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MANIFESTO FOR SYSTEMS TRANSDISCIPLINARITY (2023-2030)

Vladimir Moki*Director of Institute of Transdisciplinary Technologies,
Russia, KBR, Nalchik
E-mail: vmokiy@yandex.ru***Tatiana Lukyanova***Specialist of Center for Sustainable Development,
Kabardino-Balkarian State University,
Russia, KBR, Nalchik
E-mail: luktania@mail.ru*

МАНИФЕСТ СИСТЕМНОЙ ТРАНСДИСЦИПЛИНАРНОСТИ (2023-2030)

Мокий Владимир Стефанович*директор Института трансдисциплинарных технологий,
РФ, Кабардино-Балкарская республика, г. Нальчик
E-mail: vmokiy@yandex.ru***Лукьянова Татьяна Александровна***специалист Центра устойчивого развития,
Кабардино-Балкарский Государственный Университет,
РФ, Кабардино-Балкарская республика, г. Нальчик
E-mail: luktania@mail.ru*

ABSTRACT

It is suggested that the challenging problems of contemporary society have reached the peak of their negative effect. In such a situation, society faces a dilemma whether to enter the era of fatal social, anthropogenic and climatic disasters, or to overcome the narrow-minded thinking and follow the path of transforming society and forming a new civilization. It is assumed that the new civilization will be based on values in which the meanings of ancient wisdom are manifested. Similar statements have appeared before. However, today, their former declarative content should become conceptual, methodological, and technological. To achieve this goal, it is proposed to recognize that the period of transdisciplinary awareness and resolving complicated low-threshold and medium-threshold problems has been successfully completed. The authors declare the commencement of a new period – the period of systems transdisciplinary solution to complicated high-threshold problems of society, as well as describe the basic principles that underlay such a period.

АННОТАЦИЯ

Высказано предположение, что сложные проблемы современного общества достигли пика своей негативной активности. В такой ситуации перед обществом возникает дилемма: войти в эпоху фатальных социальных, техногенных и климатических катастроф, либо преодолеть косность мышления и пойти по пути трансформации общества и формирования новой цивилизации. Предполагается, что новая цивилизация будет основана на ценностях, в которых проявятся смыслы древней мудрости. Подобные заявления появлялись ранее. Однако, сегодня, их прежнее декларативное содержание должно стать концептуально-методологическим и технологическим. Для достижения этой цели предлагается признать, что период трансдисциплинарного осознания и решения сложных низкопороговых и сложных среднепороговых проблем успешно завершился. Авторы заявляют о начале нового периода – периода системного трансдисциплинарного решения сложных высокопороговых проблем общества, а также, описывают основные принципы, которые заложены в основу такого периода.

Keywords: transdisciplinarity, scientific worldview, systems thinking, sustainable development, innovations of higher education.

Ключевые слова: трандисциплинарность, научное мировоззрение, системное мышление, устойчивое развитие, инновации высшего образования.

1. Introduction

In 2020, F. Pasquier and B. Nicolescu, President and Honorary President of the International Center for Transdisciplinary Research (CIRET), gave a principled assessment of the development state of society and the role of transdisciplinary researchers in the renewal of modern civilization. They stated:

We are experiencing a time of great trials and great transformations. It is quite obvious that unrestrained globalization, based on economic profit, has proved untenable. The world of tomorrow is going to be dramatically different from the world of today. This is not about a simple reform of civilization but about a radically new civilization based on new values, in which the meanings of ancient wisdom will appear again. We are deeply convinced that transdisciplinary researchers, as well as spiritual associations around the world, will become a source of new and updated ideas of this new civilization [29].

