The object of research is the relationship between the processes of formation of the information-network society and the global-local transformation of property relations at the turn of the XX–XXI centuries. The problem has been identified that the limitations of theoretical approaches to explain the content and interrelation of property relations and the social meaning of high-tech development have led to an increase in general socio-economic instability. To solve the problem, the definition of the institution of property as an economic good is provided. A three-level traditional model of public management has been highlighted. It is shown that the existing triple structure of the public sector of economy should acquire a different value content. The new model in the dynamic unity of markets of pure public benefits, public goods, private goods harmonizes public interests, strengthens relations of trust. This model forms the foundations for the formation of nanoeconomics in a broad sense as the forerunner of harmonious institutional architectonics of the economy. Nanoeconomics, as part of baby economics, human economics, and economics of nanotechnology, is based on the principles of rational behavior in making economic decisions within the limits of power. In the depths of baby economics, skills and competencies are formed in handling property. The human economy ensures the proper implementation of property functions. Within the experimental part of the study, a mathematical model of multifactor regression is constructed. The model confirmed the presence of dense dependence (0.9076) of the growth of GDP per capita on the state of distribution of property rights in the national economy. The area of practical use of the results is the post-war reconstruction of Ukraine's economy through the activation of its domestic business potential

Keywords: market transformations, information economy, instability, property relations, nanoeconomics, institutional architectonics

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DETERMINING THE IMPACT OF GLOBAL-LOCAL TRANSFORMATIONS OF PROPERTY ON THE FORMATION OF NANOECONOMICS

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1. Introduction

Global-local market transformations associated with the formation of an information network society at the turn of the XX–XXI centuries were combined with the processes of large-scale transformation of property rights and relations. Due to the limitations of existing theoretical approaches for their adequate explanation, they led to an increase in general economic procedurality and uncertainty of economic prospects. The newest stage of social development against the background of the spread of information and digital technologies actualized the need to know the laws of functioning of nanoeconomics. The social model of nanoeconomics is designed to promote the realization of the universal human right to creative activity and effective accumulation of human capital. However, the process of creativity is increasingly directed against humans because it is carried out mainly in industries that feed the technologies of hybrid warfare. Consequently, the problem of harmonization of social relations through streamlining and proper regulation of property relations and mechanisms for the application of nanotechnology requires an urgent solution.

2. Literature review and problem statement

With regard to property relations in the world scientific mainstream, there is a fundamental agreement on the interpretation and definition of the main components. Namely, the main tradition established since the development of the system of Roman law, property is considered as the right to use, dispose of, possession. The outstanding heirs of this approach, mainly Nobel Prize winners in economics, have collectively shaped the content of property in a broader institutional context. In particular, work [1] deals with the launch of a methodological direction on the relationship

between the distribution of property rights and the institutional structure of production. It is disclosed that such a relationship will occur under the coordination of the price mechanism on the basis of transactional outputs. Work [2] focuses on the problems of control over the use of specific economic resources. At the same time, the implementation of the functions of the institution of property is revealed through the prism of contractual relations, power hierarchy, and management. In [3], the behavioral aspects of rational choice within the collective actions for effective management of objects of the common property are distinguished.

Work [4] identifies long-term trends in the relationship between property, demand, social wealth, and poverty. Specific ways to overcome social poverty are revealed. Issues of corporate wealth management are actualized through the definition of a comprehensive system of financial goals [5] and vesting ownership rights to financial assets of employees [6]. In [7], the origins of the market power of large corporations are analyzed, which makes it possible to increase profits through exploitation mechanisms and imposes a burden of capitalization on society.

However, due to the insufficiently clear definition of the relationship between property relations and value in these works, it was not possible to consistently embody a principled position regarding the value nature of the property institution. Due to a narrow understanding of the institution of property as a set of power-legal powers, a significant body of modern research is concentrated around the situational problems of economic life. So, in work [8], the authors are talking about the possibility of restructuring (changes in vertical organization and diversification) of firms under the influence of risks of political uncertainty. In [9], the problems of coordination of legal powers in the purchase of land plots are analyzed. In [10], the principles of rational choice of a partner under conditions of joint production are clarified. Work [11] outlines the problems of correlation between non-cooperative and cooperative social responsibility of the organization. In [12], the principles of equilibrium coexistence of private and public firms are analyzed.

On the one hand, such detailing is right in clarifying the content and determining ways to solve urgent organizational and economic problems. On the other hand, when functions are shredded, the concept of property as a fundamental institution is blurred, its heuristic potential is lost. At the same time, for the researcher, the multidimensional institutional space of local socio-economic interactions is darkened.

Regarding the definition of the content and principles of nanotechnology, a similar trend is observed in the scientific literature. So, at the end of the XX and in the first decade of the XXI century, the conjuncture of world markets adjusted public sentiment to upward trends in business activity. Consequently, researchers considered the development of nanotechnology mainly as a catalyst for economic development. Namely, in [13], the use of general-purpose technologies is defined as a prerequisite for economic growth, a source of national competitiveness and well-being. Work [14] clarifies the problems of global strategies and industry trends in the introduction of nanotechnology. Work [15] focuses on the relationship between nanotechnological development and the competitive state of the national economy. However, in the early 2000s, especially after the global financial and economic crisis, previously accumulated instability and uncertainty gradually turned into threatening attributes of public life. Prominent representatives of political science and sociological thought noted the growth of a general management crisis. However, they did not provide constructive answers regarding the mechanisms of its prevention and ways to overcome it. In particular, in [16], the dilemma of geopolitical relations is seen on the basis of mutual cooperation or harm. At this, the implementation of a positive scenario is associated with some general renewal of the country-geopolitical leader. Work [17] outlines significant gaps in regulation in the field of global environmental policy and the provision of public goods. But the decision to overcome the existing threats is proposed to be formed by the readers themselves. Work [18] emphasizes the spread of deglobalization processes against the background of the deployment of protectionism scenarios. At the same time, it is noted that even in the face of increased violence and new crises, globalization is constantly paving its way.

