Chapter 1
THEORETICAL FRAMEWORK OF ENSURING NATIONAL RESILIENCE

In recent years, the term "resilience" has been increasingly used in various fields, so it is important to reveal the essence of this interdisciplinary concept, identify its characteristics and manifestations, and distinguish it from other phenomena. Due to the growing complexity of the global security environment, complex and disappointing forecasts for its development in the coming years and decades, studies of the resilience concept in national security draw special interest. In particular, the application of a systematic approach to forming national resilience and determining its basic principles, criteria, processes, and mechanisms have significant theoretical and practical importance.

1.1. The Concept of Resilience in National Security: Research Approaches to Determining Its Content, Structural Elements, and Practical Application

1.1.1. Research Approaches to Forming the Interdisciplinary Resilience Concept

Scientific research on resilience has been going on for a long time. This research pertains to different scientific branches and objects, and the context implies different definitions of this term and proposes fundamentally different resilience ensuring mechanisms. Initially, this term had become common in technical disciplines as a characteristic of certain physical phenomena and processes (for example, the ability of a material or mechanism to accumulate energy and withstand significant loads without breaks and damage). Later, it began to be used in psychology (as one of the individual's properties helping not

to change behavior under the adverse influence or trauma), ecology (as an ecosystems' ability to recover from disasters), and social relations.

The resilience concept is multifaceted, used in different areas, and has different shades of meaning. For example, terms: "polymer resilience," "resilience of a building," "human psychological resilience," "urban infrastructure resilience to natural disasters," "resilience of society to terrorist threats," and "computer system resilience to hacker attacks" are well-known to many people. The "resilience" concept is decisive in each phrase even though it is associated with completely different processes not connected with each other at first glance. However, an in-depth analysis reveals common features of all these cases.

Many researchers, including Martin-Breen and Anderies (2011), Walsh-Dilley and Wolford (2015), Walker and Cooper (2011), Norris, Stevens, Pfefferbaum, Wyche and Pfefferbaum (2008), and others have focused on the diversity of meanings and the transformation of the resilience concept. Their works consider the term "resilience" as a direct research object rather than as a knowledge domain. This implies certain limitations of their research. The authors note that, despite the high popularity of relevant research, there is currently no single definition of "resilience" in the world.

In studying how to define social resilience, Community and Regional Resilience Institute (2013) researchers have concluded that it is hard to choose one ideal definition of resilience among their variety. Each of them has its own significance allowing it to make significant contributions both in the development of various knowledge domains and in interdisciplinary resilience studies. Community and Regional Resilience Institute (2013) experts argue that it is important for this concept definition to reflect the way it is used.

It should be noted that it is not enough to merely semantically analyze the term "resilience" even with modern technologies, including big data, to understand the meaning of this concept for a particular sphere, and even more so

to shape systemic measures and policies. In view of this, it is essential to conduct a comprehensive study and discover patterns and links that link resilience with certain characteristics and processes, as well as other concepts in a particular field. That is, *it is necessary to determine the general characteristics of the resilience concept and its manifestations in the field under study*.

While analyzing various research approaches to the definition of "resilience," we can conclude that the following characteristics are fundamental to understanding and further conceptualizing it:

- the field of study;

- the object for which resilience is considered;

- external factors/influences which the object must be resilient to;

- the aim of achieving resilience by a particular object;

- parties interested in the relevant result;

- actors or factors able to influence the achievement of such a result.

Based on the analysis of the above-mentioned studies and thematic glossaries on resilience, developed by a range of research centers (including the Stockholm Resilience Centre (n.d.), the Resilience Alliance (n.d.b), the Disaster Recovery Institute (n.d.), and other authors, we can conclude that in its *generalized form, the "resilience" concept characterizes how an object responds to certain external stimuli and can adapt to their impact without significant loss of its functionality*.

The studies have discovered that the resilience concept is ambiguous and tailored when used in different fields, and practices of its implementation are controversial.

Martin-Breen and Anderies (2011) argue that the widespread use of the term "resilience" has not led to the unification of the resilience concept in the areas where it is used, and different researchers use different methods, methodologies, and databases in their relevant works.

Other scholars, such as Walsh-Dilley and Wolford (2015), argue that the existing definitions of "resilience," their conceptualization, and practical implementation are not objective and are based on different assumptions. Such terminological "blurring" causes concern, as it allows us to interpret and apply the resilience concept in a rather inaccurate way. This makes it difficult to assess the concept's impact on development processes. At the same time, the wide scope of research provides an opportunity to rethink what is really important for the development as a complex dynamic process. Walsh-Dilley and Wolford (2015) argue that examination of the resilience concept enables complex thinking, goes beyond the dominant knowledge paradigms, and opens new opportunities for discussion and elaboration of new knowledge inside and outside the traditional disciplinary discourses.

Walker and Cooper (2011) associate the spread of the resilience concept in various fields with the development of systems theory and the introduction of innovative ideas both in theory and in practice. Concurring with the conclusion of these authors, it should be remembered that C. Holling gave significant impetus to the development of resilience studies. Holling (1973) proposed new conceptual approaches in environmental research based on the complex systems theory. The scientist pioneered in defining the "environmental resilience" concept and its formation principles. Holling (1973) also discovered peculiarities of resilience-based management, which shifted the emphasis from anticipating future events as a key crisis management task to building a system capable of adapting to such events, in whatever unpredictable forms they may occur.

Later, these conceptual approaches expanded to the sphere of social and economic relations, and in the 1990s, under C. Holling's initiative, the Resilience Alliance was formed. Later, this organization, which included leading environmental scientists, merged with the Stockholm Resilience Center and

expanded its research into sustainable development while trying to reconcile social, economic, and biosphere issues.

It should be noted that in the field of social studies, the resilience concept is based on the general systems theory, including regularities of complex systems formation and functioning. The common features in forming resilience of complex systems of different nature were defined by Holling (1973) through the concept of the system's internal "capital" which "absorbs" external impacts and allows positive systemic changes while retaining the system's structure and basic functions. In addition, scientists distinguished between "resilience" and "stability" concepts, understanding system stability as its ability to return to equilibrium after a temporary disturbance.

Gradually, the outlines of the *interdisciplinary resilience concept and a new approach to resilience thinking* began to emerge. T. Abel, W. Adger, C. Barrett, F. Berkes, M. Biggs, E. Boyd, K. Brown, F. Brand, W. Galas, K. Jacks, J. Ebbesson, K. Eckerberg, A. Duit, S. Carpenter, J. Colding, M. Constas, T. Crane, C. Curtin, C. Lyon, K. Magis, M. Mitchell, D. Nelson, E. van Ness, A. Norström, O. Olsson, J. Parker, S. Polasky, S. Robinson, J. Rockström, H. Ross, J. Stepp, T. Hughes, C. Folke, R. DeFries, M. Schlüter, and M. Shoon contributed to this field of research. The resilience concept has gradually become an integral part of sustainability science.

According to Folke (2016), resilience is the capacity of a system to absorb disruptions and reorganize itself during the change to retain its function, structure, and feedback, and, therefore, identity. In other words, it is the ability to withstand the impact of change and continue to live and develop, even if the environment has changed. At the same time, the scientist noted that resilience thinking was aimed at studying the resilience of socio-ecological systems, their endurance, adaptability, and ability to transform. According to Folke (2016), resilience thinking is "about how periods of gradual changes interact with abrupt changes, and the capacity of people, communities, societies, cultures to adapt or

even transform into new development pathways in the face of dynamic change"
and "… how to navigate the journey in relation to diverse pathways, and
thresholds and tipping points between them." At that, purposeful human actions
are important, because, within the resilience concept, adaptation refers to
measures that support system development on the current trajectory, while
transformation refers to transferring the development to other new pathways or
even creating such pathways. According to C. Folke (2016), it is this that
explains the dynamic and promising nature of the concept.

In accordance with the definition of resilience published in the Handbook
by United Nations International Strategy for Disaster Reduction [UNISDR]
(2009), resilience means "the ability of a system, community, or society exposed
to hazards to resist, absorb, accommodate to and recover from the effects of a
hazard in a timely and efficient manner, including through the preservation and
restoration of its essential basic structures and functions." The key is the ability
to "resile from" or "spring back from" a shock. UNISDR (2009) noted that the
"resilience of a community in respect to potential hazard events is determined by
the degree to which the community has the necessary resources and is capable of
organizing itself both prior to and during times of need."

Proposing an alternative research approach, Hodicky et al. (2020), argue
that resilience is mostly about the measurement of capacity, and its concept is
uncertain.

Summarizing the resilience discourse, Carpenter and Brock (2008) note
that resilience is a broad, multifaceted, and loosely organized cluster of
concepts, each one related to some aspect of the interplay of transformation and
persistence. Thus, resilience does not come down to a single theory or
hypothesis. According to the scholars, resilience is a constellation of ideas,
testable through various practices.

The analysis of various research approaches to the content of the
interdisciplinary resilience concept allows us to conclude that they revolve

around the ability of complex systems to respond to adverse impacts in a way that allows them not to lose their functionality and ability to develop. As resilience manifestations in different fields may vary, the aim of the monograph makes it necessary to analyze how the resilience concept is implemented in the field of national security.

1.1.2. The Evolvement of Security Studies

Resilience as a security category came to be considered somewhat later than in other fields. This is due to the fact that national security studies has been formed only in the second half of the 20th century, and the combination and mutual enrichment of national security research and resilience studies occurred at the beginning of the 21st century.

The term "national security" became widely used at the beginning of the 20th century when the role of the state in the system of social relations, ways of exercising power, and protection of national interests was conceived. The development of the international relations theory in the 2nd half of the 20th century contributed to the intensification of national security studies. If national security was initially considered primarily in the classical realism international relations paradigm, then later national security issues were studied within other paradigms: liberalism, the English school, strategic studies, critical theory, peace studies, etc. Eventually, a separate research direction – security studies – emerged.

In the 2nd half of the 20th – early 21st century, conceptual approaches to national security, as well as the security concept itself, have significantly changed. After World War II, the traditional approach to defining security within the political realism paradigm dominated, in which a state played the main role in providing security, an external war was considered a key threat, interstate conflicts were considered highly probable, and force was to be a key to

resolve them. Besides, state security was practically synonymous with personal security, as it was considered an indispensable condition for the well-being of citizens. According to Jones (1999), this approach was too static and limited. The events of the last decades of the 20th century, in particular the end of the Cold War and the USSR collapse, did not fit into it. Meanwhile, the scholar notes that such radical changes took place exclusively by peaceful means.

After the events of the above-mentioned period, as Thompson (1982) predicted, not "détente," but rapid and unpredictable changes, disruption of ties between states, and acute intra-state conflicts, resembling "mapless movement" should have happened.

Under the new circumstances, the narrowed (traditional) approach to the definition of national security, which focused on the military component and had a state-centric character, needed to be revised. The change in the security environment has highlighted a wider range of threats and dangers than military ones, and new non-state actors in this field have become more active. For example, the traditional research approach has overlooked the security implications of rapid technological change, including in transport, energy, and information.

Under such conditions, the securitization theory, proposed by B. Buzan, O. Weaver, and other representatives of the Copenhagen School, became popular. According to Buzan and Weaver (1998) the new research approach has expanded the security concept to include political, economic, social, and environmental components in addition to the military one. At the same time, the scientists recognized the key role of the state in providing national security.

Ullmann (1983) stressed that interpreting the term "national security" only in the context of countering military threats diverts attention from non-military dangers and does not take into account many aspects of vital human interests. Based on the conclusion that it is impossible to achieve world peace if people are not safe in their daily lives, United Nations Development Programme

(1994) formulated in the Human Development Report a new scientific *"priority of human security" concept* and its components: economic security, food security, health security, environmental security, personal security, community security, and political security.

In general, in the early 1990s, many studies explored the role of security actors other than the state including citizens, society, ethnic groups, and religious organizations. The scientific and expert community, including Booth (1991), began to raise the issue of "emancipation of security" as its release from restrictions. As we can see, the changes in the national security concept interpretation proposed by researchers during this period were aimed at making the national security system more flexible.

The security issue has become more addressed not only at the national level but also at other – regional and global – levels. After the globalization concept appeared, discussions about the role of nation-states in the context of strengthening their ties and mutual influence, the emerging players in the international arena, and the formation of global networks have intensified. The changes that have taken place in the world under the influence of globalization have not made the world safer. According to Held and McGrew (1998), an emerging complex system of interstate political and economic ties left only a little difference between national security strategies and international security strategies for many states. They also argue that globalization is driving the transition from a state-centric policy to a new comprehensive form of multi-layered global governance in the field of security. Although countries with different potentials and development levels have benefited differently from globalization, there is a general tendency of reducing the ability of nation-states to ensure national security due to a lack of their institutional capacities. This has put the need to transform political systems at both national and international levels on the agenda in order to bring them more in line with the new global development conditions.

We should also pay attention to the discourse in which nation-states (especially global leaders) have expanded their understanding of security beyond the principle of protecting and promoting national interests in favor of interventions (external interventions) in cases when human rights need protection, which was enabled in light of the emerging "global community" theory and the development of the concept of prioritizing human security. This, in particular, was pointed out by Chandler (2012) in his analysis of the paradigm shift in security studies.

However, the concept of "strong" states being responsible for global security and their right to interfere in the internal affairs of other states to protect basic human rights proved to be quite problematic in practice and created fundamental contradictions between this right and the sovereign rights of independent states. Furthermore, such global security measures required adequate resources and became quite burdensome for the national economies of the "strong" states.

Changes that have begun in the global security environment, emerging new and exacerbating traditional threats have mainstreamed questions about the flaws of the existing security systems and their inconsistency with new circumstances. This has led to an assumption that national security systems needed to acquire new characteristics, which would allow states to independently counter threats and hazards of any nature and origin. Within this approach, the role of "strong" states had to change from providing direct protection to the "weak" states to helping them to develop the ability to adapt to changes in the security environment and to counter threats on their own. In fact, a question about state resilience-building arose.

In general, in addition to the above-mentioned, the following works of famous scholars also contributed to shaping and developing a separate scientific direction of security studies: M. Barnett, T. Balzacq, D. Bezvik, A. Bellamy, K. Buza, T. Weiss, P. Williams, J. Duffield, H. Dexter, D. Joseph, B. Evans, J.

Reid, S. Tang, J. Hertz, J. Hoogensen Gjørv, L. Friedman, M. Foucault, and D. Chandler. These issues were also studied by the following Ukrainian scientists: O. Belov, V. Gorbulin, D. Dubov, B. Kaczynski, O. Kornievsky, V. Kosevtsov, N. Nyzhnyk, O. Lytvynenko, G. Sytnyk, and V. Smolyanyuk.

1.1.3. Features of Using the Resilience Concept in National Security

Due to evolving conceptual approaches to national security, developing systems theory, and forming resilience thinking the resilience concept expanded to security studies and the notion of *"national resilience"* has emerged. Further insights and streamlining of the relevant knowledge enabled the formation of an independent concept of national resilience. Among the researchers of this concept are J. M. Anderies, P. Bourbeau, J. Joseph, B. Evans, C. Zebrowski, M. D. Cavelti, M. Kaufmann, K. S. Kristensen, M. Cooper, P. Martin-Breen, G. Laskonjarias, V. Proag, J. Reid, J. Walker, K. Fieder, and D. Chandler.