In the context of such an assessment, Pasquier and Nicolescu proposed to update the fundamental ontological question: how to be? (or how not to be?):

We have to learn how to live all together. This brings us to translate the question from just a personal position (point of view) and instead in its collective and social dimension. It means the whole thing might become a question of education: we probably have to (re-)invent a new pedagogy. It should include: transdisciplinary approach, complex thinking process, transpersonal psychology, soft skills, consciousness, spirituality (not to be confused with religion) etc. The use of (always) new technologies must be part of this investigation, as they can increase our awareness and consciousness, creating a new field called technontologies (i.e. technics + ontology). Then, we will approach a transdisciplinary paradigm for our personal and collective lives, for a future of hope and fair sharing of the only planet we collectively need to take care of. Therefore, we need work together to find the answer to this question. [30, pp. 7-8].

A. Ertas, Director of the Academy of Transdisciplinary Studies (honorary member of CIRET), also stated the need to teach students new skills of dynamic synthesis of disciplinary knowledge. Such skills will allow future specialists to adequately respond to existing and future Grand Challenges [8].

E. Morin, a well-known philosopher (member of the CIRET Board of Directors) summarized the above:

One of the greatest problems we face today is how to adjust our way of thinking to meet the challenge of an increasingly complex, rapidly changing, unpredictable world. We must rethink our way of organizing knowledge [27, p. 5].

We have summarized similar statements, assumptions and utterances of CIRET members, and the opinions of many transdisciplinary researchers from international transdisciplinary communities [1, 2, 6, 34, 37, 39, 40].

As a result, we came to the conclusion that the existing ideas, as well as the conceptual and methodological apparatus of transdisciplinarity have successfully fulfilled their task [24]. This apparatus allowed comprehending complicated low-threshold problems (complicated disciplinary and interdisciplinary problems) and complicated medium-threshold problems (problems of non-standard situations related to space exploration, green energy, preservation of the ecology of the region, creation of advanced industrial technologies, etc.), as well as offered their transdisciplinary resolutions.

However, resolutions of complicated high-threshold problems were not proposed during this period. Such problems include scientific substantiation and development of a new model of the global socio-economic order; effective management of sustainable development of society; regulation of climate change processes; countering viral pandemics, coping natural disasters, etc. We are confident that the lack of resolutions of complicated high-threshold problems is not related to their high complexity. The main reason is the lack of special departments at universities to train specialists who could effectively solve these complicated high-threshold problems. Therefore, we invoke transdisciplinary experts, higher education organizers, and executives of funding organizations to support a new period in the development of transdisciplinarity – the period of transdisciplinary resolutions of complicated high-threshold problems, as well as to support first international projects in this field.

Appeals to the effective solution to complicated high-threshold problems, which mark the commencement of the transformation of the existing civilization, were heard earlier [31, 38]. However, these appeals were declarative and did not have the appropriate mechanisms for their practical implementation. Now the situation has changed. Appeals to the effective solution to complicated high-threshold problems are based on an appropriate theoretical and methodological apparatus as well as technical and technological ideas. As a consequence, these appeals and related activities are gaining many well-wishing supporters. Nevertheless, we predict the emergence of even more influential opponents. Our task is to show obviously, simply, and convincingly such opponents that the society transformation processes and the renewal of civilization that have begun are objective and, therefore, inevitable. Taking into account the objective character of such a transformation, we are obliged to provide its theoretical and practical support, as well as to involve disciplinary specialists and transdisciplinary researchers from all concerned countries in the upcoming work.

To achieve this goal, we announce:

- the expediency of customizing the conceptual and methodological apparatus of systems transdisciplinarity to solve complicated high-threshold problems

accompanying the transformation of contemporary society (2023-2030);

- the expediency of full-scale preparatory works on customizing the systems transdisciplinary conceptual and methodological apparatus, tools, and technologies to solve the problems of planning, forecasting, and management of sustainable development of contemporary society (2023-2030);

- the expediency of full-scale preparatory work on customizing the systems transdisciplinarity to teaching at universities and training generalist specialists, professionally proficient in systems transdisciplinary tools, techniques, and technologies for solving complicated high-threshold problems of contemporary society (2023-2026);

- the expediency of full-scale preparatory work on customizing the systems transdisciplinarity conceptual and methodological apparatus, tools and technologies to immediate resolving of the wicked problems of contemporary society (2023-2026).