At the same time, contradictory trends in the development and application of nanotechnology have emerged in the research field. On the one hand, specialized nanoengineering programs of "open access" are actively stimulated and promoted. In particular, in [19], the use of nanocomposites in the field of intelligent optoelectronics is investigated. In [20], the problem of nanoprocessing of graphene waste in the energy sector, etc. is raised. In [21], the possibilities of using nanotechnology for early diagnosis and monitoring of cardiovascular diseases are revealed. On the other hand, technological nanodevelopments are increasingly concentrated in the military sector [22, 23], their results are not disclosed, directed against people and society. That is, the processes of development and application of nanotechnology are considered and carried out mainly from functional positions, without analyzing their concomitant and long-term socio-economic consequences. And this, through the fueling of hybrid war technologies (up to its hot phase), increases tensions in public relations.

In the scientific Ukrainian space, active research into property rights and relations continues. Scientists track the genesis of the institution of property [24], taking into account the mechanisms of state influence on its transformation [25]. The origins in the system-property in the era of the first civilizations are considered [26]. A separate layer of research clarifies the role of the institution of property in the formation and development of a market economy in Ukraine [27, 28], the system-formation transformations [29]. However, despite the emphasis of these and other researchers on the diversity of interpretation of property in the scientific literature and the need to apply new, more coherent, approaches, their own definitions do not go beyond the established traditions. On the one hand, property is considered mainly in a narrow economic plane – as an identity of appropriation-alienation of tangible and intangible goods. On the other hand, as a general institution, it is understood too broadly, taking into account legal, social, political, ideological, moral, religious, family aspects that are difficult to unite on an economic platform.

Considering the problems of intellectual property [30, 31], authors usually avoid considerations about its content. The right of ownership is taken for granted and attention is focused on the objects of such a right.

As for nanotechnology projects, they began to develop in Ukraine in the 1990s; In 2003, the National Academy of Sciences of Ukraine initiated the development of a comprehensive program "Nanosystems, nanomaterials, and nanotechnologies". Nano-research in the field of medicine and pharmacy has gained significant success. This trend contin-

ues to this day [32, 33]. However, the concept of nanoeconomics in a broad sense – as the center of a socio-economic system that is institutionally organized by relations and property rights and directs nanotechnology for the benefit of man and society, has yet to be formed.

Overcoming the trend of functional, methodologically narrowed, or too broad traditional approaches to understanding the content and relationship between property relations and the social meaning of high-tech development has become the driving motive for writing our paper.

3. The aim and objectives of the study

The aim of this study is to reveal the content of global-local transformations of property relations as the basis for the formation of a social model of nanoeconomy in the context of further development of harmonious institutional architectonics of the economy.

To accomplish the aim, the following tasks have been set:

– to define property as a fundamental social institution and economic benefit;

– to clarify the meaning of global-local transformations of property relations as the basis for the formation of nanoeconomics in a broad sense;

– to reveal the impact of property relations on the development of nanoeconomy;

– to apply methods of regression analysis of the dependence of the increase in social wealth on the distribution of property rights and to mark a window of internal opportunities for the post-war recovery of Ukraine's economy.

4. The study materials and methods

The object of research is the relationship between the processes of formation of the information-network society and the global-local transformation of property relations at the turn of the XX–XXI centuries. The subject of the study is a set of theoretical and methodological provisions and practical recommendations for harmonizing the foundations of the social system through institutional power-value mediation of technological development. The hypothesis has been identified that the limitations of the existing theoretical approaches to explaining the content of property and nanotechnological transformations cause an increase in the processes of global-local socio-economic instability.

To achieve the objectives, the study used methods of system analysis, structural and functional approach, induction and deduction, observation, and comparison. These methods have been used to clarify the content of global-local transformations of property relations and the socio-economic nature of technological development.

The main theoretical approach is a critical understanding of information materials through the prism of value economic methodology. This approach, in unity with the concept of jointly divided labor relations, creatively combines the potential of the classical, neoclassical, and institutional directions of economic science. This methodology forms an interactive value platform that allows reflecting the institutional content of economic phenomena and processes as an economic good through the prism of the mutual flow of relations of marginal utility, value, and price. The application of this methodology allowed us:

– to define property as a fundamental social institution and economic good in the triple unity of natural-economic, socio-economic, and organizational-legal components;

– to reveal the content of nanoeconomics in a broad sense as a forerunner of institutional architectonics of management;

– to determine the directions of transformation of the public sector of the economy as the basis for the formation of nanoeconomics.

The method of applied verification of theoretical hypotheses is multivariate regression modeling. This made it possible to identify the dependence of the increase in social wealth on the distribution of property rights and to identify the possibilities of activating the factor of domestic business activity for the post-war recovery of Ukraine's economy.

The information base of the research is formed by scientific investigations of leading world and Ukrainian experts in the field of property theory and nanoeconomics.

5. Results of investigating the content of transformations of property relations as the basis for the formation of the social model of nanoeconomy

5. 1. Defining property as a fundamental social institution and economic good

The organization of relations of use, disposal, possession is the basis of the economic life of society at all stages of its development. Thus, the leading norms of the functioning of the market economic system are official recognition and public respect for acquired property rights. It is believed that it is beneficial for economic entities to respect property rights. On the one hand, property rights are one of the institutions that reduce uncertainty in social interactions; on the other hand, when establishing and observing property rights, a state of optimal use of limited resources is achieved.

Monitoring of proper protection of property rights is carried out by leading international organizations. In particular, the Working Expert Group on Land Management (WPLA) at the United Nations Economic Commission (UNECE) Committee on Urban Development, Housing and Land Use regularly publishes analytical reports. They provide assessments of public perceptions of the level of protection of the rights to housing and land plots.

