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INSTITUTIONAL DESIGN OF INVESTMENT SECURITY IN CONDITIONS OF GLOBAL INSTABILITY

ABSTRACT

The aim of the article is to develop a comprehensive framework for adaptive investment security systems that can maintain national economic stability and resilience amid persistent global turbulence, geopolitical fragmentation, and technological disruption.

For the first time, investment security is reconceptualized as a systemic and adaptive capacity for proactive self-regulation, enabling national economies to maintain functional stability, continuity, and investment attractiveness under severe and prolonged external shocks. This approach expands the classical interpretation of investment security by incorporating resilience-oriented and adaptive governance principles. The study further develops the understanding of the institutional environment as a dual-layered construct that combines formal rules, such as legislation, investment screening mechanisms, and arbitration frameworks, with informal constraints, including business norms, reputational capital, and trust-based networks. Their synergistic interaction reduces transaction costs related to information asymmetry, property rights enforcement, and regulatory compliance, forming an "institutional harbor" that stabilizes investment flows during crisis periods.

The article proposes an improved adaptive institutional design that integrates advanced digital and analytical tools, including blockchain-based decentralized asset verification, smart contracts as self-executing legal norms, and digital identification systems for dynamic investor profiling. The novelty of this approach lies in embedding scenario-based stress testing and algorithmic regulatory mechanisms into institutional governance, thereby enhancing systemic resilience, transparency, and investor confidence under exogenous shocks.

A network-type corporate security model is further developed, demonstrating how structured input-output information flows can be managed to prevent systemic overloads and maintain operational continuity. The research substantiates the effectiveness of multi-level governance strategies, such as polycentric decision-making, asymmetric responsibility distribution, and multilateral institutional engagement, in increasing institutional flexibility and responsiveness. It is proven that the foundation of future investment security lies in the transition to adaptive regulation that combines technological transparency with high legal plasticity, forming the basis of "institutional immunity" against global instability.

Keywords: institutional design, investment security, global instability, transaction costs, blockchain technologies, investment screening, adaptive regulation, geopolitical risk

JEL Classification: E22, F21, F52, G18, O17

INTRODUCTION

Today, the global economy stands at a profound turning point. The established rules that ensured investment stability for decades are no longer effective. We have grown accustomed to an era of "great moderation", characterized by relatively free capital flows and predictable risks. That order, however, has now been definitively replaced by

an architecture of global instability. Geopolitical conflicts, sanctions-driven confrontations, and rapid technological transformations have given rise to a new reality – a state of “perma-crisis”, in which security increasingly takes precedence over profit.

Under these conditions, traditional mechanisms of investor protection have proven inadequate. When financial systems become instruments of political pressure, conventional legal frameworks and international agreements often fail to provide reliable safeguards. Asset freezes and disruptions in global supply chains have demonstrated that existing institutional protections no longer guarantee security. This necessitates a fundamental shift in approach – from reactive crisis management to proactive institutional design. What is required are not static legal norms, but dynamic systems capable of adapting autonomously to emerging challenges. The objective is to develop a regulatory model that not only withstands external shocks but also possesses an inherent “immunity” to them.

The relevance of this study lies in its exploration of new instruments – from digital registries to flexible legal regimes – that can sustain the attractiveness of the national economy. The task is to design a system in which the rules of the game remain transparent to investors, while the protection of assets is ensured automatically, irrespective of external conflicts.

LITERATURE REVIEW

The issue of institutional support for investment security in the context of increasing global turbulence has become particularly relevant due to the intensification of geopolitical risks, technological disruptions, and shifts in the logic of capital flows. In contemporary research, investment security is increasingly examined through the lens of institutional design, adaptive regulation, and digital mechanisms aimed at minimizing transaction costs.

A substantial part of scientific research focuses on analyzing the factors that influence capital risk and the stability of financial systems. In particular, Bai et al. (2021) propose the application of survival models and gradient boosting algorithms to improve the accuracy of credit risk assessment and default probability forecasting, thereby providing a foundation for institutional mechanisms of prediction and preventive response in the financial sector.

Similarly, Medina-Olivares et al. (2023) demonstrate the effectiveness of combined models in the analysis of long-term risks, enabling enhanced investment stability through improved screening and monitoring mechanisms.

Kramarenko et al. (2019) examine how effectively a nation leverages its investment potential to stimulate economic growth. They highlight the critical role of strategic investment allocation in enhancing macroeconomic performance and sustaining long-term development. Their findings underscore the interplay between investment efficiency and the overall dynamism of the national economy.

The impact of structural transformations in the real sector on economic stability is addressed in the work of Giray & Ömür (2022), who establish a relationship between fixed capital investment dynamics and changes in employment and GDP.

Billio et al. (2019) further show how asset characteristics, particularly energy efficiency, affect the risk profiles of loan portfolios, which is directly relevant to the development of institutional models for assessing the stability of collateral instruments. A number of studies emphasize the transformative role of digital technologies in shaping investment policy and security mechanisms. Boratyńska (2019) highlights the role of digital platforms in generating new value within the fintech sector, while Melnyk et al. (2019) analyze disruptive technologies as drivers of the transition toward more resilient digital economies.

Parasii-Verhunen et al. (2024) demonstrate how analytical procedures embedded within anti-corruption audit systems enhance enterprise-level economic security by improving the early detection of financial distortions, compliance risks, and governance failures. Their findings are directly relevant to institutional investment security, as they highlight the role of systematic diagnostics and data-driven controls in reducing informational asymmetries and strengthening investor confidence. Complementing this perspective, Tiutiunyk et al. (2022) analyze the complex causal relationships between foreign direct investment and the shadow economy, revealing that institutional quality and transparency decisively shape both investment inflows and informal economic activity. Together, these studies underscore that effective investment security frameworks depend not only on formal regulatory instruments but also on advanced analytical mechanisms and institutional transparency, which mitigate systemic risk and support the resilience of investment processes under conditions of economic uncertainty.

In this context, the paper of Mia et al. (2022) is particularly noteworthy, as it underscores the importance of complex models that capture the interaction of factors within socio-economic systems capable of adapting to instability.

An additional dimension concerns the institutional quality of the environment underpinning the sustainability of investment processes. Earlier contributions, such as Lim (2014), provide foundational insights into the structural and institutional determinants of investment at the global level, demonstrating that macroeconomic stability, institutional quality, and financial development jointly shape investment dynamics. These findings reinforce the argument that investment security is inherently multidimensional, encompassing legal, economic, and institutional dimensions. Hutorov et al. (2020) consider inclusive development as a foundation of economic resilience.

An important strand of contemporary research further deepens the understanding of investment security by emphasizing the role of institutional quality as a fundamental determinant of investment attractiveness and resilience. In particular, recent empirical studies provide robust evidence that institutional environments not only influence the volume of capital inflows but also determine their stability and structural composition.

For instance, H. Khan et al. (2024) demonstrate, using global panel data and advanced econometric techniques, that improvements in governance indicators, such as regulatory quality, rule of law, and control of corruption, significantly enhance foreign direct investment (FDI) inflows. Their findings suggest that institutional quality acts as a risk-reducing mechanism, reinforcing investor confidence under conditions of global uncertainty. This conclusion is consistent with the earlier cross-country evidence provided by Sabir et al. (2019), who identify institutional stability as a key determinant of both the scale and sustainability of FDI across developed and developing economies.

The heterogeneity of institutional effects is further explored by Gökçeli (2023), who shows that the impact of institutional quality varies across OECD countries depending on their level of economic development and structural characteristics. Notably, the study reveals that institutional improvements yield stronger marginal effects in less institutionally developed economies, highlighting the importance of convergence processes and institutional upgrading.