2. On the frozen image of a dynamically developing transdisciplinary reality

In 2022, welcoming the new members of CIRET, Pasquier expressed regret that it is difficult to imagine a frozen image of a dynamically developing transdisciplinary reality, in which human civilization is inscribed.

The absence of such an image makes it difficult to confidently predict the development of nature, plan social advancement, as well as effectively manage the socio-economic development of modern civilization.

To imagine such a frozen image, one should agree that the observed complexity and unpredictability of the world do not cancel the objective goal of its existence and development. We do not discuss the content of this goal, but we argue that in order to preserve the expedient advancement of a complicated and rapidly changing world, there must be periodic synchronization of world's many diverse, different-sized cyclic, non-biological, biological, and social processes (see Figure 1a). Synchronization is caused by the coherence of these cyclic processes. (*Coherence* – is the coordinated flow of oscillatory or wave processes in time and space, manifested when they superposed). Superposition and synchronization of the processes result in an appearance of a certain interference pattern. (*Interference pattern* – is a *time-independent* distribution of the amplitudes of the resulting oscillations at points where the waves are superposed on each other). In our opinion, this interference pattern, independent of time, is the very same frozen image of a dynamically developing transdisciplinary reality. A model of such an interference pattern is shown in Figure 1c.

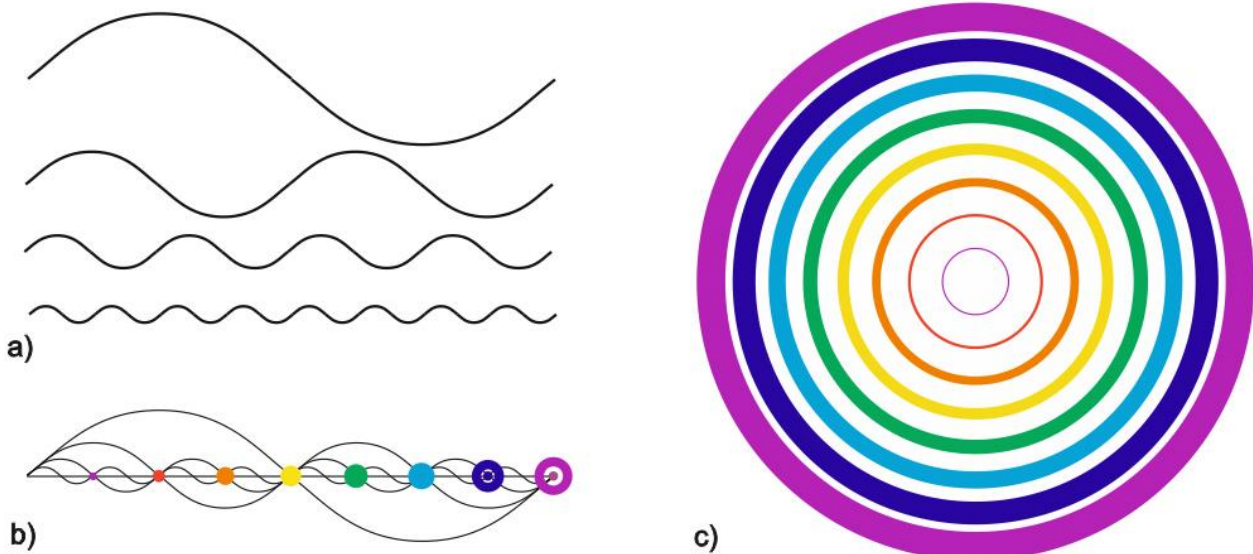


Figure 1. Schematic representation of the interference pattern of a frozen image of a dynamically developing transdisciplinary reality. a) various and different-sized cyclic processes; b) scheme of superposition of cyclic processes, manifesting the stages of general development (points of processes synchronization) and periods of general development (intervals between points of processes synchronization); c) interference pattern, manifesting a single space in which the logic of the general development of various and different-sized cyclic processes manifests itself