Studying the emergence and development of the national resilience concept, Walker and Cooper (2011) point out that over the past decade, the topic of resilience has become widespread as an operational strategy for emergency preparedness, crisis response, and national security. Lasconjarias (2017) argues that building national resilience has become a crucial task for states, as it allows them to prepare for countering threats of a new type, which manifested after the hybrid aggression of the Russian Federation against Ukraine in 2014. According to Fjäder (2014), the national resilience concept has emerged in the national security agenda from the expanding range of new threats due to growing global interdependence and uncertainty. The scientist notes that under such conditions, providing security by nation-states is becoming an extremely difficult task and requires new approaches, including the development of national security strategies with due account for national resilience principles.

At the same time, not all researchers interpret the national resilience concept in the same way. Joseph (2013) and Zebrowski (2013) consider national resilience as a special form of governance from the perspective of neoliberal ideas of reducing the role of the state. Critics of the national resilience concept, including Evans and Reid (2015), point to its depressive nature, as it views the real world solely through the prism of threats and imminent catastrophes, thus creating constant anxiety and danger as a "new reality" framework. Besides, Evans and Reid (2015) conclude that the ideology of national resilience changes the public administration principles and political rules, shifting much of the responsibility to the population, which must prepare to live under constant threats.

The study by the Community and Regional Resilience Institute (2013), which analyzes the terms used in social resilience, identifies key classes in the interpretation of the resilience concept in national security depending on the ways of providing resilience, namely:

- resilience as a certain *ability* of an object – a static approach; or as a *process* of achieving a determined result – a dynamic approach;

- strengthening resilience through the object's *adaptation* to cope with adversity or to prevent or *resist* its impact;

- resilience in the context of possible changes (*trajectory*): the first approach proposes to consider an object which survives adversity as resilient, (if it does not – as not resilient), and the second proposes to consider an object that was able to regain its functionality after the crisis also as resilient;

- resilience in the context of predictability of adversities (*predictability*): the first approach considers resilience as the ability to anticipate a threat and prepare for possible adverse impacts in advance, and the second approach considers resilience as the ability to respond to threats effectively;

- temporal or permanent nature of resilience as an immediate crisis response or a dynamic process of preparation to, response to, and recovery from crisis.

As for complex systems resilience, having analyzed numerous studies (Ashby, 1960; Bertalanffy, 1968; Chandler, 2012; Folke 2016; Gunderson & Holling, 2001; Holling, 1973; Holling, 2001), we can identify the following main differences in defining the essence of this phenomenon, namely due to its ability to:

- absorb disruptive impacts and violations of integrity to maintain or regain equilibrium;

- quickly regain equilibrium after environment changes or adversities;

- effectively counter disruptive impacts and other adversities by adapting to their action, including through transition to a new equilibrium.

These differences determine different approaches to ensuring resilience in national security and forming relevant public policy and mechanisms.

In the modern world, there are more and more security challenges and threats to humans, society, and the state. They become more complex and almost impossible to prevent or overcome. Countering such threats usually requires an integrated approach and joint efforts of different national security actors. The concept of resilience should be introduced in national security because of the need for a timely and effective response to a wide range of threats and crises to prevent destructive processes in the state and society caused by their vulnerabilities or inability of the state to perform critical functions.

The implementation of the relevant set of tasks becomes especially crucial in the context of countering hybrid threats. They feature coordinated simultaneous use of a wide range of traditional and non-traditional methods and means of struggle in various fields and active involvement of non-state actors. Combined methods of influence cause a synergistic effect. Besides, hybrid threats are often covert or disguised as other processes within the legal field.

Therefore, such actions are often difficult to identify as threats, especially at an early stage. A hybrid war aims not to establish control over a certain territory, but to destabilize the state and society under aggression and to weaken their ability to protect national interests and values. The continuing aggression of the Russian Federation against Ukraine, which began in 2014, is carried out using this very technology (Horbulin et al., 2017).

A response to hybrid threats, which are mostly long-term and create a situation of uncertainty, must also be comprehensive. In turn, this requires the national security system to be upgraded. However, building capabilities of security and defense forces alone is clearly not enough to strengthen national resilience. In this context, the application of the resilience concept to the field of national security helps form a state strategy that allows the state to overcome threats, crises, and other hazards of any origin and provides acceptable conditions for the state and society to function even in crises. The relevant mechanisms have to be developed and implemented to formulate and implement state policy in national security and resilience.

As Cavelti, Kaufmann, and Kristensen (2015) note, considering the interdisciplinary nature of the resilience concept, it aims to offer universal mechanisms for resilience, survivability, and security that would equally satisfy individuals, society, ecosystems, and technical systems.

National resilience studies is a quite new and promising field for many countries, including Ukraine. National resilience as an effective state and society development vector in conditions of uncertainty should be strengthened with due account for national interests and development prospects. In this regard, the practical implementation of the resilience principles and mechanisms in various fields requires an understanding of the basic theoretical regularities and conceptual approaches in this area, as well as the application of relevant methodology. Otherwise, it is possible to encounter the inconsistency of practical results with the planned tasks and declared intentions.

Now we can see that recommendations in national resilience provided by some Ukrainian and foreign advisors are sometimes divergent and fragmentary. This results from different interpretations of the national resilience concept and differences in conceptual approaches to its formation offered by representatives of the scientific and expert community. Due to the specific features of different disciplines and areas of activity some terminological confusion and substitution of concepts often emerge during the practical implementation of the resilience concept. For example, the following terms are sometimes used as synonyms for "resilience" in the security sphere: "power," "steadfastness," "reliability," "survivability," "security," "stability," "immutability" and even "stagnation" (as resistance to change). These terms have close meanings with certain semantic nuances and characterize different aspects of certain processes or states of a particular object. But they are not completely identical.

For example, the definition "state power" refers primarily to state resource potential in a broad sense (as a set of material and spiritual capabilities available to the state and used to achieve its geopolitical goals (Kachynskyi, 2015)). The concept of "survivability" characterizes a system's ability to remain within safe limits of balanced functioning (Gigch, 1981b). This term is used primarily to describe biological organisms, as well as technical systems (e.g., energy, transport). The term "reliability" can be used as a synonym for resilience regarding technical systems. To characterize the balance in the economy, social relations, and ecology, the terms "stability" and "sustainable development" are usually used. Sukhodolya (2018) draws attention to the peculiarities when such terms are used in energy security, and Boyko (2014) – in the economic sphere. In the medical sphere, the term of resilience in the sense of "resistance" to medicines or treatment (meaning a lack of response or changes in the patient's health) is widespread in Ukrainian society (due to the use of the same word in Ukrainian). In the security sphere, the term "resistance" can be interpreted as opposition to the enemy, including through sabotage, subversion, and guerrilla movement. This

term also differs from the definition "resilience" which has broader sense and characterizes mainly the dynamic processes linked with change.

Therefore, given the variety of above-described definitions, we can emphasize the need to elaborate a common terminology in the national resilience field. It should be noted that there are different approaches to the definition of "national resilience" in the scientific community. In most states and international organizations, which have recently paid considerable attention to resilience building, appropriate glossaries have been created and are used to eliminate confusion and ambiguity in the elaboration of governing documents. There are both thesauri providing interpretations and definitions of all terms and concepts used in this field, and special glossaries of individual reports, articles, documents, etc. The following references deserve attention:

- International Glossary for Resilience (Disaster Recovery Institute, n.d.);

- Security and Resilience Vocabulary of the International Organization for Standardization (ISO, 2021);

- Australian Disaster Resilience Glossary (Australian Disaster Resilience Knowledge Hub, n.d.);

- Glossary: Resilience. Evidence on Demand (UK Government, 2016) as part of a series of inter-related resources synthesizing knowledge on resilience;

- Glossary English from the report: AR5 Climate change 2014: mitigation of climate change (Allwood, Bosetti, Dubash, Gómez-Echeverri & Stechow, 2014) as part of the UN Intergovernmental Panel on Climate Change reports[1];

- Online glossary of the UNISDR (United Nations Office for Disaster Risk Reduction, n.d.), established in accordance with the recommendations of the report of the intergovernmental expert working group on terminology

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[1] The Panel was established in 1988 by the World Meteorological Organization in collaboration with the UN Environment Programme to assess scientific information on climate change and formulate realistic strategies for responding to the consequences; it prepares reports used in the work of the parties to the UN Framework Convention on Climate Change.

relating to disaster risk reduction, adopted by the UN General Assembly on February 2, 2017;

- Glossary of Humanitarian Terms (ReliefWeb, 2008);
- Glossary of basic terminology on disaster risk reduction (UNESCO, 2010);
- Glossary of the FEMA, US Department of Homeland Security (Federal Emergency Management Agency, n.d.a);
- Glossary of Key Terms in Evaluation and Results Based Management (OECD, 2002).

In 2017, the International Organization for Standardization (ISO) included the "organizational resilience" concept as the ability of an organization to absorb and adapt to a changing environment in the "Security and Resilience" section of the Standards Catalog (ISO, 2017a).

A team of scholars from Israel and Canada (Canetti, Waismel-Manor, Cohen & Rapaport, 2013) conducted a survey among students at a number of universities in Israel and the United States to determine their perceptions of the definition "national resilience." According to Canetti et al. (2013), respondents' understanding of this term was influenced both by their individual perception of major threats to national security and by a number of national peculiarities and political-psychological aspects (including trust in national institutions, patriotism, optimism, social cohesion, historical experience, and cultural differences).

There was little difference in "national resilience" definitions made by Americans and Israelis: the generalized American version was more abstract, while the Israeli version was more detailed (Canetti et al., 2013). In general, due to results of this survey, the essence of this concept was defined as the ability of a nation to successfully overcome threats (e.g., terrorism, corruption, and poverty) while keeping social values intact.

Generally agreeing with the conclusions of the above-mentioned researchers regarding the content of the "national resilience" notion, we should add that it focuses on such definitions as a nation, threats, and social values. It also allows for the application of an integrated approach in terms of counteracting a wide range of threats, crises, and other hazards; and it identifies certain functional characteristics (in particular, safeguarding social values). However, such a characteristic of national resilience as "the ability to successfully overcome threats," mentioned by Canetti et al. (2013), is too generalized and does not reflect all the inherent features of the "national resilience" definition. First of all, it is about adaptability which allows the state and society to adapt to the constant influence of threats and rapid changes in the security environment, function continuously during crises, and recover quickly from destructive effects of any kind of threats and adversities to optimal equilibrium under the determined conditions (Reznikova, 2018d).

Given the main provisions of the resilience concept in national security, it can be argued that the adaptability of the state and society means not passively executing the will of a stronger party of relations at the expense of national interests, but a purposeful search for new formats of interaction and mechanisms for the protection of national values and interests, which could continue to function effectively under long-term or imminent threats and hazards.

Analyzing the various definitions of "resilience" and taking into account the alternative conceptual approaches outlined in the above-mentioned studies, we can reveal key features of the "national resilience" definition that distinguish it from other terms and form the basis of a national resilience concept.

First of all, the issue of national resilience concerns security and development of *state* and *society*. *Threats* to national security, *challenges*, and *crises* are also one of the defining characteristics of the national resilience concept. In turn, the need to *respond* to threats and crises requires appropriate actors, capabilities, and mechanisms capable of adapting to change and

effectively overcoming hazards and crises in various spheres. The need to combine two opposite processes (that is *movement* and *immutability*) within this concept should also be considered. It means that some systemic characteristics and processes in the state and society must remain unchanged while others may significantly change, provided the integrity and functionality of the main objects remain intact. Here, the key constants may be, in particular: the need to preserve national values and protect national interests, providing the continuity of the essential services, which the state provides to the population, as well as acceptable living conditions for society and the state. Dynamics is determined by the need to timely and effectively respond to rapid changes in the security environment, new challenges and threats, and the ability to adapt to their permanent or long-term influence. According to this paradigm, the *aim* of ensuring national resilience can be determined.

So, the meaning of the "national resilience" definition can be described as follows: **national resilience** is the ability of the state and society to effectively counter threats of any origin and nature, adapt to rapid changes in the security environment, function continuously, including during crises, and quickly recover after crises to the optimal equilibrium under the reasonable conditions (Reznikova & Voytovskyi, 2021).

That is, the state, society, organizations, institutions, and other objects and parties, as well as certain technical, technological, organizational, and operational systems functioning within the particular state, should acquire a certain *set of qualities* necessary for their secure existence, sustainable functioning, and development in conditions of uncertainty and increased risks, as well as the ability to quickly recover after crises. Determining the limits of transformations that various complex systems can undergo in adapting to adversities while maintaining their functionality, development capability, elemental composition integrity, and system links is currently one of the most controversial issues and requires further research.

In order to avoid terminological confusion, it should be noted that in this case the definition of "national resilience" is used not in the context of preserving integrity and development of a particular ethnic group, but in a broader sense, related to the existence of collective identity and nation-wide political organization. According to many modern scholars,[2] including Rozumnyi, Stepykom, and Yablonskyi (2012), the phenomenon of the nation is complex and multifaceted, it characterizes a certain socio-cultural and historical community, which should not be considered only from the perspective of ethnic characteristics. Rozumnyi (2016) notes that nation-building processes are complex, multidimensional, and multivariate. The scholar argues that currently the concepts of civil society and political nation are equally present in the public consciousness as landmarks of national development and socio-political transformations.

That is, in the above-mentioned "national resilience" definition, the word "national" means belonging not to a particular ethnic group, but to a specific nation state. At the same time, it reflects not only the processes around the state as a political institution and its ability to overcome threats, but also covers a wider range of social relations and objects.

Summarizing the above, as well as taking into account the recommendations of the Resilience Alliance (2010) for assessing complex systems resilience, we can identify key issues, systemic elements, and links that represent the quintessence of the resilience concept in national security (*Table 1.1*).

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[2] Українська політична нація: проблеми становлення : зб. наук. ст. / за ред. М. М. Розумного (заг. ред.), М. Т. Степика, В. М. Яблонського. Київ : НІСД, 2012. 384 с. – Ukrainian Political Nation: Problems of Formation / collection of scientific articles edited by M. Rozumny, M. Stepyk, and V. Yablonski – Kyiv, NISS, 2012.

Table 1.1

Key Characteristics of the National Resilience Concept

Key issues of national resilience	Semantic content	System elements and links
Resilience of what?	Object of resilience	State and society
Resilience to what?	Adversities (stimuli)	Threats, crises, or impacts to which the object must be resilient
What for?	Aim and level of resilience	Adapting to the changing and uncertain security environment while preserving national values and protecting national interests
Whom for?	Parties interested in obtaining the relevant result	Public and local authorities, civil society, scientific institutions, communities, business, and the population that become better protected
Who will do it?	Parties able to ensure achievement of the relevant result	Public and local authorities, civil society, scientific institutions, communities, business, and the population that take the determined measures on strengthening security and resilience of the state and society

Source: developed by the author.