Similarly, Dorożyński et al. (2019), focusing on Central and Eastern European countries, confirm that institutional quality plays a decisive role in attracting investment flows, particularly in transitional economies where institutional frameworks are still evolving. This finding is especially relevant for countries integrating into broader economic systems, such as the European Union.

From a theoretical perspective, Jung (2020) provides a conceptual framework linking institutional quality, FDI, and productivity growth. The author argues that strong institutions facilitate efficient resource allocation and technological diffusion, thereby amplifying the positive spillover effects of foreign investment. This perspective extends the understanding of investment security beyond risk mitigation toward long-term economic efficiency and structural transformation.

In addition to influencing the volume of investment, institutional quality also shapes the qualitative characteristics of capital flows. Tan et al. (2023) introduces the concept of asset specificity, demonstrating that higher institutional quality attracts more complex and knowledge-intensive forms of FDI. This implies that secure institutional environments are essential not only for protecting investments but also for fostering innovation-driven economic development.

Recent methodological advancements further highlight the nonlinear and heterogeneous nature of institutional effects. Chinh and Dat (2026), applying a novel quantile regression approach, show that the influence of institutional quality varies across different levels of investment distribution. Their findings indicate that institutional improvements have a particularly strong impact at higher quantiles of FDI inflows, suggesting that high-value investments are more sensitive to institutional conditions.

The broader macroeconomic and governance context of investment security is addressed in the work of Ivančík and Dušek (2026), who analyze the transformation of European Union economic governance in response to increasing geopolitical and economic instability. Their study underscores the growing importance of economic security as a policy paradigm, integrating investment protection, industrial policy, and strategic resilience. This aligns with the policy-oriented perspective of the OECD (2024), which emphasizes the emergence of investment screening mechanisms and national security considerations as integral components of institutional design in a changing global environment.

So, the integration of these studies into the existing body of literature confirms that institutional quality constitutes a central pillar of investment security in conditions of global instability. The evidence suggests that effective institutional design should incorporate: strong legal frameworks ensuring property rights and contract enforcement; transparent and accountable governance systems; adaptive regulatory mechanisms capable of responding to external shocks; strategic policies aimed at balancing openness to investment with national security considerations. The contemporary research increasingly conceptualizes investment security not merely as protection against risks, but as a dynamic institutional system that enhances resilience, supports sustainable development, and facilitates the efficient allocation of global capital in an uncertain and rapidly evolving economic environment.

Particular attention is paid to the behavioral and organizational dimensions of institutional design, which shape the internal stability and adaptability of economic agents. In this context, both informal institutional mechanisms and sector-specific structures play a critical role in ensuring investment security. Grynko et al. (2017) emphasize the role of intangible incentives and motivational frameworks in shaping behavioral institutions that influence corporate stability. Research examining the banking sector as a key component of investment infrastructure is also of considerable importance for institutional design.

Kirchner et al. (2020) and Repko (2019) provide detailed analyses of the transformation of banking systems under the influence of crisis phenomena and legal instability, highlighting the importance of transparency and effective financial monitoring.

Ramskyi et al. (2017) stress the significance of harmonizing Ukraine's regulatory frameworks with European standards as a prerequisite for ensuring the institutional stability of financial markets.

Another important area of contemporary research is the analysis of investment risks in an international context. Rafat & Farahani (2019) identify country risk as a key determinant of foreign direct investment flows, arguing that institutional weaknesses significantly increase barriers for investors. Their conclusions are consistent with those of Yereshko et al. (2022), who emphasize the structural interdependence of financial, environmental, and economic sustainability within the framework of sustainable development.

A distinct strand of the literature focuses on the role of digital and analytical tools in the financial sector. Roza et al. (2023) examine the impact of behavioral digital traces on credit risk modeling, highlighting the growing importance of algorithmic solutions in financial security systems.

Serhiienko O. et al. (2024) further emphasize the role of instrumental modeling in bank investment policy, particularly the use of digital optimization and analytical methods to support institutional resilience. Some studies also address the environmental and social dimensions of investment security.

Sumet et al. (2022) develop a model for environmental risk management in agroholdings based on the principles of sustainable development, illustrating the integration of environmental considerations into the broader system of institutional risk management.

The literature analysis indicates that contemporary scientific discourse is evolving toward a synthesis of institutional, behavioral, and digital approaches. Most scholars concur that ensuring investment security in an era of global shocks requires a combination of: a flexible institutional framework; algorithmic risk monitoring mechanisms; digital verification and control technologies; transparent systems for managing information flows. The reviewed literature confirms that the institutional design of investment security should be grounded in dynamic, adaptive models and supported by a digital infrastructure capable of reducing transaction costs while ensuring the resilience of the economic system under conditions of global instability.

Research Gaps

The problem of institutional stability and the security of investment processes has been a central concern of leading representatives of economic thought over recent decades. The foundational principles of institutionalism, as developed in the work of North (1986), make it possible to conceptualize investment security not as a merely technical parameter, but as the outcome of an effective configuration of formal and informal institutions. The research demonstrates that the quality of the institutional environment directly influences the level of transaction costs, which is of critical importance for capital under conditions of risk.

The issue of economic security in the context of globalization has been extensively examined by both international and domestic scholars. However, despite the substantial body of existing research, most prevailing concepts were developed during a period of relative market liberalization. Today, the global economy is confronted with an unprecedented phenomenon – a profound transformation of security instruments amid geopolitical fragmentation and technological disruption.

Notwithstanding the depth of the theoretical foundation, a key contradiction remains unresolved: classical institutional models of investment protection were designed for a stable and predictable environment. Under contemporary conditions, existing mechanisms, such as international treaties, arbitration systems, and bilateral guarantees, often prove to be inert or even ineffective. This gives rise to an acute scientific and practical challenge: how to design a system of investment security that is sufficiently robust to neutralize threats (such as hostile takeovers or capital flight), while simultaneously remaining flexible and attractive to bona fide investors.

The lack of a comprehensive methodology for adaptive institutional design –one that integrates legal instruments with the capabilities of modern digital verification technologies – constitutes a significant gap in economic science. It is the need to develop a toolkit for creating the “institutional immunity” of the national economy under conditions of structural instability in the global system that has determined the focus of this study.

AIMS AND OBJECTIVES

The aim of this research is to develop a comprehensive framework for adaptive investment security systems that can maintain national economic stability and resilience amid persistent global turbulence, geopolitical fragmentation, and technological disruption. Objectives of the research:

1. To reconceptualize investment security as a dynamic systemic capacity for proactive self-regulation rather than a static state.
2. To analyze the evolving architecture of global economic instability, identifying key determinants such as geopolitical risks, technological transformations, and multi-crisis interactions.
3. To examine the role of formal institutions (legislation, investment screening, arbitration mechanisms) and informal constraints (business practices, trust, reputational mechanisms) in reducing transaction costs and enhancing investment stability.
4. To investigate digital and analytical tools – including blockchain, smart contracts, digital IDs, and algorithmic regulatory mechanisms for ensuring transparency and real-time risk management in investment security systems.
5. To design a network-type corporate security model that integrates information flows, logistics, and institutional interactions to sustain operational continuity under turbulence.
6. To propose multi-level and polycentric governance strategies that enhance the flexibility, coordination, and resilience of investment security systems.
7. To develop a post-crisis institutional design framework that embeds “institutional immunity” within the national economy, ensuring predictable, transparent, and sustainable investment processes.

METHODS

Our research is based on the confirmation of the following hypotheses:

- *Hypothesis 1.* Investment security in conditions of global turbulence is not a static state but a dynamic systemic capacity, and economies that implement adaptive institutional frameworks demonstrate higher resilience to exogenous shocks and greater stability of investment flows.
- *Hypothesis 2.* The effectiveness of investment security systems is directly dependent on the coherence and synergy between formal institutions (legal and regulatory mechanisms) and informal constraints (trust, business practices, and reputational factors), resulting in a significant reduction of transaction costs.
- *Hypothesis 3.* The integration of digital technologies (such as blockchain, smart contracts, and digital identification systems) into institutional design significantly enhances transparency, risk monitoring, and the overall efficiency of investment security systems in the context of geopolitical and technological uncertainty.