The points at which the superposition (synchronization) of processes occurs should be perceived as objectively existing commencements and terminations of the development *stages* of transdisciplinary reality (see Figure 1b). The intervals between the points of superposition of processes should be perceived as objectively existing *periods* of general development (see Figure 1b). A logical sequence of stages and periods manifests the expediency of the overall development, revealing its

true (objectively existing) goals and objectives. This sequence transforms *space, information and time* into objective forms, respectively, of *existence, manifestation, and transformation* of the general development potency. As a consequence, the interference pattern is not only a frozen image of a dynamically developing transdisciplinary reality but it is also a frozen image of the *General order* that determines its unity. Due to an objective General order, a complicated, dynamically developing

and unpredictable world becomes comprehensible, orderly, and predictable. Probably, we should accept our way of thinking, world perception concept, methodological support, tools and technologies precisely to the perception and exploration of the world in the image of such a specific interference pattern. In other words, we must be ready to extend maximally the horizon of the existing scientific worldview, so that we could simultaneously see the frozen image of ancient history, the disturbing present and the promising future through the prism of the frozen image of the General order.

3. The need to integrate systems thinking and transdisciplinarity with the formation of a specialized scientific discipline

In our opinion, among many types of thinking and worldviews, systems thinking and transdisciplinarity have the highest theoretical and practical significance in solving complicated high-threshold problems.

Systems thinking resulted from people's desire to know and describe the whole world [35]. The content of modern thinking has been influenced by the urgent need to plan, predict and manage complicated systems, including technical and technological ones [33]. Therefore, the general meaning of modern systems thinking is reflected by the following definition:

Systems thinking is a way to extend the range of available solutions to a complicated problem by rethinking it and creating new formulations [9].

Modern transdisciplinarity embodies the advantages of academic thinking, disciplinary worldview and practical experience of interdisciplinary interaction. Therefore, in our opinion, the general meaning of modern transdisciplinarity is reflected by the following definition:

Transdisciplinarity is a way of intensifying intellectual activity in the field of interdisciplinary interactions, contributing to the maximum extension of the scientific worldview horizon [22, p. 9].

Within the framework of the present Manifesto, we do not discuss the advantages and disadvantages of numerous types of transdisciplinarity, systems theories, and systems sciences. This diversity has created a high potential for transdisciplinary and systems research. However, we focus on the fact that these arbitrary ways of extending the boundaries of worldview and world perception universally apply *unique research methods* [28, p. 80]. The search and application of unique methods of systems and transdisciplinary research significantly increases the tolerance of knowledge of different scientific disciplines, as well as the significance of compromises of disciplinary specialists. However, this leads to the recession in level of scientific rigor [3, p. 161].

The highest level of scientific rigor is peculiar to academic scientific disciplines. All the elements within the framework of a scientific discipline determine scientific rigor, namely, a philosophical and conceptual framework, language, and, most importantly, a methodology that allows reproducing previously obtained research results. This circumstance forms a logical chain of reasoning:

- to adapt our way of thinking to the challenges of an increasingly complicated, rapidly changing, unpredictable

world, it is necessary to extend the boundaries of scientific understanding and worldview;

- to maximally extend these boundaries, it is necessary to use the potential of modern systems thinking and transdisciplinarity;

- to endow the potential of systems thinking and transdisciplinarity with all the elements of scientific rigor, it is necessary to synthesize systems thinking and transdisciplinarity within the framework of a specialized scientific discipline – Systems transdisciplinarity [15, 17].

3.1. Metatheory and metanarrative of systems transdisciplinarity

Systems transdisciplinarity as a meta-discipline has basic attributes: meta-theory and meta-narrative. Within the framework of this metatheory and metanarrative, there is an integration of systemic and academic thinking and worldview.