Given the above considerations on the content and key characteristics of the national resilience concept, we can argue that this phenomenon has features of complex systems. We are talking about the basic system elements and their links: objects, subjects, aim, critical parameters, functions, management principles, etc. A set of relevant elements and links makes a *national resilience system*. This conclusion is important not only to understand the specifics of the application of the interdisciplinary resilience concept in national security, but also to develop specific mechanisms and practical recommendations to formulate the relevant public policy.

In light of the above, using a systems approach, it is expedient to analyze features of providing national resilience and formation and functioning of the

relevant system, to identify common features and differences that make the national resilience ensuring system different from the national security ensuring system, and to analyze possible interactions between the two systems.

1.2. National Resilience Ensuring System: Its Essence and Main Characteristics

1.2.1. The Essence of the National Resilience Ensuring System

Based on the systems theory, in particular the studies of Ackoff (1971), Ashby (1960), Bertalanffy (1968), Bogdanov (2003), Parsons (1977), Prigozhyn and Stengers (1986), Setrov (1988), and Scott (1961), it can be argued that the national resilience system, like any other complex system, is a set of objects, subjects, aims, critical parameters, functions, and management principles. Combined according to certain rules, they must be focused on a certain result of system functioning, which will differ from (usually overwhelm) the results that can be produced by its individual elements or other systems.

While applying a systems approach to the national resilience system analysis, the following basic regularities should be considered:

- social phenomena should be considered as systems (Bertalanffy, 1968);

- systems have structures that are a stable unity of elements, their links and system integrity (Ovchinnikov, 1969);

- a system is a set of interrelated variables (Ashby, 1960; Scott, 1961);

- a system is characterized by system parameters – attributes by which it can be identified and classified (Uyemov, 1969);

- complex systems contain simpler systems (Sachkov, 1969);

- complex systems are open, constantly interact with external environment, function purposefully, are able to solve different groups of tasks, and have different levels of structural organization (Sachkov, 1969; Ashby, 1960).

We will also take into account other formation and operation regularities of complex systems during further analysis.

As in the case of the national security system, the national resilience system needs a mechanism to ensure its functioning and development and enable the interaction of all its components so that the system will begin to produce the expected result. Its key purpose is to perform certain actions aimed to achieve the determined goal. The national resilience ensuring system is a holistic and structured mechanism with closely linked elements, including a common mission and aim. A break of links between the elements of this system can lead to its damage or destruction. The integrity and balance are influenced by feedforwards and feedbacks between its elements, the nature of interaction with other systems, and influences from the internal and external security environment, etc.

Therefore, taking into account the previously proposed definition of national resilience and the content of the relevant concept, **the national resilience ensuring system** can be defined as a comprehensive mechanism of interaction between public and local authorities, institutions, enterprises, NGOs, and people, as well as targeted actions, methods, factors and mechanisms that safeguard the security and continuous functioning of key spheres of the society and state before, during, and after crises, including through adaptation to threats and rapid changes in the security environment (Reznikova & Voytovskyi, 2021).

The main **stimuli** (adversities) to which the national resilience ensuring system must respond are threats of any nature and origin, crises, and other hazards. As Rapoport (1969) found out, an input together with a certain system state determines the output and a possible system transition from its initial state to another. At the same time, while stimuli (inputs) can affect various system elements, they, first of all, influence objects that largely determine the system outlines and must gain the determined qualities according to the established aim (Rapoport, 1969). It means that various threats and crises can adversely affect

national resilience objects in different ways and intensities, disrupting both their elements and system links. However, the functional national resilience ensuring system is devoted to preserving the integrity of both objects and system links, giving them the ability to absorb such influences, counteract them, adapt to impacts without significant loss of functionality, recover, and develop after crises.

1.2.2. Characteristics of Objects and Actors in the National Resilience Ensuring System

The key **objects** of the national resilience ensuring system are the *state* and *society*, which may experience destructive impacts (threats, crises, and other hazards). They themselves and their components must have the above-mentioned qualities necessary for a sufficiently safe existence, functioning, and development in conditions of uncertainty and increased risks.

In general, any things (metals, structures, etc.), social and technical systems (political, economic, energy, informational, infrastructural, etc.), people, or organizations may become objects of resilience. As complex systems, they have resilience potential which can be enhanced. The state and society as key national resilience objects are also complex systems. Their elements and system links may be affected differently by different threats, therefore the mechanisms for strengthening the resilience of the state and society may also differ. To determine what specific mechanisms and practices should be used to enhance the resilience of individual components of the state and society, it is necessary to apply the decomposition method to these objects. At the same time, it is important to take general systemic characteristics of key objects, their internal links, and interaction with other elements of national resilience ensuring system into account. In this context, the following conclusions about complex systems' features made by Ovchinnikov (1969) are noteworthy: one object can be

represented as different systems unity; during the study, an object as certain integrity may disappear from the scene shifting attention to the subject of the study determined by the conditions of the formulated task.

As we know from the systems theory, resilience is one of the conditions for the existence of any system. So, the question may arise: why do we need a national resilience ensuring system at all, if its main objects are a priori resilient? However, the resilience of a complex system is not absolute and constant. In response to environmental changes, systems seek to restore their initial state of stability or reach this state at a new level. This can be reached in different ways. The variability of complex systems' adaptability and features of adaptive behavior was pointed out, in particular, by Ashby (1960).

There is also the phenomenon of systemic contradictions, which was studied, in particular, by A. Bogdanov and E. Vinogray. According to Bogdanov (2003), a system develops towards the most stable relations, both internal and between the system and its environment. A contradiction may become apparent in the fact that stable links do not always determine the system development vector but may cause a certain equilibrium to preserve. One way to resolve system contradictions and increase system resilience is to make additional links. As Vinogray (1989) notes, the more precisely the system elements complement each other functionally, the higher the system focuses its actions in a certain direction. This is the basis of the principle of function-added relations in the system.

Given that the modern security environment is becoming more aggressive for the state and society, and adversities are more destructive, it seems reasonable *to create an additional comprehensive mechanism aimed to strengthen the resilience of these objects in the perspective of their further existence, security, and development*.

As complex systems, the state and society also consist of various components, including subsystems.

Certain measures may be taken to strengthen some subsystems or make them more resilient. Such *subsystems* may be classified according to various indicators, in particular, according to the:

1) *sphere of social relations* where they manifest: economic, political, social, and spiritual;

2) *organization level*: national, regional, sectorial, group, and object;

3) *sphere of activity*: economic, environmental, technical, infrastructural, governance, and security.

Depending on the object, scientists often distinguish different subtypes of national resilience: social, technological, and organizational.

Resilience objects may group according to certain features. Taking into account that stimulus's impact is one of the determinants of national resilience system objects, scholars often distinguish areas and sectors of providing national resilience based on the nature or sources of threats.

In order to assess national resilience, a report, prepared for the World Economic Forum [WEF] (2013), suggested singling out the following national subsystems: economic; environmental; governance; infrastructure; and social.

Based on this study, Donno (2017) identified five main areas where threats are most likely to occur, and their impacts can be most devastating, namely: economic, technological, societal, geopolitical, and environmental. Accordingly, the researcher proposes to focus on the resilience of the following sectors: government; agriculture and food; energy and nuclear; water and wastewater; transportation; defense; health; communication and information technology (IT); financial; education; chemical; retail; manufacturing; social services; and tourism.

According to another researcher on this issue, Proag (2014), system resilience matters for a range of the following key sectors: technical, political, organizational, social, legal, economical, ecological, and environmental.

In addition to these scholars, Bourbeau (2013), Rogers (2013), Walklate, McGarry and Mythen (2013) proposed different approaches to the national resilience typology depending on the object or nature of threats.

In general, analyzing numerous scientific publications and existing world practices, we can argue that determining key areas of the national resilience depends on the nature and sources of major national security threats (in terms of their possible manifestations and impacts on different spheres), and the main sectors of resilience development should be determined by processes and activities critical to the sustainable functioning of the state and society. Therefore, it is expedient to determine the following *key spheres of providing national resilience*: economic; environmental; technological; geopolitical; public relations. The *main resilience-building sectors/directions* can be identified within these spheres, in particular: governance; defense and civil protection; critical infrastructure, including water, food, and energy supply, transport, information infrastructure; healthcare; economy and finance; education; retail; social services; internal affairs and foreign policy (*Table 1.2*).

Table 1.2

Key Sub-Systems

of the National Resilience Ensuring System Depending on Object

Base attribute	Classification
1. Nature and source of threats and crises that adversely impact the objects in terms of their possible manifestations and consequences	*Spheres*: • economic; • environmental; • technological; • geopolitical; • public relations
2. Processes and directions critical to the continuous functioning of the state and society	*Sectors*: • governance; • defense and civil protection; • critical infrastructure, including water, food, and energy supply, transport, information infrastructure; • healthcare; • economy and finance; • education; • retail;

	- social services; - internal affairs; - foreign policy
3. Organizational levels of key objects of ensuring national resilience	*Levels*: - national; - regional; - sectorial; - group; - object; - individual

Source: developed by the author.

It is important to determine key spheres and sectors/directions for providing national resilience in order to select a model, which will become a basis for organizing the national resilience ensuring system in each country. Such models may significantly differ in various countries depending on their national interests or governance peculiarities.

An individual can also be an object under threat. In particular, it is about risks of loss of life, health, or property due to an emergency or illegal actions of others. As long as the adverse impacts on individuals are isolated and not systematic, they do not pose a threat to national security. If they cover many people across the country, individual groups, communities, or society as a whole become objects under threat. To determine specific mechanisms for providing national resilience to various threats, it is important to analyze threats and other adverse impacts and their consequences for various target groups, including individuals. Thus, *characteristic features of national resilience ensuring system objects in terms of the stimuli' impact are the scope of the relevant effect and its relation to the national security status*.

While forming resilience of the state and society (as key objects) and their subsystems, it is important to realize what their elements/characteristics should remain *unchanged* during adaptation to changes in the security environment in

order to ensure their integrity and/or ability to perform basic functions, and what elements could be *modified, supplemented, or removed* in order to achieve the determined aim and ensure development in difficult circumstances. So, the national resilience concept combines such processes as *movement* and *immutability*.

Given that an object's resilience is not an absolute value but may change in a certain way, it is necessary to discover how we can influence it, and, in particular, raise the resilience of a particular object to the determined level. This raises a question about the role of actors, methods, factors, and mechanisms for ensuring national resilience.

The main **actors** in the national resilience ensuring system are *public and local authorities, enterprises, institutions, organizations, civil society structures, and citizens that initiate or participate in the national resilience providing processes* (Reznikova & Voytovskyi, 2021). Purposeful activities of these actors enable objects to acquire necessary characteristics, namely: the ability to effectively resist threats of any origin and nature, adapt to rapid changes in the security environment, function continuously (including during crises), and quickly recover after a crisis to the optimal equilibrium under the determined conditions.

One of the distinctive features here is that *objects can transform into actors* in the national resilience system. The point is that a person, organization, society, institution, or state is no more considered a purely passive object of threat but begins to acquire (independently or assisted by other actors) necessary qualities and capabilities to actively resist threats, crises, and their consequences, as well as adapt to new security conditions. In this way objects strengthen their own resilience, using both self-development potential and the capabilities of the national resilience ensuring system. Transforming resilience objects into actors has been studied, in particular, by Cavelti, Kaufmann, and Kristensen (2015). Chandler (2012) believes that a resilient object (both at the individual and

collective level) is never considered passive or insufficiently free but only as an active actor able to achieve self-transformation.

Within the traditional research approach to national security, the state, represented by the authorized state bodies (actors of the national security ensuring system), was entrusted with the main functions of providing the security of citizens, institutions, enterprises, organizations, etc. (objects of the national security ensuring system), including in case of terrorist attacks, natural disasters, and other emergencies. At the same time, citizens, institutions, enterprises, and organizations can independently or in cooperation with others take measures to increase their own security and resilience, turning from passive security objects to active actors in providing national resilience.

The initial response is performed usually at the lowest level, especially when a human is under threat. In an uncertain security environment, strengthening national resilience at all levels, from state to object, is particularly important. At the level of individuals, it is expedient to take measures to increase individual security and resilience (for example, raising awareness of existing and expected threats and hazards, obtaining skills necessary to respond to them, attending self-defense courses, and improving legal and informational awareness) This requires a responsible attitude of citizens to their security. According to Cavelti, Kaufmann, and Kristensen (2015), in the modern world, the security or insecurity of an object is determined not only by the nature and level of threat but also by its qualities, namely how resilient the object is to adverse impacts and hazards.

Most often, researchers distinguish the following organizational levels of the national resilience ensuring system: state, regional (within the state), local (territorial communities level), and object (organizational resilience). There may also be supranational resilience ensuring systems: regional (interstate) and global. Chandler (2012) pointed out the international nature of resilience in his studies.

1.2.3. System Links in National Resilience

The above considerations about national resilience objects acquiring subjectivity allow us to conclude that *system links and processes of providing national resilience have special nature determined by their proactivity*. It is not only about the ability of objects and actors to promptly and effectively respond to threats and crises, but also about their active influence on the environment to prevent threats, reduce their adverse impacts, create the necessary capabilities, and strengthen system links. Practical implementation of such an approach requires changing the paradigm of thinking in order to form a more active and responsible stance of people for the current and future consequences of their actions or inaction. This, in turn, should be reflected in education at all levels, including in training staff for the national security and defense sector.

By enhancing individual resilience, actors not only increase their chances to overcome or adapt to threats and hazards of different nature and origin but also contribute to national resilience-building in general. For example, if an individual household installs solar panels, wind turbines, and other alternative energy sources, then it will increase its individual resilience to the risks of state/regional power grid disruptions. If all households, enterprises, and organizations take such actions, then we can talk about large-scale measures and strengthening national resilience in certain directions and criteria, because reserve capacity and alternative strategies will be formed. At the same time, increasing organizational resilience and clearly-defined responsibilities in providing national resilience of state and local authorities, communities, organizations, and individuals will foster their preparedness and effectiveness in responding to a wide range of threats. In this context, we can consider national resilience as *a set of resilient objects and resilient actors* (Kaufmann, Cavelty, and Kristensen, 2015; Reznikova, 2018d).