The methodological basis of the article is the fundamental principles of modern economic theory, in particular neo-institutionalism, systems theory, and the concept of strategic management. To achieve the goal and solve the research tasks, a complex of general scientific and special research methods was used in the paper, which allowed us to ensure the objectivity and reliability of the results obtained.

The following methods were used in the research process:

1. The method of dialectical cognition and systemic approach to study the genesis of investment security and its transformation from a static state into a dynamic property of the economic system. This method allowed us to consider the institutional structure as a holistic organism that constantly interacts with the external aggressive environment.

2. Institutional analysis has become a basic tool for studying the interaction of formal rules (legislation) and informal constraints (business practices, level of trust). It is this method that has made it possible to identify “institutional traps” and regulatory gaps that arise in conditions of global turbulence.
3. Comparative analysis method – used when comparing conservative and adaptive models of investment regulation, as well as to study international experience in implementing investment screening systems.
4. The scenario modeling and forecasting method was used to develop promising vectors for the transformation of the security architecture in the post-crisis period, which allowed taking into account the variability of the development of the geopolitical situation.
5. Economic and statistical methods (grouping, comparison, and graphical analysis) served as the basis for interpreting empirical data on the movement of foreign direct investment and global risk indices in 2024-2026.

The information base of the study consists of official data from international organizations (UNCTAD, the World Bank, and the IMF), regulatory legal acts of Ukraine and EU member states, analytical reports from leading consulting agencies, as well as the results of the author’s own observations concerning the transformation of the global investment landscape. The scientific logic of the study is grounded in the principle of “from the analysis of destructive factors to the design of protective mechanisms.” This approach makes it possible not only to identify the structural problems inherent in the architecture of global instability but also to propose a concrete toolkit for modeling resilient institutional systems based on digitalization and transparency.

RESULTS

Traditional approaches to the interpretation of investment security, which dominated economic thought in recent decades, have generally been reduced to a static perspective, namely, the creation of a fixed state that protects the interests of investors and the state from external and internal threats. However, the modern architecture of global markets, characterized by a high degree of entropy and frequent “black swan” events, renders such a descriptive approach not only outdated but potentially dangerous.

In our view, investment security should not be understood as a constant or an end state, but rather as the dynamic capacity of a system for proactive self-regulation. Under conditions of global turbulence, security is defined by the ability of the institutional environment to maintain functional stability and a consistent development trajectory, even in the face of severe external shocks.

The shift from statics to dynamics necessitates a fundamental rethinking of the nature of protective mechanisms. Whereas earlier approaches emphasized the rigidity of regulatory barriers, the current priority lies in institutional flexibility. In the context of investment security, self-regulation implies the existence of built-in “safeguards” that are automatically activated when critical thresholds, such as capital volatility or political risk, are exceeded.

We are dealing with a living ecosystem in which each institution is not merely a formal entity, but an active component that minimizes transaction costs. Under conditions of uncertainty, the costs of information search, negotiation, and the specification of property rights increase exponentially. Therefore, the task of institutional design is to create a configuration of formal rules (laws and regulations) and informal constraints (business practices, market ethics, and trust levels) capable of absorbing these costs and preventing them from disrupting investment cycles. A key issue observed in both Ukrainian and global practice is the gap between formal legal frameworks and actual practices.

We argue that the effectiveness of a security system’s design depends on the coherence between these two levels.

1. Formal rules establish a rigid framework, including mechanisms such as the right to veto strategic investments from aggressor states, protections for minority shareholders, and transparency in financial monitoring.
2. Informal constraints serve as a lubricant within this system. During crises, when formal norms cannot adapt quickly enough, such as during sharp currency devaluation or armed conflict, it is informal institutions, including reputational capital and established patterns of interaction between business and government, that prevent panic-driven capital flight.

Thus, the methodology of institutional design in an era of turbulence should be grounded in the principle of resilience. The system should not merely withstand shocks but should utilize the energy of crises for transformation. Rather than constructing rigid “bunkers” that will eventually fail, the goal is to design flexible, intelligent networks capable of redistributing risks in real time. This reflects a transition from reactive management to preventive institutional design.

In this context, treating institutions solely as regulatory frameworks constitutes a methodological error. Global instability demonstrates that, at critical moments, the “letter of the law” often yields to actual practices of interaction. Institutions should therefore be conceptualized as complex, two-level systems composed of formal rules and informal constraints, whose synergy is directed toward minimizing transaction costs under conditions of radical uncertainty.

Formal institutions within the investment security system include constitutional provisions, legislation, legal investment regimes, and international agreements. In turbulent conditions, their role is to create a “zone of predictability” for capital. However, simply replicating Western regulatory models does not guarantee security unless they are adapted to local risks. We propose viewing formal rules as filters. During periods of global instability, they should perform an investment selection function. This does not imply restricting capital flows, but rather clearly defining property rights and establishing effective enforcement mechanisms. When investors understand arbitration procedures and asset protection mechanisms, their transaction costs related to hedging political risks decrease, thereby enhancing the overall level of investment security.

However, formal rules represent only the visible portion of the institutional structure. In times of turbulence, when legal norms cannot keep pace with rapidly evolving crises, informal institutions become increasingly important. These include codes of conduct, business traditions, and, critically, public trust in state institutions.

Informal constraints operate where the law is either silent or excessively rigid. Under conditions of uncertainty, distinct from calculable risk, the probability of events cannot be determined. As a result, the transaction costs associated with monitoring partners and state actions become prohibitively high. In such situations, institutional memory and reputational mechanisms often provide more efficient and cost-effective safeguards than additional layers of regulation. Therefore, the design of investment security systems must incorporate these informal elements by promoting transparent business practices that reduce the need for costly bureaucratic oversight.

The central postulate of this research is that the level of investment security is directly proportional to the capacity of institutions to reduce transaction costs.

In an era of global instability, these transaction costs include:

- the cost of searching for and verifying information about beneficiaries and the origin of capital;
- the cost of overcoming administrative barriers and corruption pressures;
- the cost of specifying and protecting property rights through judicial mechanisms, particularly in force majeure situations.

When institutional design is ineffective, these costs function as a “risk tax” that drives investment away. Conversely, an effective security system creates conditions in which the rules of the game are clear and sanctions for violations are inevitable. This produces an “institutional harbor” effect: even amid global turbulence, transactions within the system remain relatively safe and inexpensive due to the coordinated functioning of formal and informal institutions. Thus, institutional design in turbulent conditions is not about increasing the number of regulations, but about creating a coherent institutional matrix in which formal norms are reinforced by sound informal practices, ensuring resilience to external shocks.

The modern global economic system has entered a phase of long-term structural transformation that should not be viewed as a sequence of isolated crises, but rather as a new architecture of persistent instability. The prevailing paradigm has shifted: whereas turbulence was once seen as a temporary deviation from equilibrium, instability has now become a fundamental characteristic of the environment. For institutional design, this implies abandoning strategies based on ожидание stabilization in favor of strategies focused on operating within chaos.

The first major determinant of this instability is the transition from a unipolar world to one characterized by intense geopolitical competition. We are witnessing the “weaponization of finance” – the transformation of financial instruments, payment systems, and investment flows into instruments of geopolitical power. The sanction regimes of 2022–2025 have fundamentally altered the concept of investment risk. Investment security now depends not only on financial performance but also on jurisdiction and geopolitical alignment. Institutional design must therefore account for risks such as asset freezes, disconnection from payment systems, and forced market exit (divestment), which were previously considered highly improbable.