However, the value methodological disorientation in the scientific, primarily economic, sphere significantly affects the understanding of the foundations and state of social life. Thus, global-local market transformations of the late XX–early XXI centuries combined with the processes of large-scale transformation of property rights and relations. They led to an increase in economic procedurality and uncertainty of economic prospects, and, consequently, revealed the limitations of existing theoretical approaches for their adequate explanation and regulation.

When the existing model of the world political and economic order is destroyed, and a new scientifically substantiated project of social interactions has not yet been formed, the legal foundations of civil society undergo erosion. The past threats to civilization are growing against the background of the general politicization of global-local economic relations in the context of the intensification of the hot phase of the hybrid war with the beginning of russian aggression against Ukraine. In particular, due to the arbitrarily introduced "new" laws of warfare, processes of irrational transfor-

mation of the institution of property are taking place. Such an institution is increasingly realized mainly as the right of political disposal of property, legal powers, life, economic prospects, and historical destinies.

The growth of threatening trends of global-local turbulence and uncertainty of economic prospects prompts an active search for new methodological foundations for studying property relations and power. This will contribute to the formation of adequate mechanisms for institutional management of social transformations. Nevertheless, despite the long history of the study of property relations, power, and management, we can state significant differences in their scientific understanding. In dictionaries, property is usually interpreted as the belonging of material and spiritual goods to certain persons, as a legal right of such affiliation, due to social economic relations. That is, the social nature of property appears dual with an emphasis on the prevalence of the legal component. For the market economic system, this state of affairs is appropriate since the totality of property rights of subjects to capital and consumer goods determines the principles of freedom of economic choice. At the same time, the principles of business motivation (conditions for obtaining income), norms of economic responsibility, the foundations of social relations in accordance with the rules for obtaining equal profit on equal capital are determined.

However, despite the fact that the totality of property rights is the initial prerequisite for market exchange, economics textbooks traditionally focus on the study of functional economic relations and do not specifically explain the content of such rights. Consequently, in economic science and educational circles today there is a paradoxical situation. Namely, the legal aspects of property rights are considered mainly from functional standpoints, and the economic nature of property relations is increasingly excluded from research programs. Given this, the latest global-local market transformations, on the one hand, are caused by the transformation of property rights and relations, on the other hand, actualize and produce such transformations. Therefore, the study of property relations in modern conditions urgently needs to be updated methodological tools. With the help of a close "look" at history, fundamental economic concepts, and ideas about the picture of the world should be reconsidered.

In the context of Ukrainian scientific traditions, property is interpreted as a system of historically changing relations of appropriation of means of production and consumer goods. Such a system, on the one hand, is objectively determined by the nature of the existing organization of production, distribution, exchange, consumption, on the other hand, determines this organization itself. By the end of XX century several approaches to understanding ownership were formed. Namely, property:

– was defined as a separate economic (production) relationship, reflecting the form of social appropriation of material goods, first of all, the means of production;

– identified with the general set of economic relations that provide expanded social reproduction;

– was considered as a form of legal manifestation of industrial relations, a set of rules of law.

Consequently, in the first case, property is too narrowed to a separate economic and production relation, in the second – it dissolves in the general system of socio-economic relations. In the third case, property acquires the status of an autonomous social institution, focused on the processes of observance of property rights within the existing political and economic system. It is worth noting that this methodological personification is not a private matter of economic science. Due to the fundamental importance of property relations for the organization of public life, it entails a number of negative effects in its various spheres. Namely, it limits the creative potential of the economic study of property, complicates the methodology of teaching relevant educational topics and disciplines, and in practice causes a conflict of private and public interests and feeds the mechanisms of the general social instability.

However, even at the beginning of global market transformations in domestic economic science, a new direction is emerging to study the economic nature of property through the prism of relations of jointly divided labor [34]. This approach contains heuristic potential for understanding global market transformations at the turn of the XX–XXI centuries [35], although to this day has not received proper recognition in scientific circles.

From the standpoint of the concept of jointly divided labor, in the subject plane of political economy, three categorical series are distinguished – use value, value, and exchange value (price). At the same time, property, although it does not belong to any of these series, nevertheless, in unity with the relations of value, plays the role of a system-forming, common binding subject category.

If we proceed from the position on the relationship between property relations and value, then from the standpoint of the value methodology, reflecting the mutual flow of relations of marginal utility, value, and price [36], property can be defined as a fundamental social institution. Such an institution in the unity of its natural-economic, socio-economic, organizational, and legal components is a public economic good.

The dual, economic-legal, nature of property relations has been recognized in modern economic science. It is known that every legal norm follows from an economic relation that requires social approval in legal form. After legal fixation, this attitude, however, is no longer a specific reason for such a norm, but a consequence of the application of law. Therefore, in everyday life, people, first of all, are faced with property relations as phenomena of law. And only a closer penetration into the processes of real use of objects allows us to designate the dialectical relationship of legal and economic relations of appropriation.

From a legal point of view, property is a subject-object relationship, unfolding in the system of legal norms of use, disposal, possession. Such an attitude is understood broadly – as everything personally and privately peculiar to man, including his life and freedom. According to Hegel's definition, even the human body itself, since it is an immediate present being, does not correspond to spirit; and in order to be its obedient organ and living means, it must be taken possession of by the spirit [37] Thus, in addition to economic and legal aspects, property is based on a certain natural platform, that is, it reflects not the dual, but the previously mentioned triple nature of social economic relations.

In fact, according to experts, use as the initial definition of possession and appropriation of consumed is a general law of biological life. As a condition of all appropriation, use is inherent not only to man, but to all living beings and is primarily associated with the possession of living natural space, territory [38]. However, economic property relations arise during the transition from the appropriative type of economy to reproductive – productive-production. Their

initial cause is labor relations, and the object of appropriation-alienation is not just a resource, but a limited, economic good. Labor relations proceed in time and materialize in investment and consumer goods, which, in turn, are objects of power-property relations.