Close *links and mutual influences* between objects and actors determine the complex and comprehensive nature of national resilience-building measures

which should cover political, economic, social, informational, psychological, and other aspects. Such connections are embodied through purposeful actions, relevant methods, factors, and mechanisms. At the same time, the national resilience ensuring system interacts with the external environment, which includes other systems. Here, new links (which will help develop key objects and the national resilience ensuring system in general) and additional negative impact factors may arise. Interaction of actors and objects is conditioned by a certain purpose and is aimed to achieve such results, as reducing risks of crises and their impacts, continuous functioning of the state and society under any conditions, strengthening the resilience of key objects and their components against internal and external adversities (stimuli), including through strengthening the existing and forming new system links. The diagram of the interaction between key elements of the national resilience ensuring system and the external environment is shown in *Fig. 1.1*.
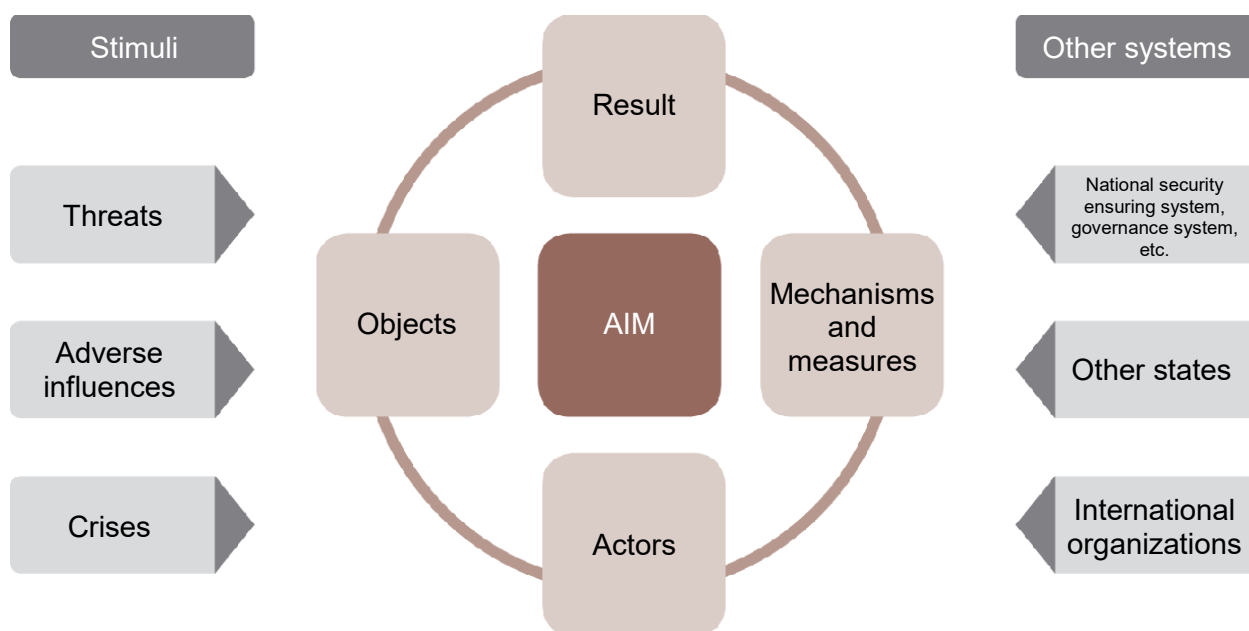
Fig. 1.1. Interaction between the national resilience ensuring system and external environment
Source: developed by the author.

Complex systems' elements can be other systems that interact with each other in keeping complex systems' resilience. Given this, according to one of the founders of the systems theory, Bogdanov (2003), protecting from external impacts and maintaining internal links are two manifestations of the identic trend. At the same time, Ackoff (1971) emphasizes that the interaction of system elements can lead to different results depending on the specifics and purpose of the relevant elements, as well as the nature of their links. We should also take into account that the orderliness of the whole system depends not only on how well its individual elements function, but also on how its relevant processes are organized. For the purposes of systems analysis, Bertalanffy (1968) singled out system structural order (orderliness of elements) and functional order (orderliness of processes).

According to Bogdanov (2003), system changes become more predictable not only because the environment as a source of influence is analyzed but also because the system itself actively influences the environment. Analyzing social systems, the scholar notes that it is necessary to forecast changing external influences and prepare for them not only for success but also for the very existence of such systems. According to O. Bogdanov's conclusions, organizations should carefully allocate their capabilities to strengthen work in some areas and weaken in others. Here it is expedient to use offensive tactics in an area where environment resistance is expected to weaken and vice versa: where hostile activities are expected to intensify, it is necessary to strengthen protection (Bogdanov, 2003).

The aforementioned allows us to conclude that *if the nature and formation features of the links between system elements and its external environment are determined, then public policy in national security and resilience is formed and implemented more effectively*.

1.2.4. Comparative Analysis of the National Security Ensuring System and the National Resilience Ensuring System

After considering the content of the national resilience concept, which links such categories as state, society, national values and interests, threats, and responses, it is expedient to conduct a comparative analysis of the national resilience ensuring system and national security ensuring system. Hence, we should discover interrelationships and differences between these two systems, as well as how to develop specific policy practices that can significantly improve national security (Reznikova, 2018g).

One of the main methods to examine national security issues is a systems approach with the determined necessary conceptual framework and basic system elements: objects, actors, aim, critical parameters, system functions, and management principles. In general, ***national security*** *is protection of national interests and national values from external and internal threats*. There is no established definition of "national security" term worldwide and an exclusive list of areas/components it should cover. The phrase "national security" was introduced into political discourse in 1788 by one of the Founding Fathers of American democracy, A. Hamilton (Hamilton, 1788). Currently, scientists and experts have different approaches to interpreting this term due to its complex, multicomponent, and interdisciplinary nature.

For example, Gorbulin and Kaczynski (2009) define national security as protection of the vital interests of an individual, society, and state in various spheres of activity from internal and external threats, which ensures sustainable and progressive development of the state. Kornievsky (2011) believes that national security is the ability of a state to preserve its integrity, sovereignty, political, economic, social, and other foundations of public life and to act as an independent actor in international relations. Sytnyk (2011) defines national security as protection of the vital interests of human and citizen, society and the state (national interests), which ensures sustainable development of society,

timely detection, prevention, and neutralization of threats to national interests in various social and state spheres. Brown (1983) argues that national security is the ability to preserve a nation's physical integrity and territory; maintain its economic relations with the rest of the world on reasonable terms; protect nature, institutions, and governance from adversities; and control its borders. Holmes (2014) believes that national security is the safekeeping of the nation as a whole. We should add that Western scientific discourse considers a nation primarily as a political rather than an ethnic community (James, 1996).

In general, there are two main research approaches to defining "national security" in the expert community: broad and narrow (traditional). According to the broad approach, national security covers almost all spheres of public life. The second approach narrows the scope of the concept first of all to the military and foreign components of public policy and focuses mainly on preserving state sovereignty and territorial integrity. The above-mentioned research approaches imply that different key means, methods, mechanisms, and tools of the state should be used to provide national security.

Similarly, approaches to determining key national security objects and actors in the scientific literature may also differ. Most often, national security *objects* include national-level phenomena, processes, and relations that need to be protected and preserved. In a more general manner, the objects of national security can be defined as follows: a human, society, and state. *Actors* that have to take necessary security measures are usually the state represented by its authorized bodies. Citizens, society, enterprises, and organizations may be involved in the implementation of certain tasks in the relevant field in the prescribed manner. All elements of the national security system are interconnected, and the relevant mechanisms begin to function due to the **national security ensuring system**, which is a set of interacting national security actors, forces, facilities, methods, factors, and purposeful actions that guarantee preservation and strengthening of national values, protection and progressive

development of national interests through timely detection, prevention, localization, neutralization, and overcoming of internal and external threats, as well as through providing the effective functioning of the national security system and its components. So, the national security ensuring system is an organizational system that arranges the activities of public authorities, institutions, enterprises, organizations, and other entities that should accomplish national security objectives in the manner prescribed by law (Reznikova, Tsiukalo, Palyvoda, Driomov, and Siomin, 2015).

According to Nyzhnyk, Sytnyk, and Bilous (2000), the national security ensuring system is usually organized by the state on the basis of national legislation. Although various actors interact in such a system, it is the state that plays the key role, sets necessary rules, and regulates the system. Here we can clearly differentiate between the terms of national security objects and actors. If a state becomes an object under threat, then all actors (first of all, the authorized state bodies) must interact with each other and take measures within their purview to protect it. Smolyanyuk (2018) also emphasizes the priority of the state in solving national security and defense problems.

In general, the national security ensuring system is intended to counter threats of various origins and levels. Its actors are the state, represented by the main institutions and authorities (primarily the security and defense sector and the strategic governance sector), as well as civil society, organizations, enterprises, and citizens involved in the relevant tasks. All of them are identical key actors of the national resilience ensuring system. Both systems focus on the existing and potentially likely phenomena, trends, factors, and influences that hinder the preservation of national values and the effective implementation of national interests in all governance spheres, i.e. threats to the national security of any nature and origin.

However, as noted earlier, there is no clear delineation between actors and objects in the national resilience ensuring system. A state, institution, society,

individual, organization, or enterprise ceases to be considered exclusively an object under threat when it begins to acquire qualities and capabilities necessary to effectively counter dangerous processes and phenomena and successfully adapts to new security conditions, thereby strengthening its own resilience.

As we know, the national security ensuring system is organized in a clearly *centralized manner*, while the national resilience ensuring system is more *decentralized and flexible*. According to Bogdanov (2003), such methods of organizing complex systems have their advantages and disadvantages.

As the scientist states, centralized systems are able to concentrate efforts ("activities"), and due to linear links between their centers and other elements, their structures are more simple and more stable. But it is harder for the systems to develop, in particular, acquire new characteristics and go beyond the determined model. It is assumed that such systems demonstrate greater efficiency in a predictable environment and planned development. However, too high a concentration in the center weakens its links with the periphery. Besides, links between the other elements are quite weak. According to Bogdanov (2003), this makes the system more vulnerable, especially to environmental influences, and less resilient.

In turn, the adaptability ("plasticity") of the system gives more flexibility to the links between its elements, which facilitates their regrouping (Bogdanov, 2003). This accelerates system development but, at the same time, leads to its organizational complexity and emergence of vulnerabilities. As Bogdanov (2003) states, increasing "quantitative" resilience causes complexity and heterogeneity of system organization to increase and its "structural" resilience to decrease. It is believed that flexible systems function better in changing environment.

There are differences not only between the nature and principles of interaction between the actors of the national security ensuring system and the national resilience ensuring system. The missions of such systems (the ultimate

aims of their activities) also differ. Each of the systems is established to organize activities primarily to provide national security or national resilience, respectively.

The aim of ensuring national security, in general, is the absence of threats and hazards or their surmounting. If a society or a state has suffered significant losses and destruction under adversity, we can consider that the ultimate goal of the national security ensuring system has not been achieved, and the system itself is incapable.

In turn, ***the aim of ensuring national resilience*** is to adapt to threats and rapid changes in the security environment in order to maintain continuous functioning of the main spheres of society and state before, during, and after the crisis.

So, missions of the two systems differ. Providing national resilience implies not the absence but the constant presence of potential or current threats, hazards, and crises. This requires not only the ability to counter them but also to adapt to their permanent or long-term influence.

Measures taken in these systems to achieve a specific aim also have different intentions. An important task of the national security ensuring system is to protect the state, society, and every individual through the authorized state bodies. At the same time, due to the redistribution of responsibilities, providing resilience of people, communities, and organizations is largely their own responsibility. They are the ones that should take basic measures to ensure resilience while the state should facilitate this by providing necessary support.

Emphasizing the differences between these aims, Fjäder (2014) argues that the concepts of national security and national resilience are fundamentally different despite their common features. The scholar concludes that from the public policy-making perspective, the critical question is how to balance the relevant interconnected systems so that they can achieve their goals and make optimal use of resources.

Comparing the core provisions of the human security concept (as currently prevailing in the field of national security) and the national resilience concept, Chandler (2012) points out, in particular, the following fundamental differences: national security focuses mainly on protecting "victims" from threats and crises, responding to the latter, and recovering from them, while national resilience is about eliminating vulnerabilities and possible causes of crises, preventing threats, and preparing for crisis responses. Besides, the main security tools in national security are rights and legal provisions (i.e. direct actions), while in national resilience it is abilities and capabilities (i.e. indirect actions). In the national security system, organizational links are built according to the "top-down" principle (the state concentrates key powers), while in the national resilience system – according to the "bottom-up" principle (the powers are distributed) (Chandler, 2012).

In general, *national security ensuring system and national resilience ensuring system are compatible: they can interact and complement each other*. Here, a *synergetic effect* appears: the national security ensuring system acquires new properties enabling it to significantly improve countering modern threats and hazards.

This conclusion is based, in particular, on the research of Lewes (1875) on the emergence and development of this concept in the complex systems theory, as well as on the works of Bertalanffy (1968), Bogdanov (2003), Corning (2002), and others that claim that interaction of several elements within the system result in exceeding the sum of individual actions, and the system itself acquires new properties that were not inherent in individual elements. Thus, there is an effect of increasing interaction between different factors with coinciding vectors. According to Corning (2002), the main ways to achieve synergistic effects are as follows: functional complementarity of similar activities; a combination of different types of activities; and scale effect (a set of elements produces a unique joint result).

Analyzing the current practices in providing national security, we can conclude that some non-systematized measures are taken within this sphere, which can be generally attributed to ensuring national resilience. In particular, we can speak about periodic reviewing and updating national security strategies and the relevant program documents, forming necessary reserves and emergency plans, and plans for special periods. Nyzhnyk, Sytnyk, and Bilous (2000) argue that the critical parameters of the national security system should also cover resilience of the basic social system characteristics: protecting the constitutional order, adjusting the determined procedures for normalizing ongoing changes, providing the succession of power, and social policy in general.

Regarding the protection of the basic social system characteristics – sovereignty, territorial integrity, and inviolability of the state border – it would be more appropriate to speak about their steadfastness and resistance rather than resilience. The relevant objects need, first of all, protection provided by foreign policy and hard power. Here, national resilience ensuring measures can be used mainly in the form of strengthening, if necessary, national security and defense sector capabilities, using alternative security strategies, asymmetric indirect impacts, and strengthening external ties.

According to Fjäder (2014), security and reliability are important elements of national resilience, reducing the likelihood (prevent) of an emerging crisis, limiting its impact to avoid irreparable damage and fatalities, and facilitating rapid recovery by securing critical structures and resources. At the same time, resilience can be considered an integrated element of national security allowing to provide preparedness for unpredictable and sudden threats when it is impossible or at least uneconomic to use a preventive approach to security. Fjäder (2014) summarizes that in contrast to national security, national resilience is about creating conditions that will guarantee at least minimal stability in meeting basic social needs until adverse impacts of crises and hazards are eliminated. Thus, the scholar proposes to consider national resilience

as a resource-efficient national security guarantee in the face of the recognized risk of uncertainty.

So, the analysis conducted within this study allows us to argue that national security and national resilience ensuring systems have both common and distinctive features (Reznikova, 2018d, 2018g). In general, these systems consist of the same actors and have a certain similarity of objects, but differ in mission, organization of links between actors, and mechanisms.

Within traditional national security ensuring system, the state performs basic functions, and other actors (citizens, civil society, organizations, enterprises, etc.) are involved in certain tasks if necessary (i.e., in case of mobilization or to perform democratic civilian control). That is, the relevant links are formed according to the "top-down" principle. The national resilience ensuring system redistributes certain powers, and actors exercise more powers on a permanent basis. Links between the actors become more complex and become especially significant in the national resilience ensuring system. Here, an important task for the state is to establish coordination, concerted functioning, and effective interaction between the existing or emerging national systems, state and local authorities, and other entities to address common challenges in providing national security and resilience. That is, the relevant links are formed according to the "bottom-up" principle.

