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A SYSTEMS APPROACH TO SECURITY IS BECOMING THE FUNDAMENTAL BASIS FOR SUSTAINABLE DEVELOPMENT

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ABSTRACT

In order to effectively address any issue, it is essential to have a strong and scientifically grounded conceptual foundation. This requirement is crucial not only for scientific advancements, but also for the development of security and development strategies that are rooted in fundamental principles and concepts. Therefore, this article seeks to explore the interplay between system security and development through a systems approach in conjunction with risk analysis, aiming to contribute to fostering mutual understanding and a cohesive approach to sustainable development. The article covers two main areas: firstly, the theory and methodology of security studies, the patterns associated with its evolution, and the global community's focus on this issue; and secondly, methodological recommendations for ensuring the sustainable development of systems.

KEYWORDS

Security, Security Systems, System Management and Regulation, Risk Assessment, Sustainable Development, and Education for Sustainable Development

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Introduction.

1. Security Studies and Development, Focusing on Global Trends.

Securing system integrity and development is a multifaceted challenge that demands a deep understanding and awareness, as failure to address it properly can result in its compromise.

Two factors have contributed to the necessity of clarifying the basic concepts of security in current security and development policies:

First, there exists a disconnect between the theoretical security model and its practical implementation, as well as the regulatory oversight of development models. The challenge of constructing these models primarily relies on empirical data and is characterized by a pragmatic approach that lacks theoretical underpinnings.

Secondly, the absence of a solid scientific foundation for comprehending security issues is evident in development policies and practices.

Therefore, the first crucial step in addressing this situation is to comprehend and implement the three methodological principles of security studies. These principles are as follows:

Firstly, the primary methodological principle of security studies is the principle of systematicity, which focuses on the relationship between the whole and its components. The whole entity possesses unique characteristics, significance, and potential that go beyond the sum of its parts. It acquires new qualities through the interactions among its constituent elements.

Secondly, the subsequent methodological principle of security studies is the principle of interconnectedness and interdependence. The world is a unified entity, with all its components intricately linked. There are no isolated phenomena or entities in nature or society. This principle underscores the interconnected nature of phenomena and processes, highlighting their mutual interactions.

Thirdly, the third methodological principle of security studies is the principle of determining factors. This principle involves identifying the key connections and relationships that have a significant impact on security. By distinguishing between primary influences and secondary effects, we can better understand the functioning of the system under examination.

The primary method of security research that follows these principles is the systems approach.

From a systems approach perspective, an activity that relies on multiple factors to achieve a specific goal can be classified as a system, with these factors being organized into system elements or subsystems. The system itself is a component of a larger system. Every system comprises interconnected elements that interact with the internal environment, receiving and transmitting data to express its current state. The external surroundings of the system are referred to as the system environment. The system engages in ongoing interactions with its environment, adapting and evolving based on the external conditions in which it operates. As the system is dependent on its environment, it must maintain continuous communication with it. Therefore, regular assessment and adjustment to the environment are essential for the system's functioning.

The system environment is divided into two categories: the operational environment, which includes customers, suppliers, competitors, and the labor market, and the external environment, which impacts the system's operations indirectly.

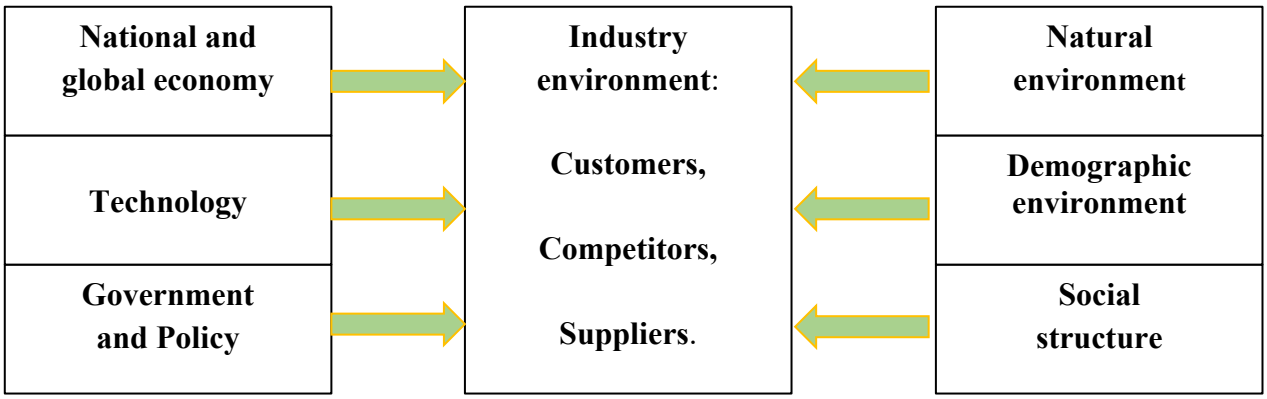

Fig. 1.

