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Theoretical Aspects of Creating a Scientific and Educational Platform for Information and Trading Systems

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ABSTRACT

The subject of the work is the theoretical aspects of creating a scientific and educational platform for information and trading systems; the object of the work is a scientific and educational platform for information and trading systems, the purpose of the work is to improve the efficiency of information and trading systems; to achieve this goal, the following tasks are solved: the concept of scientific support of information and trading systems is discussed; the paradigm of the development of scientific support for the design of information and trading systems is being formed; the methodological provisions and tasks of the general theory of scientific support of information and trading systems are described; the architecture of the scientific platform of information and trading systems is discussed; the scientific methods in the article are: system analysis, logical and historical analysis, philosophy and methodology of science, system engineering, theory of hierarchical systems; the scientific novelty of the article lies in the formation of a paradigm for the development of scientific support for design information and trading systems.

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1. INTRODUCTION

The relevance of the work is explained by the intensive development of information and trading systems during the new technological order. Historically, information and trading systems began to be formed by automating individual trading operations.

Such a design can be called a heuristic. The creation of such systems was conducted and is being conducted by the method of "trial and error". Therefore, even though such systems have been developing for about 30 years and well-known developers of such systems periodically have significant losses, adequate scientific support for the development of such systems has not yet been created. This increases the risks of creating and operating such systems. This contradicts the thesis that in the conditions of the formation of a new technological order, science is a productive force.

Additional relevance to the topic under consideration is given by the fact that the formation and operation of information and trading systems is part of the global development process of consumer society.

The hypothesis of the article consists of the assumption that the formation of a general theory and extensive scientific support of information and trading systems will accelerate the process of formation of such systems.

The purpose of the work is to improve the efficiency of information and trading systems. Also, several points are considered:

(i) the concept of scientific support of the information and trading system is discussed;
(ii) a paradigm for the development of scientific support for the design of information and trading systems is being formed;
(iii) methodological provisions and tasks of the general theory of scientific support of information and trading systems are described;
(iv) the architecture of the scientific platform of information and trading systems is discussed.

The object of the work is a scientific and educational platform of information and trading systems. The subject of the work is the theoretical aspects of the formation of the general theory and paradigm of scientific support for the design of information and trading systems. We will analyze the literary sources on the topic of this article.

2. LITERATURE REVIEW

At the beginning of the 21st century, e-commerce is rapidly developing (Makeeva, 2023; Sprano & Zakak, 2000). Scientists discuss the differentiation of the concepts of "electronic commerce" and "e-commerce" (Shaidullina, 2020). Electronic payment systems (Oney *et al*., 2017) are a part of information and trading systems. System engineering is actively developing and being put into practice abroad and in Russia. These changes are a reflection of the fourth industrial revolution and the process of formation of a new and technological way of life. Complex hierarchical systems play an increasingly important role in these processes. When designing information systems, the concept of interaction is used. Cyber-physical systems are actively developing (Glushchenko, 2023).

The methods of system engineering are regulated by the state. Complex systems are characterized by the use of the concept of "architecture" and development strategies. Scientists study interfaces as structural elements of complex systems. For the analysis of innovative tasks and structures of complex systems, field analysis, design thinking, and other innovative methods are developed (see https://web.snauka.ru/issues/2022/12/99402). Research is being conducted on the direction of scientific support of information and trading

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systems. When designing and researching complex systems, their functional decomposition representation is possible (Glushchenko, 1990).

The analysis shows that the methods of operations research and, in particular, the theory of queuing can be used to design information and trading systems. Methodological provisions of the general theory of science-Scientology can be used for the development of scientific foundations for the creation of information and trading systems. The analysis of scientific publications confirms the lack of detailed scientific and methodological support for information and trading systems. This confirms the relevance of this article.

3. METHOD

This paper is a literature survey. We get data from internet sources, especially articles published in international journals. Data was collected, reviewed, and concluded to get new ideas and suggestions for constructing this paper.