Consequently, property in the economic sense can be defined broadly – as a system of subject-subject relations regarding the appropriation-alienation of materialized (embodied in a certain object) individual-social free time. Such a system is mediated by the spatially localized right to own economic resources (capital) and causes a "synergy effect": income increments or cost savings [39]. This system is dynamically modified in the process of evolution of jointly divided relations organization of the labor process.

The formation of a system of relations of jointly divided labor is combined with the evolution of private and state forms of ownership, during which the phenomena of divided community – joint division are caused by a complex collision of power and managerial powers of private and public institutions. The jointly divided system of property relations acquires maturity with the formation of joint-stock companies and the formation of an appropriate model of corporate governance. It is formed both within state-owned enterprises and large companies, and in relations between the state and corporations. A properly ordered set of relations between ownership and management determines the content and dynamics of institutional forms of modern economic life. It is designed to direct the effects of economic synergy for the benefit of society.

At the same time, in the context of the logic of jointly divided labor, taking into account world experience, the form of ownership (public or private) as such is not an unconditional sign of the success of economic activity. The criterion of economic efficiency is the quality of management relations – proper organization of jointly divided corporate management of property.

Thus, in relation to the relations of value (economic value), property acquires the quality of an economic good – a fundamental social institution. Such an institution in the triple unity of natural-economic, organizational, legal, socio-economic relations is capable of dynamic modification, while maintaining its structure in the process of evolution of jointly divided relations of the organization of the labor process.

5. 2. Clarification of the meaning of global-local transformations of property relations as the basis for the formation of nanoeconomics

The processes of transformation of forms of ownership in the global-local economic space remain relevant. At the same time, outside of public regulation, the functioning of the institution of private property is densely associated with the spread of processes of socio-economic alienation. Such processes in a minimized form contain all forms of social personification and dissonance. The study of the nature of alienation in the theories of the social contract, in the works of Hegel and Marx had a significant impact on the philosophical understanding of this phenomenon in the twentieth century. From the standpoint of the main sociological and philosophical approaches, the most important forms of manifestation of alienation are determined and combined with the processes of "depopulation" – the loss by subjects of essential species characteristics, their own socially reasonable "nature". Prominent representatives of sociological thought noted and carefully studied the long-term trends in the activation of the phenomenon of social alienation.

Overcoming the relationship of alienation is a complex, contradictory, and lengthy process, therefore, most philosophers of the twentieth century would be skeptical about a quick solution to this problem. The main task of philosophy, they considered, was the development of conceptual advice that would help a person to live with dignity in an alienated world, against the background of constantly renewing vital threats.

At the turn of the century, great hopes in this sense were associated with the formation of an information and network economy, however, the latter contributed to the generation of a number of new social contradictions and alienated forms. Namely, the global-local processes of transformation of property rights and relations initiated the reform of the dominant paternalistic model of the social market state. The reformers assumed that under the new economic conditions, the efficiency of the public administration system should become a key factor in the economic power of the state. Consequently, this will contribute to the formation of a new type of public sector [40]. The formation of mechanisms for effective management of the reproductive potential opened for the world intellectual elite the opportunity to form a model of a socially oriented innovative economy that meets the realities of the information (post-industrial) society.

However, the weakening of the methodological positions of causal analysis has led to an insufficient theoretical understanding of the transformation of public administration mechanisms. This, in turn, contributed to the value emasculation of institutions designed to carry out an adequate transformation of property and management relations. Consequently, in the course of the transformation of property rights, there was a strengthening of social priorities of economic efficiency by weakening the principles of social responsibility. The global financial and economic crisis has revealed the inconsistency of this form of effective state with the laws of the formation of the information society; the post-crisis stage of social development has consolidated and strengthened contradictory trends [41].

The newest phase in the development of the information and network economy is a digital algorithmic society with a cell in the form of a platform economy, which, against the background of the spread of high technologies, also produces a number of social threats and risks. At the same time, the realization of the universal human right to creative activity could become an effective way to counteract the dictates of algorithmic technologies. But the process of creativity is increasingly directed against man because it is carried out mainly in high-tech industries that fuel hybrid warfare technologies. Taking into account the above-mentioned and the latest challenges associated with Russian military aggression against sovereign Ukraine, it can be stated that the problem of social alienation is becoming most acute. After all, the very existence of a global-local society depends on its adequate solution.

It is important to bear in mind that the modern model of public management as a medium for the transformation of property rights and relations has a triple structure. Its common visible platform is the traditional market economy, on which the information sector and network structures are "layered". And in the depths of the system there is a restructuring of the economic way of life: socialization relations are gradually replaced by the laws of capitalization under the

pretext of building institutions of efficient management. It is this structure, due to inadequate scientific understanding of the content and socio-economic consequences of the spread of information-digital technologies, that feeds relations of social exclusion.

In the context of value coverage of the content of property relations, the existing model of social management should, within its triple structure, acquire a different meaningful content. Namely:

– its upper level is associated with the production and provision of pure public goods. It is intended to reflect the socio-economic power of the nation-state;

– the lower level is represented by the market of private goods. Here is concentrated the sphere of realization of private interest, free interaction of supply and demand forces;

– middle level – the market of public goods. Through a meticulously organized system of mutual corporate governance, it ensures the coordination of private and public interests and forms the foundations of the economy of trust as the basis for further development of harmonious institutional architectonics of the economy [42].

This structure of the public sector can be considered an adequate platform for the formation of nanoeconomics in a broad sense as a forerunner of the harmonious institutional architectonics of the economic system.