The primary principles outlined below can help differentiate the critical effects of system environmental factors from the basic critical factors: In order for a system to be profitable, it needs to provide value to its customers. This requires understanding the customers' needs. Additionally, the system must procure goods and services from suppliers, necessitating a good understanding of suppliers and the establishment of strong business relationships. Efficiency in creating value for customers is influenced by competition among systems vying for the same opportunities, so understanding competitors is crucial.

The central environmental components of the system establish three key relationships: customers, suppliers, and competitors.

The internal context of a system refers to the internal environment that is essential for the system to accomplish its objectives. This internal context encompasses various factors such as:

- governance, structure, organization, roles, and responsibilities;
- policies, objectives, and strategies to be accomplished;
- the size and capacity of resources and knowledge (e.g. capital, time, people, processes, systems, and technology);
- information systems, information flows, and decision-making processes (formal and informal);

- internal customer relationships, expectations, and values;
- the culture of the system;
- the standards, methodological guidelines, and models adopted by the system;
- the form, scope, and other aspects of contractual relations.

Hence, the security of any system can be guaranteed by an operational system that employs a systems approach, which can be represented in general mathematical notation as:

$$\sum \boldsymbol{S_{sess}}: \boldsymbol{F}\left(\{\boldsymbol{X_{S_i}}\}, \{\boldsymbol{X_{S_e}}\}, \{\boldsymbol{X_{S_i\,,\,S_e}}\}\right),$$

$\sum S_{sess}$ - System of ensuring the security of the system;

$\{X_{S_i}\}$ - The set of interdependencies of the elements that make up the internal security system;

$\{X_{S_e}\}$ - The set of interdependencies of the elements that make up the external security system;

$\{X_{S_d\,,\,S_g}\}$ - The set of interdependencies between the internal and external security systems;

$F\left(\{\{X_{S_i}\}, \{X_{S_e}\}, \{X_{S_i,S_e}\}\}\right)$ - The result of the operation of calculating the interdependencies between the elements of the internal and external security system of the system and between the two systems.

The effectiveness of a system in safeguarding security relies on the theory and approach to sustainable development of the system's cognitive security, specifically its outcome function $F(\{X_s\})$. This directly influences the system's performance.

In theory, the connection between system security and development, when examined from a cognitive standpoint, is intricately linked, complex, and dialectical, with inherent contradictions. This is because development necessitates ongoing growth, rejuvenation, and creativity across all aspects of societal endeavors, while security demands the preservation of current stability and the restriction of potentially hazardous new concepts. As a result, their intricate and conflicting interaction is demonstrated through risk. [*Urjin Odkhuu].*

Researchers have pinpointed two main causes of system failure in ensuring system security and development: the lack of awareness among system designers and the neglect of system security principles and laws during development. The diagram below illustrates this process, using the example of National Security.

This lesson emphasizes the importance of authorities making decisions on two key areas: defining the primary objectives and tasks of the system's policy to safeguard security and development, and distributing system resources and opportunities. While the national values and interests that underpin these decisions are inherently objective, they are also vulnerable to subjective influences. Neglecting these factors could have severe consequences, jeopardizing the system's security and hindering its development.

Hence, the document created by the Third World Conference of United Nations Member States underscored the significance of efficient disaster risk management for sustainable development.[1] It identified *"Understanding Disaster Risk"* as one of the key focus areas for action until 2030, emphasizing that *Disaster risk management policies and strategies should be grounded in a comprehensive understanding of all aspects of disaster risk, including vulnerability, capacity, exposure of individuals and resources, hazard attributes, and the surrounding environment.* This understanding can inform pre-disaster risk evaluations, prevention efforts, hazard mitigation, disaster readiness, and successful mitigation measures.

When evaluating the balance between system security and development:

- Risk is a complex aspect of the future state of any system, whether natural or human, with multiple dimensions.
- Risk is linked to random events and processes within a global nonlinear dynamic system involving "nature-technology-society", which follows statistical laws.
- It is crucial to recognize that risk is a conditional phenomenon with specific characteristics.