In general, traditional exclusive approaches are more suitable for solving a range of tasks in national security, especially those in which the state plays a leading role. At the same time, other mechanisms based on resilience and inclusiveness should be offered to respond to new threats (especially hybrid ones) as well. This approach is especially relevant for solving tasks that require interaction of various actors (first of all, state and local authorities, civil society organizations, business representatives, and individuals) or allocation of responsibilities. Fig. 1.2 schematically shows the formation features of the national security ensuring system and the national resilience ensuring system

(including the weight of key system elements and the nature of systemic links) and their possible interaction.

Fig. 1.2. Possible interactions of the national resilience ensuring system with the national security ensuring system with due account for their features

| National security ensuring system | National resilience ensuring system |
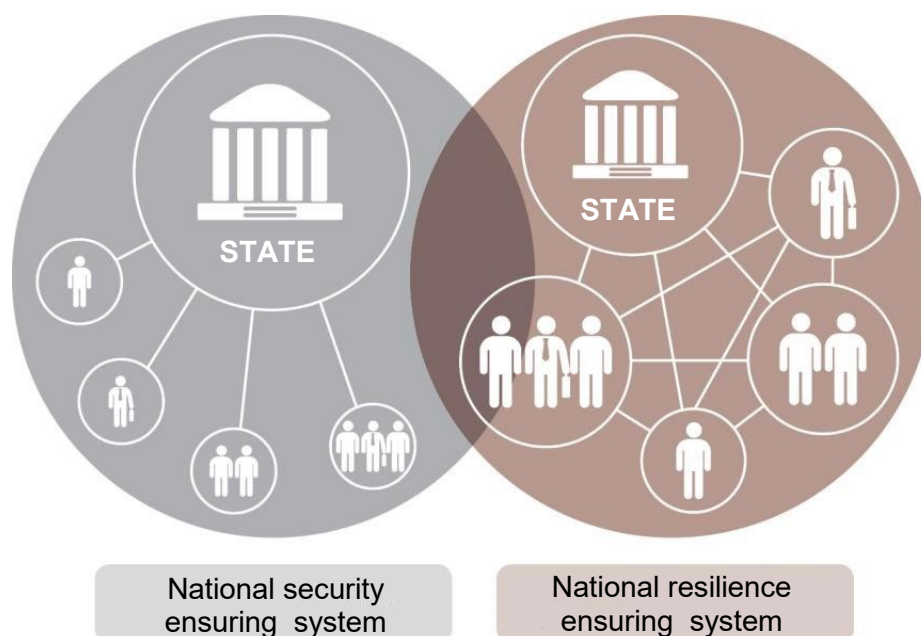
Source: developed by the author.

Given the compatibility of national security ensuring system and national resilience ensuring system, it can be argued that by forming and implementing state policy in national resilience and implementing the relevant mechanisms we can strengthen the national security system by giving it a new quality that better meets the current conditions of uncertainty and high-turbulent environment.

1.3. Theoretical Basis for Assessing and Managing National Resilience

1.3.1. National Resilience Criteria

The national resilience ensuring system can be identified, in particular, by such system parameters as national resilience *criteria* and the *principles*. The resilience of the system objects is formed as they acquire a set of necessary

qualities – fundamentally important characteristics that allow us to identify resilience and distinguish it from other statuses or processes inherent in the state and society. Ways to achieve these parameters determine the nature of national resilience ensuring *mechanisms*, which allow the relevant system to fulfill its mission.

There are different approaches to defining the **national resilience criteria** in the expert community due to different interpretations of the national resilience concept. Let's consider the key criteria of national resilience.

Adaptability (i.e. the ability to withstand impacts and adapt to a change in environment through certain internal changes) is one of the most important characteristics of a complex system's resilience, which allows the system to preserve its integrity and continue to function.

In addition to this criterion, Uyemov (1969) also includes the system's simplicity or complexity, its reliability, stability of the structure, individual elements, and system links in the parameters associated with the system's resilience. Fiksel (2003) determines the following system resilience criteria: diversity (existence of multiple forms and behaviors of the system), efficiency (performance with modest resource consumption), adaptability (flexibility to change in response to new pressures), and cohesion (existence of unifying forces or linkages).

A special report on building national resilience to global risks, compiled by a team of scholars as part of the World Economic Forum's annual report (WEF, 2013), identified five key national resilience criteria, grouped in two clusters:

1) resilience characteristics:

- robustness;
- redundancy;
- resourcefulness;

 2) resilience performance:

- response;

- recovery.

The Resilience Alliance (2010) defines the following important criteria for assessing the social-ecological systems resilience: diversity, openness, tightness of feedbacks, system reserves, and modularity.

Thus, the above-mentioned research approaches to determining complex systems' resilience criteria reflect the main characteristics inherent in a resilient system.

In further research on the determining resilience criteria, Rensel (2015) offers a detailed classification of these criteria depending on the characteristics of their application: the criteria of purpose, status, processes, and system interaction. The scholar developed a resilience matrix, which is an operational tool and can set system parameters which, if achieved, ensure the system's resilience at a level determined by key criteria of its operation: system parameters (overview, normal operation, protection, corrective actions, vulnerabilities, planning, mitigations, and vigilance), confidence, security, continuity of operations, and preparedness. So, according to Rensel (2015), the system resilience is assessed in terms of the system's key functions and processes from the perspective of their sufficiency or insufficiency to achieve the assigned goal or ensure business continuity. Accordingly, the achievement of resilience criteria by an object can be assessed differently depending on the state of the system. In particular, the scholar identifies the following resilience *states*: exposed; confusion; aware; operational; capable.

Other researchers (Proag, 2014; Rose, 2007) offer alternative approaches to determining the resilience criteria of complex systems. They are usually relevant to a particular field of activity and can be used to characterize the state of certain components of the country and society or processes that take place within the national resilience ensuring system.

Recognizing that specific criteria may be used to characterize the resilience of individual subsystems and elements of the state and society as complex systems, based on the generalization of current theoretical research and world practices, it is expedient to determine the *basic criteria of national resilience*. They can be used to characterize various fields, subsystems, organizations, complexes, and processes in national security as well as in the national resilience ensuring system in general. It is expedient to include the following criteria in the list of the basic criteria of national resilience:

resilience criteria of the object's state:

- robustness;
- redundancy;
- adaptability;
- absorption;

resilience criteria of the object's functioning

- preparedness;
- rapidity;
- response;
- recovery.

In general, the above criteria characterize the following key *features of national resilience:*

- the ability of the state and society to effectively respond to threats and crises, ensure sustainable (continuous) functioning and development of key areas, anticipate risks, and overcome obstacles arising from adverse impacts/threats (reliability);

- the availability of additional capabilities that may be involved in case primary and alternative plans fail, as well as development strategies for crises, and safety margin (redundancy);

- the ability of the state and society to ensure survival in crises and adapt to adversities without significant loss of functionality; the ability to transform negative results into positive ones, apply non-traditional, innovative, and inclusive solutions (adaptability);

- the ability of the state and society to neutralize destructive influences and prevent threats (absorption);

- the ability of state servants and citizens to study, learn lessons from the exercises, training, and experience of overcoming threats and crises, establish effective communication and broad liaisons, and plan joint measures to respond to threats and crises (readiness);

- the ability of state servants and citizens to join efforts and effectively respond in a threat or crisis; cohesion; adherence to protocols of concerted action (response);

- the ability of the state and society to restore sustainable functioning of the main spheres of life after crises at a level not lower than pre-crisis; adaptation to new circumstances arising under the destructive influence of a crisis; development (recovery);

- providing rapid access to resources, their mobilization in crisis, and high rates of post-crisis recovery (rapidity).

Summarizing the above, we can conclude that in general, a state can be considered resilient if it is able to:

- function continuously in the normal mode; adapt to changing conditions;

- withstand unexpected blows;

- recover quickly from destructive impacts of threats and crises of any nature and origin to a determined equilibrium (at the previous or new level) while maintaining management continuity;

- develop under difficult security circumstances (Reznikova, 2017).

The above-mentioned basic criteria of national resilience can be used to assess the resilience of various branches, institutions, organizations, and complexes in relation to various threats and crises. At the same time, to assess *society's resilience* we should add a few more features important for determining the nature of social relations.

Having analyzed scientific sources, we may argue that there are some differences in ensuring the resilience of the state and the resilience of society. According to a number of researchers, including Polasky, Carpenter, Folke and Keeler (2011), a set of resilient individuals does not guarantee social resilience. At first glance, this statement contradicts the classical systems theory, which holds that a system's functioning result is greater than a simple sum of its individual elements' results. But at the same time, this judgment emphasizes the special importance of system links and behavior management in society. According to Brown and Kulig (1996/97), people are resilient when they are together.

The authors of the "Report of criteria for evaluating resilience" (Pursiainen & Rød (Eds.), 2016) note that today there are no generally accepted criteria to assess the resilience of society and communities. Those proposed by various researchers are mostly just a list of general socio-economic and institutional-political indicators related to crisis management or the ability of communities to defend themselves.

The aggregated potential of a society or community (social capital) is often considered a basis to assess social resilience. It covers primarily economic, social, and environmental capital, in the context of which specific criteria and indicators are determined. Wilson (2012) argues that economic capital is characterized by economic prosperity, business diversification, budget dependence on external financing, etc.; social capital is characterized by the strength of social ties, access to educational and medical services, corruption level, communication between the main actors, etc.; environmental capital is

characterized through biodiversity, quality, and availability of water resources, predictability of yields, etc.

In addition to the economic and social capital of a society, scholars, including Norris et al. (2008), identify the following important components of social resilience: information and communication (narratives, responsible media, information infrastructure, traditions and skills of the population to use basic information sources, and credible information resources); social responsibility (social proactivity, ability to solve problems together, flexibility and creativity, joint strength and authority, and partnership) and more. According to Norris et al. (2008), the economic capital of a society or community includes, in particular, the level and diversity of resources, as well as their fair distribution; social capital includes the possibility of receiving real and potential social support, social involvement (informal ties), organized (formal) ties and cooperation, community participation, leadership and responsibility, community sense, and attachment to a particular territory. Considering social resilience as a process that ensures the security and well-being of citizens, increases their readiness and effectiveness in responding to threats and emergencies, these scholars suggest taking into account such criteria as reliability, redundancy, and rapidity (including rapidity of access to resources and their mobility) when analyzing the above-mentions social resilience components.

There is a close link between social resilience and community resilience, on the one hand, and the resilience of organizations that ensure their safety and provide critical services, on the other. In particular, Lee, Vargo and Seville (2013) pay attention to this. According to the researchers' conclusion, in order to be resilient, organizations have to meet certain criteria, i.e. have strong leadership, be aware of the environment in which they function, have the ability to overcome vulnerabilities and adapt to rapid change. The ability of organizations to overcome social, cultural, and behavioral barriers that hinder effective communication is also important in today's world.

Summarizing the above, it is expedient to determine *key criteria of social resilience* as follows:

resilience criteria of the state of society/community:

- identity;

- coherence and unity;

- ties between different social groups;

- involvement of the population in economic, political, and other activities within the state and community;

- confidence in authorities;

resilience criteria of functioning of society/community

- effective community management;

- citizens' awareness of the nature of threats, as well as the procedure in case of their occurrence;

- readiness to respond;

- controllability of the situation before, during, and after a crisis;

- creating joint capabilities to counter a threat or crisis.

Table 1.3 shows a classification of basic criteria of national resilience depending on the type of objects in terms of the main components of the state and society, as well as their state or functionability, which are the defining characteristics of resilience in national security. The proposed methodology for determining the basic criteria of national resilience has interdisciplinary nature and can be used as a basis to develop criteria of specified resilience related to various areas, objects, and spheres of public relations.

Table 1.3

Classification of Basic Criteria of National Resilience

Objects	Resilience criteria of the object's state	Resilience criteria of the object's functioning
Branches, subsystems, technical complexes, organizations, processes, the	• reliability; • redundancy; • adaptability;	• preparedness; • rapidity; • response;

national resilience ensuring system, etc.	• absorption	• recovery
Society, communities, social groups, etc.	• identity; • coherence and unity; • ties between different social groups; • involvement of the population in economic, political, and other activities within the state and community; • confidence in authorities	• effective community management; • citizens' awareness of the nature of threats, as well as the procedure in case of their occurrence; • readiness to respond; • controllability of the situation before, during, and after a crisis; • creating joint capabilities to counter a threat or crisis

Source: developed by the author.

To study the resilience of different target groups (communities, organizations, populations, etc.) and branches to certain threats or destructive impacts deeper, detailed criteria can be developed that characterize the specifics of the selected group or branch and its response to relevant threats and impacts (for example, resilience criteria of rural and urban populations to disinformation, critical infrastructure resilience to the terrorist threats, etc.)

1.3.2. Resilience Indicators and Levels in National Security

Based on the basic criteria, we may develop appropriate resilience *indicators* and determine resilience *levels*. It should be noted that researchers define the following main conceptual approaches to determining indicators and levels of resilience: recognition of resilience as a certain system *state* or as a *process* aimed to achieve the formulated goal. Besides, there are other peculiarities and differences in determining resilience indicators and levels of complex systems.

In general, both specified resilience and general resilience of a system can be assessed. According to the Resilience Alliance (2010), *specified resilience* is

the resilience of different objects to different threats or impacts, while *general resilience* characterizes the system as a whole.

It would be reasonable to distinguish two subtypes of specified resilience on the following grounds:

- object's resilience to certain types of threats and crises (for example, resilience of a state and its subsystems to terrorism, droughts, floods, economic crises, and information attacks);

- resilience of a certain object to a wide range of threats and crises (for example, organizational resilience, community resilience, and social resilience)

The Resilience Alliance (2010) has developed a comprehensive methodology to assess the resilience of social-ecological systems based on identification of key system elements and links between them, including aims and motivations of various actors and factors influencing the system state. According to this research approach, the lists of questions have been formulated allowing to:

- assess the state of various subsystems and elements, characterize adversities, and determine if certain problems exist;

- identify factors influencing the whole system and the scope of possible changes (including temporal and spatial);

- identify and evaluate cascading effects within a complex system; evaluate the condition and effectiveness of system management, and in particular, identify formal and informal links between key actors.

The Resilience Alliance (2010) emphasizes that the proposed questionnaires are tailored. They need to be adjusted with due account for the characteristics of the examined object (specific subsystem). According to the Resilience Alliance (2010), appropriate resilience-strengthening strategies should be developed based on the analysis of assessment findings.

Having analyzed the above researches, we can conclude that *assessing national resilience is a complex and comprehensive process that combines*

assessing conditions of various subsystems and processes within the state and society, identifying and assessing risks and vulnerabilities, determining the optimal and acceptable balance of the state and society and their relevant resilience levels. As methodologies for assessing different subsystems and areas of public relations may significantly vary, the question arises if it is possible to harmonize them and compare their results. These problems will be addressed in Chapter 2 of this monograph.

It is expedient to use **indicators** within the above-mentioned basic criteria to assess national resilience. Generally, indicators should reflect peculiarities of the branch, object, or process they will be applied to. That is, we are talking about specified resilience indicators. Therefore, it is expedient to use the method of decomposition of the national resilience system and its objects in order to develop such indicators.