The second factor is the accelerated transition to a new technological paradigm, including artificial intelligence, quantum computing, and green energy. This generates technological uncertainty: investments in traditional sectors risk rapid obsolescence, while competition for technological leadership fosters policies of “technological nationalism.” States increasingly employ investment screening mechanisms to restrict foreign participation in strategic sectors, linking investment security directly to technological and digital sovereignty.

It is essential to recognize the emergence of a multi-crisis environment in which environmental risks, social tensions, and inflationary pressures interact and reinforce one another. For the development of investment security systems, this implies:

- the erosion of traditional institutional guarantees (e.g., investment protection treaties) under the pressure of political expediency;
- the shortening of planning horizons, as long-term strategies give way to adaptive models;
- the declining effectiveness of global governance institutions (such as the WTO, IMF, and UN), leading to a shift toward regional and national protection mechanisms.

In conclusion, the architecture of global instability should be understood not as a temporary disturbance but as a “new climate.” Designing investment security systems in such an environment requires abandoning linear models in favor of adaptive frameworks capable of functioning amid constant disruptions to logistical and financial systems, thereby ensuring economic resilience regardless of external volatility. Comparative characteristics of regional shifts in FDI and geopolitical risks in the context of global instability are presented in Table 1.

Table 1. Comparative characteristics of regional shifts in FDI and geopolitical risks in the context of global instability. (Source: compiled and adapted by the author based on data from the UNCTAD World Investment Report 2025 and Global Economic Prospects 2026)

Region / Indicator	Foreign Direct Investment (FDI), % change (2024-2025)	Geopolitical Risk Index (GPR)	The main determinant of influence
Developed countries (EU, USA)	-11% (in the EU up to -45%)	High (stable)	Sanctions regimes, energy transformation
North America	+13%	Moderate	Reshoring (return of production), AI subsidies
China	-29%	Very high	Trade wars, technological confrontation
ASEAN countries	+10%	Moderate	Friendshoring (transfer of capacities from China)
Global indicator	-11% (without conduits)	Growth by 30-40%	General architectural instability

The data presented in Table 1 allow us to draw several fundamental conclusions that should form the basis of institutional design:

1. The 45% decline in FDI in Europe (excluding technical transit flows) indicates that proximity to conflict zones, combined with elevated energy costs, is creating an “institutional vacuum” that cannot be offset by traditional legal guarantees.
2. The increase in investment flows to North America and ASEAN countries, against the backdrop of declines in China and Europe, demonstrates that capital is no longer primarily attracted by cost efficiency, but by geopolitical security and political alignment – a phenomenon commonly referred to as “friend-shoring.” In other words, investment security is now increasingly determined by the strength of geopolitical alliances.
3. The 13% growth in North America is largely driven by megaprojects, implying that institutional design should prioritize the protection of critical technologies, which are becoming the central assets around which security frameworks are constructed.
4. The overall 11% decline in global FDI, occurring alongside rising profits among multinational corporations, points to a “wait-and-see” approach. Capital is accumulating but not being deployed into real assets due to the absence of clearly defined and stable institutional rules. The data confirm the need to develop a security framework suited to a “new climate”, in which negative regional dynamics are a direct consequence of institutional fragility in the face of geopolitical shocks.

Designing resilient systems in an era of heightened instability requires a transition from static regulatory models to adaptive institutional frameworks. The primary objective of this toolkit is to establish mechanisms capable of automatically adjusting security parameters in response to the intensity of exogenous shocks.

The first instrument in this framework is the implementation of mandatory institutional stress testing. Drawing on analogies from the banking sector, national investment security systems should be evaluated against hypothetical scenarios such as abrupt supply chain disruptions, the imposition of mirror sanctions, or severe currency devaluation. Such modeling should be grounded in game theory, where the state (as the guarantor of security) and the investor act as strategic partners in minimizing shared risks. The aim is to develop a system that not only reacts to crises but is equipped with predefined “institutional protocols” for each scenario, thereby mitigating panic and sustaining transactional continuity.

In contemporary conditions, the security toolkit must also incorporate investment screening mechanisms (ISMs). This does not signify a return to protectionism, but rather reflects a necessary form of institutional due diligence in an era of geopolitical competition.

Within this framework, institutional design entails:

- the establishment of “red lists” identifying critical infrastructure sectors (such as energy, digital communications, and defense technologies), where foreign investment is subject to multi-layered scrutiny;
- the analysis of ultimate beneficial owners (UBOs) through the lens of their political exposure (PEPs) and their affiliations with governments in countries associated with systemic instability;
- the application of Big Data analytics to detect anomalous capital flows that may signal hostile takeovers or attempts to destabilize financial markets.

To attract investment to destabilized regions, particularly Ukraine, during its reconstruction phase, traditional legal frameworks alone are insufficient. The modeling toolkit should therefore include the creation of special institutional enclaves (priority development zones), characterized by:

- the application of English law (or selected elements thereof) for the resolution of commercial disputes, ensuring legal clarity and access to independent arbitration;
- state-backed guarantees for insuring military and political risks, facilitated through cooperation with international financial institutions (such as MIGA and the DFC);
- the automation of fiscal and customs procedures, thereby eliminating discretionary human intervention and significantly reducing corruption risks as a major institutional constraint.

To better conceptualize the architecture of the proposed system, it is useful to view it as a three-tier structure. The institutional stability of the investment system is illustrated in Table 2.

Table 2. Levels of institutional stability of the investment system and their functional content.		
System level	Implementation tool	Function in the security system
Preventive	Monitoring and screening	Identifying hidden threats at the stage of capital entry
Operating	Flexible regulation and digitalization	Minimizing current transaction costs
Rehabilitation	Arbitration and insurance mechanisms	Rapid restoration of rights and assets after shock

The toolkit for modeling resilient systems represents a synthesis of stringent control over strategic assets and the maximum liberalization of processes for virtuous capital. The objective is to construct a system that is “robust” in the face of external threats while remaining “transparent” and facilitative of internal development.

The effectiveness of institutional design is directly contingent upon the capacity of the legal system to promptly identify and close regulatory gaps, namely gaps in legislation which, under conditions of global turbulence, can evolve into “gateways” for destabilization. In the current environment, the adaptability of legislation outweighs its stability, as a rigid legal framework subjected to exogenous shocks risks losing its functional relevance altogether.

Contemporary approaches to investment security regulation frequently fall into an “institutional trap”: in attempting to erect stringent barriers against dubious capital, the state simultaneously imposes excessive administrative burdens on bona fide investors.

Addressing these deficiencies requires:

1. Harmonization with EU regulatory frameworks (notably Regulation 2019/452), thereby establishing a transparent and rules-based mechanism for screening foreign direct investment grounded in considerations of national security and public order, rather than discretionary administrative decision-making.
2. Elimination of legal uncertainty in the domain of force majeure. Modern conflicts and hybrid threats necessitate a precise and operational legal definition of “force majeure circumstances” that safeguards investor assets against unlawful expropriation or sanction-related pressures during periods of instability.
3. A transition to Agile regulation (flexible risk management).

The conventional lawmaking process is excessively inert for an era characterized by persistent crises. We propose the introduction of the concept of “dynamic regulatory gaps,” whereby legal frameworks incorporate provisions for the temporary adaptation of norms to specific crisis conditions without requiring a comprehensive overhaul of the legal system. This approach entails delegating certain rapid-response powers from central authorities to specialized investment protection agencies, as well as the deployment of algorithmic regulatory mechanisms, under which predefined restrictions or incentives for investors are automatically activated when key market indicators, such as inflation rates, fiscal deficits, or volatility indices, reach critical thresholds.