To prevent narrow and extreme approaches in risk assessment, it is important to consider and evaluate the various dimensions of traditional and non-traditional threats to security comprehensively. Hazard is defined as a serious event, phenomenon, or human activity that causes harm to life, health, property, disrupts socio-economic activities, or harms the environment. Hazards can stem from natural sources like geological, hydrological, climatic, or biological factors, as well as human-induced causes such as environmental degradation or technological hazards.[2] Vulnerability refers to conditions that increase a population's exposure

[1] Sendai Framework for Disaster Risk Reduction 2015-2030. 2015.
[2] ibid

to hazards, including physical, socio-economic, and environmental factors.[1] Resilience is the ability of a system, community, or society to withstand, absorb, adapt to, and recover from the impacts of hazards by promptly and effectively implementing actions to protect and restore critical infrastructure and functions, as defined by the UN.

The significance of comprehending and evaluating risks, along with the challenges involved in their assessment, have been emphasized by scientists and former officials. British disaster researcher Ion Davis stated, "Creating a plan without evaluating the risks of disasters is akin to sending your wife and child into surgery without a diagnosis." Additionally, the Chairman of the Russian State Duma S.E.Naryshkin highlighted the importance of a professional and evidence-based preliminary assessment of geopolitical nature in today's context.

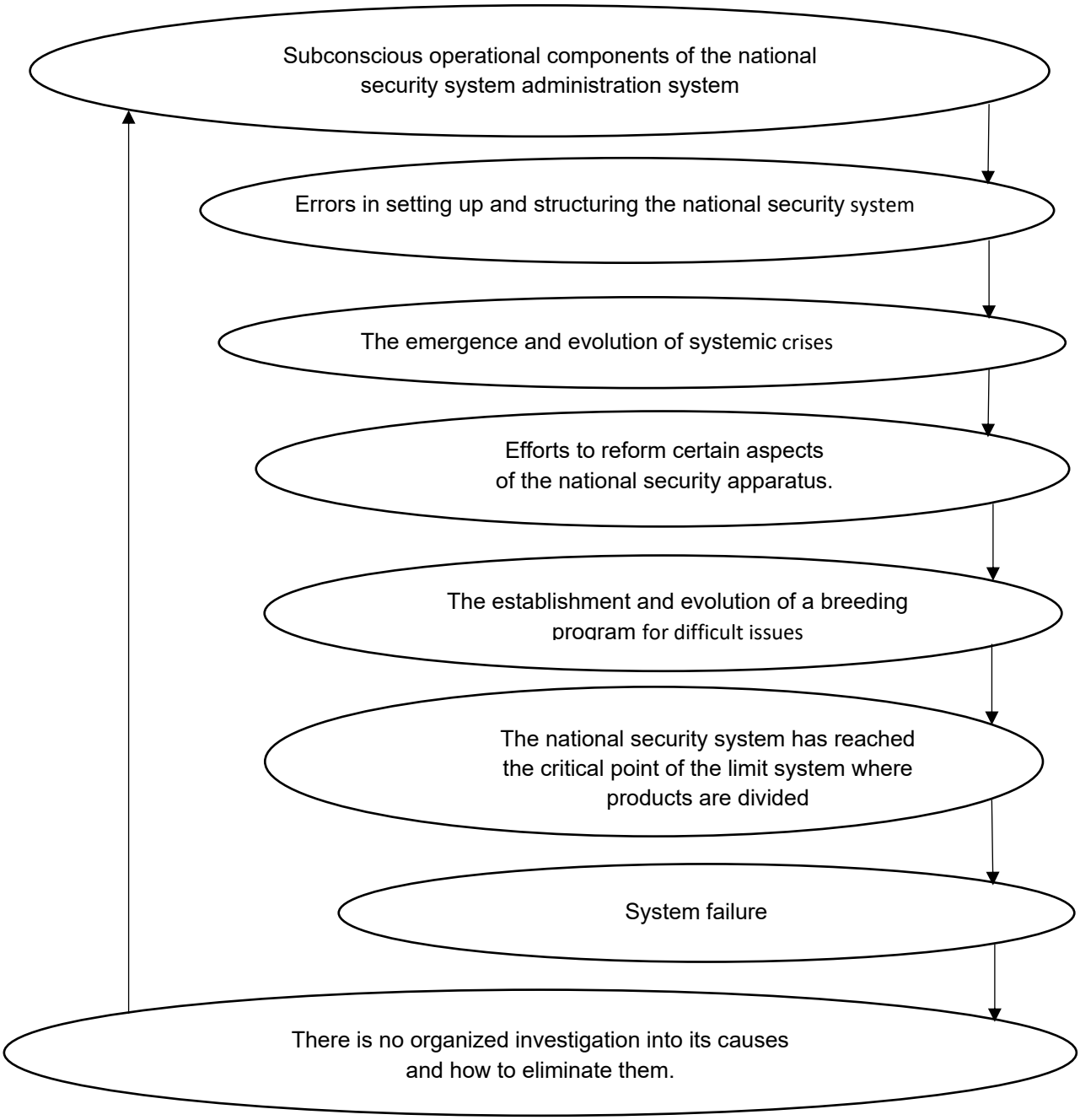

Fig. 2.

[1] ibid

By anticipating the potential changes in a situation and understanding how they may unfold, one can effectively address challenges, prevent errors in strategic planning, and make informed decisions in lawmaking.[1] Academician A.Dynkin emphasizes the importance of conducting a preliminary assessment to identify development trends, strategize, and set policy priorities for various timeframes.[2]

The primary goal of scientific forecasting is not to predict future events with precision, as this is challenging even in the short term due to various random and subjective factors. Its main objective is to anticipate significant long-term trends, understand the key drivers of global development, and recognize potential pivotal moments, which is a particularly challenging task.

The Rio Declaration,[3] the Millennium Declaration,[4] and the Johannesburg Declaration,[5] which outline global development trends and strategies by assessing the connection between security and development in the 21st century, vary in terms of timing and focus. However, their fundamental aim is to promote the three pillars of sustainable development: economic, environmental, and social development.

The two factors that influenced these changes were the shift from trying to avoid risk to embracing and managing risk for sustainable development, and the establishment of a global development mechanism within the security system. This led to the adoption of the "Sustainable Development" triangular model at the 1992 World Conference on Development and Environment in Rio de Janeiro, Brazil.