5. 3. Analysis of the impact of property relations on the development of nanoeconomics

The phenomenon of nanoeconomics as a new form of social transformation was predicted in the second half of the twentieth century. [43]. Nanoeconomics is the focus of effective realization of human economic functions as owner, producer, and consumer through rational and irrational economic behavior. The most important factor in stimulating business activity remains the institution of property, which at the turn of the millennium acquires a new meaning in the context of effective management of the process of reproduction of social potential. Thus, property relations actively affect the technological structure of production. Indeed, within the framework of an innovative economy, ownership of technological decision-making is crucial for profit and causes a change in technological structures.

The structure of nanoeconomics – as part of baby economics, human economics, and economics of nanotechnology – forms a pyramid with a basis in the form of baby economics as the basis for further comprehensive development of man and society. Thus, in childhood, knowledge, skills, and competencies are formed, which a person subsequently uses in economic life at his first and subsequent jobs. Thus, the second level of nanoeconomics is formed – human economy, which is the basis for the realization of accumulated creative abilities, namely, the creation of nanotechnology. To create nanotechnology and make adequate nanotechnological decisions, economic actors must be properly educated and motivated, have appropriate skills and material support. That is, the focus of nanoeconomics is a model of socially oriented innovative economy. Such a model assumes the existence of ownership of nanotechnology from individual creators who can sell them in the highly intelligent market for nanotechnological knowledge.

The development of nanotechnology marks the beginning of the formation of the sixth and future seventh technological structures. In the realities of the information society, nanotechnology is of particular importance as a technology for accumulating information itself and its material electronic carriers.

Today's digital society is increasingly organized according to the algorithmic principle; this principle is preserved in the formation and functioning of nanoeconomics – from baby economics, through the human economy, to the economy of nanotechnology. But the algorithmic organization of economic activity is based on certain pattern schemes that significantly narrow the creative freedom of man. Going beyond such patterns is associated with the production of innovative nanotechnological solutions.

Algorithmic technologies are associated with strict adherence by economic actors to certain standards. This, on the one hand, leads to a significant improvement in production processes, on the other – to the loss of innovative individuality of products and processes. A sign of successful application of algorithmic technologies is diffusion, as a result of which the new technology is perceived by the majority of recipients, and its owner receives the greatest benefit. Especially desirable and highly profitable today is the use of algorithmic technologies in management systems of various levels.

The development of nanoeconomics is significantly influenced by the processes of irrational transformation of the institution of property. The producers of such transformations associated with the choice of suboptimal solutions are political actors and persons with insignificant property powers. The right of political disposal of property affects the redistribution of public and private property. Consequently, irrational actions of politicians can acquire the characteristics of rational action for individuals if they are able to optimize conditions for managing property. In particular, within the framework of baby economics, property objects are passed on from generation to generation, the principles of rational property management are formed through the acquisition by actors of the necessary knowledge and skills in the course of education and their subsequent implementation in the household economy. That is, the rationalization of economic behavior of power subjects is determined by the principles of structural organization of nanoeconomics [44].

The multidimensionality of social phenomena and processes that form the foundations of nanoeconomics encourages the search for adequate means of their ordering. In particular, the key features of nanoeconomics can be outlined by identifying sources of value creation, value added and production efficiency. In turn, all these sources are determined by the distribution of property rights and management in the economic space of nanoeconomics.

The explanation of nanoeconomic phenomena and processes occurs through the interpretation of internal contradictions of property relations, which are a fundamental principle of knowledge of economic theory. Conflict, contradiction, difference, and identity are properties that are revealed in the cognizable contradiction between the development of nanoeconomics and property relations.

The identity in the definition of nanoeconomics implies that the central link of all components of the nanoeconomy is the individual. For baby economics – a child, a growing individual, for the human economy – a person as a full-fledged economic entity, for the economy of nanotechnology – a person as a developer and subject of nanotechnology decision-making. In view of this, in various components of nanoeconomics, a unified approach to determining the object of study can be traced. This object is a person who is at

different stages of formation and in different socio-economic statuses (qualities) [45] and in particular as a subject of property rights and relations.

The difference in the definition of different components of nanoeconomics is as follows. At the baby level, for example, the economy works for the child-individual, provides him with high-quality consumer goods for a comfortable life, leisure, and professional growth. Thus, baby economics is aimed at transforming a child into a mature individual – a conscious owner, an active economic person, able to effectively manage own property [46].

Contradictions in the definition of nanoeconomics relate to the fact that a person, on the one hand, is an integral part of society, on the other hand, a personified individual, a person. This contradiction is the central axis both in theoretical understanding and implementation of the laws of functioning of the nanoeconomy. The difficulties also concern the relationship between nanotechnology and nanoeconomics. The nanolevel of matter reaches scales of 10^{-9} m, and, therefore, the core of nanotechnology for the production of products and processes is extremely small. This makes it possible to create objects at the micro level, which at the macro level acquire signs of increased flexibility. Accordingly, nanoeconomics is an economic economy, a human owner, which marks an "extreme small" indivisible share of society and by its actions determines the acquisition of specific value characteristics by society at the macro level.

In the context of the structural structure of nanoeconomics, these contradictions acquire a new color and relate to the ratio and forms of interest expression in the system of baby economics – human economics – economics of nanotechnology. Thus, in the process of growing up individuals may show a tendency of their unwillingness to move to the state of a responsible economic person, and an adult – to a state of creative growth. These contradictions through the prism of the relationship between property institutions and value (economic value) should be investigated using systemic and structural-functional methods. After all, they allow us to consider the phenomena of economic life as an integral system with an integral assessment of the functions of complementary components [47]. The use of such methods provides an opportunity to outline the actual structure of nanoeconomics, which is formed under the influence of various forms of ownership and various models of state policy in the global-local economic environment. At the same time, taking into account changes in ownership forms, transformations of each component of the nanoeconomic system are highlighted, which, in turn, have an inverse value impact on the social system of rights and property relations. An appropriate method of research is observation and comparison. After all, in general, the nanoeconomic system is modified through the transformation of interrelations of different levels:

