated in a narrow circle of actors, while risks and transaction costs are dispersed across a wide base of participants, which means the need for a differentiated analysis of the distributional consequences of digitalization for different groups of actors and a shift in the focus of economic policy from the technological to the institutional level, since the specific balance between inclusive and exclusionary effects is determined not by technologies as such, but by the configuration of the regulatory and institutional framework.

Thirdly, a fundamentally important conclusion of the study is that digital transformations do not create a separate, parallel dimension of economic security, but penetrate all its traditional dimensions, food, energy and financial, transforming them from the inside, as a result of which digital security and cybersecurity become not parallel categories, but constitutive mechanisms of economic security as a whole, without which traditional dimensions of security cannot be ensured in principle. Investments in digital security cease to be technological costs and become strategic investments in national economic security, and digital sovereignty becomes a key component of economic sovereignty, underscoring the need to form a holistic national digital strategy that integrates economic, security, and technological dimensions. Fourth, digital competition becomes a meta-mechanism for the redistribution of economic power, which directly affects the configuration of economic security through such forms as platform competition, coopetition, the escalation model, and especially algorithmic collusion, which constitutes a fundamentally new form of market failure and a new category of threats to economic security, requiring a revision of the traditional antitrust toolkit and the formation of preventive regulatory mechanisms adequate to the emergent nature of algorithmic coordination.

Fifth, digital stratification constitutes an endogenous factor undermining economic security from within the national economic space through such channels as the erosion of the tax base, the destabilization of the labor market, the reduction of consumer demand, the weakening of the fiscal capacity of nation states, and the formation of a new geography of economic inequality, with a special axis of digital stratification being the intergenerational dimension, in which different generations demonstrate qualitatively different matrices of perception of digital threats and digital inequality. Sixth, digital agents and artificial intelligence form a new frontier of economic security, which requires a rethinking of the very concept of an economic entity and the category of systemic risks, and their systemic and cross-border nature actualizes the need to form international risk

management mechanisms, which so far remain fragmentary and do not form a coherent architecture of global digital security.

Further research should focus on several interrelated areas that together form a promising research program in the field of the relationship between digital transformations and economic security. The first area involves the development of methodological tools for measuring the multidimensional structure of digital stratification, which would allow us to quantitatively assess its impact on economic security and analyze its dynamics over time, with special attention being paid to the operationalization of categories such as digital stratification, digital sovereignty, digital rent, and algorithmic power, which so far remain predominantly qualitative concepts. The second direction covers the analysis of the effectiveness of various regulatory models in mitigating the negative effects of digital competition, with a special emphasis on a comparative study of European, American and Asian approaches to regulating digital markets and platforms and their implications for national economic security, and such an analysis should form the basis for the formation of best practices in regulating the digital economy in the context of national specificities. The third direction is related to the formation of a strategic framework for digital sovereignty as a component of economic sovereignty for countries with an intermediate status in the global digital hierarchy, which would combine economic, security and technological dimensions and take into account the specifics of national conditions, limited resources and the need for integration into global digital processes. The fourth direction involves deepening the theoretical analysis of risks associated with autonomous digital agents and artificial intelligence systems, and the formation of adequate regulatory and institutional mechanisms for managing these risks at the national and international levels, which is one of the most complex and urgent tasks of modern economic theory and policy.

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UKRAINE'S GREEN RECOVERY IN THE INTERNATIONAL MEDIA: THE POSSIBILITIES AND LIMITS OF FINBERT-BASED SENTIMENT ANALYSIS

ЗЕЛЕНА ВІДБУДОВА УКРАЇНИ В МІЖНАРОДНИХ МЕДІА: МОЖЛИВОСТІ ТА ОБМЕЖЕННЯ АНАЛІЗУ ТОНАЛЬНОСТІ НА ОСНОВІ FINBERT

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Abstract. This paper examines the tone of international media coverage of Ukraine's green recovery and asks how far that measurement depends on choices made in constructing it. The corpus consists of 456 English-language headlines retrieved from Google News RSS across eight queries between November 2019 and August 2026, classified with FinBERT (ProsusAI/finbert). The overall tone is moderately positive: 35.31% of headlines are positive, 57.02% neutral and 7.68% negative, giving a sentiment index of +0.276 (95% CI [+0.222, +0.331]). Two dimensions of genuine variation are identified. Institutional publishers are three times more likely than media outlets to produce a positive headline (+0.581 against +0.245; Fisher exact $p = 0.00062$). Tone also differs sharply by retrieval frame, from +0.545 for reconstruction-and-energy coverage to exactly 0.000 for climate finance, where positive and negative headlines are in perfect balance (chi-square = 58.84; $p < 0.0001$). The apparent recovery of tone over the course of the war, by contrast, does not survive scrutiny: the aggregate rise from +0.016 in 2022 to +0.363 in 2025-2026 is driven by a shift in which queries return content in which period, and disappears when the retrieval frame is held constant ($p = 0.121$). Two further demonstrations point the same way. Removing the publisher name that Google News appends to every headline changes 14.69% of classifications and moves the index from +0.217 to +0.276; and classifying topic by keyword match rather than by retrieval query turns a significant effect into a non-significant one. Applying financial language models to reconstruction discourse therefore requires full reporting of preprocessing, explicit control for retrieval composition and validation against a hand-coded subsample.

Keywords: green recovery, Ukraine, sentiment analysis, FinBERT, sustainable finance, media discourse, natural language processing, post-war reconstruction.

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Анотація. У статті досліджено тональність міжнародного медійного висвітлення зеленої відбудови України та з'ясовано, наскільки результат такого вимірювання залежить від рішень, ухвалених у процесі його побудови. Корпус становлять 456 англомовних заголовків, зібраних із Google News RSS за вісьмома запитами з листопада 2019 року до серпня 2026 року та класифікованих моделлю FinBERT (ProsusAI/finbert). Загальний тон висвітлення є помірно позитивним: 35,31% заголовків позитивні, 57,02% нейтральні і 7,68% негативні, індекс сентименту становить +0,276 (95% ДІ [+0,222; +0,331]). Виявлено два виміри справжньої варіації. Інституційні джерела втричі частіше за медіа продукують позитивні заголовки (+0,581 проти +0,245; точний тест Фішера $p = 0,00062$). Тональність також різко різниться залежно від пошукової рамки — від +0,545 для висвітлення відбудови та енергетики до рівно 0,000 для кліматичного фінансування, де позитивні й негативні заголовки перебувають у цілковитій рівновазі ($\chi^2 = 58,84$; $p < 0,0001$). Натомість позірне поліпшення тону впродовж війни перевірки не витримує: агрегатне зростання з +0,016 у 2022 році до +0,363 у 2025–2026 роках зумовлене зміною того, які запити повертають матеріал у який період, і зникає, коли пошукову рамку тримати сталою ($p = 0,121$). Ще дві перевірки вказують у той самий бік. Вилучення назви видання, яку Google News додає до кожного заголовка, змінює 14,69% класифікацій і зсуває індекс з +0,217 до +0,276; а класифікація тем за ключовими словами замість пошукового запиту перетворює значущий ефект на незначущий. Застосування фінансових мовних моделей до дискурсу відбудови потребує повного опису передобробки, явного контролю за композицією вибірки та валідації на вручну закодованій підвибірці.

Ключові слова: зелена відбудова, Україна, аналіз тональності, FinBERT, стале фінансування, медійний дискурс, обробка природної мови, повоєнна реконструкція.

Introduction. The scale of Ukraine's reconstruction task is now measured in hundreds of billions of dollars, and the terms on which that money arrives are increasingly conditional. The Lugano Declaration of 2022, the successive Ukraine Recovery Conferences and, most consequentially, the European Union's Ukraine Facility have tied financial support to sustainability criteria, so that green recovery has moved from aspiration to something closer to a disbursement condition. The architecture assembled to deliver it — blended public and private instruments, donor coordination mechanisms, conditionality frameworks — has been mapped in some detail (Becker et al., 2022; Namoniuk, 2026), and what began as a normative preference among donors has become an operating constraint on how reconstruction is designed, procured and reported.

The information environment in which that agenda unfolds has attracted far less attention, although it bears directly on the financing question. Media coverage shapes how sovereign and corporate risk is priced, how donor parliaments justify continued expenditure to their electorates, and how private capital reads the plausibility of a green rebuild conducted under missile attack. The evidence that press tone carries information beyond fundamentals is long established (Tetlock, 2007), and in the climate domain specifically, indices built from newspaper text have been shown to track asset prices closely enough to support hedging strategies (Engle et al., 2020). Favourable coverage tends to compress perceived risk premia and sustain political commitment; sceptical or hostile coverage does the reverse. For a reconstruction effort dependent on sustained external financing over a decade or more, the tone of international reporting is not merely descriptive of conditions but partly constitutive of them.

To the best of our knowledge, no study has systematically measured how the green recovery narrative is framed in the international press. The relevant literature divides along an unhelpful line. Financial text analysis has concentrated on corporate disclosure in developed markets, while media research on the war and on post-crisis recovery has proceeded largely through framing analysis, whether qualitative or computational, without quantifying valence (Ptaszek et al., 2024; Ibrahim et al., 2025). Neither tradition has addressed a discourse that sits at their intersection, one in which war reporting, climate policy and financial-instrument coverage are interleaved within the same corpus and often within the same sentence.

Literature review. The analysis of financial text has moved through three broad phases. Dictionary-based approaches dominated the first, following Loughran and McDonald (2011), whose demonstration that general-purpose sentiment word lists systematically misclassify financial language established the case for domain-specific resources; roughly three-quarters of the words flagged as negative in the Harvard dictionary are not negative in a financial context. Their subsequent survey (Loughran & McDonald, 2016) documents the breadth of adoption but also the method's ceiling: word lists cannot resolve negation, cannot weight by syntactic position, and treat every occurrence of a term identically regardless of what surrounds it. Machine-learning classifiers addressed some of this at the cost of requiring labelled training data, with Malo et al. (2014) contributing the Financial PhraseBank, a set of expert-annotated sentences from financial news labelled from the standpoint of a retail investor, which remains the standard benchmark in the field.

The transformer architecture introduced by Devlin et al. (2019) altered the terms of the problem by making contextual representation learnable at scale, and domain-adapted variants followed quickly. Araci (2019) produced the model distributed as ProsusAI/finbert, further pre-training BERT on the Reuters TRC2 financial corpus before fine-tuning on the Financial PhraseBank, and reporting classification accuracy of approximately 0.86, a substantial improvement over both dictionary methods and generic BERT. A parallel model developed by Huang et al. (2023) took a comparable approach with a different pre-training corpus, and has since been extended by its authors into task-specific releases for ESG categorisation and forward-looking statement detection. These are distinct models with distinct training regimes, frequently conflated in the applied literature under the single label FinBERT; the distinction matters for replication and is observed explicitly here. The same logic of domain adaptation has been applied beyond finance proper: ClimateBERT (Webersinke et al., 2021) was pre-trained on climate-related text and used to show that corporate climate disclosures are systematically selective, with firms reporting cheap-to-disclose items while omitting the commitments that would bind them (Bingler et al., 2022). That result is instructive here in a second sense: a domain-adapted classifier proved able to detect a gap between declared ambition and concrete undertaking, which is close to the distinction this study finds between reconstruction framing and instrument-level reporting.

Applications of sentiment measurement in finance and economics are by now extensive, beginning with Tetlock (2007), who established that pessimism in financial press coverage predicts downward pressure on market prices with subsequent reversal. The literature has since extended to corporate disclosure events, where the textual tone of earnings conference calls carries information incremental to the reported figures (Price et al., 2012); to central bank communication, where even the vocal and textual characteristics of policy announcements move markets (Gorodnichenko et al., 2023); and to social media, where intraday investor sentiment extracted from message volume predicts return patterns (Renault, 2017). A related strand examines media sentiment in relation to sustainable finance. Green bonds trade at a small but persistent yield discount attributable to pro-environmental investor preferences (Zerbib, 2019), a premium whose formation and measurement have been analysed in the Ukrainian and tokenised-instrument context by Namoniuk and Matei (2025), and corporate green bond issuance is associated with improved environmental performance and positive market reaction (Flammer, 2021). What unites these applications is that they operate within the domain for which the models were built: corporate actors, financial instruments, market outcomes.

Reconstruction discourse does not fit that description, and here the literature thins considerably. Research on media coverage of conflict and post-crisis recovery has proceeded largely within the framing tradition inaugurated by Entman (1993), concerned with how selection and salience construct problem definitions rather than with quantifying valence. Recent computational work on the Russia–Ukraine war has advanced that tradition methodologically — text mining of Russian and Ukrainian agency coverage has identified a rigid technical frame on one side and an evolving moralising frame on the other (Ptaszek et al., 2024). Unsupervised modelling of two years of international coverage has traced shifts in thematic content and in the portrayal of principal actors (Ibrahim et al., 2025) — yet both identify frames rather than measure tone, and neither addresses

reconstruction financing. Work specifically on Ukraine's reconstruction has concentrated on instruments and institutional mechanisms (Becker et al., 2022; Namoniuk, 2026) rather than on the surrounding discourse, and studies of the country's post-war energy trajectory have modelled scenarios rather than their reception (Lukash & Namoniuk, 2024). The gap is therefore twofold. Substantively, the tone of international coverage of Ukraine's green recovery has not been measured. Methodologically, the behaviour of financial language models on reconstruction text, a register in which the vocabulary of finance appears but its semantics do not reliably hold, has not been examined, despite the growing tendency to deploy such models wherever financial vocabulary is present.

The aim of this paper is to establish the tone of English-language media coverage of Ukraine's green recovery and to determine how far that measurement depends on the choices made in constructing it. The first task is descriptive: what is the net tone of the corpus, and along which dimensions does it genuinely vary? The second is diagnostic: whether the patterns that emerge survive statistical testing, whether they survive the removal of confounds introduced by retrieval itself, and what systematic errors arise when a model trained on corporate financial text is turned on reconstruction reporting.

Data and methodology. The corpus consists of English-language news headlines concerning Ukraine's green recovery, retrieved from the Google News RSS endpoint. Eight queries were used to span the discourse: Ukraine reconstruction energy, Ukraine “energy transition”, Ukraine “renewable energy”, Ukraine “green recovery”, Ukraine “climate finance”, Ukraine “green bonds”, Ukraine “green reconstruction” and Ukraine “sustainable reconstruction”. Retrieval returned 456 records, each carrying a headline, a publication timestamp, the originating query and a resolved link; headline strings and links are unique throughout, so no item was returned by more than one query and each carries an unambiguous retrieval frame. The earliest item dates from 7 November 2019 and the latest from 20 August 2026. The temporal distribution is uneven but supports period comparison: 15 headlines fall before the full-scale invasion (2019–2021), 62 in 2022, 87 across 2023–2024 and 292 in 2025–2026. The concentration in recent years reflects how RSS retrieval works, since the endpoint returns what is currently indexed rather than a complete archive, and the earliest years should be read as a thinning trace rather than a representative sample. This property of the feed turns out to matter for more than sample size, as the results show.

Google News returns each headline with the publishing outlet appended after a hyphen, in the form Headline – Publisher. This is a delivery convention of the feed rather than part of the headline as published, and it was removed before classification by splitting at the final hyphen-space sequence; the publisher was retained as a variable in its own right, yielding 235 distinct outlets across the 456 records. The step is treated as substantive rather than as housekeeping, because leaving the publisher attached changes the classification of roughly one headline in seven. Both versions were therefore scored and the comparison is reported below. Apostrophes and quotation marks were normalised to their ASCII equivalents and HTML entities decoded; no further normalisation was applied, since casing, punctuation and named entities carry information the model was trained to use.

Sentiment was assigned with FinBERT in the ProsusAI release (Araci, 2019), run through the Hugging Face Transformers library at default settings. The model applies the BERT-base architecture of twelve encoder layers, twelve attention heads and 768 hidden units, further pre-trained on the Reuters TRC2 financial corpus and fine-tuned on the Financial PhraseBank (Malo et al., 2014), where it reports accuracy of approximately 0.86. A second and distinct model circulates under the same name (Huang et al., 2023), trained on a different corpus; the release used here is specified so that the analysis can be reproduced. For each headline the model returns a probability distribution over three classes. The arg-max was taken as the assigned label and the full distribution retained, since the probability mass on the runner-up class proves informative when examining misclassification. No headline approached the 512-token input limit, so truncation was never triggered.

Four grouping variables are used. The retrieval query is the frame under which each headline

was found, and is the closest thing the data contain to an externally defined topic, since it reflects how the discourse was searched rather than how an individual headline happens to be worded. As an alternative and, in applied work, more common operationalisation, headlines were also assigned to four keyword categories by string matching on the headline itself: green recovery, energy transition, climate finance and a residual category, the last of which absorbs 343 of 456 records. Publishers were sorted into institutional sources, corporate sources and media outlets by matching on the outlet name; the institutional group comprises United Nations bodies, international financial institutions, government agencies and development organisations, and the corporate group comprises company-operated domains such as those of DTEK and ORLEN. Finally, records were grouped into four periods keyed to the war and the reconstruction-financing timetable: pre-invasion (2019–2021), the invasion year (2022), the Ukraine Recovery Conference and Ukraine Facility period (2023–2024) and the current period (2025–2026). Net tone is summarised by a sentiment index defined as the positive share minus the negative share, bounded by −1 and +1. Arithmetic differences between index values are not treated as self-evidently meaningful. Independence between each grouping variable and sentiment class was tested by Pearson's chi-square, with effect size reported as Cramér's V, and pairwise contrasts assessed by Fisher's exact test where cell counts are sparse. Interval estimates for class proportions use the Wilson method; intervals for the index, a difference of two dependent proportions with no convenient closed form, were obtained by non-parametric bootstrap with 10,000 resamples. All tests are two-sided at the 5% level.