4. RESULTS AND DISCUSSION

As you know, science is a system of knowledge about patterns in the processes of development of thinking, nature, and society (as well as a separate branch of such knowledge) (Henshaw, 2019). In the conditions of the formation of a new technological order, science is recognized as the productive force of society. The socioeconomic functions of science include the following functions: cognitive (search and production of new knowledge); ideological (formation of a scientific picture of the world in people); prognostic; industrial; cultural (educational); and social (Mooney & Hunt, 1996).

In the course of performing its production function, science ensures the introduction of knowledge in the form of innovations, develops and applies new forms of organization of production processes, develops new technologies, and synthesizes and implements scientifically based innovations in manufacturing industries.

It is known that the scientific method is a system of categories, methods of substantiation of knowledge, values, regulatory principles, samples, etc., which are used and guided in their work by the scientific community. The scientific method integrates: methods of detecting scientific problems; methods of studying phenomena, systematization and classification, correction of new and verification of previously acquired knowledge, etc.

Knowledge formed in the course of scientific research includes skills, ability, ability to implement something; any data that can influence a decision, action, or behavior; the formation of forms of a person's attitude to reality aimed at obtaining new data, skills, and abilities.

The key features of scientific cognition are logical connection and derivability of some knowledge from others; validity; strict evidence; reliability; application of the scientific method of research to obtain knowledge; use of a special language for describing research procedures; sufficient development of the conceptual apparatus (categoriality); objectivity and more. All these properties of scientific knowledge make such knowledge a productive force in society. The presence of these properties of scientifically based knowledge makes it possible to increase efficiency and reduce the risks of creating information and trading systems.

The scientific support of an information and trading system is understood as a certain set of knowledge that allows for ensuring the safety and efficiency of the processes of designing and functioning of such systems. Scientific support of ITS (information and trading systems) belongs to the field of system engineering. The information and trading systems themselves

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can be classified as cyber-physical systems (Lohachab *et al*., 2021), this is due to the presence of two parts in the cyber-physical systems, namely the physical part in the form of automated warehouses, transporters, etc., and the information and computing part, including the calculation system.

We agree to call the paradigm of scientific support for ITS design a system association: the philosophy of scientific support for ITS design; the ideology of designing such ITS; the organizational culture of ITS creation; and policies (strategies and tactics) for creating information and trading systems.

The philosophy of the development of scientific support for the design and creation of ITS can be called the most general wise view of the project and the process of functioning of such ITS.

The ideology of scientific support for the creation and functioning of ITS can be called: firstly, the main idea of creating scientific support for the ITS under consideration; secondly, the way power is distributed among stakeholders in the process of forming scientific support for the creation and functioning of this kind of ITS.

The organizational culture of creating scientific support for ITS can be called a systematic combination of such elements: values, beliefs, and behavioral stereotypes of developers and staff of such an information and trading system. The ergo design of the organizational culture of creating scientific support for information and trading systems can solve the following tasks: optimization of the elements of the organizational culture of the process of forming scientific support for ITS; harmonization of relations between the elements of the organizational culture of scientific support for ITS and others.

We will assume that the life cycle of ITS includes:

(i) The origin of ITS;
(ii) Intensive development of ITS;
(iii) The period of productive work (maturity) of ITS;
(iv) Aging of ITS;
(v) Modernization of ITS;
(vi) Operation of the upgraded ITS;
(vii) Disposal (liquidation) of ITS.

The mission of creating scientific support for the life cycle of ITS can be understood as a general description of the expected socio-economic effect of such information and trading systems, and the expected benefits from it for society. The mission of creating scientific support for ITS is to reduce the cost of commercial services to the population based on integrated automation in compliance with the requirements of comfort and safety of such activities.

The vision of creating scientific support for the life cycle of ITS will be called the motivating stakeholders of such a system scenario for the development of the system under study. At the same time, the scenario of the development of the scientific support of ITS is understood as a logical sequence of events in the process of the development of such scientific support of the created ITS.