In the context of sanctions-driven economic fragmentation, investment security cannot be ensured without full integration into global financial monitoring systems. Any deficiencies in the disclosure of ultimate beneficial ownership render the national economy vulnerable to “toxic” capital, potentially exposing it to secondary sanctions. Accordingly, institutional design must ensure the seamless interoperability of national registers with international databases, alongside the digitalization of enforcement mechanisms. In such a system, automated transaction monitoring significantly reduces corruption risks, which remain a primary internal threat to investment security. Table 3 provides a comparative overview of regulatory approaches.

Table 3. Comparative characteristics of regulatory approaches.

Comparison parameter	Conservative model (static)	Adaptive model (project)
Reaction to change	Ex-post (after the event)	Ex-ante (preventive)
The role of the regulator	Supervision and control	Risk moderation and facilitation
Legislative focus	Stringency of norms	Flexibility and plasticity of rules
Efficiency in turbulence	Low (risk of system collapse)	High (system self-regulation)

Comparative analysis demonstrates that, to ensure investment security amid global instability, it is essential to move away from static regulatory frameworks and adopt a dynamic institutional matrix. Only an adaptive model that combines rigorous screening of strategic industries with operational flexibility can remain viable in today’s geoeconomic environment.

The transformation of investment security systems in the aftermath of peak global conflicts necessitates a fundamental reassessment of risk management strategies. It must be acknowledged that the post-crisis period will not signal a return to the liberal ideal of a “borderless market.” On the contrary, it will reinforce the primacy of national and collective sovereignty over purely financial expediency. The primary objective of institutional design, therefore, is to construct an architecture that minimizes the likelihood of recurrent systemic destabilization.

The scientific rationale for these transformation vectors is grounded in the analysis of two possible scenarios. The “Institutional Autarky” scenario envisions the deterioration of global legal norms and a turn toward strict protectionism, in which investment security is ensured solely through force and administrative controls. The “Technological Convergence” scenario, favored in this study, advocates replacing outdated bureaucratic institutions with algorithmic governance systems. Strategic resilience in the post-crisis period will depend on the capacity of national legislation to integrate these approaches into a cohesive “active protection” strategy, in which the state not only monitors capital flows but also models their security implications in real time.

The adoption of blockchain technologies enables the design of a system in which:

- asset verification is decentralized, preventing retrospective data manipulation (“registry raiding”);
- tokenization of real assets allows investors to diversify portfolios under conditions of low market liquidity, while maintaining full legal control over ownership shares.

Smart contracts function as self-executing legal norms, operationalizing the principle of “law-as-code.” Execution of investment agreements, payment of royalties, or return of capital is guaranteed by algorithmic protocols rather than the discretionary will of officials or the solvency of local courts. Post-crisis security architecture must be founded on absolute transparency. In an era where financial flows can serve as instruments of hybrid influence, institutional design must incorporate mechanisms for seamless financial monitoring.

Priority should be given to implementing Digital ID systems for all investment entities. This enables the creation of dynamic reputational profiles, where the origin of capital and prior transactions are automatically verified. Such an approach distinguishes constructive investment from toxic capital attempting to circumvent sanctions or launder funds of dubious origin. Consequently, transparency becomes a protective tool rather than a regulatory burden, safeguarding investors from secondary sanctions and reputational risk.

Finally, the transformation agenda entails the development of specialized legal regimes that balance national sovereignty with international standards of justice. We propose a design in which asset security is ensured through a multi-tiered system of risk insurance (via international pools) and access to digital arbitration. This framework reduces transaction costs for legal protection by an estimated 20–30%, a critical factor for competitiveness amid global capital constraints. The focus of institutional design is shifting from increasing the quantity of regulatory acts to enhancing their quality. The future of investment security resides in technological determinism, where security is embedded as a systemic function rather than imposed through external oversight. Integration of blockchain solutions, digital identification systems, and adaptive legal regimes establishes a foundation resilient to waves of global instability.

Within the framework of investment security system design, it is advisable to analyze all logistics transactions through the lens of resilience to external shocks, integrating the logistics component into the overall security architecture of the national economy. In this context, transactions are classified as stable (constant) or unstable (non-constant).

Stable transactions are characterized by the restoration of logistical “support points” – structural nodes ensuring continuity – once disruptive forces subside. This aligns with the concept of institutional resilience, in which the system maintains functional integrity even under external pressure.

Unstable transactions, conversely, deform the logistics environment such that the initial state is not restored after the cessation of influencing factors. For the investment security system, this results in increased transaction costs, reduced control over flows, and diminished recovery capacity. Accordingly, the logistics system can be modeled as an institutional network describing the interaction of transactions, flows, and spatial configurations. This model reflects the deformation mechanisms induced by external risks and identifies critical nodes where threats to investment operations arise. The selection of factors for inclusion in this model depends on aspects of the logistics and investment process that are amenable to mathematical modeling and institutional analysis, ranging from information flow structure to the load on key system nodes.

In conditions of global instability, effective management of information flows is particularly crucial, as information and knowledge constitute the primary resources of institutional security. Their optimal use determines the system’s capacity to maintain stability, ensure transparency, enhance predictability, and reduce transaction costs. Taking this into account, we propose a network-type corporate security model functioning as an institutional system with elements interconnected via finite-capacity branches. Overloading these branches without appropriate regulatory and management mechanisms introduces critical risks, potentially leading to systemic failure.

Therefore, institutional design must synthesize an adaptive management mechanism capable of:

- eliminating overload in critical network segments;
- preventing new overloads in stable elements;
- ensuring the continuity of logistics and investment flows under heightened turbulence.

The structure of the proposed network-type corporate security system is illustrated in Figure 1.

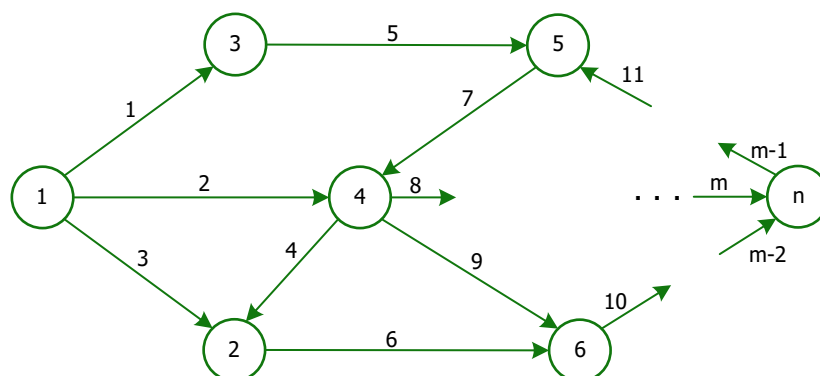


Figure 1. Diagram of a network-type corporate security system.

They are also related by the following relationship:

$$\Delta S_j = \sum_{i=1}^n a_{ij} \cdot \Delta P_i, \quad (1)$$

where a_{ij} – coefficients that take into account the impact of changes in the information flow (impact coefficients).

The conditions for normal operation of a corporate security system, in which the change in the information flow is within acceptable limits, can be written in the following form:

$$\left. \begin{aligned} S_{jH} - S_j &\leq \Delta S_j = \sum_{i=1}^n a_{ij} \cdot \Delta P_i \leq S_{jB} - S_j \\ P_{iH} - P_i &\leq \Delta P_i \leq P_{iB} - P_i, j = 1, 2, \dots, m, i = 1, 2, \dots, n \end{aligned} \right\} \quad (2)$$

where S_j, S_{jH}, S_{jB} – current, lower bound, and upper bound value of the information flow along the j -th vector ($j = 1, 2, \dots, m$) respectively; P_i, P_{iH}, P_{iB} – current, lower bound, and upper bound value of the information flow of the i -th individual elements of the corporate security system ($i = 1, 2, \dots, n$); ΔP_i – change in the information flow in the i -th separate element of the corporate security system, which is necessary to eliminate a critical situation, crisis, or disaster along the j -th vector; ΔS_j – change in the information flow in the j -th vector.