Main results of the research. Across the 456 headlines, 260 (57.02%) were classified neutral, 161 (35.31%) positive and 35 (7.68%) negative, giving a sentiment index of +0.276 with a bootstrap 95% confidence interval of [+0.222, +0.331]. Positive coverage exceeds negative by a ratio of roughly four and a half to one, and neither pole is a fragile estimate: the Wilson interval places the positive share within [0.311, 0.398] and the negative share within [0.056, 0.105]. Set against the period the corpus covers, that asymmetry is the notable feature. These seven years include a full-scale invasion, the systematic destruction of generating and transmission capacity, repeated winter blackouts and the suspension of payments on state-linked green bonds. Coverage of the green recovery agenda nonetheless carries four and a half positive headlines for every negative one, which is not what the underlying events alone would predict. The dominance of the neutral class calls for less comment, since headline conventions favour declarative construction and a model calibrated on financial reporting assigns most of that to neutral; the informative quantity is the balance between the two evaluative poles.

Two dimensions of genuine variation lie beneath that average. The first is who is speaking. Institutional publishers return an index of +0.581 across 43 records, against +0.245 across 404 media outlets, with corporate publishers higher still at +0.667 on nine records. The three-way association is significant (chi-square = 18.44, df = 4, p = 0.00101), and the contrast in positive share between institutional and journalistic sources survives an exact test with corporate publishers excluded (Fisher exact p = 0.000323, odds ratio 3.26). Institutional sources are, in round terms, three times more likely to produce a positive headline than media outlets covering the same subject. The consequence is methodological as much as substantive. Google News aggregates press releases from the United Nations Development Programme, UNECE, UNIDO and the EBRD alongside reporting from Reuters, Bloomberg and Ukrainian outlets, and presents them in a single undifferentiated feed. Any corpus drawn from such a source is a blend of promotional and journalistic material, and its overall tone depends partly on the mix: institutional sources make up 9.4% of records here, and a different query set or retrieval date would produce a different proportion and hence a different headline figure, without anything having changed in the discourse itself.

The second dimension is how the discourse is searched. Table 1 reports the sentiment index by retrieval query.

The association is strong and highly significant (chi-square = 58.84, df = 14, p < 0.0001; Cramér's V = 0.254), and the extremes are far apart. Coverage retrieved by reconstruction energy runs at +0.545 with barely any negative content, while coverage retrieved by climate finance is exactly balanced, positive and negative shares standing at an identical 20.41%. The contrast between

these two in positive share gives a Fisher exact p of 0.000047 and an odds ratio of 4.88. The gradient has an interpretable shape.

Table 1

Sentiment index by retrieval query

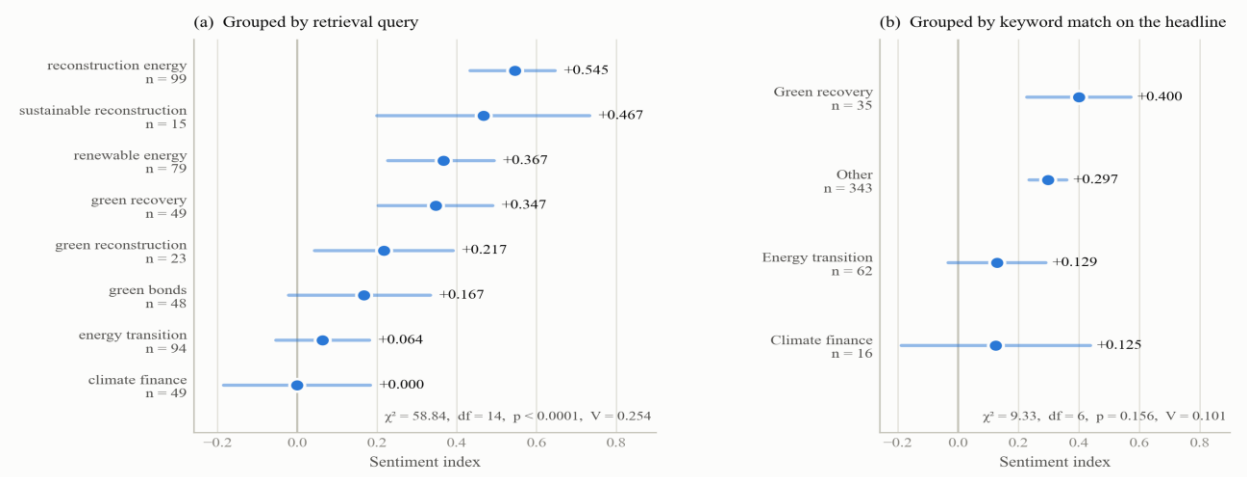
Query	n	Negative	Positive	Index	95% CI
Ukraine reconstruction energy	99	1.01%	55.56%	+0.545	[+0.444, +0.646]
Ukraine "sustainable reconstruction"	15	0.00%	46.67%	+0.467	[+0.200, +0.733]
Ukraine "renewable energy"	79	6.33%	43.04%	+0.367	[+0.228, +0.494]
Ukraine "green recovery"	49	2.04%	36.73%	+0.347	[+0.204, +0.490]
Ukraine "green reconstruction"	23	0.00%	21.74%	+0.217	[+0.044, +0.391]
Ukraine "green bonds"	48	12.50%	29.17%	+0.167	[−0.021, +0.333]
Ukraine "energy transition"	94	12.77%	19.15%	+0.064	[−0.053, +0.181]
Ukraine "climate finance"	49	20.41%	20.41%	0.000	[−0.184, +0.184]

Source: calculated by the authors on the basis of the FinBERT-classified corpus.

Queries framed around rebuilding and physical capacity attract the language of commitment: funding announced, partnerships signed, capacity installed. Queries framed around financial instruments and policy processes attract the language of execution, where the news is delay, default, dispute and shortfall. The same underlying agenda produces markedly different tone depending on which end of it is being reported, which suggests that confidence in the vision runs considerably ahead of confidence in the machinery meant to deliver it.

Figure 1

Sentiment index by retrieval query and by keyword match



Source: calculated by the authors on the basis of the FinBERT-classified corpus.

That finding, however, is available only under one of the two ways of dividing the corpus by topic, and the comparison between them is instructive. Figure 1 sets the retrieval-query grouping beside the keyword grouping applied to the identical 456 headlines. Sorted by keyword match, the four categories run from +0.400 for green recovery through +0.297 for the residual category and +0.129 for energy transition to +0.125 for climate finance. The ordering looks similar and a reader given only those numbers would draw much the same conclusion, but the association is not significant: chi-square = 9.33, df = 6, p = 0.156, with Cramér's V of 0.101, and restricting to positive

against non-positive gives chi-square = 3.08, df = 3, p = 0.380. This follows from how the rule operates. Headlines rarely contain the phrase by which they were found; the item “Norway and UNDP strengthen partnership to accelerate Ukraine's energy recovery” was returned by a green recovery query but contains none of the trigger phrases and therefore lands in the residual category. The keyword rule consigns 75.2% of the corpus to that category and in doing so pools the sharply divergent sub-corpora that the query variable keeps apart. Post-hoc keyword classification of short texts is common in applied sentiment work and is usually presented as a neutral operationalisation of topic. It is not: here it destroys an effect that is present in the data, significant at $p < 0.0001$ and of moderate size, and replaces it with a non-significant ordering that reads plausibly and would in all likelihood have been reported as substantive.

An apparent change in tone over the course of the war does not survive the removal of a confound introduced by retrieval itself. Table 2 reports sentiment by period, together with the share of each period's headlines that came from queries scoring above the corpus mean.

Table 2

Sentiment and corpus composition by period

Period	n	Neg.	Neut.	Pos.	Index	95% CI	Above-mean q.
Pre-invasion (2019–2021)	15	0.00%	53.33%	46.67%	+0.467	[+0.200, +0.733]	0.0%
Invasion year (2022)	62	17.74%	62.90%	19.35%	+0.016	[−0.129, +0.161]	4.8%
URC / Facility (2023–2024)	87	11.49%	63.22%	25.29%	+0.138	[+0.011, +0.264]	31.0%
Current (2025–2026)	292	4.79%	54.11%	41.10%	+0.363	[+0.298, +0.428]	72.6%

Source: calculated by the authors on the basis of the FinBERT-classified corpus. The final column reports the share of each period's headlines returned by queries whose own index exceeds the corpus mean of +0.276.

Taken at face value the trajectory is dramatic and statistically significant (chi-square = 25.84, df = 6, p = 0.0002; Cramér's V = 0.168). In 2022 the index stands at +0.016, indistinguishable from zero, with a negative share of 17.74%; by 2025–2026 it has risen to +0.363 with the negative share down to 4.79%. The obvious reading is that coverage brightened as the financing architecture consolidated, and the temptation is to conclude that the framing of reconstruction changed while conditions on the ground did not.

The final column of Table 2 shows why that conclusion cannot be drawn. The retrieval frame did not hold still across the period. Two of the four highest-scoring queries, reconstruction energy at +0.545 and renewable energy at +0.367, return no material at all before 2025 and together account for 61% of the current period's records. The 2022 sub-corpus, by contrast, is dominated by energy transition and climate finance, the two lowest-scoring frames. The share of each period drawn from above-mean queries runs 0%, 4.8%, 31.0% and 72.6%, and the association between period and query is overwhelming (chi-square = 227.30, df = 21, $p < 0.000001$). Later periods are not merely later; they are composed of different searches.

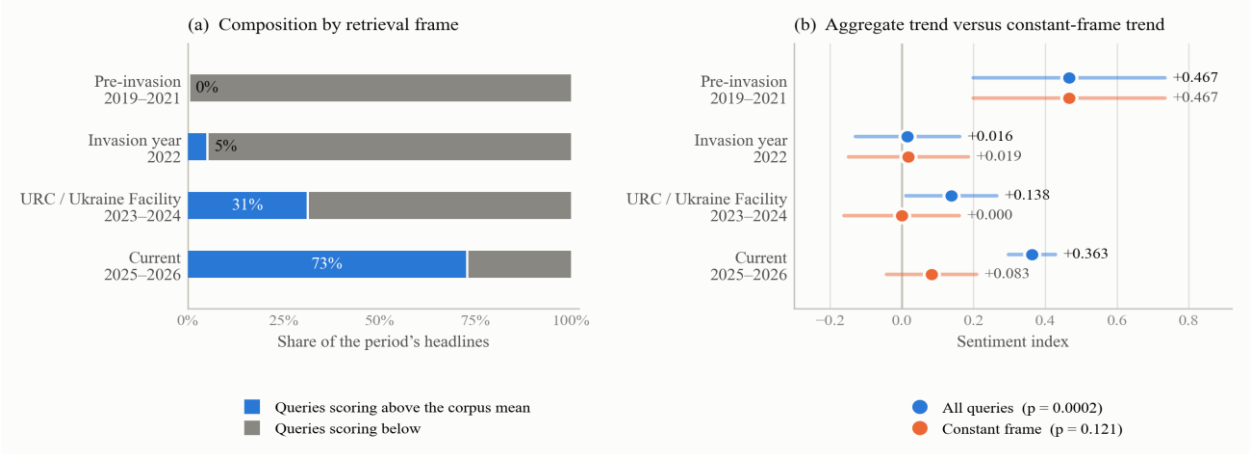
Figure 2 separates the two effects. Panel (a) shows the compositional shift. Panel (b) sets the aggregate index against the index computed on the three queries present in every period, which hold the retrieval frame constant across 191 records. On that constant frame the series runs +0.467, +0.019, 0.000 and +0.083, and the association with period is not significant (chi-square = 10.09, df = 6, p = 0.121). The upward movement that the aggregate displays is therefore largely compositional. Holding the frame fixed leaves a slight and statistically unsupported drift, not a recovery.

One alternative confound can be dismissed. Because institutional sources are markedly more positive and their share also varied across periods (chi-square = 14.68, df = 3, p = 0.00212), the trajectory might have been a change in the promotional share of the feed. It is not: restricted to

media outlets alone the period association remains significant (chi-square = 25.78, df = 6, p = 0.00024). Source mix is not what drives the aggregate pattern; retrieval frame is. The substantive conclusion is correspondingly narrow. This corpus cannot support a claim that international coverage of Ukraine's green recovery grew more favourable as the war continued. What it shows is that the searches which return material about Ukraine's green recovery have themselves shifted towards frames that attract favourable coverage.

The measurement is sensitive to a preprocessing decision that published applications do not ordinarily report. Scoring the same 456 records with the publisher name left attached, as a pipeline built directly on the feed would do, produces 122 positive (26.75%), 311 neutral (68.20%) and 23 negative (5.04%), for an index of +0.217.

Figure 2
Corpus composition by period and the aggregate trend against the constant-frame trend



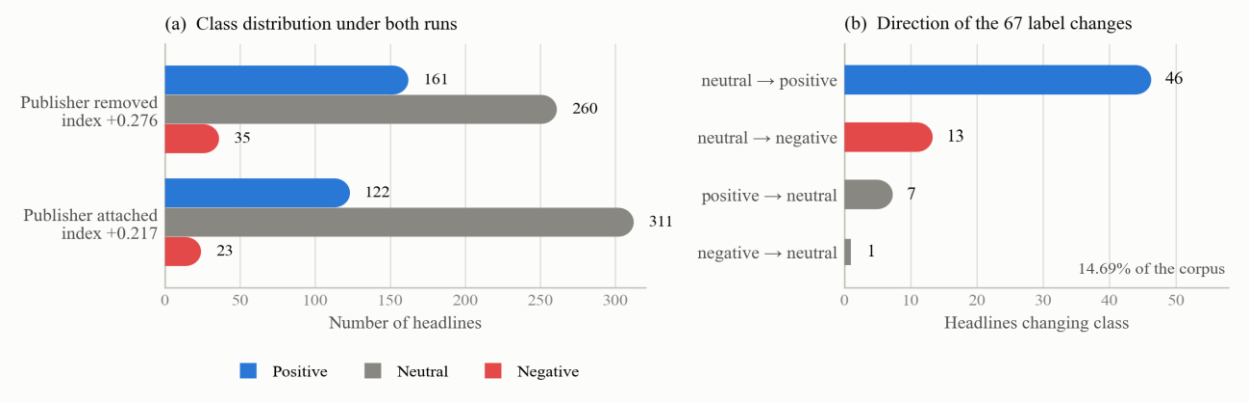
Source: calculated by the authors on the basis of the FinBERT-classified corpus. The constant frame comprises the three queries returning material in every period (n = 191).

The two runs agree on 85.31% of labels; 67 headlines, or 14.69% of the corpus, change class depending on whether the outlet name is present. Figure 3 reports both the class distributions and the direction of the changes, which are not symmetrical: 46 run from neutral to positive, 13 from neutral to negative, 7 from positive to neutral and 1 from negative to neutral. Attaching the publisher pulls the corpus towards neutrality, converting evaluative headlines into non-evaluative ones far more often than the reverse. The mechanism is visible in individual cases. “DTEK Renewables wins the Climate Bonds Initiative's Green Bond Pioneer Award” is classified positive once the outlet is removed but neutral when the string continues “– dtek.com”; “Global sustainable bond issuance takes Q1 hit on Ukraine crisis” is negative alone and neutral once “– Reuters” is appended. The added tokens are institutional names carrying no valence, and in a text of a dozen words they dilute the evaluative signal. The gap between +0.217 and +0.276 is of the same order as the substantive differences reported above, which means an unreported preprocessing choice can be as consequential as the phenomenon under study.

The classifications themselves also err systematically rather than randomly. Three mechanisms account for most of it. The model treats rising quantities as favourable, which holds in the corpus it was trained on and inverts here: “Ukraine reconstruction estimate jumps 12% to $588 billion, World Bank says” is classified positive at 0.938, “Chart of the week: Ukraine's reconstruction needs rise 12% to $588 billion” positive at 0.947, and “Energy costs rise to 75% in Ukraine's greenhouse production” positive at 0.613, though all three report deterioration. It fails on negation, classifying “Russia's invasion fails to prevent progress in Ukraine's energy sector” as negative at 0.835 by resolving on the salient negative tokens. And it responds to isolated lexical markers detached from context, flagging headlines containing blackout, power cut or shortage as negative irrespective of the surrounding proposition, which is precisely the failure for which

dictionary methods were criticised (Loughran & McDonald, 2011), reappearing in a contextual model operated outside its training domain.

Figure 3
Effect of publisher-name removal on classification



Source: calculated by the authors on the basis of two FinBERT runs over the same 456 headlines.