Meta-theory is a description of the general representation about the fundamental features of the world order and the forms of their manifestation, which form the basis of the entire system of human knowledge about the surrounding reality. The set of initial systemic and academic worldview reference points and the main philosophical categories within the framework of the meta-theory of systems transdisciplinarity under-goes certain intellectual processing – rethinking, ordering, and generalization. The purpose of the meta-theory of systems transdisciplinarity is to create a picture of the one and only world. Disciplinary (local) pictures of the world, in this case, are considered as abstract models of certain areas (fragments) of the one and only world. As a result, the meta-theory of systems transdisciplinarity appears to be a scheme that defines the way and context of building scientific models of the researched areas (fragments) of reality. Such a scheme, because of its abstract nature, provides a systems transdisciplinary interpretation of the results of modeling the fragments of reality within the framework of different disciplinary and interdisciplinary approaches.

Meta-narrative is a universal system of notions, signs, symbols, and models, which aims to create a single type of description of objects and the presentation of interrelated events in the picture of the one and only world. This meta-narrative summarizes the knowledge and languages of scientific disciplines, as well as cultural and semantic discourses (areas of interaction). Meta-narrative is formed in the process of philosophical rethinking of general concepts and categories (space, time, information, system), which are necessary and sufficient to describe the picture of the one and only world [26].

This understanding of meta-theory and the meta-narrative of transdisciplinarity as meta-discipline has always attracted the support of philosophers. According to the famous philosopher, E. Laszlo:

In the case of transdisciplinary unification of the evolutionary variety, a specific worldviewfactor intervenes. In adopting an evolutionary framework, we no longer look at phenomena as things or objects that are to be described as they are. Instead, we describe phenomena in terms of how they come to be [11].

The essence of the one and only world is reflected by four axioms [23]:

- The world is One Orderly Medium;
- The unity of the Orderly Medium determines the General order;
- General order is associated with a transdisciplinary system;
- Models of the transdisciplinary system, manifested in space, time, and information, allow understanding, know, and describe the world in its unity at any level of reality.

One Orderly Medium, as well as each of its elements and fragments, manifests itself in reality due to its own space, time, and information. Consequently, the systems transdisciplinary models of spatial [16], informational [18], and temporal [19] units of General order are universal models.

The world in the form of the One Orderly Medium and the system in the form of the General order, which makes the condition for the unity of this assembly, are close to the vision of L. Bertalanffy with respect to the General systems theory. L. Bertalanffy wrote:

A unitary conception of the world may be based, not upon the possibly futile and certainly farfetched hope finally to reduce all levels of reality to the level of physics, but rather on the isomorphy of laws in different fields. Speaking in "material" language, it means that the world, i.e., the total of observable events, shows structural uniformities, manifesting themselves by isomorphic traces of order in the different levels or realms [4, pp. 48-49].

The need to create a systems transdisciplinary conceptual and methodological apparatus capable of studying "isomorphic traces of order at different levels or spheres" are called for by modern followers of the General systems theory [36].

4. About the mental and psychological comfort zones of researchers

When arguing about consciousness, thinking and worldview, we often forget that these categories do not exist by themselves. Consciousness, thinking, and worldview are mechanisms or products of the highest nervous activity of each human. Consequently, each specific person uses a specific type of thinking and

worldview that determine the features of his intellectual and practical activities [20].

Through the prism of concrete thinking and worldview, a person evaluates the truth of statements, justifies the behavior and relationships of people between themselves and nature, as well as supports the meaning and content of planning, forecasting, and management of sustainable development. The type of thinking and the content of the worldview are formed and constantly trimmed by the family, spiritual associations, school and university, as well as a person's own life experience. As a result, a specific type of thinking and worldview forms a zone of mental and psychological comfort for its bearer. Consequently, when we call on disciplinary specialists to adapt our way of thinking to the challenges of an increasingly complicated, rapidly changing, unpredictable world, we call on them to leave their own zone of mental and psychological comfort. Being forced to leave or leaving this personal comfort zone causes irritation or aggression in most disciplinary specialists. Therefore, when starting to solve complicated high-threshold problems of contemporary society, we must first of all solve the problem of preserving the mental and psychological comfort of disciplinary specialists. This problem can be solved in two trends.