In particular, the Resilience Alliance (2010) suggests considering, among others, the following important indicators that can be used to characterize social-ecological systems' resilience:

- the number of adverse effects that the system can absorb without significantly upsetting its balance;

- the level of the system's ability to self-organize;

- the level of the system's ability to learn and adapt.

Carpenter, Walker, Anderies, and Abel (2001) emphasized the important difference between resilience indicators and other ones. According to them, resilience indicators should focus on variables that describe the system's potential to provide system services (in the case of social-ecological systems – the ecosystem services), while other indicators mainly relate only to the current condition of the system or service.

Today, various international organizations, research centers, and individual scientists develop and offer numerous resilience indicators, which can be used in the national security field. These are, in particular, resilience

indicators of branches and institutions (Jovanovich et al., 2016; Prior & Hagmann, 2012), business processes (IBM, 2009), and operational services (Rensel, 2015). On their basis, certain indices of the resilience of states (FM Global, n.d.), cities (City resilience index, n.d.), and security and resilience standards (ISO, 2007a, 2007b, 2013, 2019a) are formulated. However, there are currently no universal indicators of national resilience.

Other important system parameters on which national resilience ensuring mechanisms should be focused are **resilience levels**. The level estimates can be benchmarks in formulating public policy in the field of national security and resilience. For example, comparing the current object resilience level with an acceptable risk level will help detect vulnerabilities in the state and society. These estimates also allow determining the need to apply certain mechanisms and practices and the amount of resources required for their implementation.

A common method of assessing the resilience level of a complex system is to develop indicators based on the results of generalized expert evaluation according to the selected criteria. This is due to the fact that a large number of risks and threats (especially hybrid), as well as the system characteristics that allow systems to resist or adapt to adverse effects, cannot be statistically estimated. Results of such evaluation are usually somewhat subjective. Given this, the relevant evaluations cannot be perceived as completely reliable but should be considered as the most probable vector of system development. They demonstrate the system's strengths and weaknesses allowing to choose the best strategy for providing the system's resilience.

Considering the above-mentioned research approach, the level of national resilience or the corresponding index (general system resilience index) should be aggregated indicators consisting of estimates of resilience levels in different branches and sectors (specified resilience indices). Criteria for assessing national resilience level should reflect, on the one hand, the specifics of the selected

branch/sector, and, on the other, take into account the basic resilience criteria of the system's state and system's functioning, which were mentioned above.

Another research approach to determining resilience level is to form a list of fundamentally important characteristics of processes and states (benchmarks) that should be achieved to obtain the optimal level of resilience under the determined conditions. According to this approach, the system and its components are assessed during periodic benchmarking.

Based on the above, we can conclude that the need to achieve the established criteria, identify priority areas and optimal level of national resilience, as well as the acceptable risk level and possible losses, is the basis to form mechanisms allowing national resilience parameters to achieve the determined benchmarks. Here we should take into account that the *optimal resilience level varies depending on the objects. The level of an object's resilience to different types of threats, in particular, in different times and contexts, may also vary*.

Holling (2001), Hayek (1967, 1991), Walker and Cooper (2011), Carpenter and Brock (2008), Bowles, Durlauf and Hoff (2006), Erikson (1995) and other researchers draw attention to certain *resilience traps*. First of all, there are extreme cases when a certain system (for example, a state) can be too weak (poverty trap) or too rigid (rigidity trap). Both cases make it impossible to further change the system, its adaptation and development in order to effectively respond to destructive influences and threats. To support their conclusions, these scholars cited the example of a fully decentralized liberal system of government and a totalitarian regime.

Carpenter and Brock (2008) discovered that rigidity traps have the following features: low diversity of system elements, rigid links between them (hierarchy), high ability to focus on a single problem-solving approach, and low ability to develop alternative solutions. All this reduces the system's ability to adapt and increases the risk of its destruction. Such conditions are characterized

by high resistance. For example, biological organisms may stop responding to medicines that have been used for a long time against a particular disease making them more vulnerable to it and limiting treatment mechanisms. In extreme cases, this leads to death.

Carpenter and Brock (2008) also noted that insufficient resilience (poverty) traps are characterized by a significant diversity of system elements with weak links between them. This reduces the ability to mobilize problem-solving ideas and resources. And too weak control combined with significant variability of possible solutions does not allow focusing on the optimal solution to the current problem. For example, this may lead to neglecting public interests in favor of individual or corporate ones. According to Carpenter and Brock (2008), insufficient resilience (poverty) traps indicate the unrealized potential of the system.

Based on the above theoretical conclusions, we can assume that a complex social system cannot have zero resilience level even if it falls into a resilience trap. If we assume such a situation, it would mean the absence of system links between the complex system's elements and, therefore, its inability to function and maintain integrity. Obviously, all existing systems have a certain level of resilience, which can be higher or lower depending on various circumstances and influencing factors. So, within the interdisciplinary resilience concept, it is incorrect to say that a complex system, such as a state, is not resilient. Even in the case of a failed state, it is advisable to equate it with one that has fallen into the resilience trap until it ceases to exist or transforms totally.

In the context of the system resilience level discourse, Bourbeau (2013) concludes that protection from dangers and shocks cannot be guaranteed completely, and no society can be completely resilient. Chandler (2012) agrees, saying that it is impossible to achieve complete resilience: this is just a continuous process with an assigned aim.

To determine the national resilience level, it is important to pay attention to the conclusions of Bogdanov (2003) on the peculiarities of complex systems functioning. According to the law, he elaborated, the structural resilience of a whole system is determined by the lowest resilience of its comprising elements (the law of the least relative resistances, or the law of minimum). This is about a limiting factor that determines, in particular, the rate of system recovery after disrupting effects. Extrapolating Bogdanov's conclusions to the national resilience system, we can argue that if one of the system's elements remains non-resilient, it may point to vulnerabilities, in particular in the state, its subsystems, and society. In view of this, and given that key national resilience system objects are complex systems, it is important to assess the resilience of each of their elements (including individual branches, subsystems, critical processes, public authorities, and communities).

The results of the above research show that the ability of the system to adapt, as well as its resilience level, can change. This raises a concern about how to influence the processes of providing objects' resilience without falling into resilience traps and guiding the system development in a determined direction.

1.3.3. Fundamentals of National Resilience Management

In general, the resilience level of a complex system depends on its organizational features, the type of threats and adversities it faces, as well as the targeted actions of resilience ensuring actors (key actors). In the context of providing national resilience, the activities of such actors are determined by aims and objectives that form the basis of state policy in this area. The effectiveness of such a policy largely depends on whether it corresponds to the content of the national resilience concept and whether it takes into account national resilience management regularities.

In this context, Bogdanov's "law of minimum" deserves attention. According to it, the most destructive effects concentrate on the weakest links. This causes the greatest system resistance (Bogdanov, 2003). In the context of national security policy formation, this law encourages looking for solutions aimed not only at timely detecting vulnerabilities but also at optimizing capabilities directed at recovering from destructive impacts.

Bogdanov (2003) also identified the main ways to overcome the relevant system weaknesses: 1) under anticipated influences (forces) with a determined trajectory, it is logical to systematically strengthen the "weak links;" 2) in conditions of uncertainty, the uneven concentration of capabilities in favor of some and to the detriment of others is pointless and dangerous, as it increases the probability of destructive results even from quite weak impacts on the most unreliable system elements. Relative resilience is maximized through even distribution of capabilities between all endangered links of the whole system.

The Resilience Alliance (2010) expresses a similar caution, arguing that if all attention and management resources are focused on managing resilience to certain types of influences and consequent obstacles, management actions may inadvertently reduce the resilience of the system as a whole. For example, if you strive to be highly resilient to the destructive influence of a certain type, then the system's ability to cope with unexpected or completely new threats may decrease.

Complex systems are able to *self-organize* and *self-manage*, which allows them to counter influences and return to equilibrium. This is a basis for the *"embedded" resilience* of complex systems. This system potential can be increased, in particular, through purposeful actions of the national resilience actors or synergistic effect from liaisons with other systems. This added value is the *"acquired" resilience (Fig. 1.3).*
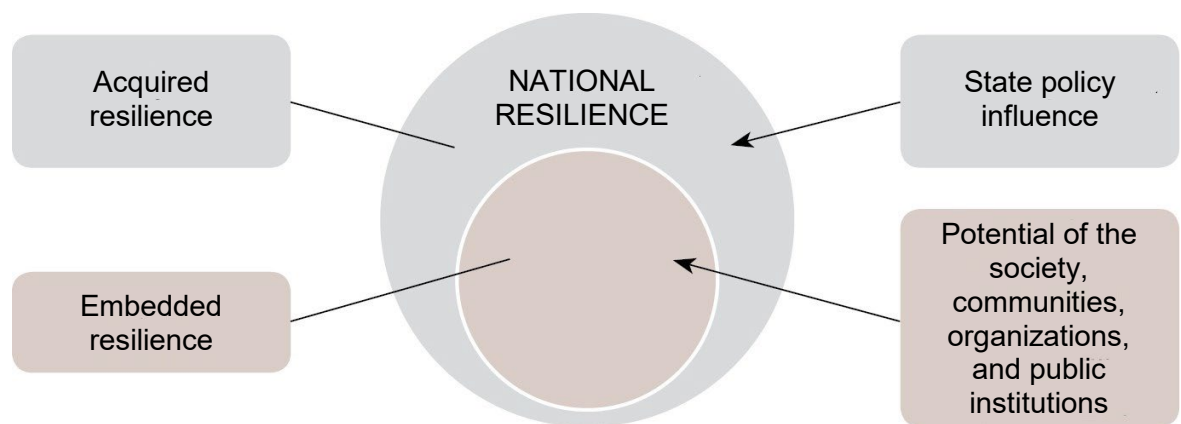
Fig. 1.3. Resilience types by their origin

Source: developed by the author.

Purposeful actions of national resilience actors can change the resilience level of different objects in a certain way. The relevant processes are determined by the laws of systems *adaptive behavior* and *adaptive management* formulated within the complex systems theory.

Ashby (1960) explains the adaptability phenomenon by the peculiarities of the adaptive behavior of biological organisms as complex systems: each mechanism adapts to function according to its purpose; and in general, the mechanism aims to maintain important system parameters (variables) within the determined limits. According to the scientist's conclusions, adaptive behavior equals the behavior of a stable system that functions in an environment where all significant variables are within their normal values (homeostatic range).

Extrapolating these findings to complex social systems, we can argue that they are able to self-organize and, to some extent, to self-govern. This corresponds to Bertalanffy's conclusions (Bertalanffy, 1968) about such important complex systems characteristics as equifinality (a trend to achieve an end state which allows acquiring stability starting from different initial conditions and using different ways based on dynamic interaction in an open system) and feedback (homeostatic support of the system's stability on the basis

of circular causal connections and mechanisms for monitoring feedback on deviations from the condition which should be maintained). According to Bertalanffy (1968), a situation when a system restarts on the basis of a new behavior or operating rules after having overpassed critical values can be an example of adaptive behavior.

However, we should not assume that self-organization and self-governance is the best option for the state and society as complex systems to exist and develop. Governance and social development remain extremely important, especially in national security. Under a wide range of threats and changing security environment, it is expedient to use adaptive management, which, according to Holling (1978), combines the understanding of problems, concepts for solving them, and processes and methods for adaptive assessment and management. It is a flexible adaptive policy-making process, partly aimed at reducing uncertainty. Here, the scientist points out that *assessment as an integral part of adaptive management is particularly important*. Assessment should be carried out continuously during the implementation of the relevant policy or project and provide information essential for selecting and adjusting ways of further development. This is how policy should be adjusted (Holling, 1978).

According to Habron (2003), the Resilience Alliance (n.d.a), and Walters (1986), adaptive management identifies uncertainties and then establishes methodologies to test hypotheses concerning those uncertainties. This process implies the openness and involvement of a wide range of stakeholders. It aims to increase institutional flexibility and encourage forming new institutions required to use this understanding on a daily basis. To this end, adaptive governance must be both a social and scientific process focused on the development of new institutions and institutional strategies, scientific hypotheses, and experimental frameworks. Adaptive management can enhance the overall system resilience by

increasing its flexibility, inclusiveness, diversity, and innovation (Habron, 2003; Resilience Alliance, n.d.a; Walters, 1986).

Bourbeau (2013) identifies three *resilience types* according to actor-defined aims and the amount of effort required to achieve them:

1) resilience as maintenance, which implies such a level of object adaptation at which the available resources and actions will be directed towards maintaining the status quo in the new circumstances (for example, strengthening certain measures within the state policy under implementation);

2) resilience as marginality, which implies responses that bring changes at the margins of an object's functioning (in particular, within the current state policy, regulations, and social structure) that will not affect its systemic parameters (e.g., organizational, institutional, political, and other foundations of society);

3) resilience as renewal, which implies a transformation of basic foundations of the object (e.g., public policy priorities or social structure of society) according to new conditions of development and transition to a new equilibrium.

According to the Resilience Alliance (2010), systems can move from one equilibrium to another, going beyond certain limits. Such movement can be abrupt and unexpected or carefully planned. With this in mind, it is important to know how to push change in order to achieve the determined aim and desired equilibrium. In the context of providing national resilience, it is a matter of determining the relevant public policy priorities.

According to the classification proposed by Bourbeau (2013), we can, in particular, determine various national resilience dimensions in national security policy-making. Given that the first two types of resilience have a more fragmented nature (a specific threat affecting a specific object), it is more expedient to talk about strengthening specified resilience (resilience of the state, society, organization, critical infrastructure, etc.). This means that a set of

resilient objects and actors should be formed to ensure national resilience, which implies that measures aimed to strengthen certain spheres and areas of national security (the first resilience type), as well as to reform the national security and defense sector (the second resilience type) should be developed and implemented.

More effort is required to apply an integrated approach to providing national resilience, especially in countries that face a wide range of threats. It is usually associated with some changes in the social relationships system, including security. This approach is more in line with achieving the third resilience level proposed by Bourbeau (2013).

So, based on the above, we can argue that in the context of adaptive management in national resilience, providing the first level of resilience implies constant monitoring of national security threats, timely detection of dangerous trends, situation analysis, and preparation (adjustment) of action plans (including alternative ones) if the threat level increases.

The second level of national resilience must be ensured when a threat is permanent, but its consequences will moderately impact the society, or if its level tends to exceed the established limits. This requires strengthening national security and defense sector capabilities, providing continuous public awareness about the nature and dynamics of threats and about operating procedures in case they materialize, creating sufficient emergency reserves, and conducting appropriate training, exercises, and other activities within the limits defined by law.

In order to achieve the third level of national resilience, a large-scale reform of the national security ensuring system or its components and mechanisms is required. This, in turn, should aim to provide continuity in governance, continuous functioning of all life-support systems, and social relations during crises, as well as their rapid recovery after a crisis, at least to the previous level.

Bourbeau (2013) points out that these resilience types can exist in a state or society simultaneously or by turns. Summarizing the above, we can assert that it is expedient to combine the above-mentioned different groups of measures to achieve the determined aim and create a basis for a comprehensive national security and resilience policy.