These errors do not cancel, and they are not evenly distributed. Thirty headlines, 6.6% of the corpus, contain the cost-and-damage vocabulary on which the first mechanism operates, and they are classified positive at 46.7% against 34.5% for the remainder. Their share rises from 0% in 2019–2021 and 1.6% in 2022 to 9.2% in 2025–2026 (chi-square test of independence, $p = 0.023$), and varies by frame from 14.1% under reconstruction energy and 12.5% under green bonds down to 2.1% under energy transition and 2.0% under green recovery ($p = 0.006$). The bias therefore concentrates in the most recent period and in the highest-scoring frames, which is to say in exactly the cells that drive the aggregate figure upward. The corpus index of +0.276 should be read as an upper bound rather than as an unbiased estimate, and the comparative results cannot be assumed to be insulated from the level effect in the way that a uniformly distributed error would allow. Quantifying the bias requires manual coding of a stratified subsample against which the classifier can be scored; that is identified here as the necessary next step rather than claimed as performed.

Conclusions. International coverage of Ukraine's green recovery is, on this measure, supportive: an index of +0.276 with four and a half positive headlines for every negative one, sustained across a period that includes invasion, systematic attacks on the energy system and a debt restructuring. The tone is not uniform, and the two dimensions along which it varies are informative. Institutional publishers are three times more likely than journalists to produce a positive headline, so that the apparent favourability of any aggregator-drawn corpus depends partly on how much promotional material the feed happens to contain. More consequentially, tone tracks the framing of the subject: coverage of reconstruction and physical energy capacity runs at +0.545, while coverage of climate finance sits at exactly 0.000, with positive and negative headlines in perfect balance, and green bonds and energy transition are only marginally better. Confidence in the vision runs well ahead of confidence in the instruments meant to realise it, and that is where a policy reader should expect the aggregate to turn first.

The second conclusion is methodological and, in our assessment, the more transferable of the two. Three demonstrations in this study show the same thing from different angles. Removing the publisher name that the feed appends to every headline changes 14.69% of classifications and moves the corpus index by 0.059, a shift comparable to the substantive differences the study set out to measure. Classifying topic by keyword match on the headline rather than by retrieval query consigns three-quarters of the corpus to a residual category and converts an effect significant at $p < 0.0001$ into a non-significant ordering that nevertheless reads plausibly. And an apparent recovery of tone across the war, significant at $p = 0.0002$ and available for exactly the kind of narrative interpretation that such a result invites, dissolves once the retrieval frame is held constant ($p = 0.121$), because the

searches that return material about Ukraine's green recovery have themselves migrated towards frames that attract favourable coverage. In each case the corpus, the model and the metric are identical, and the finding depends entirely on a decision that published applications do not ordinarily report.

These findings do not discredit such tools; they specify what their use requires. Preprocessing must be reported in full, because the operations that appear to be housekeeping are not. Any disaggregated comparison must be tested rather than read off a ranking of point estimates. Where the corpus is assembled by retrieval, the composition of that retrieval must be treated as a variable and controlled for, since a change in what the search returns is indistinguishable, in the aggregate, from a change in what is being said. And the classifier's output must be validated against a hand-coded subsample, particularly where the vocabulary of the target domain overlaps the training domain while its semantics do not, as the reading of a rise in reconstruction cost estimates as good news illustrates. The availability of pre-trained financial language models has outpaced the scrutiny applied to their output.

The limits of the study bound these claims. It works from headlines rather than full texts and so measures framing rather than argument. It draws on a single aggregator whose retrieval favours recent material, which leaves the pre-2022 sample too thin to characterise and which, as the temporal analysis shows, introduces composition effects that must be modelled rather than assumed away. It covers English only, describing how the story reads to an international audience and saying nothing of Ukrainian, German or Polish reporting. The source-type classification rests on matching outlet names and would benefit from hand-coding. Each of these is addressable by applying the same pipeline to full-text, multi-source data with source region, outlet type and topic as designed strata rather than as variables recovered after the fact, provided the inferential discipline argued for here is carried across with it.

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CROSS-BORDER CRYPTOCURRENCY PAYMENTS AND THEIR ROLE IN EU-UKRAINE FINANCIAL INTEGRATION (2024–2025)

ТРАНСКОРДОННІ КРИПТОВАЛЮТНІ ПЛАТЕЖІ ТА ЇХ РОЛЬ У ФІНАНСОВІЙ ІНТЕГРАЦІЇ ЄС–УКРАЇНА (2024–2025)

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Abstract. *The growing role of cryptocurrency in cross-border financial flows between Ukraine and the EU has become one of the notable side effects of the war that began in 2022. This article examines how that role has evolved in 2024–2025, a period defined by two parallel regulatory developments: the full entry into force of the EU's Markets in Crypto-Assets Regulation (MiCA) and the continued, if uneven, implementation of Ukraine's Law on Virtual Assets (No. 2074-IX). The purpose of the study is to assess the volume and structure of EU-Ukraine crypto flows, identify key regulatory divergences between the two frameworks, and outline a realistic harmonisation pathway. Blockchain analytics data, NBU remittance statistics, and Eurostat figures are used alongside comparative regulatory and acquis gap-analysis methods. The results show that EU-originated crypto inflows to Ukraine in 2024 reached an estimated USD 13–16 billion, with USDT accounting for approximately 62% of identified cross-border transactions. Four regulatory gaps are found to create operational friction in practice: CASP licensing asymmetry, stablecoin classification, AML/CFT obligations, and the travel rule. The article concludes that addressing these gaps – particularly through travel rule implementation and a MiCA-aligned stablecoin regime – is a necessary condition for deeper EU-Ukraine financial integration and, ultimately, for a credible EU accession trajectory in the financial services domain.*

Keywords: *cryptocurrency; stablecoin; MiCA; financial integration; Ukraine; European Union; cross-border payments; CASP; travel rule; virtual assets.*

Анотація. *Зростаюча роль криптовалюти у транскордонних фінансових потоках між Україною та ЄС стала одним із помітних побічних наслідків повномасштабної війни, яка розпочалася у 2022 році. Дана стаття досліджує, як ця роль еволюціонувала протягом 2024–*

2025 років – у період, що визначається двома паралельними регуляторними процесами: повноцінним набранням чинності Регламентом ЄС про ринки криптоактивів (MiCA) та продовженням, хоча й нерівномірним, впровадження українського Закону «Про віртуальні активи» (№ 2074-IX). Метою дослідження є оцінка обсягів і структури крипто-потоків між ЄС та Україною, виявлення ключових регуляторних розбіжностей між двома правовими рамками та окреслення реалістичного шляху гармонізації. Для досягнення цієї мети застосовано дані блокчейн-аналітики, статистику грошових переказів НБУ та дані Євростату в поєднанні з методами порівняльно-правового аналізу та аналізу прогалин у рамках acquis-вирівнювання. Результати свідчать, що крипто-надходження з країн ЄС до України у 2024 році сягнули орієнтовно $13–16 млрд, причому USDT становив близько 62% ідентифікованих транскордонних транзакцій. Виявлено чотири регуляторні прогалини, які на практиці створюють операційні перешкоди: асиметрія у ліцензуванні постачальників послуг з криптоактивів (CASP), відсутність класифікації стейблкоїнів, неузгодженість вимог у сфері протидії відмиванню коштів та фінансуванню тероризму (AML/CFT), а також правило мандрівника. Зроблено висновок, що усунення цих прогалин – передусім через впровадження правила мандрівника та розбудову режиму стейблкоїнів, сумісного з MiCA, – є необхідною умовою поглиблення фінансової інтеграції між ЄС та Україною і, врешті-решт, для формування переконливої траєкторії вступу до ЄС у сфері фінансових послуг.

Ключові слова: *криптовалюта; стейблкоїн; MiCA; фінансова інтеграція; Україна; Євросоюз; транскордонні платежі; CASP; правило мандрівника; віртуальні активи.*

Introduction. February 2022 did not just start a war – it upended the financial architecture that Ukrainians had relied on for cross-border transactions. Parts of the conventional banking network went offline or became unreachable. Capital controls tightened. Roughly 8 million people left for EU countries and, almost immediately, faced the practical question of how to move money across the border. Cryptocurrency filled part of that gap. Not in any organised way at first – a lot of it happened through peer-to-peer channels, informal exchange networks, and Telegram-based brokers. But the volumes built up quickly, and by 2024 Ukraine had one of the highest crypto adoption rates in the world.

The 2024–2025 period carries particular analytical weight because two regulatory clocks were ticking at the same time. On the EU side, the Markets in Crypto-Assets Regulation (MiCA, Regulation (EU) 2023/1114) fully entered into force on 30 December 2024 – the most comprehensive crypto-asset rulebook any major jurisdiction had produced. On the Ukrainian side, Law No. 2074-IX on Virtual Assets continued its rollout, but key secondary legislation – on CASP licensing procedures, capital requirements, and stablecoin-specific rules – remained incomplete as of mid-2025. That gap between a finished framework and an unfinished one is the central problem the paper examines.

The topic sits at an intersection that the academic literature has been slow to address: financial integration theory applied to crypto-payment corridors in the context of an active EU accession process. Most existing studies focus either on crypto adoption patterns in emerging economies (Auer et al., 2020) or on the technical dimensions of blockchain-based payments (Gozman et al., 2018). The regulatory convergence dimension – particularly for a country navigating the EU accession process – has received far less attention. This article attempts to contribute to that gap.

Literature review. The foundational technical and economic literature on cryptocurrency – from Nakamoto (2008) through Böhme et al. (2015) – is well-established and needs no extended summary here. What matters more for this paper is the intersection of crypto with financial integration frameworks and with regulatory design in the EU-Ukraine context.

Auer, Cornelli, and Frost (2020) examined the drivers, approaches, and technologies behind central bank digital currencies – a regulatory and monetary development that contextualises the growing role of private crypto assets in cross-border flows. Their analysis of the conditions prompting jurisdictions to explore CBDC alternatives is indirectly relevant to the Ukrainian case: Ukraine in 2022–2025 displays the macro profile – hryvnia depreciation, tightened capital controls,

widespread financial precariousness – under which private stablecoins tend to assume remittance and store-of-value functions. These dynamics are directly observable in on-chain transaction data, where stablecoin inflows spike during episodes of currency weakness, confirming the dual function of these instruments as both remittances and currency hedges.

On the regulatory side, Zetzsche, Buckley, and Arner (2020) analysed EU crypto regulatory fragmentation before MiCA existed and essentially anticipated the problem MiCA was designed to solve. Blandin et al. (2023), assessing early MiCA implementation, found that compliance costs weigh heaviest on smaller service providers – a finding directly relevant to the Ukrainian CASP sector, which consists largely of young firms with limited institutional capacity.

The financial integration literature – from Baele et al. (2004) on euro area convergence to Cihák et al. (2013) on broader financial development – offers the analytical framework but does not engage with crypto as an integration instrument. This paper attempts to bridge that gap by treating crypto-payment corridors as a functional subset of financial integration, subject to the same logic of barrier identification and convergence assessment.

Methodology. Three approaches are combined. First, a comparative regulatory analysis examines MiCA and Ukraine's Law No. 2074-IX alongside secondary guidance from the EBA, NBU, and NSSMC, focusing specifically on four dimensions: CASP licensing, stablecoin classification and reserves, AML/CFT obligations, and the travel rule. The goal is not an exhaustive legal mapping but identification of divergences with the most direct operational impact on cross-border transactions.

Second, a quantitative review of available transaction data draws primarily on the Chainalysis 2024 Geography of Cryptocurrency Report, cross-checked against NBU quarterly remittance statistics and Eurostat data on financial transfers from EU member states. Attribution of on-chain flows to geographic origins involves known methodological limitations, and where sources produce divergent estimates the more conservative figure is used.

Third, a policy gap analysis adapted from Radaelli's (2000) acquis alignment framework provides a structured basis for translating the regulatory comparison into actionable harmonisation priorities. This moves the analysis beyond cataloguing differences toward specifying what would need to change, in what order, and with what likely effects. The study period runs from January 2024 to September 2025; the geographic scope covers EU-Ukraine bilateral flows only.

Main results of research. MiCA draws a clear line between two types of stablecoins. Tokens referencing a single fiat currency are classified as e-money tokens (EMTs); tokens backed by baskets of assets are classified as asset-referenced tokens (ARTs). Both carry reserve requirements, liquidity rules, and disclosure obligations. USDT technically falls under the EMT category – yet Tether had not obtained EMT authorisation under MiCA as of mid-2025, placing USDT in a legally ambiguous position for EU-licensed exchanges (European Parliament & Council, 2023).

Ukraine's Law No. 2074-IX creates a general virtual-asset framework but does not distinguish between stablecoin types. USDT and USDC are treated the same as other crypto assets – no reserve requirements, no mandated disclosures, no restrictions tied to the issuer's regulatory status. That creates weaker user protections but fewer friction points for Ukrainian CASPs domestically.

The travel rule gap is the most immediately problematic from an AML perspective. The EU's Transfer of Funds Regulation requires CASPs to transmit originator and beneficiary data for any transfer above €1,000. Ukrainian CASPs are not yet subject to equivalent requirements, meaning transfers from Ukrainian exchanges frequently arrive at EU counterparts flagged for enhanced due diligence – and are often delayed or rejected in practice.

Table 1 presents the author's original six-dimensional regulatory gap analysis. Priority ratings are assigned using the acquis alignment methodology adapted from Radaelli (2000), weighting operational friction, AML/CFT risk, and Chapter 9 acquis compliance requirements.

Table 1

Regulatory Gap Analysis: MiCA (EU) vs. Ukraine Law No. 2074-IX

Requirement	MiCA (EU)	Ukraine Law No. 2074-IX	Gap level	Convergence priority
Travel Rule	Mandatory for transfers >€1,000; CASP-to-CASP transmission of originator and beneficiary data	Not implemented; Ukrainian CASPs have no VASP-to-VASP data-sharing obligations	Critical	1 – Most urgent (affects >60% of corridor volume)
Stablecoin classification	EMT (single-currency) / ART (basket-backed); USDT requires EMT authorisation	No type differentiation; USDT treated as standard VA; no reserve requirements	Critical	2 – Most urgent (USDT ~62% of flows)
CASP licensing	Mandatory authorisation in a member state; EU-wide passporting	Registration regime partially in place; full licensing deferred to 2026	Significant	3 – High (Chapter 9 acquis requirement)
Reserve requirements	EMT: 100% liquid reserves; ART: diversified reserves and volume caps	No stablecoin-specific reserve requirements	Significant	4 – High (consumer protection)
AML/CFT	AMLD5/6: CASPs as obliged entities; enhanced due diligence for high-risk jurisdictions	Partial compliance; KYC exists, transaction monitoring limited	Moderate	5 – Medium
Disclosure / White paper	Mandatory white paper; disclosure standards for tokens and CASPs	Basic requirements exist; no standardised white paper	Moderate	6 – Medium

Source: compiled by the author based on Regulation (EU) 2023/1114 (MiCA); Law of Ukraine No. 2074-IX; FATF (2023); EBA Guidelines on CASP authorisation (2024). Priority ratings derived using the acquis alignment methodology of Radaelli (2000).

Ukraine received approximately $106 billion in on-chain transaction value during the July 2023 – June 2024 measurement period, ranking sixth globally (Chainalysis, 2024). An estimated 28–34% originated from EU-based senders – roughly $13–16 billion – with Poland, Germany, Italy, and the Czech Republic accounting for the largest shares. USDT on Tron and Ethereum networks comprised around 62% of identified cross-border transactions. Monthly volumes peak in December and June and also spike during hryvnia depreciation episodes, indicating stablecoins serve both remittance and currency-hedging functions.

Table 2
Estimated Cryptocurrency Flows: EU Member States → Ukraine (2024)

EU Country	Est. volume (2024, $bn)	Share of EU→UA flow	Dominant asset	Primary channel
Poland	3.8 – 4.5	~27%	USDT (Tron)	P2P + CEX (Binance, WhiteBIT)
Germany	2.6 – 3.1	~19%	USDT / ETH	CEX (MiCA-licensed)
Italy	1.5 – 1.9	~12%	USDT	CEX + remittance services
Czech Republic	1.2 – 1.5	~10%	USDT / BTC	P2P + local exchanges
Other EU	4.0 – 5.0	~32%	Various	Mixed channels
Total (estimate)	**13 – 16**	**100%**	**USDT (~62%)**	**–**

Source: author's calculations based on Chainalysis (2024) Geography of Cryptocurrency Report; Chainalysis Eastern Europe Regional Data (October 2024); NBU Remittance Quarterly Reports Q1–Q4 2024; Eurostat (2024).

Conclusions. Three main conclusions emerge from this analysis. First, cryptocurrency – and stablecoins in particular – has become a structurally significant component of EU-Ukraine financial flows, not a marginal or speculative phenomenon. Estimated EU-originated on-chain inflows to Ukraine of $13–16 billion in 2024 are comparable in scale to formal remittance channels, and for segments of the Ukrainian diaspora in EU member states, crypto is now the primary transfer instrument.

Second, the regulatory divergence between MiCA and Ukraine's framework is not a minor technical misalignment – it generates specific, identifiable friction that affects real transactions and real households. The travel rule gap and the stablecoin classification gap are the two most operationally significant, and both have tractable solutions given sufficient institutional priority and, where needed, external technical support.