To form the key methodological provisions of the general theory of information and trading systems, we use similar provisions of Scientology (general theory of science).

We agree to call the general theory of information and trading systems (ITS) a scientific discipline on the creation of scientific knowledge and physical, and technical objects, which covers a complex of scientific problems, philosophy, ideology, politics, motives, methods, methods, tools, technologies of innovative creation of ITS to the full depth of their life cycle.

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From an epistemological point of view, the general theory of information and trading systems can be studied as a methodology for research, analysis, and management of methods for solving scientific problems facing modern economics and society in the field of ITS creation.

Let's define the scientific method, object, subject, functions, and roles of the general theory of information and trading systems. The scientific method in the general theory of information and trading systems, we agree to call a system of principles and techniques by which objective knowledge of scientific processes and socio-economic results of design, creation, circulation, use, modernization, utilization of technologies, etc. is achieved.

Functions (from the word "perform") The general theory of ITS consists in the fact that, within the framework of the emerging general theory of information and trading systems, it can be performed in the geopolitical, political, social, economic, technological, environmental subsystems of the state, global economy, and society.

The economic and social role (significance) of the general theory of information and trading systems is determined by the effectiveness of its functions, which this theory performs concerning meeting the needs of the economy and society.

The basic functions of the complete theory of information and trading systems are proposed to recognize: methodological, cognitive, instrumental, legislative, optimization, prognostic, preventive, and psychological functions, the function of socialization of knowledge, minimization of technogenic, environmental, and social risks, the system-forming function of scientology.

The methodological function of the general theory of information and trading systems (GT ITS) consists in the formation of the conceptual apparatus, the theoretical foundations of scientific research and methodology for the study of phenomena and processes, the formulation of laws and categories from ITS, the synthesis of methods and tools for managing scientific research, innovative project (in various areas of ITS), ITS life cycle to maximize their efficiency, minimizing damage from man-made and socio-economic risks and ensuring the effectiveness of ITS development policy (system of measures).

The cognitive function of ITS includes the processes of accumulation, description, study of facts of reality in the field of ITS, innovations, technologies at various levels (global, national, sectoral, regional, etc.), analysis of specific phenomena and processes within the process of scientific research, implementation of innovative projects, study of the life cycle of ITS, identification of the most important problems and sources development of ITS sphere, substantiation of individual measures and programs of ITS development in the conditions of consumer society.

The instrumental (regulatory) function of ITS has a practical nature, as it consists of the following: the development of methods and tools for managing scientific research (in all areas) ITS, innovative projects, the life cycle of ITS; formation of practical recommendations for the authorities in the field of ITS, research and development (R &D and R&D) in the field of ITS and their organizations; preliminary assessment of the effectiveness of R & D, R& D, production and operation, modernization and disposal of ITS within the life cycle of such systems.

The legislative function of ITS is embodied in the process of substantiating the need and developing legal norms that contribute to the development of the ITS sphere, innovations, forms of responsibility for causing damage to third parties, personnel, and society as a whole at all stages of scientific research, innovative projects, the life cycle of ITS, etc.

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The optimization function of ITS covers the synthesis or selection of the best (from a certain point of view, for example, the minimum costs for ITS) methods and techniques for implementing both individual stages and the entire life cycle of ITS.

The prognostic function of ITS includes assessment of the state of ITS, economy, and society in the future from the point of view of the possibility of ITS development; reduction of dangerous levels during scientific research, implementation of innovative projects, ITS functioning; modeling of social and economic processes involving ITS and their changes under the influence of scientific and technological progress in the field of ITS and more.

The preventive function of ITS can be expressed in the implementation of proactive and preventive measures based on the results of the forecast of ITS development, taking into account the possibility of the development of techno-economic crises, man-made disasters, technological crises, and other types of negative phenomena arising from the development of global and national socio-economic systems with the participation of ITS.