The triangular model of sustainable development is a crucial approach for addressing the three key concerns of social development, economic development, and ecosystem preservation in a manner that upholds security without sacrificing any of these aspects.

Depending on the system's development model, success and results can be attained, but there may also be unforeseen negative consequences. If the model is not well-suited to the environment, it could result in unexpected negative outcomes and crises. Thus, a system development model serves to assess the strengths and weaknesses of a system's culture, customs, and traditions, and adapt it to address changes in the external environment.

There are multiple definitions of sustainable development and education for sustainable development, which serves as the primary tool for its implementation. For instance, sustainable development is defined as the process of ensuring the development of any complex system in nature and society while maintaining safety and preserving the quality of life for current and future generations. It also involves meeting the needs of the present without compromising the ability of future generations to meet their own needs.[6] Education for sustainable development aims to empower individuals to make informed decisions for both present and future generations, while respecting cultural diversity, preserving environmental balance, ensuring social justice, promoting economic viability, and enabling informed decision-making.

The Sustainable Development Goals (SDGs) are currently being implemented by countries worldwide as a way to address their security and development challenges comprehensively through the 2030 Agenda. This agenda was adopted by over 160 heads of state and government, as well as more than 30 foreign ministers, during the 70th session of the UN General Assembly on September 25-27, 2015. The agenda consists of 17 goals and 169 targets. In March 2017, the 48th session of the UN Statistical Commission established 244 indicators to assess progress towards the SDGs.

The study indicates that the key to addressing the conflict between security and development in any system is to establish sustainable development through risk assessment. The global community has produced

[1] Military-political aspects of forecasting global development: an analytical report by A. I. Podberezkin, R. Sh. Sultanov, M. V. Kharkevich, et al.; Moscow State Institute of International Relations (University) of the Ministry of Foreign Affairs of Russia, Center for Military-Political Research. — Moscow: MGIMO-University, 2014. Page 3.

[2] Dynkin A. A. Preface to Strategic Global Forecast 2030. Extended version. Edited by Academician A. A. Dynkin / IMEMO RAS. Moscow: Magister, 2011. Page 15.

[3] In 1992, the UN Conference in Rio de Janeiro, Brazil, reviewed the outcomes of the "20 Years of Ecology" from the Stockholm Conference and endorsed the "Rio de Janeiro Declaration" and the "Global Agenda for Sustainable Development for the 21st Century." As per this agreement, each country is required to create a national sustainable development strategy tailored to its specific characteristics. Mongolia introduced the "Mongolian Development for the 21st Century" (MG-21) program in 1996, which was officially launched in 1998 following government approval.