Third, the financial integration argument for convergence is stronger than the compliance argument alone. Proactive alignment now is less costly than retrofitting after accession, and the concrete benefits – lower remittance costs for displaced Ukrainians, greater transaction transparency, reduced systemic risk from unregulated stablecoin exposure – are achievable within the current legislative cycle. The scientific contribution of this paper lies in the systematic application of financial integration theory to crypto-payment corridors in an EU accession context. Future research should examine whether regulatory convergence actually shifts volume from informal to regulated channels, assess the competitive dynamics between private stablecoins and the developing CBDC landscape on both sides, and draw on household-level channel-choice data as better micro-evidence from the Ukrainian diaspora becomes available.

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THE ROLE OF "MONEY LEGO" IN THE DEVELOPMENT OF DECENTRALIZED FINANCE

РОЛЬ «MONEY LEGO» У РОЗВИТКУ ДЕЦЕНТРАЛІЗОВАНИХ ФІНАНСІВ

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Abstract. *The rapid development of the decentralized finance ecosystem between 2017 and 2020 was technologically driven by smart contracts built on the Ethereum blockchain and compatible networks. A fundamentally new architecture of financial services emerged, in which high modularity and protocol interoperability became the key determinants of success. One of the foundational principles underlying this success is the concept of "Money Lego" – the paradigm of a modular, composable financial construction system. Through the "Money Lego" principle, the philosophy of an open, modular, and programmable financial system is brought to life. Innovation within the crypto-finance ecosystem does not occur incrementally but rather follows an explosive trajectory, whereby increasingly complex and efficient constructs are assembled from simple, standardized building blocks – as the principle unlocks boundless possibilities for the creation of bespoke financial strategies.*

The "Money Lego" architecture has fundamentally transformed the DeFi sector by enabling permissionless innovation, allowing developers to reuse existing financial primitives. However, composability also introduces systemic propagation risks: failures within a single protocol can cascade throughout the entire Lego structure, as has been demonstrated by major exploits and large-scale liquidation events. Accordingly, a thorough understanding of the role of "Money Lego" is essential for forecasting the developmental trajectory of DeFi and for formulating effective regulatory and infrastructural policy in the context of the ongoing transition to Web3-based finance.

Keywords: *DeFi, Money Lego, composability, smart contracts, protocol-controlled liquidity, DeFi 2.0, financial transformation, systemic risk.*

Introduction. The rapid development of the decentralized finance ecosystem between 2017 and 2020 was technologically driven by smart contracts built on the Ethereum blockchain and compatible networks. A fundamentally new architecture of financial services emerged, in which high modularity and protocol interoperability became the key determinants of success. One of the foundational principles underlying this success is the concept of "Money Lego" – the paradigm of a modular, composable financial construction system. Through the "Money Lego" principle, the philosophy of an open, modular, and programmable financial system is brought to life. Innovation within the crypto-finance ecosystem does not occur incrementally but rather follows an explosive trajectory, whereby increasingly complex and efficient constructs are assembled from simple, standardized building blocks – as the principle unlocks boundless possibilities for the creation of bespoke financial strategies. The "Money Lego" architecture has fundamentally transformed the DeFi sector by enabling permissionless innovation, allowing developers to reuse existing financial primitives. However, composability also introduces systemic propagation risks: failures within a single protocol can cascade throughout the entire Lego structure, as has been demonstrated by major

exploits and large-scale liquidation events.

Accordingly, a thorough understanding of the role of "Money Lego" is essential for forecasting the developmental trajectory of DeFi and for formulating effective regulatory and infrastructural policy in the context of the ongoing transition to Web3-based finance.

The purpose of the article is a comprehensive study of the role of the "Money Lego" principle in the development of DeFi, revealing the mechanisms of its impact on innovation, scalability, and resilience of the ecosystem, as well as assessing the associated risks and prospects for further development.

Analysis of Recent Research and Publications. The study by Katona (2021) represents one of the earliest attempts at a systematic academic investigation into the "Money Lego" concept. By examining the capabilities of the blockchain-based "money Lego construction system," the author attempts to demonstrate the profound impact of composability on DeFi. As noted in the work, it is the implementation of the "Money Lego" principle in DeFi that marks a fundamental departure from the isolated architecture of traditional finance. In contrast to bundled services offered by monolithic institutions, decentralized finance unbundles these functions through separate protocols that can interact with one another. Users can combine these protocols with specific functionalities (such as borrowing, exchange, derivatives) depending on their individual needs.

As noted by Luo et al. (2025), the technical side of the "money constructor" capabilities is provided by the characteristics of the Ethereum Virtual Machine (EVM) based on the interaction of smart contracts. In their view, it is Ethereum's flexibility that allows Contract Accounts (CAs) to invoke other Contract Accounts, which ensures the interaction of smart contracts. Consequently, entire DeFi protocols can utilize the financial functions offered by other protocols and combine them like "financial Lego bricks."

The study by Kitzler et al. (2023) proposes a clear methodological framework for identifying and analyzing these so-called building blocks. Their algorithm extracts "building blocks" from Ethereum transaction datasets specific to smart contract protocols. Collectively, these smart contracts contain certain financial functions, such as asset exchange, lending, or liquidity provisioning.

Based on a unique methodology of graph representations to study the similarity of DeFi building blocks, the conclusions of the study by Luo et al. (2025) were formulated. According to the results obtained, the authors insist that the building blocks effectively cluster according to financial functionality (purity reaches a score of 0.888), and this is even more pronounced according to the protocol family (purity reaches a score of 0.864, along with a higher V-Measure score of 0.571). This conclusion is of critical significance for understanding "Money Lego," as protocol-specific implementation patterns often carry more weight than functional similarity. On this basis, it is assumed that code reuse and forking create "dialects" within the space of the broader language of financial primitives.

According to De Carvalho et al. (2022, 2023), flash loans act as paradigmatic examples of the composition of money constructions. Flash loans allow borrowers to access unsecured loans within a single atomic transaction, provided that this loan is repaid before the transaction is completed. Consequently, such a mechanism allows organizations to borrow crypto-assets, trigger various economic events, and repay the loan in a single transaction without the need to provide collateral. This study introduces the concept of the "composability assertion." The main idea of this concept lies in the necessity for auditors to verify the completeness, accuracy, and economic interpretation of the transaction components. It is important to note that this study represents one of the first attempts to address the auditing problem associated with the architecture of money constructions.

Main Results of the Research. The earliest experiments on Ethereum-like blockchains, characterized by the emergence of the first decentralized exchanges (DEXs), represented a phase of "manually assembled" protocols with minimal levels of composability. The Ethereum blockchain accelerated the launch of DeFi innovations, and through the rapid development of token standards (most notably ERC-20) and the growing number of projects, determined the evolution of the industry (Farenyuk, 2026). The growing demand for new tokens and the necessity for instruments

to trade and utilize them accelerated the technological formalization of the "Money Lego" principle (Foxley, 2020, July 7).

Within cryptographic protocols, this principle is realized through the property of compatibility or composability of cryptographic protocols. This property of independent protocols and applications manifested in the fact that protocols began to interact freely and combine with one another, creating complex financial schemes. For example, if each protocol performs a single, simple function (such as exchange, lending, or staking), composability allows a developer to assemble these functions into a new, complex financial instrument without having to build the underlying infrastructure from scratch (Katona, 2021).

The assembly of these elements, resembling a construction set, is only possible under several core principles, namely: open source code and standardization, permissionless integration, and programmability. Because the protocol's code is publicly accessible and the ERC-20 token standard exists on the Ethereum network, this guarantees that one protocol will "understand" the tokens of another (Foxley, 2020, August 13).

The fact that developers do not need to obtain permission from the creators of an existing protocol to integrate its functionality into their own decentralized applications serves as a primary unifying element of this architecture.

The principle of programmability allows the smart contracts of one protocol to call functions embedded in the contracts of another (such as lending, swapping, etc.), creating complex chains of action.

The practical implementation of this principle lies in the fact that individual financial primitives (tokens, liquidity pools, lending protocols, derivatives, oracles, etc.) function as universal building blocks that can be freely combined to create complex financial structures.

Based on this principle, capital efficiency is significantly increased through recursive strategies (for example, utilizing deposited assets across multiple protocols). Furthermore, this principle facilitated the emergence of "protocol-controlled liquidity" models and novel tokenomics (such as vote-escrowed tokens and self-repaying loans), which define the DeFi 2.0 developmental phase. At this stage, the fundamental problem of financial programmability was successfully resolved (Farenyuk, 2026).

The evolutionary trajectory of understanding and utilizing "money legos" has laid the foundation for identifying distinct phases ("waves") in the development of the DeFi sector. Currently, academic literature distinguishes three waves. The first wave is associated with protocol primitives. The second wave manifested through yield optimization. And the third wave, which coincides with the maturation of the "money lego" concept, allows us to speak of abstract finance. This periodization implies that composability itself becomes increasingly complex over time (Mitosis University, 2025).

The first wave of the concept's development, referred to in the literature as protocol primitives, was a time for creating basic "building blocks." Protocols such as Uniswap (November 2018, swapping ETH for tokens), Aave (2017, a decentralized liquidity protocol), and Compound (2017, yield farming), while not complex in themselves, laid the foundation. Their emergence, by breaking down financial functions into discrete, interchangeable modules, clearly demonstrated a departure from traditional banking practices. At this stage, the "maturity" of the concept was measured by the simplicity of integration. Developers learned to invoke one smart contract from another, which was enabled by the Ethereum Virtual Machine (EVM).

The development of the concept corresponding to the second wave was accompanied by the emergence of protocols for yield optimization. A defining characteristic was the scaling up of "money lego" blocks into entire strategies. At this stage, complete DeFi compositions emerged as coordinated combinations of dozens of smart contracts within a single transaction. Using the example of flash loans, where borrowing, a series of economic actions, and loan repayment occur in a single step (that is, within a single transaction), it became evident that this was no longer a simple coupling of two blocks, but a complex engineering construct that had to withstand its own weight within microseconds (De Carvalho et al., 2023). Flash loans, described as an example of

"atomic composability", became the perfect illustration of the maturity of this approach. Now, "building blocks" comprised not only basic exchanges or lenders, but entire strategies (Luo et al., 2025).

However, it was precisely at this stage that the first flaws in the "Money Lego" concept became apparent. At its peak, the DeFi 1.0 sector encountered what can be termed the composability paradox (Kitzler et al., 2023). The more protocols were interconnected, the more complex the system became for the end user. Three key challenges emerged: fragmentation of liquidity across networks, complexity of strategy management, and inaccessibility for non-professionals (Mitosis University, 2025).

The subsequent evolution of the concept led to unexpected scenarios. For instance, it turned out that the codebase of SushiSwap, which is a fork of Uniswap, creates a "Lego" dialect that may not perfectly align with the original. Notably, SushiSwap and Uniswap are decentralized exchanges on the Ethereum blockchain operating under the Automated Market Maker (AMM) model. The original project was Uniswap, and due to a fork of the original codebase, the SushiSwap project emerged as a fork of Uniswap (KuCoin, 2026). The metaphor of a "universal construction set" faced certain criticism and lost its absolute flawlessness. This example made it clear that the "bricks" are not always compatible, even if they appear identical (Luo et al., 2025). The maturity of the concept now demanded not just connection, but a deep audit, defined as a "composability assertion" (De Carvalho et al., 2023).

The reaction to this crisis was the formation of the third wave, marking a period of abstract finance. Infrastructure specifically engineered to facilitate the building of "money legos" began to emerge. The most prominent example of this trend is the Gelato project (July 2020), which positioned itself as a "Money Lego" tool that allows developers to automate transactions based on conditional logic (Foxley, 2020, July 7). This network executes transactions on behalf of users or even decentralized applications themselves based on specific conditions, such as asset price or the collateralization ratio of a debt position. This elevated DeFi to a meta-level of "money Lego parts" featuring automated assembly and interoperability with other Lego parts.

Even more illustrative is the G-UNI (management system) solution developed by Gelato for the updated version of the Uniswap v3 decentralized cryptocurrency exchange. This exchange operates on the principle of an on-chain marketplace, allowing users to buy and sell cryptocurrencies on Ethereum and over ten other blockchains. While the liquidity tokens of the previous Uniswap v2 version were fungible via the ERC-20 standard (the so-called "perfect bricks"), in Uniswap v3 they became non-fungible tokens (NFTs) (i.e., "bad bricks"). The implementation of the G-UNI solution successfully resolved this issue: the management system automatically manages the position and wraps it back into ERC-20, thereby restoring composability. The presence of an ERC-20 wrapper around Uniswap v3 liquidity pool positions is extremely important, as it allows other development teams to offer "Liquidity Mining" incentive schemes on top of G-UNI.

At the end of 2024, Gelato integrated with Factor.Fi to establish an environment characterized by "AI-driven automation" and "omnichain trading". The core idea is that any user can build automated, multi-protocol DeFi strategies directly from the Factor decentralized application without the need to write code (Gelato Network, 2024).

At this stage, combining strategies from different DeFi protocols within a strategy builder, or using ready-made, permissionless DeFi strategy templates that are fully owned and controlled by the user, became highly accessible. The cooperation between Gelato and Factor.Fi abstracts away technical complexities, allowing users to focus entirely on building effective DeFi strategies in record time.

The "Money Lego" principle is no longer limited to a single blockchain; it has evolved into a cross-chain builder. This stage of maturity demonstrates engineering at the level of abstractions, where protocols hide complexity within themselves, presenting a simple, composable interface to the outside world. The high interconnectedness of protocols, which through the implementation of the "Money Lego" principle has become the architectural and economic foundation of DeFi, conceals systemic risks. Research by (Kitzler et al., 2023) has shown that such deep interdependence

generates systemic risk, where a vulnerability in a single "brick" can collapse the entire tower.

The 2022 Terra blockchain ecosystem crisis marked the first major cryptocurrency crash and contributed to the collapse of several other key players in the ecosystem. The collapse of Terra provides valuable insights into the dynamics of a sudden run in the absence of oversight, while also highlighting the vulnerabilities of typical decentralized finance architecture (Liu et al., 2023).

The Terra blockchain ecosystem was created by Terraform Labs in 2018 and positioned itself as a DeFi platform with a focus on stablecoins. The primary elements of the ecosystem were two tokens: UST (TerraUSD) and LUNA.

UST was positioned as the first true crypto-stablecoin and was a defining feature of the Terra network. Unlike other prominent stablecoins, such as Tether or Circle, which are backed by off-chain liquid assets like government bonds, UST was not backed by such collateral. Instead, it was supported by a smart contract that allowed one unit of UST to be exchanged for $1 USD worth of Terra's native currency, LUNA, and vice versa. In economic terms, UST can be compared to perpetual convertible debt with a nominal value of $1 USD, backed by the volatile ecosystem token LUNA. The algorithmic nature of the UST stablecoin was implemented on top of the Anchor lending and borrowing blockchain protocol.

To stimulate the growth of UST, the Anchor protocol offered depositors an extremely high fixed yield of 19.5% APY on UST deposits, which was exceptionally attractive under low-interest-rate conditions. As a result, the volume of deposits surged, and the issuance of UST increased substantially.

Figure 1

Market Capitalization of LUNA and UST

Source: Ehrlich (2022).

To maintain such yields, the ecosystem subsidized payouts using newly issued UST and LUNA. The volume of deposits in Anchor reached nearly $18 billion. This created an unsustainable, pyramidal structure, as new users and token issuance funded these high interest rates.

However, as the volume of deposits grew sharply, the level of required subsidies became

increasingly unsustainable. By April 2022, the daily subsidy rate reached $6 million USD, which became the driving factor that forced the Terra community to agree to a proposal to gradually reduce the interest rate to market levels, starting May 1, 2022.

At its peak, LUNA was valued at over $119 (April 2022), and the ecosystem's market capitalization exceeded $40–60 billion. To defend the peg, the Luna Foundation Guard (LFG) accumulated reserves that included approximately 80,000 BTC.

After reaching a peak value of $119.18 on April 5, 2022, the price of LUNA declined amid a general downturn in the cryptocurrency market, which reduced LUNA's relative market capitalization compared to UST. By the end of April 2022, a significant decrease in inflows and an increase in withdrawal requests from the Anchor protocol were observed.

The first signs of a mass capital flight appeared on May 7, 2022, when two large addresses belonging to banks withdrew 375 million UST through the Anchor platform. Blockchain technology allowed investors to closely track each other's actions, significantly accelerating this process. The UST stablecoin began to lose its peg and fell below the $0.99 threshold.

LFG began selling BTC and other assets to buy back UST and support the peg. Initially, they managed to stabilize it at around $0.995, but selling pressure continued. Large and sophisticated investors exited first. UST plummeted to $0.75.

Figure 2

Price dynamics of LUNA and UST over a week

Source: (Malwa, 2022).

The UST peg design also allowed users to exit UST either through direct sale of UST or through an initial swap of UST for LUNA followed by selling LUNA at the market price. Users mass-swapped UST for LUNA through the protocol's native mechanism. As UST was swapped for LUNA, the price of LUNA plummeted, leading to further capital dilution and driving LUNA's price even lower. This created a scenario known as the "Death spiral", where in just three days, LUNA's supply surged from 1 billion to 6 trillion, and the price of LUNA collapsed from $80 USD to virtually zero.

The Terra blockchain was halted several times in attempts to stabilize. By May 13, Anchor was nearly depleted, with less than $2 billion UST remaining.