4.1. The first trend of preserving the mental and psychological comfort of disciplinary specialists

Within the framework of the first trend, we should familiarize disciplinary specialists and organizers of interdisciplinary and transdisciplinary research with the information that in contemporary science there are several consistent ways to extend the horizon of scientific worldview [24]. Academic thinking allows extending the horizon of the scientific worldview outbound from disciplinary approaches to interdisciplinary, multidisciplinary, and transdisciplinary approaches. To that end, systems thinking allows moving from a systems disciplinary approach to systems interdisciplinary, systems multidisciplinary and systems transdisciplinary approach (see Figure 2). Each subsequent method in this classification does not oppose itself to other methods. It allows specialists to use their obvious advantages in solving, respectively, complicated low-threshold, medium-threshold and high-threshold problems.

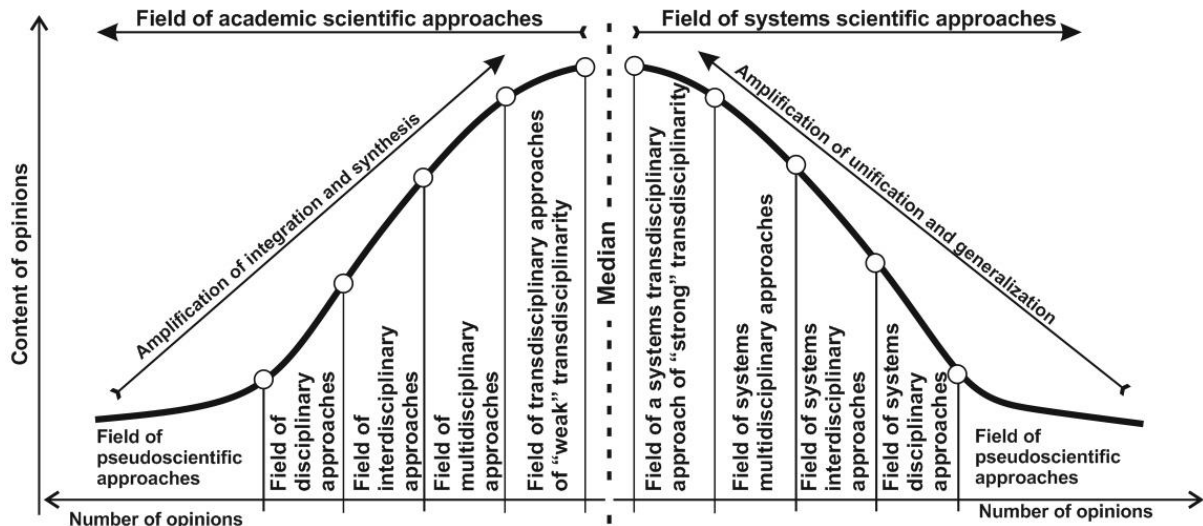


Figure 2. Gaussian distribution of academic and systems approaches in the environment of interdisciplinary interactions

It is important to understand that due to objective reasons, a short-term change of ways to extend the horizon of scientific worldview within the framework of a specific study is impossible for most disciplinary specialists. The effective functioning of a particular type of thinking and worldview is determined, among other things, by a specialized quasi-stable mega-structure of neuronal connections in the brain, as well as by the quantity and quality of neurohormones, functioning in this mega-structure [12]. Such neurohormones allow retaining a certain image of the object under study, as well as adequately decipher the information flows associated with this image. This constructive and physiological feature explains not only the mental and psychological discomfort of the specialist caused by going beyond the boundaries of the disciplinary worldview, but also the aggressive rejection of a different viewpoint. Therefore, when solving complicated high-threshold problems, a disciplinary specialist should not be required to adopt other concepts and ways to extend the boundaries of the scientific worldview. In a transdisciplinary team, disciplinary specialists should be suggested to engage in the usual intellectual activity – conducting academic disciplinary research. At that, the right to interpret the results of these studies should be given to generalist specialists who have theoretical and methodological training, as well as practical skills in applying a systems transdisciplinary approach.