[4] In the year 2000, 147 heads of state from various countries convened in New York, USA, and endorsed the "United Nations Millennium Declaration." This declaration outlined the key obstacles to human development in the new millennium and established objectives to address them. Consequently, the Millennium Declaration is now being put into action in nations worldwide as the "Millennium Development Goals." Every five years, countries are required to produce comprehensive reports on their progress in achieving the Millennium Development Goals.

[5] In 2002, the United Nations convened the "World Conference on Sustainable Development" in Johannesburg, South Africa to assess the progress of the "Global Development Agenda for the 21st Century" established at the Rio de Janeiro conference and set new objectives. Following Principle 7 of the Rio Declaration, the conference produced the "Johannesburg Declaration" emphasizing enhanced collaboration among nations and the promotion of the harmonious integration of the environment, society, and economy in sustainable development efforts.

[6] The 1987 report by the well-known Brutland Commission

and shared documents that focus on promoting sustainable development by connecting the principles of sustainable development and education with fundamental security concepts.

2. Methodological Guidelines for Promoting Sustainable Development

The key to guaranteeing the sustainable development of the system is established based on the theoretical and methodological principles of the systems approach, serving as a mechanism for safeguarding national security, as outlined below:

1. A sustainable development strategy must be established through proactive research and analysis that takes into account the interplay of risk factors between system security and development strategies.

A potential research and planning methodology for developing such a strategy is depicted in the diagram.

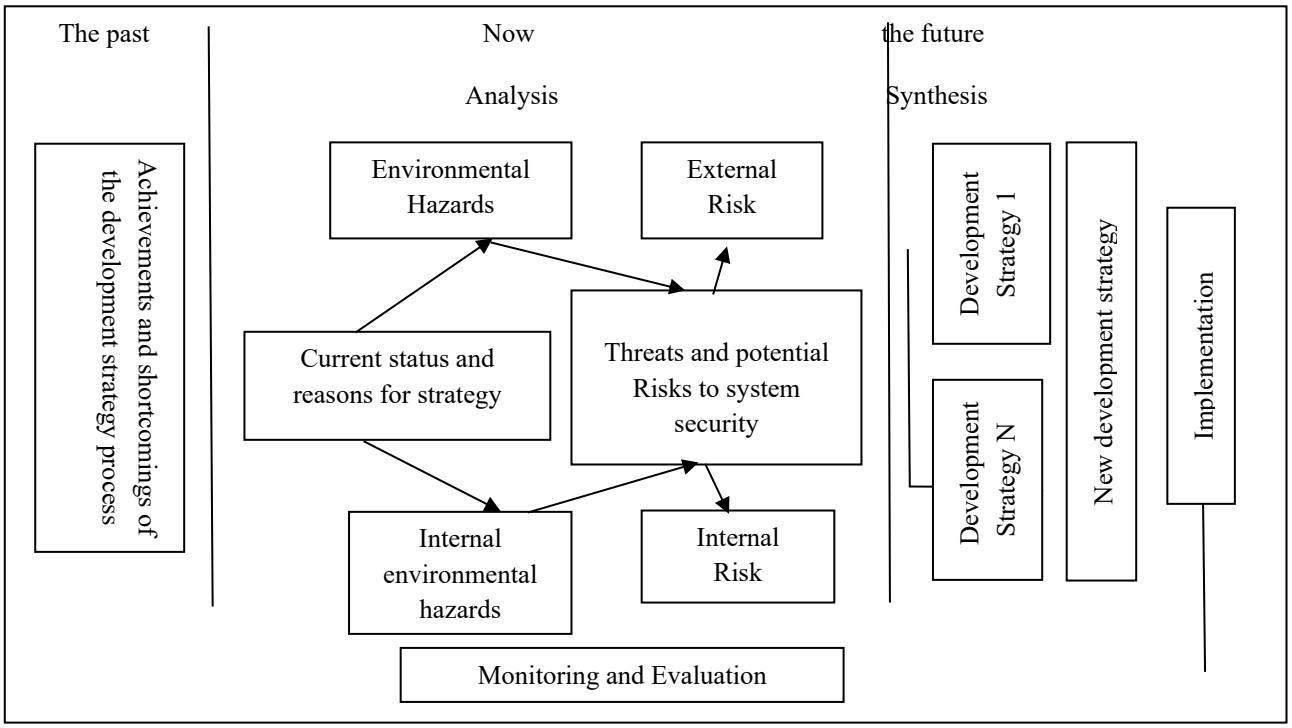

Fig. 3.