Total losses amounted to around $40–60 billion in market capitalization within a few days. This triggered a chain reaction in the cryptocurrency market (causing issues for Three Arrows

Capital, Celsius, and Voyager) and set the stage for the subsequent collapse of the FTX exchange later that year.

Conclusions. The "Money Lego" principle reflects the high composability of smart contracts within an open blockchain environment. Unlike traditional finance, where products are developed in isolation within banking or financial institutions, in DeFi, any developer can utilize public smart contracts as ready-made modules. This enables the creation of new financial instruments—ranging from automated market makers (AMMs) and yield farming to complex structured products, synthetic assets, and algorithmic stablecoins—in a matter of days or even hours.

Thanks to composability, the DeFi sector demonstrated exponential growth in 2019. The "Money Lego" principle became a catalyst for innovation, significantly lowering entry barriers for new market participants and accelerating the evolution of financial services.

However, composability carries not only opportunities but also systemic risks. The Terra/Luna case became a classic example of "Money Lego" systemic risks in DeFi, where a single protocol (Anchor) could drag down the entire ecosystem. It demonstrated the limits of algorithmic stablecoins, the vital importance of real collateral, the risks of "bank runs" in a transparent blockchain environment, and the danger of overpromising high yields.

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EXPLOITATION OF LABOR MIGRANTS AS A FACTOR OF COMPETITIVENESS IN THE GLOBAL LABOR MARKET

ЕКСПЛУАТАЦІЯ ТРУДОВИХ МІГРАНТІВ ЯК ФАКТОР КОНКУРЕНТОСПРОМОЖНОСТІ НА ГЛОБАЛЬНОМУ РИНКУ ПРАЦІ

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Abstract: *The article provides a comprehensive analysis of the exploitation of labor migrants as a systemic factor shaping competitiveness in the global labor market. The relevance of the study stems from the rapid growth of international labor mobility, the intensification of socio-professional segmentation of employment, and the spread of forced and semi-forced labor practices that enable businesses to artificially reduce costs while simultaneously deepening structural socio-economic imbalances.*

The methodological framework of the research integrates general scientific and specialized methods, including analysis and synthesis, statistical and comparative analysis, as well as an institutional approach that made it possible to assess the impact of regulatory mechanisms on the situation of labor migrants across countries. The empirical base relies on data from leading international organizations, such as the ILO, OECD, IOM, and UNHCR, as well as specialized analytical reports on global labor market trends.

The findings demonstrate that labor migrants are predominantly concentrated in low-paid, unstable, and high-risk sectors of the economy, where they experience substantial wage gaps compared to local workers. The study identifies manifestations of "double discrimination" against migrant women and reveals key exploitation mechanisms - tied visas, restricted access to information, and confiscation of documents - which generate pronounced power asymmetries between employers and workers. The analysis shows that exploitative practices may reduce labor costs by up to 40% and generate significant illicit profits. Special attention is devoted to emerging forms of exploitation in the digital economy and the gig sector, as well as to the specific vulnerabilities of Ukrainian labor migrants in the context of war.

The article concludes that the exploitation of labor migrants provides only short-term competitive advantages while undermining the sustainability of economic development and

reinforcing global inequality. A promising alternative is a shift toward a model focused on human capital development, inclusive migrant integration, and productivity growth, which can prevent a "race to the bottom" and support a more balanced functioning of the global labor market.

Key words: *labor migration; labor exploitation; global labor market; forced labor; labor market segmentation; gig economy; human capital; migration-related discrimination*

Анотація. *У статті здійснено комплексний аналіз експлуатації трудових мігрантів як системного чинника, що впливає на формування конкурентоспроможності в умовах глобалізованого ринку праці. Актуальність дослідження обумовлена стрімким зростанням міжнародної мобільності робочої сили, посиленням соціально-професійної сегментації зайнятості та поширенням практик примусової або напівпримусової праці, які дають змогу бізнесу штучно скорочувати витрати, водночас поглиблюючи структурні соціально-економічні дисбаланси.*

Методологічну основу роботи становлять загальнонаукові та спеціальні методи дослідження, зокрема аналіз і синтез, статистичний та порівняльний аналіз, а також інституційний підхід, що дозволив оцінити вплив регуляторних механізмів на становище трудових мігрантів у різних країнах. Емпіричну базу сформовано на основі даних провідних міжнародних організацій, включно з ILO, OECD, IOM та UNHCR, а також спеціалізованих аналітичних звітів щодо тенденцій світового ринку праці.

У результаті доведено, що трудові мігранти зосереджені переважно у низькооплачуваних, нестабільних і високоризикових секторах економіки, де вони стикаються з істотним розривом в оплаті праці порівняно з місцевими працівниками. Виявлено прояви «подвійної дискримінації» щодо жінок-мігранток, а також ключові механізми експлуатації – залежні візи, обмежений доступ до інформації, вилучення документів, що створюють асиметрію влади між роботодавцем і працівником. Показано, що використання експлуатаційних практик може зменшувати собівартість праці до 40% і формувати значні тіньові прибутки. Окремо проаналізовано нові форми експлуатації, характерні для цифрової економіки та гіг-сектору, а також специфічні вразливості українських трудових мігрантів у період війни.

Зроблено висновок, що експлуатація трудових мігрантів забезпечує лише короткострокові конкурентні переваги, водночас підриваючи стійкість економічного розвитку та поглиблюючи глобальну нерівність. Перспективним напрямом визначено перехід до моделі, орієнтованої на розвиток людського капіталу, інклюзивну інтеграцію мігрантів і зростання продуктивності праці, що дозволить уникнути «перегонів на дно» та забезпечити більш збалансоване функціонування світового ринку праці.

Ключові слова: *трудова міграція; експлуатація праці; глобальний ринок праці; примусова праця; сегментація ринку праці; гіг-економіка; людський капітал; міграційна дискримінація*

Introduction. The contemporary stage of global economic development is characterized by intensive labor mobility, accompanied by a steady increase in the number of international labor migrants and their significant contribution to the formation of global added value. According to estimates by the International Labour Organization, the number of labor migrants worldwide exceeds 167 million people, accounting for approximately 4.7% of the global labor force (ILO, 2024). Their contribution to labor-intensive sectors of the economy is disproportionately high, particularly in the context of population ageing and labor shortages in high-income countries (OECD, 2025).

At the same time, the integration of migrants into national labor markets remains uneven and is often associated with their concentration in the secondary segment of employment, which is characterized by low wages, unstable working conditions, and limited opportunities for social mobility. Such labor market segmentation aligns with the theoretical propositions of the dual labor market model, according to which migrants serve as a source of "flexible" labor, filling low-paid

and low-prestige jobs (Doeringer & Piore, 1971; ILO, 2024). Empirical studies likewise confirm the existence of a systemic wage gap between migrants and native workers, which on average exceeds 13% and may reach significantly higher levels depending on the country (World Inequality Lab, 2026).

The issue of labor migrant exploitation acquires particular urgency, functioning not only as a social phenomenon but also as an economic category directly linked to the formation of business competitiveness. As highlighted in the report *"Profits and Poverty: The Economics of Forced Labour,"* forced labor generates approximately USD 236 billion in illicit profits annually, demonstrating its systemic integration into global production networks (ILO, 2024). Employers' use of migrants' institutional vulnerability–through mobility restrictions, informational isolation, and dependence on a single employer–enables significant reductions in labor costs and compliance expenditures related to workplace standards (OECD, 2026).

In the current context of economic digitalization, the problem of exploitation is acquiring new forms, extending to the gig economy and the data annotation sector for artificial intelligence systems, where workers, including migrants, are engaged in low-paid and unstable forms of employment (ILO, 2026). Simultaneously, the vulnerability of certain groups of migrants is increasing, particularly among individuals affected by armed conflict. According to the International Organization for Migration, a substantial share of Ukrainian migrants face various forms of labor exploitation, including informal employment, excessive working hours, and violations of wage payment conditions (IOM, 2024).

The purpose of the article. The aim of this study is to analyze the exploitation of labor migrants as a factor shaping competitiveness in the global labor market and to identify the key mechanisms, forms, and consequences of this phenomenon. To achieve this aim, the study addresses several tasks: examining the role of labor migrants within the global labor market structure; identifying the main mechanisms of their exploitation and the conditions that facilitate its persistence; assessing the economic benefits employers derive from the use of vulnerable labor; analyzing emerging forms of exploitation driven by digitalization and the expansion of the gig economy; and characterizing the specific risks and employment conditions faced by Ukrainian labor migrants in the current geopolitical context. This approach enables a comprehensive assessment of the structural drivers of exploitation and its implications for the functioning of the global labor market.

Literature review. Labor migration has become a central focus of contemporary economic research, as migrant workers play a significant role in sustaining global production and addressing structural labor shortages in host economies (ILO, 2024; OECD, 2025). At the same time, numerous studies emphasize that migrants are disproportionately concentrated in the secondary segment of the labor market, where employment is characterized by instability, low wages, and limited prospects for advancement (Doeringer & Piore, 1971; Piore, 1979). This structural positioning renders migrant labor a flexible resource for employers and creates conditions conducive to systemic exploitation. A substantial body of economic literature also investigates the broader macroeconomic effects of migration. G. Borjas (1989) demonstrates that immigration has a positive impact on GDP growth in receiving countries, although it may simultaneously intensify income inequality. Conversely, T. Hassan's (2024) research highlights the crucial contributions of highly skilled migrants to innovation, technological development, and investment attraction. Further studies by A. Gharas et al. (2017) and P. Sgrignoli et al. (2013) emphasize the important role of migrant networks in facilitating international trade and foreign direct investment by strengthening cross-border economic linkages. Meanwhile, investigations by C. Ara-Figueros (2018) and A. Lopatinas (2017) suggest that labor mobility also enhances regional innovation capacity, as the circulation of skilled workers promotes knowledge transfer and supports the formation of innovation-driven regional ecosystems.

The economic incentives behind such exploitation are well documented. Firms frequently rely on migrants' legal and institutional vulnerabilities to reduce labor costs and gain competitive advantages, practices that are deeply embedded in global value chains (ILO, 2024; OECD, 2026).

According to international assessments, forced labor alone generates approximately $236 billion in illegal profits each year, illustrating the scale of these exploitative mechanisms. Wage inequality remains a persistent issue, with studies confirming a migrant wage penalty and a compounded disadvantage affecting migrant women due to intersecting forms of discrimination (World Inequality Lab, 2026; ILO, 2026).

Digital transformation has further expanded the geography of exploitation. Migrants are increasingly engaged in platform-based and invisible digital labor–such as content moderation and data annotation for AI systems–often without adequate pay or social protections (Berg et al., 2018; ILO, 2026). This reinforces existing power asymmetries and shifts exploitation from traditional sectors into new technological domains. Additionally, migration driven by crises, including armed conflicts, heightens vulnerability to labor abuses. Evidence shows that displaced workers, such as Ukrainian migrants in Europe, face elevated risks of informal employment, excessive working hours, and wage violations due to insecure legal status and limited access to formal labor markets (IOM, 2024; UNHCR, 2026).

In Ukrainian scholarship, labor migration and its demographic and economic implications have been actively analyzed by Shepel, Reznikova, Bulatova, Krykun, and Grydasova (2025a; 2025b; 2025c). Their works conceptualize migration as both a developmental opportunity and a structural challenge, emphasizing the role of international regulatory frameworks in managing labor mobility and mitigating regional disparities. These findings resonate with global analyses of the "race to the bottom," in which competitive pressures incentivize states and firms to lower labor standards. Despite extensive literature on migration, inequality, and labor rights, the specific link between migrant exploitation and competitive advantage formation in global labor markets remains insufficiently integrated into a unified analytical framework. Existing studies tend to examine these issues separately, while a systematic exploration of how exploitation mechanisms translate into economic competitiveness is still emerging.

Main results of the research. The number of international labour migrants stands at over 167.7 million, representing around 4.7% of the total global workforce *(ILO, 2024)*. However, this figure significantly underestimates their actual contribution to the GDP of several regions. The concentration of migrants in labour-intensive sectors results in the disproportionately high contribution to value added, particularly given the imbalances in national labour markets.

Migrants demonstrate significantly higher economic activity compared to the local population. Table 1 shows that the employment rate among them stands around 66%, which is six percentage points higher than the corresponding figure for non-migrants. This is clearly evident in high-income countries, where migrants fill niches genuinely arising from demographic ageing, as well as the unwillingness of the local population to take on 'unprestigious' or low-paid jobs.

In such a context, the segmentation of the labour market takes on particular significance, with migrants largely concentrated in the secondary sector of employment, where unstable employment conditions, lower wages and limited social opportunities for social mobility are often observed. It is precisely this that enables employers to minimize production costs, thereby creating a dependency of certain sectors on foreign labour.

Table 1

A comparison of labour force participation among migrants and non-migrants

Indicators of labour activity	Migrants	Local citizens
Labour force participation rate, %	65.8	60.1
Employment to population ratio, %	60.9	57
Unemployment rate, %	7.2	5.2

Source: ILO 2024

The analysis demonstrates that migrants do not merely supplement the labour market, but form its structural basis, particularly in the agriculture, construction, services, and logistics sectors.

In the countries of the Organisation for Economic Cooperation and Development, for example, there has been a steady increase in the inflow of foreign workers. In 2023 the UK admitted 283,000 migrant workers, which is 48% more than the previous year. Canada welcomed 145,000 people (a 7% increase), and Germany admitted 93,000 (a 4% increase). However, these impressive figures often mask the poor working conditions faced by migrants, where employers achieve labour flexibility by depriving them of their wages and basic rights *(ILO, 2024).*

In particular, it is important to highlight the wage gap. The top 10% of the highest-paid workers account for over 50% of total income, while the 50% of the lowest-paid (among whom migrants frequently make up the majority) account for less than 8% of the global earnings. This results in the top 10% of high-earners earning more than the remaining 90% combined. Migrants, on average, earn 13% less than local workers. In some countries, the gap reaches 30-40%. In Italy, for example, it this figure stands at 30%, and in Cyprus, 42% *(World Inequality Lab, ILO, 2026)*.

Meanwhile, women earn 21% less than men. It points not only to a 'migrant wage penalty' but also to a 'double penalty', under which female migrants face double discrimination – on the basis of gender and origin. This causes dissatisfaction among women, yet they, like other migrants, are often unable to defend their own rights.

The service sector consistently accounts for the vast majority of the workforce. In 2024, 68.4% of all migrant workers were employed in the tertiary sector. However, among women this figure is higher and reaches 81% of female migrants, who are employed, to a large extent, in the care and domestic work sectors *(ILO, 2024).* This creates specific risks, as such work is often informal. This practically makes it impossible for them to receive social protection and leaves them invisible to state labour inspectorates.

Labour migrants face constant risk. This risk comes from institutional barriers, they are shown in the Table 2. One key example is the system of tied visas. A clear case is Canada's Temporary Foreign Worker Program (TFWP). Under this system, migrants lose legal status if they lose their job. This also creates a risk of deportation. In such conditions, workers often have no real choice, consequently they are forced to accept unsafe working conditions and may work unpaid overtime. In practice, they have very limited ability to protect their rights.

The next barrier is social and informational isolation. Migrants often do not know the local language or the specifics of the law, which makes them easy prey for dishonest employers. Research *(ILO, 2026)* highlights that women and children are the most vulnerable, since women are more likely to become victims of sexual exploitation and forced domestic labour. Young people are often exploited in low-paid sectors of the gig economy.

The confiscation of documents is a clear sign of exploitation and modern-day slavery. This creates a closed trap, as the migrants will be unable to move around the country or leave it legally. They will also be completely dependent on the employer, which would result in an imbalance of power. By taking away their documents, the employer keeps the worker 'tied' to them and leaves them with no choice but to accept lower wages and poor working conditions. Nowadays around twenty-eight million people are in a state of forced labour, one of the main indicators of which is the confiscation of documents *(ILO, 2026).*

Table 2

Benefits to employers from the exploitation of migrants

Vulnerability factor	The mechanism of influence on a migrant	Economic benefit for the employer
Tied visas	Fear of deportation in the event of complaints or dismissal	The ability to dictate any working conditions
Information isolation	Migrant's ignorance of local laws and language	Saving on legal support and employee safety
Confiscation of documents	Complete physical and legal dependence	The establishment of conditions that resemble modern-day slavery

Source: ILO

The report *"Profits and Poverty: The Economics of Forced Labour" (ILO, 2024)*

demonstrates that forced labour generates about 236 billion in illegal profits each year. In practice, this money is taken directly from the employees' pockets since employers charge high fees for housing and food. They may also refuse to pay wages. The highest illicit profits are recorded in Europe and Central Asia, as shown in Table 3. They reach about 3,943 dollars per year per victim. In Arab countries, the losses can be much higher, in some cases reaching up to 15,000 dollars per person.

The largest profits come from the domestic work in the service sector. Construction and manufacturing also bring high returns. In most cases, migrants earn much less than local citizens. Their wages are often 13-40% lower, or they are not paid at all.