The psychological function of ITS is to explain to ITS stakeholders, and citizens the need for financial and other costs for the continuous development of scientific and innovative activities, the acceleration of scientific and technological progress in the field of ITS creation, the orientation of society towards sustainability and effective management of scientific and technological progress in the field of ITS in the interests of society and the economy.

The function of the socialization of knowledge in the field of ITS is to disseminate knowledge about the role and importance of modern ITS for the modern state and society, and the need for effective measures for the development of ITS among the general population. Performing the function of socialization from ITS can be of great importance for ensuring the sustainability of development and progressive legal support for the development of science and technology, STP in the field of ITS and in general.

The system-forming function of ITS includes an accumulation of knowledge aimed at ensuring the creation of adequate ITS and; the formation of management systems for scientific and innovative processes in the field of ITS, including planning, organization, motivation, and control of the results of scientific and innovative processes in the field of ITS.

Roles GT ITS can be considered: 1) optimization of the processes of development of scientific support in the field of ITS; 2) reduction of risks during scientific research and implementation of innovative projects in the field of ITS; 3) improvement of financial results of scientific and innovative activities in the field of ITS development.

The laws of ITS can be called stable causal relationships between the methods of scientific research and the implementation of innovative projects in the field of ITS and the observed financial results of ITS, stable logical connections in the interaction of parts and relationships arising in the process of development and functioning of ITS.

It is possible to describe such laws GT ITS:

(i) In the context of the development of a new technological order and a consumer society (it is also an information, network society), the importance of ITS will increase.
(ii) The lag in the development of scientific support for ITS creation processes creates socio-economic risks.
(iii) The general theory of ITS refers to generalizing scientific theories of an object's nature, which means: that within the framework of ITS, all the knowledge necessary for the sustainable development of the ITS sphere is integrated; the object of this theory is ITS at all stages of their life cycle.
(iv) The general theory of ITS is a structural and specialized element of system engineering in the field of ITS.

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(v) The development of ITS is influenced by two opposite trends: the growth of differentiation and specialization of sciences; system integration of branch sciences into a single whole;
(vi) The increasing complexity of the practice of creating ITS and the complexity of the science of ITS requires the creation of ITS as a basis for managing scientific and practical processes in the field of ITS.
(vii) The functions of the general theory of ITS can be considered as the direction of development of this general theory.
(viii) In the field of ITS, there is a five-level technological pyramid: at its first level there are conceptual developments and technological principles of ITS; at the second level of ITS there are technologies for the design and operation of ITS; at the third level there are the design and production of ITS technical means; at the fourth level there are technologies and processes for the actual operation of ITS; at the fifth level of the pyramid are placed ITS technical service technologies and ITS personnel training technologies, and more.

The key tasks from GT ITS can be called:
(i) formation of the paradigm, mission, and vision of ITS development;
(ii) classification of ITS types;
(iii) development of methods of system engineering in the field of ITS;
(iv) formation of ITS design methodology;
(v) development of methods for substantiating ITS architecture;
(vi) formation of the theoretical foundations of ergo design in the field of ITS;
(vii) development of methods of scientific support of ITS life cycle;
(viii) risk assessment of ITS sustainable development;
(ix) formation of methods for assessing the impact of ITS on the socio-economic development of the state and society, and more.

We agree to call the Information and trading system (ITS) systems created for automated transactions of purchase and sale of products (goods and/or services).

The classification of ITS will be called the division of the entire set of ITS into groups based on certain factors, and properties. ITS classification can be either hierarchical or non-hierarchical. The classification of ITS is carried out based on the identification and analysis of factors characteristic of ITS of a certain type. Within the framework of the hierarchical classification, the whole set of ITS can be divided into subsets based on various factors (signs): the legal status of the serviced territory; the type of the serviced market (market of pure competition, oligopoly, etc.); industry affiliation (securities market; car market; consumer goods, etc.); methodology of ITS creation.