Due to the fact that the change in the information flow along the j -th vector under the influence of a change in either resource provision or the influential influence of changes in the institutional, micro- and macroeconomic environment may be different, in our opinion, it is logical to accept as the best option the option in which the fulfillment of conditions (2) is ensured with minimal changes in the information flow.

The presented dependencies (1) – (2) formalize the network model of institutional investment security, which is fully consistent with the concept of adaptive and sustainable institutional design, disclosed in the abstract of the article. Formula (1) describes the change in the state of corporate security as a result of the cumulative impact of changes in information flows, weighted by impact coefficients, reflecting the institutional sensitivity of the system to various types of information signals. Thus, corporate security is interpreted not as a static state, but as a dynamic function of information interaction between system elements. Conditions (2) and inequalities determine the permissible limits of fluctuations in information flows, under which the normal mode of functioning of the security system is maintained. This corresponds to the idea of "institutional immunity", when the system is able to absorb external shocks without transitioning to a crisis state. Within the framework of the proposed institutional design, control over the implementation of these restrictions can be carried out using algorithmic regulators, digital monitoring, and scenario stress testing, which ensures adaptive self-regulation of investment processes and maintains the stability of information and economic relations in conditions of global instability. In this case, the objective function can be written in the following form:

$$W = \min \sum_{i=1}^n c_i \cdot |\Delta P_i| \quad (3)$$

We transform expression (2) with objective function (3) using the difference of variables method. According to this method, the following substitution is performed in expression (2):

$$\Delta P_i = P_i' - P_i''; P_i' \geq 0; P_i'' \geq 0, \quad (4)$$

and the following substitution is made in the objective function:

$$|\Delta P_i| = P_i' + P_i'' \quad (5)$$

After performing the transformations, we get:

$$\left. \begin{aligned} S_{jH} - S_j &\leq \Delta S_j = \sum_{i=1}^n a_{ij} \cdot (P_i' - P_i'') \leq S_{jB} - S_j \\ P_{iH} - P_i &\leq (P_i' - P_i'') \leq P_{iB} - P_i \end{aligned} \right\} \quad (6)$$

The objective function (3) will be equal to:

$$W = \sum_{i=1}^n c_i \cdot (P_i' + P_i'') \quad (7)$$

The resulting values ΔP_i can be presented to the corporate security system, which carries out monitoring as recommendations. The presented mathematical apparatus logically expands the concept of adaptive institutional design of investment security proposed in the article, translating it into the plane of formalized managerial choice. The objective function (3) minimizes the total costs of adjusting information flows. Thus, the security of the investment environment is interpreted

not as maximizing control, but as optimizing the minimum necessary adaptive changes, which is especially important in conditions of global instability and high volatility of information signals.

Transformation of the model using the method of difference of variables (4) – (5) allows us to present the absolute deviations of information flows in linear form, which makes the problem suitable for algorithmic implementation in digital monitoring and institutional regulation systems. The resulting system of constraints (6) ensures compliance with the permissible limits of corporate security functioning, while allowing us to flexibly respond to external and internal shocks without violating the structural integrity of the system. The rewritten objective function (7) formalizes the principle of institutional plasticity: the system chooses adjustments that ensure stability with minimal transaction and regulatory costs.

In this study, the corporate security system under investigation can be considered a dynamic system that has its own “inputs” or resource flows of individual elements of the corporate security system, to which the action of input signals or information flows is applied, such as, for example: work with customers, and “output signals”, such as production of finished products, provision of services, fulfillment of contractual obligations, etc., by which it is possible to observe or study the reaction of the corporate security system to these actions.

As a rule, input signals and transformation laws are defined in a given time domain I . In this case, the transformations do not necessarily have to be unique. Let us assume that the dynamic corporate security system under study has a finite number of k “inputs” and a finite number of m “outputs”. The system of signals at all inputs will be written as a function $y(t)$, and accordingly, the system of signals at all outputs as a function $u(t)$, and at the same time, $t \in I$ (Figure 2).

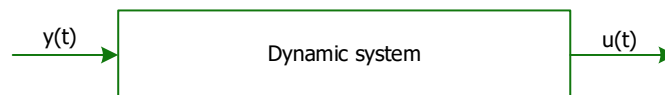


Figure 2. Dynamic corporate security system.

In the case when $k(m)=1$, the vector function is transformed into a numerical function.

Let us assume that the symbol a is the chosen moment in time represented by the interior point of the sphere I , as shown in Figure 3.

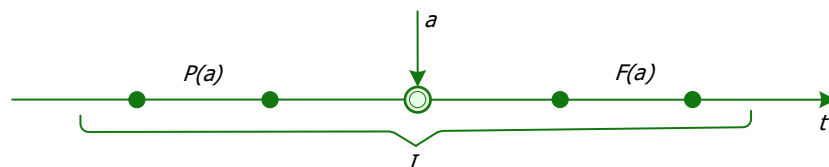


Figure 3. Structure of sphere I for the case of a discrete argument.

Then $P(a)$ is the part of the domain I that corresponds to the inequality $t < a$, respectively, $F(a)$ is the part of the domain I that corresponds to the inequality $t > a$.

The symbol Y_I denotes the set of vector functions $y(t)$ given on the domain I , and the symbol U_I denotes the set of vector functions $u(t)$ given on the domain I .

The symbols U_P and U_F denote the corresponding sets of vector functions defined only in $P(a)$ and $F(a)$, respectively, and the symbols $u_P(t)$ and $u_F(t)$ denote the elements of these sets. Then $u^*_{F(t)}$ are vector functions describing the signals obtained as a result of the transformation of the system of input signals described by vector functions from the set Y_I .

The model of a corporate security system with a finite number of inputs and a finite number of outputs under consideration will correspond to a dynamic system in the case when:

- input and output signals belong to a given set;
- for all or some time points from a given time domain, taken as separate past $P(a)$ and future $F(a)$, output signals in the future depend on input and/or output signals in the past and are determined by them;
- for any a , $y(t)$, $u_P(a)$ the vector function $u^*_{F(t)}$ is uniquely defined and belongs to U_F ;
- there exists a pair a , $y(t)$ for which $u^*_{F(t)}$ depends on $u_P(t)$.

If we denote U_F^* as the set of all vector functions $U_F^*(t)$, and I_i is the set of all interior points of the domain I , then in the case of a dynamic corporate security system, for all $a \in I_i$, the mapping $Y_I \times U_P \rightarrow U_F^*$ is uniquely defined and at the same time $U_F^* \subset U_F$.

Within the framework of institutional design for investment security systems, it is advisable to distinguish the following systemic strategies for managing economic entities:

1. Polycentric governance architecture. Governance policy is based on distributed decision-making centers, ensuring a continuous search for rational (Pareto-efficient) solutions while reducing systemic risks associated with the concentration of power and information. This approach enhances resilience and lowers transaction costs by diversifying coordination channels.
2. Identification of multiple factors and management of development contradictions. Detecting and analyzing problematic relationships within an enterprise enables the resolution of institutional "bottlenecks" and the creation of preventive response protocols, directly supporting the stability of investment flows.
3. Multi-format cooperation. Governance is implemented through systemic, problem-oriented collaboration among entities performing coordinating functions (public and private institutions, industry associations, supervisory boards). This approach clarifies problem formulation and perception, adjusts the trajectory of scientific and technological development, and reduces institutional gaps.
4. Asymmetric governance. Since enterprises operate at the intersection of diverse stakeholder interests, shared responsibility is essential for addressing problems that extend beyond the boundaries of a single firm (e.g., logistics, regulatory compliance, infrastructure). This method institutionalizes collective action mechanisms and minimizes the impact of external shocks.
5. Maximum multilateralism and multilevel engagement. Involving a wide range of participants, local, regional, national, and international, within networked, multilevel governance structures establishes stable information channels and rapid feedback loops, which are critical for investment screening and risk monitoring.
6. Transformation of goals and innovative institutionalization. Institutional and procedural reforms must facilitate adaptation to new realities (military-political risks, sanctions regimes, technological disruptions), transforming existing management systems into viable, flexible, and effective structures.