Table 3

Profits from forced labour

Region	Annual illicit profits (billion dollars)	Profit per victim (dollars)
Europe and Central Asia	84	3,943
Asian-Pacific	62	1,510
America	52	5,554
Africa	20	1,123
Arab countries	18	15,000

Source: ILO 2024

In particular, exploitation of migrants allows businesses to save up to 40% of the labour costs, personal safety equipment, and safety systems. A link has been found between the forced labour and illegal trade in counterfeit goods *(EUIPO-OECD, 2026).* For every additional percentage point of forced labour, the trade in counterfeit goods increases by over thirty-five million dollars. It undermines the legal business forced to compete with '21st-century slaves'.

The utilization of the migrants' work in order to minimize the costs is, to a great extent, based on the concept of 'race to the bottom' where the competitive advantage is achieved through the conscious lowering of social standards. This results in the deterioration of working conditions and ecology and leads to the decline in tax revenue. However, it annually generates the staggering sum of the aforementioned 236 billion dollars. The key idea of this concept is based on the fact that states willing to attract foreign direct investment usually loosen the labour inspection and limit the rights to collective bargaining, which leads to the decreasing of wages. Thus, one company receives the advantage from exploitation and others, in order not to lose the market share, start decreasing their own security standards. In 2026 the investment funds began calling for the adoption of mandatory international conventions that could preclude a collapse in labour standards, which, in turn, carries significant risks for the stability of the global economy as a whole *(ICCR, 2026).*

With the development of artificial intelligence, the exploitation of migrants has extended far beyond the confines of physical factories. Migrants now form the backbone of the 'invisible' workforce. This happens because modern AI systems rely solely on the workers who are forced to manually filter toxic content and train algorithms. In other words, companies talk about the extraordinary algorithms' efficiency, whilst hiding the fact that behind this lies the labour of migrants, who are paid just 1.30-2 dollars an hour.

Migrants also make up a significant share of the courier and taxi sectors. Companies exploit them by not recognizing themselves as employers. It is suggested that employees are treated as 'partners' rather than 'workers' in order to avoid liability. Another violation is, in particular, the swift termination of an employees' accounts if they complain or attempt to report a violation of their rights. It is also migrants who are, for the most part, encouraged to work in difficult and hazardous conditions (for example, in severe weather) in exchange for small bonuses. Consequently, the worker becomes a slave, deprived of any interaction with management, and their income depends entirely on the willingness to work to the limits of their physical capacity.

The level of exploitation among the population affected by the war is critical. 54% of the

respondents reported having faced at least one of the potential signs of the labour exploitation during the first 12 months of employment *(ILO 2024).* Table 4 demonstrates the violations of the individual rights, which Ukrainians have faced. The most widespread among them were, for example:

- Forty-two percent of the employees reported the long working hours.
- Twenty-two percent – the absence of the official contract.
- Eleven percent – the non-payment or underpayment of wages.

The most alarming of those is the figure of 22%, which practically means that one fifth of the Ukrainian migrants surveyed works informally and does not have a clearly defined employment contract. More severe forms of exploitation are also recorded, including threats and violence (3%), and the lack of basic necessities such as food, water and sanitary facilities (2%). According to the International Labour Organisation terminology, this meets the criteria for forced labour. The report also shows that up to 76% of young people (aged 18-24) among internally displaced persons have been exploited, as the lower bargaining power, the higher the probability of the exploitation *(IOM, 2024).*

The Russian war against Ukraine has led to more than 6.9 million Ukrainians forced to live abroad becoming one of the largest and, at the same time, most vulnerable segments of the European labour marker. Due to the lack of resources, Ukrainians have no other choice but accept the risky job offers. In 2025 17% of respondents reported the willingness to accept the job without a formal contract or under questionable conditions. 13% are ready to work in closed conditions (in isolation), 2% are even willing to give all their personal belongings to the employer.

Table 4

Forms of exploitation of Ukrainians

Type of violation	The percentage of Ukrainians, %
Overworking/long working hours	42
Absence of appropriate official contract	22
Non-payment of wages	11
Lack of personal safety equipment	4
Threats or violence in the workplace	3

Source: IOM

Although more than half of the Ukrainian refugees in Europe (57%) are employed, their level of income is significantly lower than local citizens', by an average of 22%. The main reason for this lies in 'de-skilling', which implies the loss from non-utilizing professional skills. Around 60% of Ukrainians are forced to work on the positions that do not match their real qualification. Refugees with higher education five times more often than local citizens have to occupy low-skilled jobs. In the event of improved migrant integration, the EU countries could gain an additional 0.7% of GDP annually *(UNHCR, 2026).*

The vast majority of Ukrainians work in the 'black' or 'grey' labour market, which leaves them with less protection. The workers may not receive their wages, lose their jobs without any explanation or work under hazardous conditions. The 'black' labour market implies fully unofficial employment without a contract and legal protection, while 'grey' market stands for only partial legalization (unofficial wages or hiding the real income level). In some cases, the employers cut their costs by hiring Ukrainians at lower wages, however, this creates pressure on the overall wage levels. The construction and agricultural sectors feel this pressure particularly strongly. This is especially noticed in Poland, Germany and Czech Republic.

Given the global risks from systematic exploitation, the international community is moving towards to more stringent regulatory methods. The key instrument is the European Corporate Sustainability Due Diligence Directive (CS3D), the provisions of which were revised as part of the Omnibus I package (February 2026). It provides for the simplification of requirements and narrowing of the range of companies to which it's applied. The Directive provides for the civil

liability of companies for human rights violations in supply chains and penalties up to 5% of the turnover and complete exclusion from the EU market. Furthermore, since 2025, coordination between the US and the EU has been strengthened regarding a complete ban on the import of goods produced using forced labour.

However, the future of the global economy lies not in the exploitation economy (a reduction in relative labour costs). The modern paradigm of global economic development is increasingly shifting towards the accumulation of human capital, innovation and increased labour productivity. In this context, the utilization of migrant labour as the cheap resource is considered as a sign of technological lag rather than a competitive advantage. The competitive advantage in medium and long term will belong to economies that are able to integrate new migrants by making effective use of their skills and creating conditions for professional development (Mario Draghi, 2026). This approach will prevent a 'race to the bottom' and ensure the stable growth of the global economy. In many countries, namely the United Kingdom, Belgium, South Korea, Greece etc., trade unions are now starting to recruit migrant workers to use them as a tool in the fight against wage dumping, whilst human rights organisations are putting pressure on brands and forcing them to check their supply chains to ensure that no forced labour has been used.

Conclusions. The findings of the study demonstrate that the exploitation of labor migrants constitutes a significant yet fundamentally detrimental component of the contemporary global economic model. While such practices may generate short-term competitive advantages for firms by reducing labor costs, they simultaneously reinforce a broader "race to the bottom," eroding social standards, weakening institutional protections, and undermining the long-term stability of labor markets.

The growing scale of forced labor and its deepening integration into global value chains further highlight the urgency of strengthening international regulatory frameworks and enhancing monitoring mechanisms to ensure compliance with fundamental labor rights. In this context, newly developed policy instruments aimed at increasing corporate accountability–particularly within multinational supply chains–play a crucial role in preventing exploitative practices and promoting responsible business conduct.

At the same time, the future trajectory of the global economy increasingly depends on a transition away from exploitation-based competitive strategies toward a model grounded in the effective development and utilization of human capital, innovation, and productivity growth. The meaningful integration of migrants into labor markets–based on their skills, qualifications, and access to decent working conditions–is emerging as a key determinant of sustainable competitiveness in both advanced and developing economies.

Thus, addressing the exploitation of labor migrants should be understood not only as an ethical imperative, but also as an economic necessity for ensuring the long-term resilience and balanced development of the global labor market. Counteracting exploitative structures is essential for building a more inclusive, productive, and socially sustainable international economic order.

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INSTITUTIONAL MECHANISMS FOR WAR-RISK COVERAGE

ІНСТИТУЦІЙНІ МЕХАНІЗМИ ПОКРИТТЯ ВОЄННИХ РИЗИКІВ

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Abstract. *Russia's full-scale invasion has fundamentally altered the institutional conditions for investment in Ukraine. The possibility of physical destruction, interruption of operations and loss of access to critical infrastructure cannot be adequately addressed through conventional portfolio diversification or contractual safeguards. War-risk insurance and investment guarantees have therefore become essential determinants of whether foreign direct investment projects can be financed and implemented under continuing hostilities.*

The article examines the current architecture of war-risk coverage available in Ukraine, including the mechanisms provided by MIGA, the United States International Development Finance Corporation, the European Bank for Reconstruction and Development, foreign and Ukrainian export credit agencies, international insurance markets and domestic insurers. The study combines positive and normative economic analysis with institutional comparison of the available instruments, their financial limits, eligibility requirements and principal exclusions.

The findings demonstrate that the emerging system remains multilayered but fragmented. International guarantees and publicly supported reinsurance facilities have expanded the range of insurable transactions, but their capacity remains insufficient for the comprehensive protection of large centralised infrastructure. The exclusion of critical infrastructure from many locally available insurance products creates a structural mismatch between Ukraine's reconstruction needs and the actual risk-bearing capacity of the insurance market.

The article proposes a portfolio-based hybrid model for attracting foreign direct investment into small and medium-sized decentralised energy projects. The model combines primary underwriting by Ukrainian insurers, targeted state support, international guarantees and reinsurance, and a catastrophic state–donor backstop. It is argued that such arrangements may transform war risk into a layered and contractually manageable exposure and influence not only the compensation of losses but also the scale, structure and sectoral allocation of foreign investment in Ukraine's reconstruction.

Keywords: *war-risk insurance; foreign direct investment; political-risk insurance; decentralised energy; investment guarantees; reinsurance; hybrid risk-sharing model; critical infrastructure; reconstruction of Ukraine; international financial institutions.*

Анотація. *Повномасштабне вторгнення Росії докорінно змінило інституційні умови здійснення інвестицій в Україні. Ризики фізичного знищення активів, припинення операційної діяльності та втрати доступу до критичної інфраструктури неможливо належним чином мінімізувати за допомогою звичайної диверсифікації інвестиційного портфеля або договірних механізмів. Страхування воєнних ризиків та інвестиційні гарантії у зв'язку з цим перетворилися на важливі чинники, що визначають можливість фінансування й реалізації*

проєктів прямих іноземних інвестицій в умовах тривалих воєнних дій.

У статті досліджено сучасну архітектуру покриття воєнних ризиків в Україні, зокрема механізми, запропоновані MIGA, Міжнародною фінансовою корпорацією розвитку США, Європейським банком реконструкції та розвитку, іноземними й українським експортно-кредитними агентствами, міжнародними страховими ринками та вітчизняними страховиками. Дослідження поєднує позитивний і нормативний економічний аналіз з інституційним порівнянням доступних інструментів, їхніх фінансових лімітів, критеріїв прийнятності та основних виключень.

Результати засвідчили, що сформована система залишається багаторівневою, але фрагментованою. Міжнародні гарантії та механізми перестрахування з державною і донорською підтримкою розширили коло операцій, які можуть отримати страховий захист, однак їхньої ємності недостатньо для повноцінного покриття великих централізованих інфраструктурних об'єктів. Виключення критичної інфраструктури з багатьох доступних на внутрішньому ринку страхових продуктів створює структурну невідповідність між потребами відбудови України та фактичною здатністю страхового ринку приймати відповідні ризики.

У статті запропоновано портфельну гібридну модель залучення прямих іноземних інвестицій у малі та середні проєкти децентралізованої енергетики. Модель поєднує первинне страхування українськими страховиками, цільову державну підтримку, міжнародні гарантії та перестрахування, а також катастрофічний державно-донорський рівень захисту. Обґрунтовано, що такі механізми можуть трансформувати воєнний ризик у багаторівневий і договірно керований ризик та впливати не лише на компенсацію збитків, а й на масштаби, структуру і секторальний розподіл іноземних інвестицій у відбудову України.

Ключові слова: *страхування воєнних ризиків; прямі іноземні інвестиції; страхування політичних ризиків; децентралізована енергетика; інвестиційні гарантії; перестрахування; гібридна модель розподілу ризиків; критична інфраструктура; відбудова України; міжнародні фінансові інституції.*

Introduction. Russia's full-scale invasion has created an investment environment in which conventional approaches to risk assessment and capital allocation are no longer sufficient. According to the Fifth Rapid Damage and Needs Assessment, the cost of Ukraine's recovery and reconstruction was estimated at almost USD 588 billion over the next decade as of 31 December 2025, which is nearly three times the country's projected nominal GDP for 2025. Energy accounts for almost USD 91 billion, or approximately 15.4 per cent, of the total identified needs and remains one of the three sectors most severely affected by the war. The scale of these requirements substantially exceeds the capacity of public finance and international assistance alone, making the mobilisation of domestic and foreign private capital indispensable for both wartime recovery and post-war reconstruction (World Bank Group et al., 2026).

The European Union has become Ukraine's principal strategic partner in combining reconstruction finance with the country's accession-related reforms. The EUR 50 billion Ukraine Facility for 2024–2027 links financial support to implementation of the Ukraine Plan, institutional modernisation and progressive approximation to the EU acquis. Its second pillar, the Ukraine Investment Framework, has a capacity of EUR 9.6 billion, including EUR 7.8 billion in guarantee cover and EUR 1.8 billion in blended-finance grants, and is intended to mobilise up to EUR 40 billion in public and private investment. In addition to reducing project risks through guarantees, grants, technical assistance and financial instruments, the Facility promotes the application of EU environmental, governance, reporting and project-selection standards. It should therefore be understood not only as a source of reconstruction finance but also as an institutional mechanism that increases Ukraine's investment capacity while accelerating its integration into the regulatory and economic space of the European Union (European Commission, 2026; Namoniuk, 2026).

The energy sector illustrates the importance of matching investment priorities with the actual

capacity of risk-sharing institutions. Large centralised facilities combine high replacement costs, fixed locations, systemic importance and exposure to repeated attacks, which makes comprehensive commercial insurance particularly difficult. Decentralised generation, by contrast, allows capital to be distributed among smaller cogeneration units, modular generating facilities, renewable-energy installations and energy-storage systems located in different communities. These assets do not eliminate war risk, but their lower individual value, modular replacement and geographical dispersion can reduce the maximum loss generated by a single event while supporting hospitals, municipal services, industrial consumers and district-heating systems. The practical significance of this segment is already increasing: during the preceding eighteen months, Ukraine commissioned 125 MW of new cogeneration capacity representing more than EUR 210 million in estimated direct investment, while regional plans provide for at least 250 additional cogeneration units with a combined capacity of 1.1 GW over the following two years (State Agency on Energy Efficiency and Energy Saving of Ukraine, 2026).

The article aims to assess the current institutional capacity for covering war risks in Ukraine and to develop a portfolio-based hybrid model for attracting foreign direct investment into small and medium-sized decentralised energy projects.

Literature review. The theoretical analysis of foreign direct investment traditionally begins with the factors determining the international allocation of productive capital. Dunning's eclectic paradigm explains international production through the interaction of ownership, location and internalisation advantages (Dunning, 1980). The institutional environment of the host economy forms an important component of location advantage because it affects transaction predictability, the enforceability of contracts and the investor's ability to retain control over productive assets. Under conditions of armed conflict, institutional arrangements also determine whether exceptional risks can be allocated among investors, lenders, insurers and public institutions or must be borne almost entirely by the investor.

This approach is complemented by new institutional economics. North (1990) defines institutions as formal and informal constraints that structure economic interaction and reduce uncertainty. Williamson (1985) relates the choice of governance arrangements to uncertainty, transaction frequency and asset specificity. These categories are especially relevant to investments in energy and infrastructure, which are characterised by high capital intensity, long payback periods, geographical immobility and dependence on particular networks. When the probability of destruction or prolonged interruption increases, conventional contractual mechanisms become insufficient and must be supplemented by guarantees, insurance, reinsurance and public–private risk-sharing arrangements.

War-risk coverage also differs from conventional property insurance because potential losses are spatially correlated and may accumulate rapidly. A single attack may damage several insured objects within the same geographical area, while repeated attacks may generate losses exceeding the capital capacity of individual insurers. The insurability of wartime exposure therefore depends not only on the characteristics of an individual asset but also on geographical accumulation limits, access to international reinsurance and the participation of public or multilateral institutions capable of absorbing exceptional layers of loss. The National Bank of Ukraine identifies limited domestic capitalisation, insufficient loss data and restricted reinsurance capacity among the principal constraints affecting the development of this market (National Bank of Ukraine, 2025).

The relationship between international assistance and private investment provides an additional perspective on reconstruction finance. Freyer, Lishchynskyi and Lyzun (2024) find a statistically positive relationship between both international assistance and FDI, on the one hand, and Ukraine's economic growth, on the other. Their results indicate that international assistance is particularly important for macroeconomic stabilisation, whereas FDI produces a stronger long-term effect through productive investment, technological modernisation and integration into the global economy. International assistance may also create conditions for subsequent private investment when it finances infrastructure, strengthens institutions and reduces the initial risks faced by investors.

Recent Ukrainian research increasingly treats reconstruction finance as an integrated institutional architecture rather than a collection of isolated programmes. Namoniuk (2026) conceptualises green reconstruction finance as an interaction among multilateral and donor mechanisms, the national regulatory ecosystem and market-based channels for capital mobilisation. Within this architecture, the Ukraine Facility performs both a financing and an integration function, while guarantees, blended finance and political- or war-risk coverage influence the cost of capital and investor appetite. This perspective is directly relevant to the present study because effective war-risk coverage requires coordination among external resources, domestic institutions, project pipelines and private financial intermediaries.