a) coordination, characterizing the mutual consistency of structural elements and the place of the element within the system. Such relationships demonstrate the mutual dependence and coherence of the components of nanoeconomics. Thus, baby economics does not make sense without the ability to apply the knowledge acquired within its limits for the practical management of property. And the development of nanotechnological solutions is impossible without high-quality education, practical skills acquired at a certain workplace, without the ability to use these solutions to obtain appropriate wealth. The actions of the individual to receive education, its professional application, the acquisition of habits of creative thinking take the form of an algorithm. Such an algorithm determines the process of making economically meaningful rational decisions on income generation and management of property;

b) subordination, defining hierarchical relations within the existing system. Thus, within nanoeconomics, depending on the conditions of management of property, it is always possible to distinguish between controlled and control subsystems. In baby economics, the child reports to the educator and teacher, later his mentor. In human economics, we are talking about the subordination of persons in the owner-manager-employee system. In general, the principles of subordination are determined by the organizational structure of social and labor relations in the system of production, distribution, exchange, and consumption, aimed at the effective management of property rights and the increase of wealth;

c) genetic, reflecting the relationship between the evolution of personified socio-economic-technological phenomena and the historical progress of the system to which they belong. Baby economics, for example, has not always been a harmonious component of nanoeconomics due to the divergence of goals in social subsystems of learning – scientific intelligence – practical business activity. And nanotechnology became an object of nanoeconomics only in the twentieth century. Property rights and relations are also subject to modification as a result of the modification of forms and objects of use, management, possession in the space of the information and network economy. After all, the latter is increasingly relying on intellectual property, intangible assets, including nanotechnology.

Consequently, the systemic features of the object of study are outlined precisely by the structural-functional approach, which is organically combined with the inductive-deductive method. So, one of the signs of consistency is integrity; at the same time, not all a priori systems are integral – they become such due to natural or managerial organization, ordering, institutionalization [48]. Indeed, in the system of nanoeconomics there is a mutual interweaving and coordination of processes characteristic of its three main components. Namely, in the course of growing up a child, there is a tight connection between the acquisition of professional education, professional experience, a tendency to creative thinking and technological decision-making, the creation of nanotechnological products. However, the structural components of the system can be unjustifiably personified, violate the harmony of its integrity. Thus, the sector of education and training in the field of baby economics may not meet the needs of the real economy (human economy). It is able to slow down the processes of reforming social institutions (in particular, the institution of property), to create certain barriers to the formation of the economy of nanotechnology. There is no doubt that the existing system of education and science in Ukraine needs to be reformed. The effective result of the reforms should be the harmonious implementation of the scientific and educational sphere to the nanoeconomic system.

The problems of development and the methods of research into nanoeconomics are shown in Fig. 1.

An important prerequisite for the proper implementation of the institution of property in the unity of its economic, social, and legal forms is the existence of mechanisms for the effective transformation of savings into capital investments.

Such mechanisms are designed to form a nanoeconomic social system. At the same time, the nanoeconomy itself, due to the effective transformation of the institution of property, receives positive synergistic effects for development and expansion. Coordinated management of capitalization processes at the nano, micro, and macro levels will contribute to the growth of social welfare and the expansion of the reproductive potential of the middle class. It is the middle social class, as the center of social and labor relations, that is the initiator and source of innovative changes, the subject of civil unity, social balance, and established economic development.

In the context of ongoing Russian aggression, long-term trends in property rights and relations at the global-local level are due to a number of economic sanctions imposed on Russia by technological leaders. The post-war reconstruction of Ukraine's economy with further restoration of its sustainable socio-economic development is considered by leading domestic and foreign experts on the basis of jointly divided participation. Thus, the restoration of destroyed infrastructure and conditions for human capital development, reduction of Ukraine's external debt is possible through the provision of international financial and economic assistance to activate internal creative business processes and incentives.

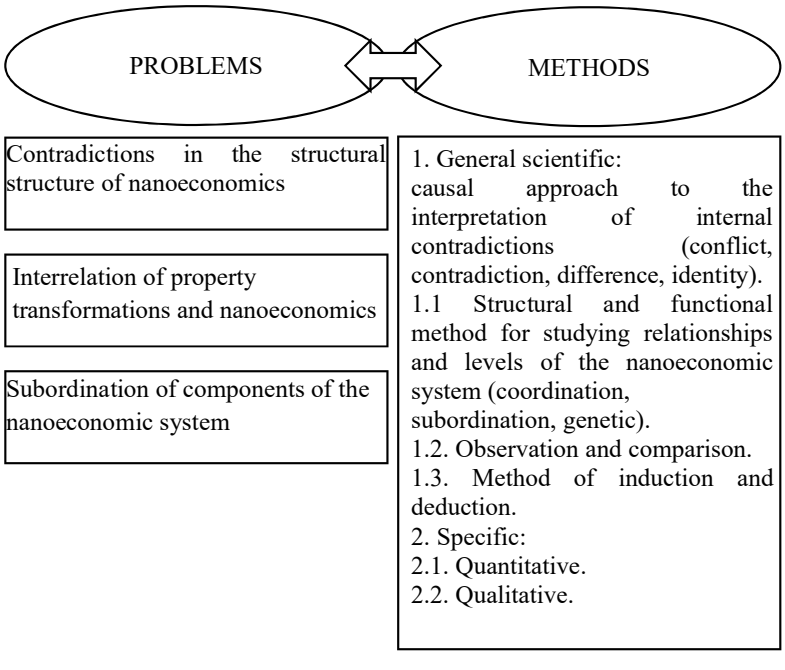

Fig. 1. Problems and methods of public identification of nanoeconomics

However, the activation of internal creative reproductive potential is a key factor in the post-war recovery and further socio-economic prosperity of Ukraine. Such activation should take place through effective management of the processes of transformation of property rights and relations towards the formation of nanoeconomy as a forerunner of harmonious institutional architectonics – socio-economic space-time acceptable for life.