Given the complexity of the management environment, the dynamic development of institutional architecture is a fundamental prerequisite for enterprise viability and long-term competitiveness.

To assess the reliability of an integrated corporate security system, we propose a two-stage approach:

- **Stage 1.** A priori reliability analysis. This analysis is based on known quantitative reliability characteristics of individual local system elements. For internal components lacking empirical data, analogies with similar elements from other enterprises are employed. A priori (ex ante) analysis generates probabilistic estimates that approximate real processes while enabling rapid identification of "weak spots" and preventive measures.
- **Stage 2.** A posteriori reliability analysis. This stage relies on statistical processing of actual economic data regarding enterprise activity and sustainability or renewability indicators of local elements. Assessments use economic and mathematical statistical methods based on observational data, allowing correction of a priori assumptions and improving the accuracy of institutional configurations.

Thus, reliability analysis involves either determining specific indicator values (a priori) or obtaining statistical estimates of these indicators (a posteriori). This dual approach aligns with the adaptive regulation model logic (ex ante $\leftrightarrow$ ex post) presented in this study.

From a reliability perspective, the corporate security system must satisfy the following requirements:

1. Clearly defined operating conditions for both the entire system and its local elements.
2. A specific, integrated objective aligned with investment security goals.
3. A hierarchical yet flexible structure capable of adapting to various environmental disturbance scenarios.

Reliability indicators quantify the properties of a corporate security system, reflecting the reliability of individual elements or the system as a whole:

1. Single reliability indicators measure a single property (e.g., probability of failure-free operation of a specific module, mean recovery time).
2. Complex reliability indicators integrate two or more properties (e.g., a resilience index combining reliability, recoverability, and sensitivity to disturbances).

Indicator selection depends on the purpose and functioning of system elements. Criteria include completeness in describing reliability properties, analytical convenience, and the ability to translate results into quality and efficiency metrics (operational and financial KPIs, investment attractiveness indices).

DISCUSSION

The findings of this study contribute to the ongoing academic debate on the transformation of investment security in an era of persistent global instability. In contrast to traditional approaches that conceptualize investment security as a static institutional condition, this research advances the argument that it should be understood as a dynamic and adaptive capacity of institutional systems. This position is partially consistent with the foundations of North (1986), who emphasized the role of institutions in reducing transaction costs. However, unlike classical institutional theory, which largely assumes relative stability of institutional frameworks, this study extends the analysis to conditions of permanent turbulence, thereby introducing a more dynamic interpretation of institutional functionality.

The results of our study are broadly consistent with empirical findings highlighting the importance of institutional quality in attracting and stabilizing investment flows. For example, Khan et al. (2024) and Sabir et al. (2019) demonstrate that improvements in governance quality significantly increase FDI inflows, while Lim (2014) identifies institutional and structural factors as key determinants of global investment distribution. Similarly, Chinh and Dat (2026) confirm that institutional quality has a differentiated impact across investment levels, particularly affecting high-value capital flows. Our findings support these conclusions but extend them by arguing that institutional quality alone is insufficient unless it is complemented by adaptive mechanisms capable of responding to exogenous shocks in real time. Thus, while existing studies focus primarily on the level of institutional development, our research emphasizes its functional flexibility.

At the same time, some aspects of our results differ from the existing view in the literature. While Dorożyński et al. (2019) and Gökçeli (2023) underline the positive linear relationship between institutional quality and FDI inflows, our findings suggest that under conditions of geopolitical instability, this relationship becomes nonlinear and conditional. Specifically, even countries with relatively strong institutional frameworks may experience capital outflows if geopolitical risks, sanctions pressures, or technological uncertainties exceed critical thresholds. This observation is supported by the findings of Rafat and Farahani (2019), who emphasize the importance of country risk, but our study expands this argument by incorporating geoeconomic and technological dimensions of risk, which are often underrepresented in traditional models.

A central point of discussion concerns the balance between security and openness. While the introduction of investment screening mechanisms and strategic sector protections enhances national resilience, it simultaneously raises the risk of excessive protectionism and reduced capital inflows. The question remains open as to how states can maintain investor confidence while implementing stricter control over foreign capital, particularly in politically sensitive sectors. This tension between liberalization and securitization represents a fundamental dilemma in contemporary investment policy.

Another debatable issue relates to the role of digital technologies in institutional design. The study highlights the potential of blockchain, smart contracts, and digital identification systems to ensure transparency and reduce transaction costs. However, their large-scale implementation raises concerns regarding cybersecurity, data sovereignty, interoperability between jurisdictions, and the legal recognition of algorithmic governance. Further research is required to determine whether such technologies can fully substitute traditional legal enforcement mechanisms or should function as complementary tools. Our findings are consistent with Boratyńska (2019) and Melnyk et al. (2019), who highlight the transformative potential of digitalization in financial systems and value creation processes. Furthermore, the use of advanced analytical tools in risk assessment, as demonstrated by Medina-Olivares et al. (2023), supports the argument that algorithmic models can significantly improve predictive accuracy. However, unlike these studies, which primarily focus on efficiency gains, our research emphasizes the institutional implications of digitalization, particularly the risks associated with cybersecurity, data sovereignty, and the legal enforceability of algorithmic governance.

The proposed concept of “institutional immunity” also opens a discussion on its practical measurability and operationalization. While theoretically grounded in the reduction of transaction costs and system resilience, the development of standardized indicators for assessing institutional immunity remains an unresolved challenge. This is particularly important for comparative analysis across countries and regions with different institutional capacities.

While the idea of resilience has been discussed in the literature (Yereshko et al., 2022), our study advances this concept by linking it explicitly to transaction cost theory and adaptive institutional design. This represents a novel theoretical synthesis that integrates economic, institutional, and technological dimensions into a unified analytical framework. In addition, the network-type corporate security model introduced in this study provides a novel analytical perspective but raises questions regarding empirical validation. The complexity of modeling information flows, system thresholds, and adaptive responses requires further testing using real-world data and case studies. The applicability of such models across different economic sectors and scales (firm-level vs. national-level systems) also remains subject to further investigation.

The scientific novelty of our research lies in several key contributions. First, it offers a conceptual shift from static to dynamic interpretations of investment security, integrating principles of adaptive regulation and systemic resilience. Second, it develops a holistic institutional framework that combines formal legal mechanisms with informal constraints, emphasizing their synergistic role in minimizing transaction costs. Third, the study advances the idea of embedding security within technological infrastructure through blockchain-based verification, algorithmic regulation, and digital monitoring systems. Finally, it proposes an original network-based model of corporate security that links institutional design with information flow management, thereby extending the methodological toolkit for analyzing investment systems under conditions of global turbulence.

So, our study contributes to the literature by advancing a dynamic, multi-level, and technology-integrated approach to investment security, thereby extending existing theoretical and empirical frameworks. While it confirms the importance of institutional quality emphasized in prior research, it also demonstrates that, under conditions of global instability, adaptability, systemic coherence, and technological integration become equally critical determinants of investment resilience.