Riabchyn and Oriekhova (2025) examine the priorities and project requirements applied by international financial institutions and development agencies. Their analysis demonstrates that access to reconstruction finance increasingly depends on compliance with environmental and social standards, climate criteria, ESG-related documentation and, in the case of European institutions, the EU Green Deal and Taxonomy principles. Consequently, the technical resilience or insurability of a decentralised energy project does not automatically make it eligible for international financing. The type of technology, emissions profile, environmental and social management arrangements and compatibility with EU standards must also be considered during project selection.

The potential role of guarantees and insurance extends beyond conventional commercial infrastructure. Bulatova and Vyshniakov (2026) argue that the transformation of international humanitarian financing requires combining traditional grants and loans with guarantees, insurance, equity instruments, public–private partnerships and other mechanisms capable of mobilising private capital. They particularly emphasise the relevance of insurance and guarantee instruments for high-risk projects and emergency-response systems, as well as the importance of long-term financing and cross-sectoral cooperation. Their conclusions suggest that layered risk-sharing arrangements may be applicable not only to energy assets but also to healthcare, food security, municipal infrastructure and other sectors operating under conditions of exceptional risk.

The broader economic significance of these mechanisms is connected with Ukraine's participation in international production networks. Shnyrkov and Chugaiev (2017) associate inward foreign investment with regulatory convergence, technology transfer and closer economic integration with the European Union. A prolonged decline in FDI therefore restricts not only capital formation but also access to managerial expertise, foreign suppliers and international markets. War-risk insurance and investment guarantees may influence this process by determining which projects can meet the risk requirements of international lenders and investors.

The institutional configuration of investment relationships is also important. Namoniuk and Maliuha (2026) demonstrate that governance architecture is not neutral, since different organisational arrangements create different incentives for long-term investment, coordination and capability development. Modular governance facilitates standardisation, replication and the replacement of individual components, while relational governance supports deeper cooperation and joint capability formation. Although their analysis concerns green outsourcing, the distinction is applicable to decentralised energy: standardised assets can be grouped into diversified portfolios, but the operation of a risk-sharing system requires sustained relationships among investors, insurers, equipment suppliers, municipalities, the state and international financial institutions.

The existing literature nevertheless remains fragmented. Research on FDI primarily examines location advantages and institutional quality; studies of recovery finance focus on international assistance, blended finance or sustainable investment; and official programme documents describe individual insurance and guarantee mechanisms. Limited attention has been paid to how the financial limits of war-risk coverage affect the appropriate scale and technological structure of energy investment. There is also insufficient research on how exposure associated with portfolios of decentralised assets should be distributed among investors, Ukrainian insurers, the state, international financial institutions and donor partners. The present article addresses this gap by combining positive analysis of the mechanisms currently available in Ukraine with a normative portfolio-based model of hybrid war-risk coverage..

Methodology. The study applies a qualitative institutional approach combining positive and normative economic analysis. The positive component identifies and compares the principal mechanisms of war-risk coverage currently available in Ukraine. The source base includes academic literature on foreign direct investment, institutional economics and global value-chain governance, as well as official materials published by the National Bank of Ukraine, MIGA, DFC, the EBRD, Marsh McLennan and other institutions participating in the provision of guarantees, insurance and reinsurance. The examined mechanisms are compared according to their principal object of coverage, eligible investors and assets, reported financial capacity, maximum liability, institutional distribution of risk and geographical or sectoral restrictions.

The normative component uses the limitations identified through the positive analysis to develop a portfolio-based hybrid model for small and medium-sized decentralised energy projects. The model is constructed through institutional comparison and analytical synthesis rather than actuarial estimation. Particular attention is paid to the correspondence between the value and geographical distribution of decentralised assets and the actual limits of insurance, guarantee and reinsurance instruments. The financial indicators reported by different institutions are not treated as directly comparable values, since they may refer to the amount of a guarantee, total facilitated insurance capacity, aggregate programme exposure or a maximum limit per object. The mapping of insurance products and war-risk facilities reflects the institutional information reported by the National Bank of Ukraine as of October 2025, while the assessment of reconstruction needs, the Ukraine Facility and decentralised-energy developments is updated through the first half of 2026. The study therefore combines a fixed comparative date for insurance-market capacity with more recent contextual data on reconstruction and investment policy.

Main results of the research. Russia's full-scale invasion has transformed war-risk insurance from a specialised market segment into one of the key institutional conditions for investment activity in Ukraine. Under normal circumstances, investors may respond to political or macroeconomic uncertainty by diversifying their portfolios, demanding higher returns, shortening investment horizons or introducing additional contractual safeguards. These measures become considerably less effective when the principal risk involves the physical destruction of productive assets, a prolonged interruption of operations or the permanent loss of access to transport and energy infrastructure. The materialisation of wartime risks may therefore eliminate not only the expected income stream from an investment but also the capital embodied in fixed and geographically immobile assets.

The institutional consequences of this reduction in the risk-mitigation capacity of conventional capital markets can be explained through the propositions of new institutional economics. Institutions reduce uncertainty and structure the incentives of economic actors, while the governance arrangements selected for a transaction depend on its level of uncertainty, frequency and asset specificity (North, 1990; Williamson, 1985). In the case of foreign direct investment, the quality of the institutional environment forms part of the location advantages considered by multinational enterprises when deciding where to place productive capital (Dunning, 1980). Investment guarantees and war-risk insurance consequently affect not only the compensation available after an insured event but also the ex-ante distribution of exposure among investors, lenders, insurers, reinsurers, the state and international financial institutions.

The significance of these mechanisms for Ukraine extends beyond the immediate reconstruction of destroyed capital. Shnyrkov and Chugaiev (2017) demonstrate that foreign investment inflows are an important condition for Ukraine's integration into international production networks and closer economic engagement with the European Union. A prolonged decline in investment therefore restricts not only domestic capital formation but also access to technologies, managerial expertise and foreign markets. Namoniuk and Maliuha (2026), in turn, emphasise that the governance architecture of global value chains is not neutral: different institutional configurations create different incentives for long-term investment, coordination and capability development. Applied to wartime reconstruction, this proposition implies that a collection of isolated insurance products is insufficient. A coherently configured architecture is required to

distribute exceptional risks among public and private actors.

The emerging Ukrainian war-risk insurance architecture remains multilayered and fragmented. It includes political-risk guarantees for foreign investment provided by multilateral and bilateral development institutions; publicly supported reinsurance facilities; inland, maritime and international cargo insurance; export-credit instruments; products offered by individual Ukrainian insurers; and insurance arrangements embedded in bank lending. Although these mechanisms support reconstruction and investment through different channels, they vary substantially in terms of eligible investors, covered assets, geographical limitations, policy periods and maximum liabilities. They should therefore be regarded as complementary rather than interchangeable instruments (National Bank of Ukraine, 2025).

One of the principal multilateral institutions capable of providing political-risk insurance for foreign investors in Ukraine is the Multilateral Investment Guarantee Agency, a member of the World Bank Group. MIGA's mandate includes protection against war and civil disturbance, expropriation, currency-conversion and transfer restrictions, breach of contract and the non-honouring of financial obligations. Such protection is especially important where private insurers and reinsurers are unwilling to assume exposure independently. MIGA combines donor-supported resources, its own guarantee capacity and, where available, public or private reinsurance, thereby reducing the concentration of risk on a single institutional balance sheet (MIGA, 2023).

According to the mapping prepared by the National Bank of Ukraine as of October 2025, the relevant MIGA instruments covered investments in Ukraine with a reported financing amount exceeding USD 30 million, while the indicative limit under one contract amounted to approximately USD 9.2 million (National Bank of Ukraine, 2025). The guarantees are concluded individually and can be structured with reference to the ownership, financing arrangements and risk profile of a particular investment. Such individual underwriting allows the instrument to reflect project-specific conditions but also requires a high degree of investment readiness, due diligence and transaction documentation.

MIGA consequently performs a catalytic rather than universal market function. Its participation may unlock equity or debt financing that would otherwise remain unavailable and may signal that the project has passed environmental, social, integrity and financial assessments. However, the project-by-project structure makes the instrument less accessible and less cost-efficient for standardised micro, small and medium-sized investments or widely distributed small-scale infrastructure projects.

A different mechanism has been developed by the United States International Development Finance Corporation with the participation of Aon. The arrangement uses public risk-bearing capacity to support reinsurance and enable Ukrainian insurers to expand the coverage offered to businesses operating in Ukraine. According to the National Bank of Ukraine, the total potential capacity associated with the mechanism exceeded USD 250 million, while the coverage limit for an individual object amounted to USD 2.5 million. Participating insurers are required to have transparent ownership structures and audited financial statements (National Bank of Ukraine, 2025).

The institutional significance of this mechanism lies in its reliance on the existing Ukrainian insurance market. Domestic insurers continue to assess risks, issue policies, collect premiums and settle claims, while DFC-supported reinsurance limits the losses that they must retain on their own balance sheets. The arrangement therefore restores part of the risk-transfer chain disrupted by the withdrawal of international reinsurance capacity following the full-scale invasion. DFC's commitment of USD 50 million in political-risk insurance was intended to unlock more than USD 200 million of additional coverage for static assets in Ukraine (DFC, 2024).

The USD 2.5 million limit per object determines the segment in which this mechanism can operate most effectively. It may provide meaningful protection for inventories, machinery, vehicles, smaller buildings and individual components of local infrastructure. It cannot, however, cover the replacement value of a large industrial plant, centralised power station or systemically important infrastructure facility. The instrument expands the frontier of insurability but does not eliminate the gap between commercially manageable business risks and highly concentrated strategic exposures.

The European Bank for Reconstruction and Development has introduced a similar mechanism focused on restoring international reinsurance capacity. The Ukraine Recovery and Reconstruction Guarantee Facility, developed by the EBRD and Aon, enables international reinsurers to cover defined war-related losses initially underwritten by Ukrainian insurance companies. The facility deliberately relies on the existing insurance infrastructure rather than establishing a parallel system. Its initial eligible categories include inland cargo, motor vehicle damage and railway rolling stock (EBRD, 2024).

The facility is supported by an EBRD guarantee of up to EUR 110 million. Because the underlying policies are generally short-term and may be renewed, the committed guarantee capital can support a substantially larger volume of insured assets. The EBRD estimated that the mechanism could facilitate coverage for up to EUR 1 billion of goods and vehicles in transit annually. In the mapping prepared by the National Bank of Ukraine, the available capacity associated with commercial goods transported within Ukraine was presented at EUR 200 million (National Bank of Ukraine, 2025). The distinction between the guarantee amount and the value of facilitated coverage is important: the former represents the maximum institutional commitment, while the latter reflects the larger volume of transactions supported through risk sharing, portfolio turnover and the repeated use of the facility.

International reinsurance is required because Ukrainian insurers cannot independently absorb substantial and geographically concentrated losses. Unlike ordinary property risks, wartime exposure may accumulate rapidly: a single attack may damage several insured objects within the same area. The EBRD mechanism addresses this problem by distributing defined layers of exposure among Ukrainian insurers, international reinsurers, the EBRD and donor governments. The commencement of underwriting by INGO, Colonnade and UNIQA, supported by MS Amlin and the EBRD guarantee facility, demonstrated the operational viability of this public–private risk-sharing structure (EBRD, 2025).

A separate institutional mechanism has emerged in maritime insurance. The Unity facility, arranged with the participation of the Government of Ukraine, Marsh McLennan, Ukrainian state-owned banks, the Ukrainian Export Credit Agency and underwriters operating in the Lloyd's market, initially provided affordable war-risk insurance for grain and other food exports from Ukrainian Black Sea ports. It was subsequently extended to ocean-going vessels carrying other categories of non-military cargo, including steel, iron ore, electrical equipment and containerised goods (Marsh McLennan, 2023; 2024).

The facility offers up to USD 50 million of hull and separate protection and indemnity war-risk coverage. Standby letters of credit issued by Ukreximbank and Ukrgasbank and confirmed by DZ Bank form a first-loss layer supported by the Government of Ukraine. State participation reduces the exposure retained by private underwriters and facilitates the provision of insurance at premiums lower than those available through conventional commercial arrangements.

Unlike MIGA or DFC-supported mechanisms, the Unity facility does not directly protect the capital invested in a manufacturing or energy facility. Its economic function is to preserve the continuity of maritime trade and reduce the operational risks faced by exporters, shipowners and charterers. This function remains relevant to FDI because the commercial viability of a productive asset depends on continued access to foreign suppliers and buyers. Maritime war-risk insurance may therefore complement direct investment protection by reducing the probability that productive assets become commercially stranded as a result of disrupted logistics.

Export credit agencies constitute another component of the emerging architecture. According to the National Bank of Ukraine, foreign ECAs had provided more than EUR 1 billion in aggregate support for foreign investment and related transactions in Ukraine by October 2025. Depending on their mandate, ECAs may insure investments, loans, equipment supplies and contractor exposures where a transaction serves the national economic interests of the guarantor state.

The scale of ECA support may be substantial, but access is commonly linked to the participation of companies, lenders or exporters from a particular partner country. The Ukrainian Export Credit Agency may insure direct investments and investment loans associated with the

establishment or modernisation of processing facilities producing goods for export. The coverage limit under one contract amounted to UAH 200 million (National Bank of Ukraine, 2025). Unlike general property insurance, this mechanism connects risk protection with structural transformation and export capacity. Its use remains limited by the export orientation of the project, the statutory mandate of the Agency and its available financial capacity.

Table 1

International mechanisms of war-risk coverage available in Ukraine

Institution or mechanism	Principal object of coverage	Reported financial capacity and limit	Principal conditions and institutional characteristics
MIGA	Foreign investments in Ukraine	More than USD 30 million; approximately USD 9.2 million per contract in the NBU mapping	Individually negotiated guarantees; foreign investor and project-level due diligence
DFC with Aon	Static property and transport assets	More than USD 250 million; up to USD 2.5 million per object	Reinsurance through eligible Ukrainian insurers; transparent ownership and audited reporting
EBRD with Aon	Inland cargo, motor vehicles and railway rolling stock	EUR 200 million of cargo coverage reported by the NBU; EBRD guarantee of up to EUR 110 million	Ukrainian primary insurers, international reinsurers and multilateral guarantee capacity
Lloyd's insurers with Marsh McLennan	Ships and non-military cargo transported through Ukrainian maritime corridors	Up to USD 50 million of hull and separate P&I coverage	Public–private first-loss structure; Ukrainian banks and government support
Foreign ECAs	Foreign investments, investment loans, equipment and contractor exposures	More than EUR 1 billion in aggregate	Connection with exporters, investors or lenders from the respective guarantor state
Ukrainian ECA	Direct investments and investment loans in export-oriented processing	Up to UAH 200 million per contract	Investment must support production of goods intended for export

Source: compiled by the author based on National Bank of Ukraine (2025), DFC (2024), EBRD (2024), MIGA (2023), and Marsh McLennan (2023; 2024).

Despite Despite the development of international mechanisms, the capacity of the Ukrainian insurance market remains limited. As of October 2025, war-risk coverage was provided only by individual companies among the 60 insurers operating in Ukraine. The principal constraints include the high probability and potential severity of losses, insufficient capitalisation of domestic insurers and limited access to international reinsurance. More than 77,000 contracts containing elements of war-risk coverage were concluded during 2022–2025. However, the structure of this portfolio indicates that market adaptation has concentrated primarily on standardised and comparatively low-value assets, particularly motor vehicles and selected categories of movable and immovable property (National Bank of Ukraine, 2025).

The approximate coverage limit offered directly by Ukrainian insurers amounted to UAH 10

million per object or insured event. A bank-linked programme involving Raiffeisen Bank, ARX, Universalna, INGO and Aon provided a limit of UAH 20 million per object or contract. Such instruments may protect individual units of equipment, inventories or relatively small business facilities and may facilitate lending by preserving the value of pledged property. Their capacity remains insufficient, however, to cover the replacement value of large industrial or energy assets.

The most consequential restriction concerns the eligibility of insured objects. Commercial products offered by the Ukrainian insurance market generally exclude assets located in areas of active hostilities and impose strict requirements intended to prevent excessive geographical accumulation of exposure. The exclusions identified by the National Bank of Ukraine also include objects classified as critical infrastructure. This creates a structural mismatch between the sectors in which protection is most necessary and those in which commercial coverage is practically available. Large energy facilities are capital-intensive, fixed in particular locations, systemically important and exposed to the possibility of repeated attacks, making their risks difficult to diversify within the capacity of private insurers.

The positive analysis therefore demonstrates that the existing architecture does not provide universal protection for capital investment in Ukraine. Many locally available products are more compatible with small and medium-sized projects, standardised contracts and relatively limited maximum losses per insured event than with large centralised infrastructure facilities. This observation provides the basis for adjusting the approach to attracting FDI into Ukraine's energy sector. Alongside the restoration of large strategic assets, investment policy should prioritise portfolios of small and medium-sized decentralised energy projects whose financial and risk characteristics correspond more closely to the actual capacity of insurance and guarantee mechanisms.