5. 4. Application of methods of regression analysis of the dependence of the increase in social wealth on the distribution of property rights

To determine the influence of distribution of property rights on indicators of economic growth and increase of social welfare as a source of formation of the nanoeconomics model, methods of multifactor regression were applied. The criterion for the productive functioning of the nanoeconomy is the size of GDP per capita, because this indicator reflects the participation of an individual in the formation of the gross product of a particular country. This is a dependent variable. The impact variables were chosen as total resources on average per month per household, household deposits, and capital investments. All these variables are a reflection of the existing institution of property since total resources (property, capital, financial, intellectual) are the basis for the distribution of property rights and the increase of social wealth at the nano, micro, and macro levels of the economic system.

To build a linear regression model, the GDP of one of the countries with economies in transition per capita, USD (GDP), is chosen as a dependent variable. The exchange rate is given in Table 1.

Vector of independent variables – total resources on average per month per household (RES), household deposits attracted by depository corporations (banks) (DEP), capital investments (INV).

The linear regression model is:

$$Y = a_0 + a_1X_1 + a_2X_2 + a_3X_3.$$

The initial data for calculating the model are given in Table 1.

Research results:

Y=937.401930·X_1+4.18314·X_2+0.01060·X_3.

Call:

lm(formula=GDP~RES+DEP+INV, data=REG).

For the optimality of our study, the coefficients of heteroscedasticity (based on the Brüsch-Pagan test), multicollinearity (based on the Belsie test), and autocorrelation (using the Durbin-Watson test) were calculated.

The results indicate sufficient quality of the model, the coefficients are statistically insignificant, except for RES, the coefficient of determination, 0.9076, is quite high, which indicates the presence of a linear relationship between factor and target variables.

Our regression analysis shows that between the indicator of nanoeconomics development and variables reflecting the state of property relations, there is a dense relationship of 0.9076. This means that a person's business activity is significantly influenced by factors of distribution of property rights.

The generalized results of investigating the influence of property transformations on the formation of nanoeconomics are given in Table 2.

The formalized results of the conducted scientific research testify to the effectiveness of the application of the chosen methodological tools for solving the initial research problem. Such application will help overcome the trends of functionally narrowed and too general approaches to understanding global-local transformations of property relations and the socio-economic consequences of the introduction of new technologies.

Table 1

Data were studied for 2010–2019

Year	Hryvnia to USD exchange rate as of January 20	GDP, mln. UAH	GDP, mln. USD	Total resources, mln. UAH	Total resources, mln. USD	Household deposits attracted by depository corporations (banks), UAH million	Household deposits attracted by depository corporations (banks), mln. USD	Capital investments, mln. UAH	Capital investments, mln. USD
2010	8.11	24798	3057.70	3481.0	478.5	275093	33920.2	189061	22313.3
2011	7.93	29980	3780.58	3854.9	486.1	310390	39141.2	259932	32778.3
2012	8.02	32480	4049.87	4144.5	516.7	369264	46042.8	293692	36619.9
2013	8.12	33965	4182.88	4470.5	550.5	441951	54427.4	267728	32897.5
2014	8.37	36904	4409.08	4563.3	545.1	418135	49956.3	219420	26215.0
2015	16.01	46413	2899.00	5231.7	326.7	410895	25664.8	273116	17059.0
2016	24.45	55899	2286.25	6238.8	255.1	444676	18187.1	359216	14691.8
2017	27.39	70170	2561.88	8165.2	289.1	495313	18083.7	448462	16373.2
2018	28.65	84228	2870.08	9904.1	345.6	530250	18507.8	526341	18371.4
2019	27.75	94653	3410.91	12118.5	436.7	530731	19125.4	584448	21061.1

Table 2

Brief results of investigating the influence of property transformations on the formation of the social model of nanoeconomy

No. of entry	Research initiatives applied	Results
1	Definition of property as a system of jointly divided relations of use, management, ownership in relation to the relations of value (economic value)	Interpretation of property, in the unity of natural-economic, socio-economic, organizational, and legal components, as a fundamental social institution and economic good
2	The embodiment of the economy of nanotechnology, in unity with the constructs of baby economics, human economics, to the social model of nanoeconomics as a forerunner of harmonious institutional architectonics	Concentration of research attention on overcoming the functional attitude to the processes of development and application of nanotechnology; emphasis on taking into account the accompanying and long-term socio-economic consequences of the introduction of new technologies; awareness of the concept of nanoeconomics as a center for realization of creative potential for man and society
3	Clarification of the meaning of global-local transformations of property relations as a source of structural change in the public sector of the economy in the direction of harmonizing the private-public interests of civil society	Definition of the value restored triple structure of the social sector as an adequate socio-economic platform for the formation of nanoeconomy in a broad sense – the forerunner of harmonious institutional architectonics of the economic system
4	Application of mathematical methods of multivariate regression to analyze the dependence of the increase in social wealth on the distribution of property rights	Formalization of the postulate of intensification of domestic business activity as a key factor in the post-war economic recovery of Ukraine

6. Discussion of the results of investigating the impact of global-local property transformations on the formation of nanoeconomics

Our results of investigating the influence of global-local property transformations on the formation of nanoeconomics are briefly given in Table 2. They are the result of creative understanding of scientific ideas about the content and relationship of property relations and the social model of nanoeconomics through the use of a number of general and special methodological tools (Fig. 1). The main research initiative was the use of value economic methodology as an interactive basis for the application of traditional theoretical approaches. The value interpretation follows the tradition of disclosing the essence and evolution of property as relations of joint-divided labor, reported in [34, 35], and creatively develops them on the platform of economic value as a triple unity of marginal utility, value, and price [36].