4.2. The second trend of preserving the mental and psychological comfort of disciplinary specialists

As part of the second trend, it will be necessary to organize training at universities of a limited contingent of generalist specialists [13, 14]. Such specialists will be initially trained to solve complicated high-threshold problems of contemporary society. They will not have to reform the mega-structure of neuronal connections in the brain, and develop for a long time the necessary amount of neurohormones that serve this activity. Therefore, in their activities, such specialists will not have to go beyond the boundaries of the shaped type

of thinking and worldview. Consequently, they will not have to leave the zone of their own mental and psychological comfort.

5. Conclusions

The image of a frozen transdisciplinary reality, reflected in transdisciplinary models of spatial, informational, and temporal units of order, acquires fundamental theoretical and practical significance in solving complicated high-threshold problems of contemporary society. Such models allow determining the calendar dates of future stages of synchronization of various natural and social processes; understanding the meanings and goals of their stage synchronization and, ultimately, comprehending the overall development strategy of a complicated, rapidly changing world.

Knowing the logic, meaning, and goals of stage-by-stage development, it is possible to describe with confidence the content of the normative parameters of all processes occurring during periods of inter-stage synchronization. Thus, generalist specialists will have the opportunity:

- to determine the calendar dates of stages and periods of various objects and processes;
- to substantiate the content of the goals and objectives of planning and forecasting inter-stage periods;
- to develop a strategy and tactics for managing the sustainable socio-economic development of the society in the near and distant future;
- to develop methods of live monitoring over the nature and results of the society’s activities in accordance with the general development strategy of a complicated and rapidly changing world [21, 25].

Therefore, during the periods of synchronization of the processes of a complicated, rapidly changing world, we will need to solve four interrelated problems:

- to shape the idea and content of a new type of thinking and worldview capable of forming an image of a single world, suitable for its scientific understanding, cognition, and description;

- to rethink the existing way of organizing knowledge and forms of interdisciplinary interactions and inter-worldview relations towards their generalization and unity;

- to create conditions for training at universities generalist specialists, carriers of new thinking and worldview, capable of organizing and fostering the efforts of disciplinary specialists to solve complicated high-threshold problems of contemporary society;

- to ensure the information security of specialists engaged in solving complicated high-threshold problems from the manifestation of irritation and acts of aggression on the part of organized and unorganized carriers of other existing types of thinking and worldviews.

Inviting transdisciplinary researchers and experts, higher education organizers and executives of funding organizations to support the Manifesto for Systems Transdisciplinarity, in fact, we propose to implement the following ideas: the idea of E. Jantsch concerning systems transdisciplinary coordination of scientific disciplines [10]; the idea of J. Piaget concerning the common language of mutual understanding of disciplinary specialists in transdisciplinary research [32]; the idea of L. Bertalanffy concerning General order and general theory of systems in the form of a scientific discipline [4];

as well as the ideas of many organizers and popularizers of science and education, focused on increasing the role and importance of systems thinking and transdisciplinarity in the renewal of contemporary civilization [5, 7].

The support of the Manifesto for Systems Transdisciplinarity will allow developing and proposing three international transdisciplinary projects in a timely manner:

- a project on creating a Systems Transdisciplinary Center for Higher Education Innovation (2023-2026);

- a project on creating a Systems Transdisciplinary Initiative Group to develop a philosophical, conceptual, and methodological apparatus for planning, forecasting, and managing the sustainable development of contemporary society (2023-2030);

- a project on creating a Systems Transdisciplinary Analytical Group to develop transdisciplinary solutions in the field of stabilizing the current condition of nature and society (2023-2026).

Each project involves direct access to the creation of technologies for solving complicated high-threshold problems. The possession of such technologies should not give advantages to just one country. That is why such projects should be international and carried out by an international team of participants.

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