1.3.4. Factors Influencing the Formation of National Resilience

In addition to the targeted actions of resilience actors, a number of other **factors**, including time, situation context, and system constraints (in particular geographical scope) may influence the level of resilience, which can be considered sufficient for a system to sustainably function and develop. According to the Resilience Alliance (2010), it is more important to know what factors push a system out of the existing equilibrium limits than those that break such limits.

The discovery of the *adaptive cycle* of complex systems development allowed finding out regularities that determine the different effectiveness of influence on the complex systems' resilience in different cycle phases. The adaptive cycle alternates between slow and gradual phases of growth and accumulation and shorter innovation-enabling periods of reorganization. Interventions at different stages of the adaptive cycle may have different consequences for system development. In view of this, according to Gunderson, Holling, and Light (1995), there is a "window of opportunity" to respond – a period with the highest effectiveness of system resilience strengthening actions within an adaptive cycle.

Bourbeau (2013) draws attention to another national resilience feature: resilience depends on the *time and context of the situation*. Thus, the same event (phenomenon, trend) may pose a threat (for example, migration as an excessive burden on national social and healthcare systems) to one state while not posing a

threat to another (for example, migration as an influx of skilled workers into the domestic market). The event may also be treated differently in different periods (for example, migration in conditions of sustainable development or armed conflict). Bourbeau (2013) gives another example: a soldier can be considered a resilient actor in an armed conflict or emergency (because of the appropriate training) but have much less resilience, including psychological, as a civilian (while on leave or after demobilization).

Formulating the law of least relative resistance (law of minimum), Bogdanov (2003) argued that the interaction of the system with the environment should be considered as changing over time, therefore, the resilience of the system as a whole depends on the resilience of its weakest link in a specific period.

Based on the above, we can conclude that the *time factor and the context of a situation are variables that should be considered in adaptive management in national security and resilience and formulating the relevant state policy*. In particular, it is important to establish and periodically review which level of national resilience can be considered sufficient under the determined conditions, including that of certain subsystems and elements of the state and society.

The influence of the time factor on the processes of determining the system's ways of development *forms permanent links between past, present, and future*. According to the observations of a range of researchers, including Bourbeau (2013), Gunderson and Holling (2001), Gunderson, Holling, and Light (1995), Kaufmann, Cavelti, and Kristensen (2015), past events often determine current actions and affect future plans.

In particular, Bourbeau (2013) argues that a system changes its equilibrium with a corresponding readjustment of system parameters based on the experience of past events, collective memory, and social history, which is crucial for decision-making in new circumstances.

Learning lessons from the past, including disasters and crises, is important to create and develop the capabilities necessary to counter current and future threats and function effectively under chronic stress and uncertainty. For example, mandatory investigations of aviation accidents according to International Civil Aviation Organization (ICAO) requirements aim to improve aviation safety by eliminating possible shortcomings in the organization of transportation, aircraft design, and staff training. Based on the lessons learned, the recommendations allow strengthening the resilience of both aircraft and aviation transportation systems in general against likely threats of various nature and origin (design flaws, terrorist attacks, and dangerous natural phenomena).

However, it is important not to fall into certain institutional and other traps, mentioned, in particular, by Ashby (1947). He argued that it made sense to reproduce a previously gained experience only if the events were similar. If a system faces completely new challenges and threats, then actions under the old pattern are inappropriate or even harmful to provide system resilience or development.

This conclusion is crucial to forming the national resilience ensuring system in modern conditions characterized by high variability and uncertainty of the security environment. This means that national security policy must be flexible enough.

Attention should also be drawn to other traps in providing national resilience. In particular, Martin-Breen and Anderies (2011) note that this process may be accompanied by a conflict of aims and values, including in the temporal dimension. The point is that by focusing only on solving current problems in the state and society in order to strengthen national resilience, we can significantly deplete resources or create new problems in the long run. For example, using certain medicines to prevent dangerous diseases from spreading can weaken people's immunity and make their bodies insensitive to the necessary treatment in the future, while strict long-time quarantine restrictions can cause significant

economic damage. Besides, given the wide range of current threats and crises and limited financial resources, we have to choose both between the aims and objectives of state policy in various fields and between aims in providing national resilience (e.g. strengthening critical infrastructure or social resilience). This foregrounds an issue of prioritizing the relevant aims and objectives of state policy in various sectors under the existing resource constraints.

Factors influencing national resilience can also be formed during the interaction of the national resilience ensuring system with other systems. In particular, governance, political, and economic processes may influence the level of national resilience. WEF (2013) identified key factors of these influences:

- politicians' ability to govern;
- business-government relations;
- reform implementation efficiency;
- public trust of politicians;
- wastefulness of government spending;
- measures to combat corruption and bribery;
- government provision of services for improved business performance.

Among other factors that influence the formation of national resilience we should mention those that characterize social development processes, namely:

- peculiarities of national mentality;
- general level of education of the population;
- standard of living;
- prevalence and availability of media and other sources of information;
- sophistication of social ties;
- society self-organization level, etc.

All these factors may both strengthen national resilience providing processes and diminish their end results.

Based on the above, we can conclude that it is expedient to apply an integrated approach to managing the national resilience level. We primarily argue that it is necessary to periodically assess the resilience of key objects and their components for their compliance with the determined indicators in terms of basic national resilience criteria. Even if the objects meet these criteria, the optimal and permissible national resilience levels should be adjusted with due account for the findings of the analysis of various factors of influence (time, situation context, etc.). In order to determine measures required to adjust the national resilience level and/or bring the resilience of major objects and their components in line with the basic national resilience criteria, it is necessary to identify an adaptive cycle phase of the state and society. This will allow applying the most effective measures in a determined period. Besides, it is expedient to eliminate or minimize the adverse influences on national resilience from other systems if possible. *Fig. 1.4* shows the general national resilience management algorithm.
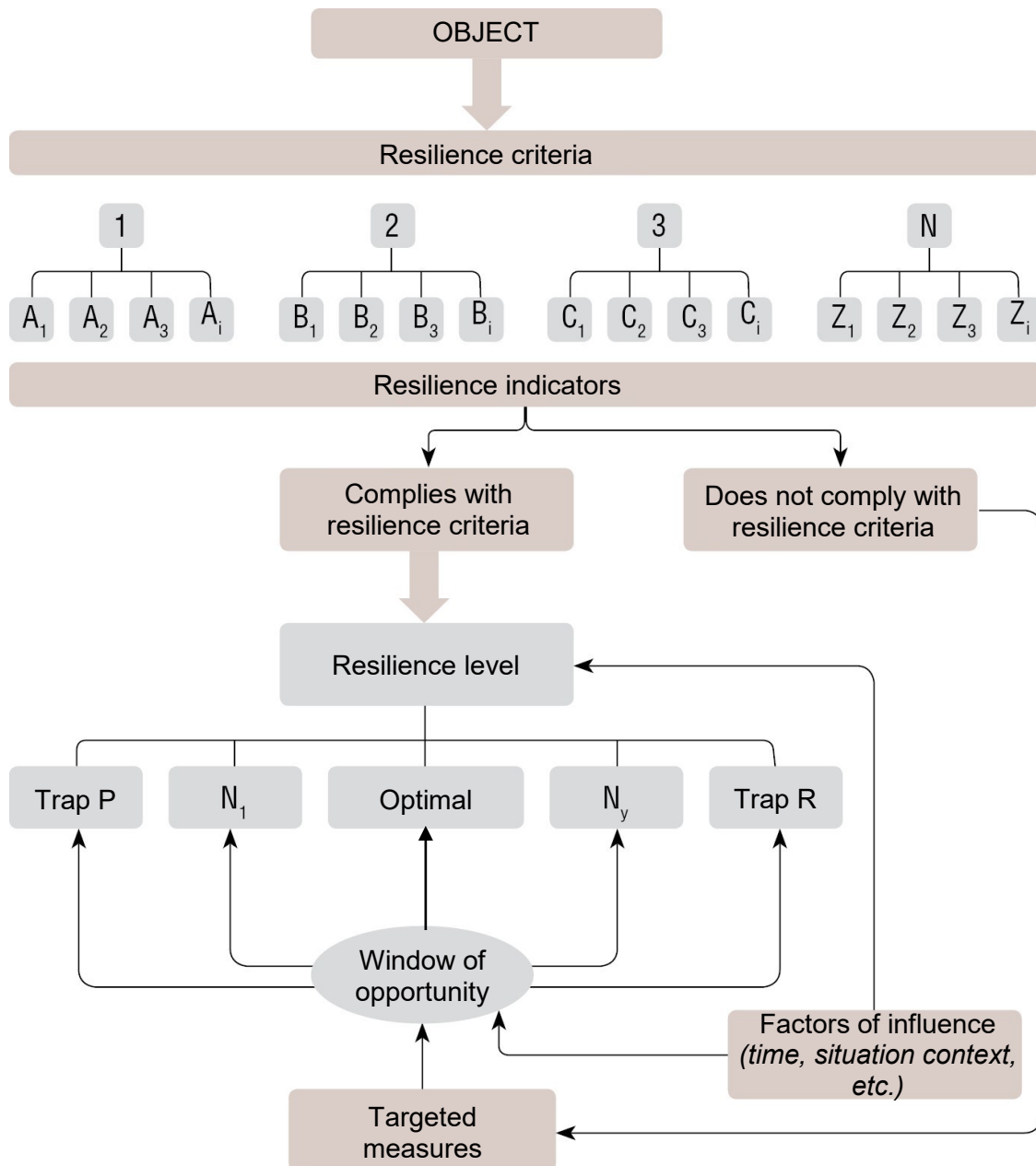
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                              ┌─────────────────────┐
                              │       OBJECT        │
                              └─────────────────────┘
                                        │
                                        ▼
        ┌──────────────────────────────────────────────────────────────┐
        │                     Resilience criteria                       │
        └──────────────────────────────────────────────────────────────┘

          [1]              [2]              [3]              [N]

     A₁ A₂ A₃ Aᵢ      B₁ B₂ B₃ Bᵢ      C₁ C₂ C₃ Cᵢ      Z₁ Z₂ Z₃ Zᵢ

        ┌──────────────────────────────────────────────────────────────┐
        │                    Resilience indicators                      │
        └──────────────────────────────────────────────────────────────┘
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Fig. 1.4. General resilience management algorithm in the national resilience ensuring system

Source: developed by the author.

System capabilities that provide system resilience create a potential of the system allowing it to effectively respond to threats and destructive influences and adapt to a changing security environment. In the national resilience ensuring system, such potential forms a pool of human, logistical, financial, and natural resources and reserves of the state, purposeful activities of national resilience

ensuring actors, organizational links, knowledge, and skills to respond to threats and crises.

So, we can offer the following definition of capabilities in the national resilience ensuring system: *capabilities* are a combination of all available resources, forces, and means of a state, society, community, or organization which determines their ability to effectively respond to threats and crises at all stages of the crisis cycle and adapt to the changing security environment (Reznikova & Voytovskyi, 2021).

The capability factor is important to provide national resilience. Sufficiency of capabilities determines the reliability and redundancy of the national resilience ensuring system and contributes to its adaptability. The capability development level affects the effectiveness of responding to threats and crises and the crisis recovery rate. Insufficient or underdeveloped capabilities may make a state and society vulnerable. Therefore, the capability factor can strengthen or weaken national resilience by the relevant criteria of the system's state and system's functioning.

Vulnerability can be characterized as existing problems, defects, and deficiencies that cause or increase the susceptibility to disruption, systemic damage, and/or susceptibility to adverse effects of risks and threats (Reznikova & Voytovskyi, 2021).

According to Proag (2014), the vulnerability phenomenon implies the existence of a certain risk in combination with social and economic responsibility and the ability to cope with a hazard. The researcher argues that vulnerability is defined as the level to which a system, or part of it, may react adversely during the occurrence of a hazardous event.

Chandler (2012) emphasizes that vulnerabilities can be both the result of the system's inability to make the right choice and the product of certain external circumstances. So, the scientist points out that vulnerabilities constitute our "unfreedoms" or the restrictions, both material and ideological, that prevent

us from being resilient. As examples of different vulnerability degrees, Chandler (2012) points out the following conditions of individuals: "at risk," "socially excluded," and "marginal;" of communities: "poor," "indigenous," or "environmentally threatened;" and of states: "failing," "failed," "fragile," "low income under stress," or "badly governed."

Summarizing the above, we can argue that *vulnerabilities not only exacerbate external threats but can also be a source of internal threats to the state and society, and therefore, timely detection and elimination of vulnerabilities is an important part of national resilience policy*.

1.3.5. Key Processes, Principles, and Mechanisms of Ensuring National Resilience

Based on the above regularities of ensuring national resilience and functioning of the relevant system, we can conclude that a significant part of the targeted actions of various actors falls on the *stage preceding the crisis or threat (pre-crisis)*. Preparations for a possible response to threats and crises are made, the necessary knowledge and skills are disseminated, reserves are formed, and vulnerabilities are identified during this period. We should note that the following crucial national resilience providing processes should be carried out at this stage with due account to the peculiarities of adaptive management:

- continuous security situation monitoring;
- risk assessment, identification of threats and vulnerabilities, assessment of capabilities and readiness of various actors to respond to threats and crises;
- preventing threats, minimizing destructive influences and possible impacts of threats and crises, eliminating reasons for conflict developments;
- providing readiness of public and local authorities, institutions, enterprises, organizations, communities, civil society, and population to respond to any threats and crises;

- planning measures and crisis management, including developing sectoral and organizational resilience plans, introducing universal concerted action protocols of response to threats and crises and recovery of the essential spheres of state and social life to a level not lower than pre-crisis;

- establishing effective coordination and strong interaction between national security and defense sector agencies and other state bodies, territorial communities, businesses, civil society, and the population in preventing, responding to, and recovering from threats and crises;

- acquiring and disseminating knowledge and skills necessary to ensure security and resilience;

- establishing and maintaining reliable communication channels between public agencies and civil society;

- development of international cooperation in the field of resilience.

Researchers identify various processes as key to providing national resilience. For example, Donno (2017) pointed out that the following processes are important:

- continuous risk management;

- emergency management and crisis communication;

- environmental and critical infrastructure protection;

- national security and anti-terrorism;

- informational transparency etc.

It should be noted that most of the above processes aim to provide the **_readiness_** of the state and society which means the ability to timely and effectively respond to threats and crises.

During a crisis or emergency, appropriate knowledge, skills, formed capabilities, plans, reserves, and well-established liaisons allow responding effectively to threats and reduce human, material, and financial losses caused by

threats or crises of any nature and origin in order to provide continuous functioning of key areas and provision of essential services.

After a crisis, the recovery rate of the quality of life and conditions of the society and state at a level not lower than pre-crisis will indicate both how ready the state and society are and how national resilience complies with basic criteria. Prolonged and exhausting recovery largely results from a lack of attention to pre-crisis measures.