Despite these contributions, the study has several limitations that should be acknowledged. First, the application of digital technologies such as blockchain and smart contracts may be constrained by institutional capacity, regulatory readiness, and technological infrastructure, particularly in developing economies. Second, the measurement of key constructs, including transaction costs and institutional adaptability, presents methodological challenges due to their latent and multidimensional nature.

CONCLUSIONS

In the article, we develop a comprehensive framework for adaptive investment security systems that can maintain national economic stability and resilience amid persistent global turbulence, geopolitical fragmentation, and technological disruption. The research successfully reconceptualizes investment security as a dynamic systemic capacity, identifies key determinants of global instability, and substantiates the role of formal and informal institutions in reducing transaction costs. The study achieves its objectives by developing a network-based corporate security model and proposing a multi-level institutional framework that integrates digital tools and adaptive regulatory mechanisms, thereby enhancing the resilience and stability of investment systems under conditions of global turbulence.

The study finds that the contemporary global economy is characterized by persistent architectural instability, necessitating a radical transformation of investment security instruments. Traditional regulatory mechanisms, based on static legal norms and predictable global conditions, have proven inadequate under geopolitical fragmentation, technological disruption, and rising cross-border risks. This underscores the need for adaptive institutional designs capable of maintaining national economic stability amid uncertainty.

The proposed concept of institutional design for investment security systems integrates formal and informal institutions, enabling the development of institutional immunity within the economic system. Effectiveness is primarily determined by minimizing transaction costs, thereby ensuring predictable and transparent investment processes. Synergy between formal norms (legal regimes, FDI screening, arbitration mechanisms) and informal constraints (trust, business practices, reputation mechanisms) forms the foundation for a stable investment system functioning under turbulence.

Analysis of global FDI flows in 2024–2025 highlights a new investment logic: capital is now redistributed based on jurisdictional security and political compatibility rather than lower resource costs. This trend reflects the friend-shoring phenomenon, reshaping investment geography and compelling states to establish protective institutional frameworks. FDI declines in the EU, growth in North America and ASEAN, and a general global slowdown amid increasing TNC profits support the hypothesis of “investment waiting” due to outdated regulatory regimes.

A three-tier structure of institutional resilience (preventive, operational, and rehabilitation) facilitates the creation of a dynamic security model capable of responding to *ex ante*, *ex nunc*, and *ex post* shocks. Integrating screening mechanisms,

financial monitoring digitalization, adaptive regulation, and military-political risk insurance establishes the foundation for a resilient investment ecosystem.

Of particular importance is the proposed networked corporate security model, which accounts for node throughput, non-linear internal connections, and overload prevention. System stability emerges from the complex interplay of eight functional areas (economic, resource, personnel, technological, informational, legal, logistical, and transactional), producing an emergent institutional resilience effect. The proposed categorical-conceptual framework and structural-logical model of corporate security provide a theoretical and methodological foundation for state investment security policy, as well as enterprise-, industry-, and cluster-level risk management systems. The findings suggest that the future of investment security lies in technologically supported, adaptive, and transparent institutional mechanisms. Integration of institutional design with digital tools (blockchain verification, digital identification, smart contracts) ensures a sustainable architecture capable of withstanding systemic global shocks while maintaining long-term national economic attractiveness for investors.

Despite the conceptual and methodological contributions of this research, several limitations must be considered. First, the proposed integration of advanced digital technologies (e.g., blockchain systems, smart contracts, algorithmic regulation, and digital identity frameworks) is treated at a conceptual design level rather than through implementation-based analysis. In practice, the effectiveness of such technologies is highly contingent on national regulatory maturity, cybersecurity infrastructure, interoperability standards, and administrative capacity. These constraints may significantly limit the generalizability of the proposed model, particularly in developing or institutionally fragile economies. Second, the study assumes a relatively high degree of institutional coordination and technological readiness, which may not reflect actual heterogeneity across countries and sectors. The effectiveness of adaptive investment security systems is likely to vary significantly depending on governance quality, state capacity, legal enforcement efficiency, and integration into global financial architectures. This introduces contextual dependency that is not fully captured within the current analytical framework. Third, the study focuses predominantly on institutional and systemic dimensions of investment security, while sector-specific heterogeneity (differences between manufacturing, energy, and digital industries, etc.) is not explicitly addressed.

At the same time, the results of this study open several promising directions for further research. Future studies should focus on the empirical validation of the proposed institutional immunity concept and network-based security model using cross-country datasets and sectoral case studies. In addition, further research may explore the quantitative measurement of transaction costs and institutional adaptability, as well as the practical implementation of digital tools such as blockchain and smart contracts in different regulatory environments. Particular attention should also be paid to the analysis of geopolitical risk scenarios and their impact on investment flows, as well as to the development of predictive models capable of supporting real-time decision-making in investment security systems.

ADDITIONAL INFORMATION

AUTHOR CONTRIBUTIONS

All authors have contributed equally.

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CONFLICT OF INTEREST

The Authors declare that there is no conflict of interest.

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ІНСТИТУЦІЙНЕ ПРОЄКТУВАННЯ ІНВЕСТИЦІЙНОЇ БЕЗПЕКИ В УМОВАХ ГЛОБАЛЬНОЇ НЕСТАБІЛЬНОСТІ

Метою дослідження є розробка комплексної системи адаптивних систем інвестиційної безпеки, які можуть підтримувати національну економічну стабільність і стійкість в умовах постійної глобальної турбулентності, геополітичної фрагментації та технологічних збоїв.

Уперше інвестиційна безпека переосмислюється як системна та адаптивна здатність до проактивного саморегулювання, що дозволяє національним економікам підтримувати функціональну стабільність, безперервність та інвестиційну привабливість за умов серйозних і тривалих зовнішніх потрясінь. Цей підхід розширює класичне розуміння інвестиційної безпеки, включаючи принципи управління, орієнтовані на стійкість та адаптивність. Дослідження далі розвиває розуміння інституційного середовища як двохшарової конструкції, що поєднує формальні правила, такі як законодавство, механізми скринінгу інвестицій та арбітражні рамки, з неформальними обмеженнями, включаючи бізнес-норми, репутаційний капітал і мережі, засновані на довірі. Їхня синергетична взаємодія знижує транзакційні витрати, пов'язані з інформаційною асиметрією, забезпеченням прав власності та дотриманням нормативних вимог, утворюючи «інституційну гавань», яка стабілізує інвестиційні потоки під час кризових періодів.

Автори пропонують удосконалений адаптивний інституційний дизайн, який інтегрує передові цифрові та аналітичні інструменти, включаючи децентралізовану перевірку активів на основі блокчейну, смарт-контракти як самовиконувані правові норми та системи цифрової ідентифікації для динамічного профілювання інвесторів. Новизна цього підходу полягає у вбудовуванні сценарного стрес-тестування та алгоритмічних регуляторних механізмів в інституційне управління, що підвищує системну стійкість, прозорість і довіру інвесторів до екзогенних потрясінь.

Розроблено мережеву модель корпоративної безпеки, яка демонструє, як можна керувати структурованими потоками вхідної та вихідної інформації для запобігання системним перевантаженням і підтримки безперервності операційної діяльності. Дослідження обґрунтовує ефективність стратегій багаторівневого управління, таких як поліцентричне ухвалення рішень, асиметричний розподіл відповідальності та багатостороння інституційна взаємодія, у підвищенні інституційної гнучкості та чуйності. Доведено, що основа майбутньої інвестиційної безпеки лежить у переході до адаптивного регулювання, яке поєднує технологічну прозорість із високою правовою пластичністю, формуючи основу «інституційного імунітету» проти глобальної нестабільності.

Ключові слова: інституційне проєктування, інвестиційна безпека, глобальна нестабільність, транзакційні витрати, блокчейн-технології, інвестиційний скринінг, адаптивне регулювання, геополітичний ризик

JEL Класифікація: E22, F21, F52, G18, O17