As illustrated in the diagram, the risk assessment-based sustainable development strategy planning and implementation methodology will be carried out in three phases:

The initial step involves analyzing the current status of the development strategy in place.

The subsequent step involves evaluating the successes and failures of the previous implementation of the development strategy, pinpointing the reasons and outcomes that resulted in the current deficiencies, and evaluating the risks to national security. The final step in the logical progression is to outline the future prospects of a new sustainable development strategy centered on risk mitigation management derived from the risk assessment of system security.

In essence, the process of developing a sustainable development strategy through risk assessment involves three key components: analysis, synthesis, and system analysis and research, which encompass the past, present, and future aspects of the process.

This methodology demonstrates that by conducting potential risk assessments, identifying and resolving issues through sustainable development planning and implementation, any system development and security interaction can be detected. It also involves calculating potential risks, strategic planning, evaluating implementation, and continually assessing the prospects for sustainable system development based on knowledge gained from sustainable development education.

This highlights the importance of sustainable development for ensuring the safety of a system, which should be guided by risk assessment policies and actions. Additionally, forecasting the future of the system should involve considering potential phenomena and processes that are not currently present but may arise in the future.

2. ***The following conditions must be established to ensure an initial evaluation of the system's sustainable development through risk assessment.*** These include:

Firstly, it is important to consider socio-economic development factors as part of a risk-based organizational system, with leading indicators guiding development goals in balance with available resources and potential capabilities.

Secondly, the preliminary assessment should consider the interactions of development factors and their impact on key indicators of development.

Thirdly, models for assessing sustainable development events should be developed based on identified patterns, allowing for simulation of system responses to changes in development factors and providing a preliminary assessment.

Fourthly, the preliminary assessment should consider various growth options for socio-economic development as well as qualitative changes in the system.

3. It is essential to create an appropriate development model using the methodological approach of preliminary assessment.

In the models for assessing sustainable development, both quantitative parameters of the system's state and the quality and characteristics of the processes of change are important for achieving the necessary results. The selection of a model is also influenced by the availability of information. As the scope of assessment calculations expands, information provision tends to deteriorate. The variety of assessment methods poses a challenge in choosing the most suitable one. It is essential to consider the timeframe of the assessment, known as the "range of preliminary assessment," which is categorized into short-term, medium-term, and long-term assessments of the socio-economic development of the system.

To select a preliminary assessment method, it is essential to evaluate the quantity and quality of historical and current information available. A well-developed methodological framework is required for conducting preliminary assessments of the socio-economic development system.

The selection of assessment tools in system development should adhere to the methodological principles of two approaches: research and objective. The characteristics of these approaches and the methods for preliminary assessment are illustrated in the figure below.

A joint working group was quickly appointed to conduct a preliminary assessment primarily focused on the economic aspects, using current data. However, due to the lack of a research-based approach, the results of the development planning were not comprehensive in terms of risk assessment.

It is recommended to adopt a comprehensive approach to the preliminary assessment of strategic indicators. This involves developing a mathematical model that accurately represents the economic development process of the system over time with unified criteria. A methodological diagram illustrating the combined use of research and objective approaches is provided in the figure below.