Given that feedback is an important factor in complex systems' resilience (Ashby, 1960; Bertalanffy, 1968), we should emphasize that learning lessons is important to ensure national resilience. In particular, lessons learned improve the existing crisis management practices and use the obtained information in the next risk and consequences assessment cycle. However, it is important not to fall into the institutional and other traps mentioned above. In particular, while preparing strategic documents and contingency plans we need to keep in mind that in addition to risks known from experience new ones should be considered, especially risks called "black swans." They are very difficult to predict, but the materialization of such threats can significantly and suddenly change the security situation and simultaneously affect different areas. The rapid spread of COVID-19 all over the world is such an example. The question of risk assessment peculiarities and methodology will be covered in more detail in Chapter 2 of the monograph.

In view of the above, we can define the ***national resilience ensuring cycle*** as a sequence of actions of national resilience actors which allow to effectively counter threats of any origin and nature, adapt to changes in the security environment, and maintain continuous functioning of essential life spheres of the society and state before, during, and after a crisis in order to survive and develop (*Fig. 1.5*).
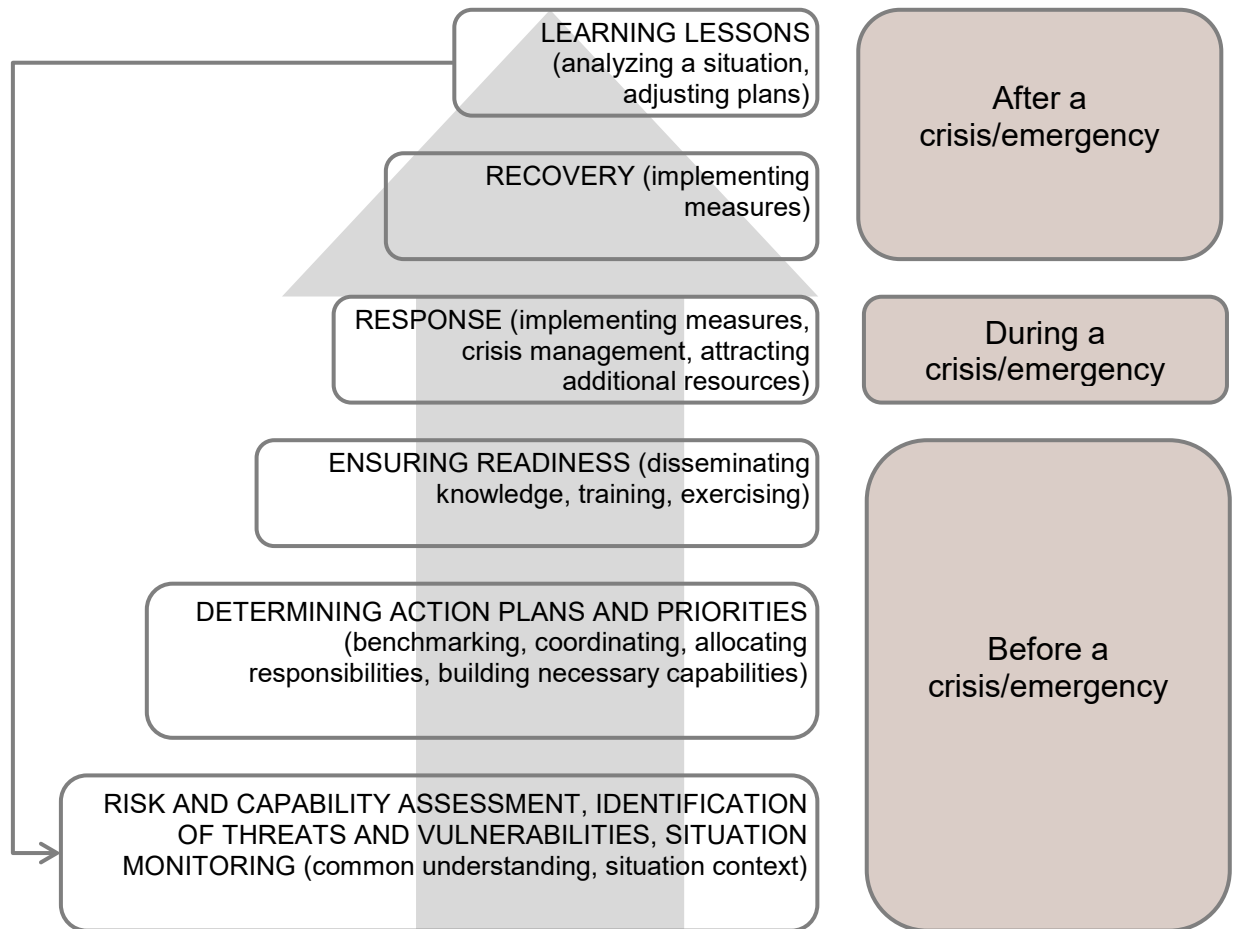
Fig. 1.5. National resilience ensuring cycle

Source: developed by the author.

Given that modern threats and responses are complex sets of links and relations, we can argue that ensuring national resilience is an open, constantly evolving, and adjusting process. This conclusion justifies the expediency of making national security and resilience policy more flexible through adaptive management.

Considering the content of the national resilience concept, it would be appropriate to define the following key organizational and functioning principles of the national resilience ensuring system:

comprehensiveness – taking coordinated measures against any threats and crises at all stages of the national resilience cycle;

inclusion (broad interaction) – implies that all involved actors continuously share necessary information, communicate with each other in different formats, jointly perform certain tasks within the determined responsibilities;

adaptability – the ability of the system to adapt (without significant loss of functionality) to new or crisis conditions, that have arisen under a threat or crisis, to ensure survival, evolution, the ability to transform negative results into positive ones, and to apply innovative solutions;

predictability – timely identification of threats and vulnerabilities and risk assessment;

reliability – implies that the system is fully operational and able to overcome failures that occur under the influence of threats and crises, and all the involved actors have sufficient and developed capabilities to respond to threats and crises;

awareness – implies that all the involved actors have the appropriate knowledge and practical skills to respond to threats and crises at any stage;

readiness – availability of action plans for a joint response to any threats; appropriate level of theoretical and practical training of all the involved actors in order to respond at all stages of the national resilience ensuring cycle;

mobility – the ability to quickly involve primary and backup forces, means, resources, and join efforts to achieve objectives under threat or crisis;

redundancy – additional capabilities of a system that can be used after primary ones fail, as well as alternative plans and development strategies;

continuity – implies that in crisis or under influence of a threat, the system continues to operate without significant loss of functionality, and all the involved actors are able to perform their basic functions;

subsidiarity – aims to allocate powers and responsibilities so that decisions on responding to threats and crises are made at the lowest possible level with coordination at the relevant higher level.

It would be reasonable to assume that key processes that must take place to ensure national resilience and organizational principles of the relevant system are crucial to forming national resilience ensuring mechanisms.

National resilience ensuring mechanisms are sets of decisions and measures that determine a sequence of certain processes and actions that meet general aims and functional principles of the national resilience ensuring system and are focused on achieving the determined resilience level and criteria by the state, society, and their individual components.

According to the content of the national resilience concept, it would be expedient to define the following *key objectives* to be solved by these mechanisms:

• adaptation of the national security policy and management system of the essential life support spheres of the state and society to uncertainty and rapid changes in the security environment;

• eradication of the causes that give rise to the vulnerability of the state and society;

• providing continuity of governance and critical financial and economic processes in the state, organizational resilience of state and local authorities, continuous functioning of the essential life support spheres of the state and society (primarily critical infrastructure) in normal mode, during and after crises;

• ensuring public resilience to destructive influences (including information);

• providing prompt restoration of the quality of life of the population and proper functioning of society and state after devastating impacts of threats and crises of any nature and origin to a level not lower than pre-crisis.

In general, national resilience ensuring mechanisms aim to achieve these objectives and have a common base, but they may have peculiar features depending on their scope of application (economic, environmental, or political) Thus, it is possible to distinguish universal and special national resilience

ensuring mechanisms. *Universal mechanisms* determine the organization of cross-sectoral processes or certain types of activities that require the interaction of different national resilience actors. *Special* mechanisms are used in certain branches or spheres of activity with due account for their functional specifics and general approaches to providing national resilience.

In order to implement a systems approach to ensuring national resilience, the state must first form and implement universal mechanisms that will make the basis of the national resilience ensuring system. This will help introduce a common understanding of the aim and objectives in this area, eliminate duplication of functions, and use resources of the state and society efficiently. However, this does not mean that special resilience mechanisms cannot be applied in different branches and areas until the relevant system is in place.

System resilience ensuring mechanisms may also differ depending on their purpose. In particular, Moench and Dixit (2007) notes that system resilience may form in two ways:

1) the direct strength of structures or institutions when placed under pressure (hard resilience); and

2) the ability of systems to absorb and recover from the impact of disruptive events without fundamental changes in function or structure (soft resilience).

Extrapolating this conclusion to providing national resilience, we can argue that national resilience ensuring mechanisms can form in two main directions, namely:

• strengthening state and society institutions and capabilities in counteracting modern threats and dangers, which implies, in particular, timely detection and elimination of vulnerabilities;

• introducing new processes and sets of measures (organizational, technical, and economic) that will enable the state and society to adapt to the continuous effects of a wide range of threats and disruptive influences.

Any combination of appropriate measures could be used in practice. In particular, the first type of national resilience ensuring mechanisms include reforming and developing the national defense and security sector, revising security strategies and doctrines, forming joint security capabilities of communities and mobilization reserves, developing early warning systems and the state situation centers network, continuous exercises and training both for state servants and the population regarding the nature of certain threats and procedures in case they escalate.

It would be appropriate to highlight the following most important groups of the second type of national resilience ensuring mechanisms:

• providing governance continuity, including the guaranteed succession of power, strengthening coordination between authorized state bodies, forging communication between them and non-governmental actors (including through forming targeted interagency groups, partnerships, and permanent networks);

• ensuring continuity of critical services to the population (including creating a critical infrastructure protection system, sectoral action plans, and concerted action protocols for crises response);

• creating a multi-level system to assess risks and capabilities and identify threats and vulnerabilities;

• forging stable two-way communication channels between the authorized state and local authorities with the population.

It should be added that such activities as improving legislation (including strategic planning and crisis management principles), coordinating forces and means, and follow-up monitoring are cross-cutting and may be part of both the first and the second type mechanisms.

Given that modern hazards can threaten not only a state but also a society, individual organizations, enterprises, and people, the resilience ensuring mechanisms can be both complex (operate at the state level) and individual –

implemented at the level of individual actors (institutions, organizations, subsystems, and communities).

Summarizing the above, we can state that it is very important to define priorities in forming and applying certain national resilience ensuring mechanisms and their settings (in particular, establishing an acceptable risk level and optimal resilience level of various objects under certain conditions) in order to form national security and resilience policy. Its development and implementation features will be described in the following chapters of the monograph.

Conclusions to Chapter 1

As a scientific direction, national resilience studies have formed as a result of the development and mutual enrichment of various scientific disciplines: primarily complex systems studies, sustainable development studies, and security studies. Science and technology advancements, new emerging threats, and expanding traditional ones point out that the national security ensuring system is inconsistent with new conditions, so new conceptual approaches and areas for improvement should be found.

Although the issue of national resilience formation is actively included in the agenda of many states and international organizations, we can state that there are still no established definitions of this term, its generally accepted criteria, methods of national resilience assessment, and requirements for building a national resilience system. Different interpretations of the resilience concept in national security cause different approaches to public policy in this area. Such an ambiguous situation leads to substitution of notions when under the pretext of strengthening national resilience, some experts and officials propose

inconsistent excursive measures with insignificant overall effectiveness and high resource consumption.

Given that the current security environment is becoming more aggressive towards the state and society with more destructive impacts, it seems justified to establish an additional comprehensive mechanism aimed at strengthening the resilience of these system-forming objects to ensure their security and further development in conditions of uncertainty. The national resilience ensuring system is such a comprehensive mechanism that it should be practically formed with due account for fundamentally important theoretical conclusions and regularities within the national resilience concept.

Among important theoretical conclusions, we would emphasize that the state and society are complex systems, and their components may be differently affected by different threats. Besides, passive security objects can turn into actors that self-ensure their resilience, and the increasing total number of resilient objects and actors can strengthen the overall national resilience. It should be noted that in order to practically achieve this, citizens need to change their paradigm of thinking and form a more active and responsible stance on current and future consequences of their actions or inaction, especially in security.

According to the formulated theoretical foundations for building national resilience ensuring system, not only the characteristics of its systemic elements and the links between them but also defining its mission, aim, operation principles, key processes, details of applying universal and special mechanisms, nature of interaction with other systems, and influences from the internal and external environment are important. The key processes that should take place within the national resilience ensuring cycle and the formulated principles of such activities are crucial to forming state policy in national security and resilience, including the prioritization of the relevant mechanisms and measures.

After a comparative analysis of the essence and fundamentals on which the national security ensuring system and the national resilience ensuring system are formed, we may see their compatibility and possible synergistic effect from their interaction. It is justified to separate the national security ensuring system and the national resilience ensuring system for research purposes. But practically, keeping a separate national resilience ensuring system to operate in parallel with the existing national security ensuring system can be too burdensome for the state. Given the limited resources and common characteristics of both systems, it would be more appropriate to say that resilience principles and the relevant mechanisms should be implemented in the national security field. A comprehensive national security and resilience ensuring system implemented in such a way would significantly increase the effectiveness of countering modern threats and destructive influences in uncertain and changing security environment.

Close links and mutual influence between national resilience objects, actors, other systems, and the external environment result in the complex nature of measures aimed at providing national resilience to cover political, social, psychological, and other aspects.

A comprehensive state policy in national security and resilience should be elaborated and implemented with due account for the content of the national resilience concept and the relevant regularities. In particular, it is important to identify which elements and characteristics of key objects and their components must remain unchanged in order to provide their integrity and basic functions and which can be correlated to strengthen national resilience. Relevant public policy should also take into account the adaptive behavior of complex social systems and their ability to self-organize and self-govern, how the general situation context and time influence the effectiveness of national resilience ensuring measures, and what resilience, institutional and other traps exist.

In general, in a changing security environment, state policy in national security and resilience should be developed and implemented with sufficient flexibility and based on adaptive management due to the fact that ensuring national resilience is an open, constantly evolving, and changing process.

As an adaptive management component, national resilience assessments should be performed regularly while formulating and implementing the state resilience policy to provide information necessary to identify and adjust priorities and measures that should be taken in the state and society to achieve a certain resilience level. Such assessment is a complex process. It is based on the use of criteria of resilience state and resilience functioning of the state and society and their subsystems, analysis of indicators developed with due account for the specifics of different spheres of social relations, as well as resilience levels of various objects that may fluctuate within a certain range and have to take situation context and other influencing factors into account.

There is also one more important theoretical conclusion of high practical importance: greater predictability of changes in a complex system may result not only from analysis of the environment, which is a source of destructive influences, but also from the active influence of the system on such an environment. In the context of providing national resilience, this emphasizes the need to transfer from reactivity to greater proactivity in formulating and implementing state policy measures in this field.

The above study reached theoretical conclusions about the features and regularities of the establishment and functioning of the national resilience ensuring system. These conclusions are crucial to forming the model of this system and to considering the peculiarities of each state and the development and implementation of national security and resilience policy in general.