The proposed reorientation does not imply that decentralised energy assets are free from war risks or automatically fall outside the legal category of critical infrastructure. Their eligibility must be assessed according to their function, location and formal regulatory status. Nevertheless, decentralised projects possess several characteristics that make their risks more compatible with the existing institutional capacity. The value of an individual unit is lower, assets can be distributed among several locations, damaged equipment may be replaced modularly, and the destruction of one installation does not necessarily interrupt the operation of the entire energy system.

This logic is applicable to cogeneration units, modular gas-engine generation, small renewable-energy installations combined with storage, and local biomass or biogas facilities serving municipalities, hospitals, industrial enterprises and district-heating systems. Instead of concentrating capital in one large and indivisible asset, an investor may form a portfolio of smaller and technically standardised installations. Geographical and technological diversification would cap the maximum probable loss associated with a single event and make it more feasible to align the insured value of each unit with the limits available under existing risk-coverage mechanisms.

At the asset level, the proposed portfolio may comprise several technically distinct but institutionally comparable project categories. High-efficiency cogeneration units can provide electricity and heat to hospitals, municipal utilities, district-heating systems and industrial consumers. Modular gas-engine or turbine units may supply reserve or balancing capacity, while renewable-energy installations combined with battery storage can support local consumption, reduce dependence on a single external connection and facilitate the integration of variable generation. Biomass and biogas facilities may additionally connect local energy production with agricultural and municipal waste-management systems. In each case, the relevant unit for insurance purposes should be an individually replaceable installation rather than the entire municipal or regional energy system.

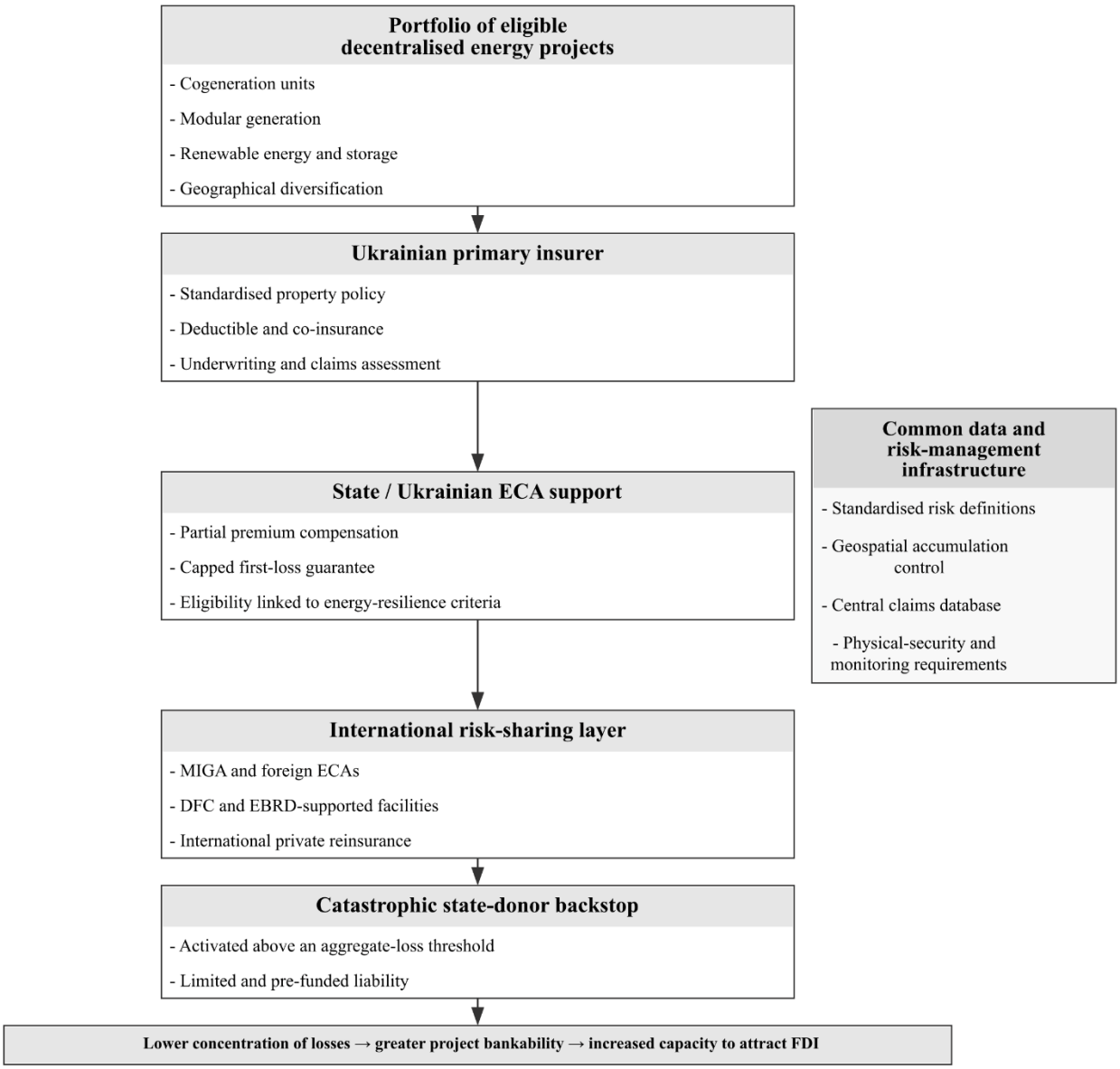
The composition of the portfolio should nevertheless reflect both insurance criteria and the requirements of prospective financiers. Relevant underwriting variables include the replacement value and location of each unit, the geographical distance between insured assets, physical protection, remote monitoring, access to spare parts, expected replacement time, redundancy and the ability to operate independently from the main network. International-finance eligibility may

introduce additional environmental and social requirements. In particular, gas-based generation may strengthen short-term energy resilience but will require project-specific assessment of its efficiency, emissions profile and consistency with the applicable EU and international-financial-institution criteria. Renewable generation, storage, high-efficiency cogeneration and projects producing measurable local resilience effects may be more readily combined with the green and blended-finance instruments available under the European reconstruction architecture (Riabchyn and Oriekhova, 2025; Namoniuk, 2026).

The institutional arrangement for such projects should also be developed on a portfolio basis. Grouping technically comparable projects within a single programme would allow risks to be diversified across locations and operators while reducing the cost of underwriting, due diligence and transaction structuring. Standardised contracts and eligibility requirements could create a scalable project pipeline rather than a succession of individually negotiated transactions. A hybrid approach would combine the local market's knowledge of Ukrainian assets and operators with the greater financial capacity of international institutions and reinsurers.

Figure 1

Proposed hybrid model of war-risk coverage for decentralised energy projects in Ukraine



Source: developed by the author

The proposed model contains four risk-sharing layers. The first layer consists of a standardised property insurance policy issued by an eligible Ukrainian insurer. The investor or project operator retains part of the exposure through a deductible and, where appropriate, co-insurance. The Ukrainian insurer performs the primary underwriting, policy-administration and claims-assessment functions.

The second layer consists of targeted state support administered through the Ukrainian Export Credit Agency or another authorised institution. Such support may take the form of partial premium compensation or a capped first-loss guarantee. It should not provide unlimited compensation, as the investor, operator and insurer must retain incentives to apply adequate physical-protection, cybersecurity, redundancy and emergency-response measures.

The third layer comprises international guarantees and reinsurance provided through MIGA, DFC, the EBRD, foreign export credit agencies and private international reinsurers. These institutions would not necessarily insure each project directly. Their role would be to absorb predefined layers of losses exceeding the retention capacity of Ukrainian insurers and the state-supported first-loss mechanism.

The fourth layer is a catastrophic state–donor backstop. It would be activated only when aggregate losses exceed a predetermined threshold and would be financed through donor contributions, a dedicated reserve or another pre-funded arrangement. Separating this catastrophic layer from ordinary insurance and first-loss support would limit the open-ended fiscal liability of the state while protecting the system against the accumulation of exceptionally severe losses.

The model therefore distributes exposure among the institutions most capable of managing each category of risk. Investors and project operators retain a limited share through deductibles and co-insurance; Ukrainian insurers provide market access, underwriting and claims management; the state addresses the initial gap between commercial supply and socially important demand; and international institutions and reinsurers supply capacity for larger and accumulated losses. The catastrophic state–donor backstop remains a separate final layer rather than an obligation imposed on conventional private insurers.

State participation should be targeted rather than universal. Premium subsidies and first-loss support may be restricted to projects that make a measurable contribution to local energy resilience. The amount of support could depend on the geographical risk category, the share of private capital, the degree of technical standardisation and the ability of the installation to provide electricity or heat during disruptions of the centralised system. Deductibles and co-insurance should be retained to ensure that beneficiaries continue investing in protective structures, cybersecurity, reserve capacity and emergency-response planning.

The development of a niche insurance programme would also require a unified methodology for assessing decentralised energy risks. This methodology should include standard definitions of insured events, uniform approaches to asset valuation, geographical accumulation limits, minimum physical-security and remote-monitoring requirements and procedures for rapid claims verification. A centralised database of insured locations and losses would allow insurers and reinsurers to monitor excessive concentration and gradually develop the actuarial information currently missing from the market. The National Bank of Ukraine identifies the absence of reliable data, insufficient market capacity and the need for niche products, hybrid arrangements and the adaptation of international experience among the principal directions for cooperation (National Bank of Ukraine, 2025).

International experience should not be transferred to Ukraine through the mechanical replication of a single model. The options examined by the National Bank of Ukraine include a state compensation mechanism; a dedicated fund financed through targeted payments, following the Israeli approach; a specialised second-level reinsurer comparable to the French model; and arrangements used in South Africa, Spain and New Zealand in which private insurers distribute standardised coverage as agents while a separate institution bears the underlying war-risk exposure.

A combination of these elements appears more appropriate for Ukraine. During active hostilities, the immediate priorities should be partial premium compensation, a capped first-loss facility and the use of Ukrainian insurers as underwriting and distribution agents. As the security

situation improves and international reinsurance becomes more accessible, the system may gradually shift towards a specialised reinsurance mechanism that centrally places accumulated Ukrainian war risks on international markets. The model should therefore be transitional and capable of adapting to changing security conditions rather than becoming permanently fixed as either a fully state-controlled or a purely private arrangement.

The proposed approach can also be interpreted through the distinction between modular and relational governance discussed by Namoniuk and Maliuha (2026). Their analysis does not directly prescribe a model for war-risk insurance; however, it provides a useful conceptual basis for the present study. Standardisation and portfolio formation introduce modularity at the project level, making individual installations easier to replicate, replace and finance. At the same time, the sustained participation of insurers, foreign investors, equipment suppliers, municipalities, the state and international financial institutions creates the relational governance required for joint investment, information exchange and the long-term development of institutional capacity.

The attraction of FDI should also be connected not only with the import of equipment but with the deeper integration of Ukrainian firms into international production networks. Shnyrkov and Chugaiev (2017) emphasise the importance of foreign investment and institutional convergence for Ukraine's participation in cross-border production. A portfolio-based programme for decentralised energy may therefore combine capital protection with technology transfer, local maintenance, component manufacturing and long-term cooperation between Ukrainian enterprises and foreign suppliers.

Accordingly, the normative objective of Ukraine's insurance and investment policy should not be the complete elimination of war risk, which remains impossible while hostilities continue. The objective should be to transform this risk into a layered and contractually manageable exposure distributed among projects, investors, insurers, the state and international institutions. The combination of project standardisation, portfolio diversification, domestic underwriting, targeted state participation and international reinsurance may expand the range of energy investments that satisfy the risk requirements of foreign investors. Institutional mechanisms of war-risk coverage should therefore be understood not only as instruments for compensating losses but also as determinants of the scale, structure and sectoral direction of FDI in Ukraine's reconstruction.

Conclusions. The analysis demonstrates that war-risk insurance has become an integral part of Ukraine's investment environment rather than a narrowly specialised financial service. Under conditions of continuing hostilities, the risk of physical destruction, operational interruption and loss of access to infrastructure cannot be adequately addressed through conventional investment diversification or contractual safeguards alone. The availability of guarantees, insurance and reinsurance consequently affects not only the compensation of losses after an insured event but also the initial feasibility, financing structure and geographical allocation of foreign direct investment.

The principal findings of the article can be summarised in four propositions. First, the existing architecture of war-risk coverage in Ukraine is institutionally diverse but fragmented. MIGA, DFC, the EBRD, foreign export credit agencies, Lloyd's market participants, Ukrainian insurers and commercial banks perform different and complementary functions. Some mechanisms protect foreign investment against political violence and other non-commercial risks; others restore reinsurance capacity, support transport and export operations or protect collateral within bank-financed projects. The presence of several instruments therefore does not amount to universal coverage, since each mechanism remains restricted by its mandate, eligibility requirements, geographical scope and financial limits.

Second, the positive analysis reveals a persistent mismatch between the structure of available insurance capacity and the structure of Ukraine's reconstruction needs. The international mechanisms considered in the article have expanded the range of insurable transactions and demonstrated that public guarantees can mobilise private underwriting and reinsurance. Nevertheless, their per-project and per-object limits remain considerably lower than the replacement cost of large industrial and energy facilities. The domestic market faces even stronger constraints arising from limited capitalisation, insufficient reinsurance capacity and the high concentration of

potential wartime losses. The exclusion of critical infrastructure from many locally available insurance products intensifies this mismatch: the assets most important for the functioning of the economy are also among the assets least compatible with conventional commercial underwriting.

Third, these limitations provide an economic rationale for supplementing investment in large strategic infrastructure with portfolios of small and medium-sized decentralised energy projects. Decentralisation does not eliminate war risk, nor does it automatically remove energy assets from the legal category of critical infrastructure. However, it changes the financial and spatial configuration of exposure. Smaller units require less capital per installation, can be geographically and technologically diversified, may be replaced modularly and reduce the probability that the loss of one asset will interrupt the operation of the entire system. Cogeneration units, modular gas-engine facilities, renewable-energy installations combined with storage and local biomass or biogas projects may therefore correspond more closely to the limits and risk-distribution capacity of the emerging insurance architecture.

Fourth, the study proposes that war-risk coverage for decentralised energy should be organised through a portfolio-based hybrid model rather than through the isolated insurance of individual projects. The model combines four risk-sharing layers: primary underwriting by Ukrainian insurers; targeted state support through premium compensation or a capped first-loss facility; international guarantees and reinsurance; and a catastrophic state–donor backstop activated only when aggregate losses exceed a predetermined threshold. Such an arrangement does not seek to transfer all risk to the state or international partners. Instead, it allocates different layers of exposure to the institutions most capable of managing them, while retaining deductibles, co-insurance and eligibility requirements to preserve incentives for physical protection, cybersecurity, redundancy and responsible project management.

The proposed model also has broader implications for the attraction of FDI. Standardisation and portfolio formation can reduce due-diligence and transaction costs, facilitate the participation of commercial banks and international financial institutions and create a scalable pipeline of investment projects. At the same time, sustained cooperation among Ukrainian insurers, municipalities, foreign investors, equipment suppliers, the state and international partners can support not only capital protection but also technology transfer, local maintenance, component manufacturing and the integration of Ukrainian enterprises into international production networks. War-risk coverage should therefore be regarded not merely as a compensatory mechanism but as an institutional instrument capable of influencing the scale, structure and sectoral direction of foreign investment.

Although the proposed model is calibrated to the characteristics of decentralised energy, its institutional logic is not limited to the energy sector. It may be adapted to portfolios of geographically dispersed and individually replaceable assets in municipal water and heat supply, healthcare, food processing, agricultural infrastructure, logistics, communications and emergency-response systems. The conditions for such scaling include the possibility of standardising project requirements, limiting the maximum loss per individual asset, establishing measurable public or economic benefits and creating a portfolio sufficiently diversified to prevent excessive accumulation of exposure. The model therefore addresses a broader practical problem: the mobilisation of private capital for socially important projects that remain too risky for conventional insurance but do not require the full risk to be assumed by the state. This intersectoral potential corresponds to the broader transition towards innovative financing, public–private cooperation and insurance-supported risk sharing identified by Bulatova and Vyshniakov (2026).

The proposed approach has several limitations. The available insurance data remain incomplete, the market is evolving rapidly and the financial limits and eligibility conditions of individual programmes may change together with the security environment and the participation of donor institutions. The article also does not provide an actuarial estimation of premiums, expected losses or the fiscal cost of the proposed state-supported layers. Moreover, the practical insurability of a particular decentralised energy asset will depend on its location, legal status, technical characteristics and possible classification as critical infrastructure.

Further research should focus on the empirical and actuarial calibration of the proposed model. This includes estimating probable maximum losses for different categories of decentralised energy assets, determining appropriate deductibles and first-loss thresholds, assessing replacement periods and spare-equipment requirements, and examining the influence of geographical and technological diversification on portfolio losses. A comparative analysis of the Israeli, French, Spanish, South African, New Zealand and other national war-risk arrangements would provide an additional basis for selecting the appropriate institutional structure for Ukraine. Further studies should also test the scalability of the model in healthcare, municipal infrastructure, logistics, agriculture and emergency-response systems. These directions would make it possible to move from the conceptual model developed in this article towards operational sectoral and cross-sectoral mechanisms for attracting foreign direct investment under conditions of exceptional risk.

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