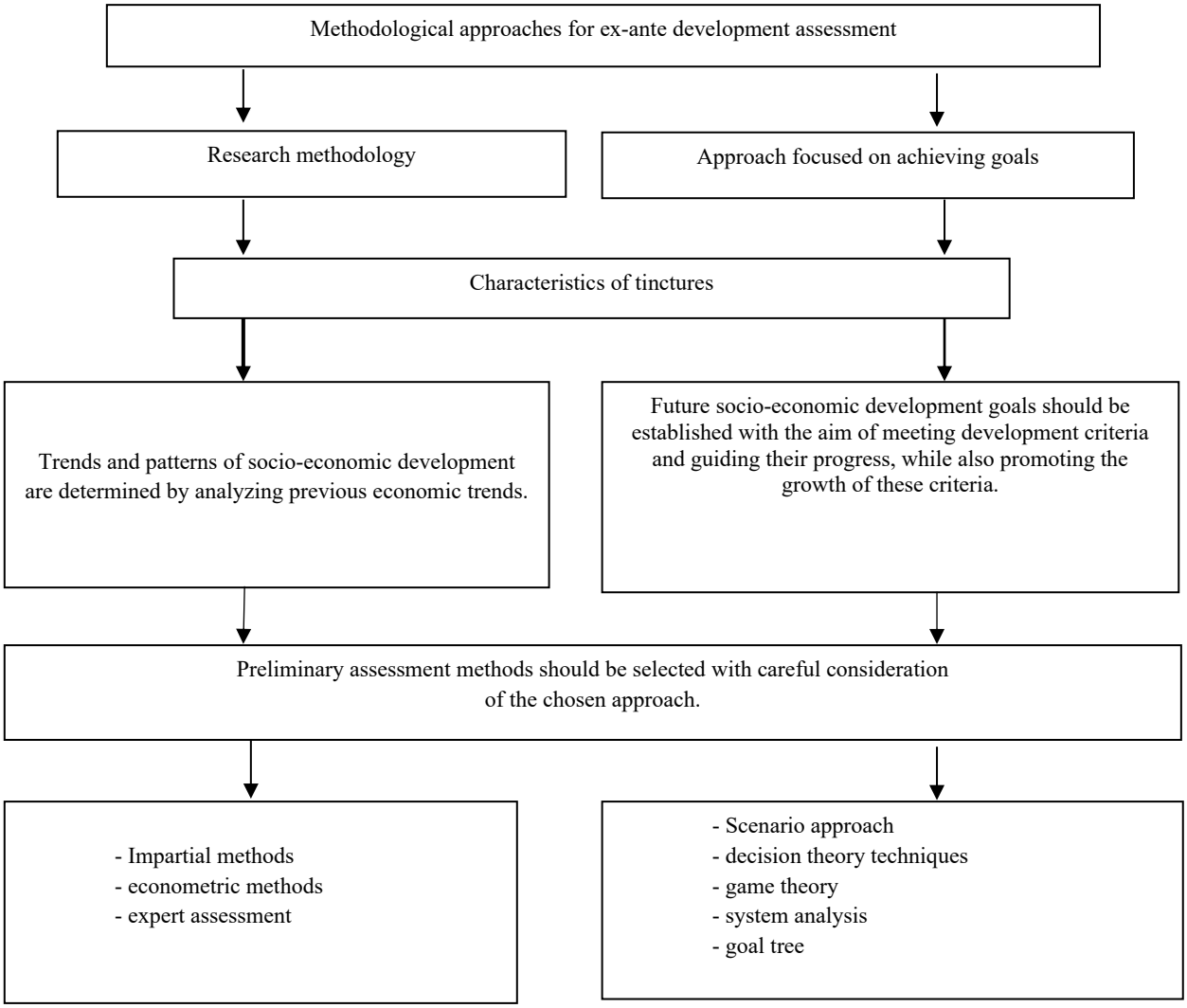
Methodological approaches for ex-ante development assessment
Research methodology
Approach focused on achieving goals
Characteristics of tinctures
Trends and patterns of socio-economic development are determined by analyzing previous economic trends.
Future socio-economic development goals should be established with the aim of meeting development criteria and guiding their progress, while also promoting the growth of these criteria.
Preliminary assessment methods should be selected with careful consideration of the chosen approach.
- Impartial methods
- econometric methods
- expert assessment
- Scenario approach
- decision theory techniques
- game theory
- system analysis
- goal tree

Fig. 4.