This has made it possible to identify directions for overcoming established tendencies of functionally narrowed or too broad understanding of the content and interrelation of property relations and the social meaning of high-tech development. Namely, in contrast to existing and interpretations, we have clarified the content of property as a fundamental social institution and economic good in the unity of natural-economic, socio-economic, organizational, and legal components: the meaning of global-local transformations of relations and property rights in the direction of forming a model of the public sector of economy, which coordinates private-public interests and contributes to strengthening the foundations of civil society, is disclosed. It is determined that the value restored triple structure of the public sector is an adequate basis for the formation of nanoeconomy in a broad sense as a forerunner of a harmonious institutional architectonics of the economic system.

Our understanding of nanoeconomics as a model of social arrangement is the result of the creative development of research initiatives initiated in work [43]. Within the social model of nanoeconomics in a broad sense, the economics of nanotechnology is embodied in unity with the constructs of baby economics, human economics. This approach will contribute to overcoming the functional attitude to the processes of development and application of nanotechnology. The concentration of research and public attention is focused on taking into account the concomitant and long-term socio-economic consequences of the introduction of new technologies; awareness of the concept of nanoeconomics as a center for the realization of creative potential for man and society.

For the purpose of applied verification of theoretical hypotheses, mathematical methods of multivariate regression modeling are applied. The results of application are given

in Table 1. The implementation of regression analysis revealed a tight relationship (coefficient of determination, 0.9076) between the indicator of development of nanoeconomics and variables reflecting the state of power relations. The revealed effect means that the business activity of a person is significantly influenced by factors of distribution of property rights. This allows improving approaches to the possibilities of successful post-war economic recovery of Ukraine, namely, the post-war restoration of Ukraine's economy with the subsequent restoration of its sustainable socio-economic development is considered on the basis of jointly divided participation. At the same time, international financial and economic assistance should contribute to the intensification of internal creative economic processes. According to the results of the study, such an activation should take place through effective management of the processes of transformation of property rights and relations on the basis of the social model of nanoeconomics as a forerunner of harmonious institutional architectonics.

The limitations inherent in these studies are due to insufficient attention to the content of the object – the modern environment of socio-economic interactions through a concise format of presenting the results. Namely, in the global-local space, the processes of standardization of production relations are becoming more active. Standards in economic systems are distributed objectively because they follow the specified algorithms of economic activity. On the one hand, algorithmic economics is an indicator of compliance with a certain average value; on the other hand, it is an indicator of social equalization when individuality can be lost. Due to the narrowing of the intellectual space for applying the methodology of causal analysis, public perception of the results also narrows.

The disadvantages of our study include a certain limitation of experimental tools. After all, the assessment of the influence of nanolevel relations on macroeconomic indicators performed using mathematical modeling methods should be supplemented by sociological survey methods or other information sources. In the future, such shortcomings can be eliminated by attracting additional information, by developing and implementing field research programs.

The development of this study is to further clarify:

– mechanisms for implementing the institution of property as a system of jointly divided relations of use, management, ownership in the system of the state-corporate sector of the economy;

– prerequisites for the formation of an effective owner as a subject of nanoeconomics in a broad sense;

– the content and features of the functioning of the institute of intellectual property as the basis for the formation of the economy of nanotechnology.

On the way of deploying such programs, the study may face the problems of limited access to the database of information sources on the organization of the corporate governance system at the state level and private firms.

Barriers to entry into the intellectual property rights market may be significant.

The application of mathematical tools will also require new approaches and may face an increase in conjugate transaction costs.

7. Conclusions

1. It is revealed that global-local market transformations at the turn of the XX–XXI centuries combined with the processes of transformation of property rights and relations against the background of powerful use of information and digital technologies. Due to insufficient scientific substantiation and explanation, they led to an increase in general social turbulence. This requires updating the methodological foundations of studying the content and interrelation of the transformation of property relations and the social meaning of high-tech development.

It is determined that Ukrainian scientific initiative to study property as a relationship of jointly divided labor contains a heuristic potential for proper explanation of market transformations. Developing this approach through the prism of value methodology, property can be defined as a fundamental social institution, a public economic good in the triple unity of natural-economic, organizational-legal, and socio-economic components.

2. It is determined that the latest global-local challenges cause socially threatening changes in property rights and relations. In the context of the hot stage of the hybrid war against the background of Russian military aggression against sovereign Ukraine, the processes of irrational transformation of the property institution have become relevant.

It is disclosed that the modern model of the public sector of economy has a triple structure. In the context of harmonization of socio-economic relations, it should acquire an updated content. Through the transformation of property rights and relations, the renewed public sector will contribute to the formation of the nanoeconomy as a forerunner of harmonious institutional architectonics.

3. It is shown that the construct of nanoeconomics as a new form of social transformation was predicted by C. Arrow in the second half of the twentieth century. But only now is it discovering its fruitful heuristic potential. The social project of nanoeconomics – consisting of baby economics, human economics, and economics of nanotechnology – forms the basis for favorable socio-economic development.

It is noted that within the framework of nanoeconomics, the accompanying and long-term socio-economic consequences of the use of the latest information and digital technologies are taken into account and barriers are created to prevent their socially harmful use.

4. For the purpose of applied verification of theoretical hypotheses regarding the influence of property transformation processes on the formation of a social model of nanoeconomics, mathematical methods of multivariate regression modeling are applied. It is revealed that indicators of GDP per capita, which reflect the state of development of nanoeconomy, significantly depend on indicators of distribution of property rights. The coefficient of determination is 0.9076.

Thus, the activation of internal creative reproductive potential is a key factor in the post-war recovery of Ukraine's economy. Creative motivation will take place through mechanisms of effective and transparent management of the processes of transformation of property rights and relations in the national economy.

Conflicts of interest

The authors declare that they have no conflicts of interest in relation to the current study, including financial, personal, authorship, or any other, that could affect the study and the results reported in this paper.

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Data availability

All data are available in the main text of the manuscript.

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