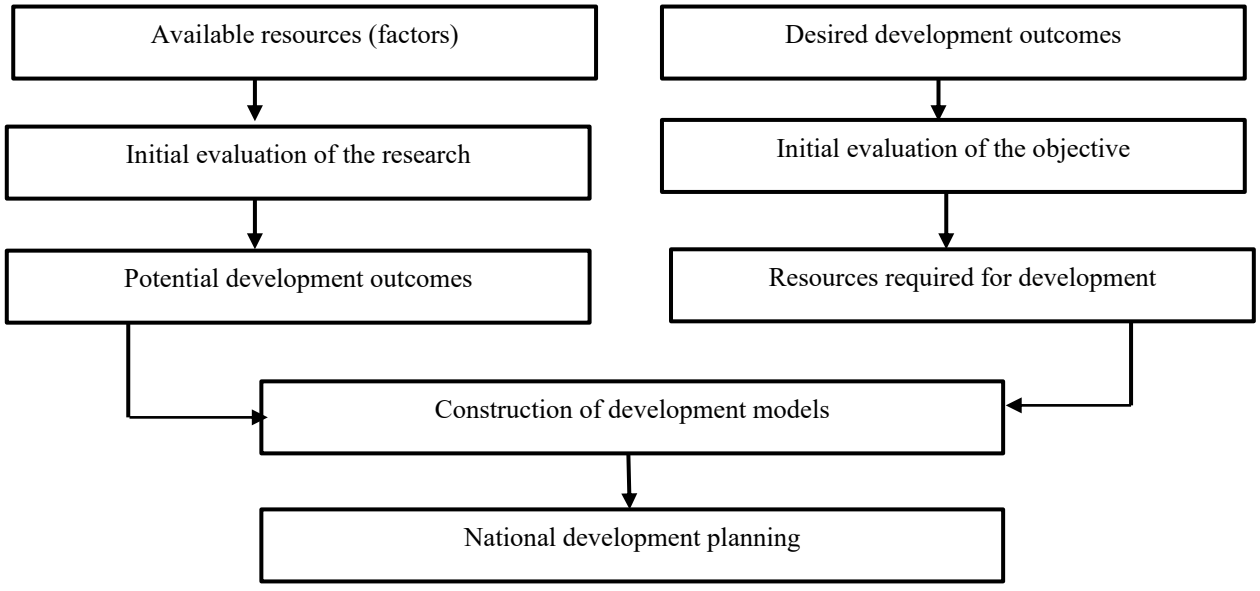
Available resources (factors)
Desired development outcomes
Initial evaluation of the research
Initial evaluation of the objective
Potential development outcomes
Resources required for development
Construction of development models
National development planning

Fig. 5.

This methodology can be used as a foundation for collaborative planning between scientists and a system-appointed working group. By utilizing standardized criteria, the necessary level of system development in the relevant areas can be strategically planned. To select the most suitable approach for a specific preliminary assessment task, it is essential to define the boundaries and acceptable range of the assessment clearly. During the preliminary assessment of an object, multiple indicators are evaluated in advance, each using a different method. This involves a combination of methods to assess the development of various indicators.

It is recommended to have a process in place that does not endorse or enforce development policies without first conducting risk assessments. This will necessitate a blend of research and objective methods in shaping development policies.

4. ***A methodological approach is essential for enhancing the formulation, planning, and implementation of development policy***.

In line with the principle of hierarchy, the development policy of any system must align with the system's interests in ensuring national security. To support this, four interconnected documents must be developed: alignment with the Constitution, alignment with the "National Security Concept" based on the Constitution, alignment with the "Foreign Policy Concept" based on the Constitution and National Security Concept, and alignment with the "Defense Policy Framework" based on these documents.

To implement the education system reform for sustainable development, it is essential to adhere to the merit principle when hiring individuals who have acquired decision-making capabilities through education at all levels.

5. ***System security and development system management and coordination should be structured according to the system's overarching quality principles.***

To do this, the following rules of system management must be followed:

First, the overall quality characteristic (Qs) of the system must not be a simple sum of the characteristics (qi) of its constituent elements.

$$Q_s \neq \sum_{i=1}^{n} q_i \ ,$$

Secondly, the properties of the system should be expressed as a function of the properties of its constituent elements: Qs=f(qi),

Thirdly, the elements integrated into the system, on the one hand, lose some of their properties that they had outside the system, that is, the system suppresses some of the properties of the elements, but on the other hand, the elements can acquire new properties by entering the system.

When there is excessive unity, the system may stifle the individual properties of its elements, resulting in a loss of their effectiveness. Conversely, granting more autonomy to the elements can lead to conflicts and lack of cohesion, hindering the system from functioning as a whole. Striking a balance between unity and autonomy is crucial for effective management, as extremes in either direction can lead to system breakdown. Finding the optimal level of coordination is essential for maintaining order and preventing chaos within the system.

In order to effectively manage the system, it is crucial for the management to strike a balance in coordination. This involves understanding that the combined quality management and coordination (α) of the system, along with the individual management and coordination (β), must add up to one, as expressed by the equation α+β=1. It is important to reiterate that failure to adapt to external changes can lead the system, which is responsible for security and development, into a crisis.

Conclusions

1. Insufficient knowledge about sustainable development, sustainable development education, and their implementation mechanisms poses a significant threat to system security and its approach, jeopardizing the system's development.

2. By systematically integrating fundamental concepts of system security research and development, linking them with risk assessment, and adopting a systems approach, we can effectively address system challenges and establish a basis for sustainable development. The methodological suggestions outlined in this article are expected to drive this process forward.

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