Based on such features (factors), the following can be distinguished: international ITS; national (operating within the same country); regional; and municipal ITS.

Within the framework of a non-hierarchical classification, sectoral ITS and others can be distinguished.

Based on such a factor as ITS design methodology, four types of ITS can be distinguished: wholesale and retail ITS (marketplaces, ITSM); information and trading ecosystems (ITES); ITS using neuromarketing technologies (ITSN); intelligent information and trading systems. By ITS marketplace we mean a virtual trading platform where products (goods, services) of other firms are sold using automation and information technologies. Marketplaces are characterized by the following properties: orientation to meet the customer's needs for specific products (goods or services); the object of interaction of such IT is a typical buyer; the content of the work of such ITS is product promotion; such ITS create pure competition in the

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market (consumer goods); such ITS are characterized by relatively low risks of monopolization of activities and low risks of manipulation by the buyer.

After 2020 (the COVID-19 pandemic), there have been trends: remote formation of individual orders (Sutherland *et al*., 2020); integration of such ITS with delivery services; issuance of orders to distributed distribution points for products delivered by pre-order from wholesale warehouses, etc.

We will call the Information and Trading ecosystem (ITES) a set of information and other types of services aimed at forming an integrated (complex) product that provides the purchase and sale of everything necessary to meet a set of key needs of customers from specific social groups. The following features are inherent in the work of ITES: a focus on comprehensively meeting the totality of needs characteristic of a particular social group; conducting advanced sociological and marketing research to study the lifestyle and needs of customer groups; the complex of customer needs are determined by the social status and lifestyle of the studied social group; market niche (object of interaction)- a certain social group of people; the content of the activity of such ITS is the formation of a certain image and lifestyle of a social group; the desire to avoid competition by creating a unique set of products; the growing risks of monopolization and manipulation of customers, and more. Intelligent information and trading systems (IITS) are characterized by the fact that their activities include the formation of new knowledge about the structure and specifics of customer needs based on the analysis of previous requests and purchases of goods and/or services.

Intellectual ITS (IITS) has the following features: deeper differentiation of customers; focus on meeting latent or specific needs of customers; focus on the specifics of the lifestyle and behavior of customers; the basis of activity is the study of the deep needs and characteristics of customer behavior; the desire to win the competition through a more in-depth study of customer behavior; relatively high risk of manipulation by the customer and/or monopolization of markets and other.

The fourth class of ITS can be called ITS with the use of neuromarketing technologies in their activities. Neuromarketing can be used to evaluate the effectiveness of advertising, optimize the appearance of products, etc. This is a promising kind of ITS.

Each of the selected ITS classes has its mission and vision. The mission of ITS will be called the benefit of their work for the economy and society of ITS. ITS mission can be recognized as improving comfort and reducing trade risks for the economy and society based on information technology and integrated automation of trading activities. For various types of ITS, this mission can be implemented using specific methods and tools.

The vision of ITS development will be called the scenario of ITS development that inspires stakeholders. The implementation of the ITS vision can be facilitated by the modular principle of ITS construction. Gradual updating of ITS modules can provide gradual modernization of ITS. Together, the mission and vision affect the architecture of ITS. ITS architecture is designed to ensure the perception of ITS as a single harmonious whole. ITS architecture involves the harmonization of the characteristics and behavior of various ITS modules.

When designing and operating ITS, it should be taken into account that ITS has the whole set of properties of complex systems (a large number of heterogeneous elements, emergence, multifunctionality, and more). This makes it possible to classify them as complex systems. The study shows that at the beginning of the 21st century, four classes of such systems can be distinguished: marketplaces; trading ecosystems; intelligent trading systems; and ITS with the use of neuromarketing (a promising direction).

Additionally, it should be taken into account that when designing and system analysis of ITS, it is possible to use a functional decomposition representation FDR of such systems

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(Glushcenko, 1990). Such an FDR of ITS can be obtained by decomposing the work of ITS into separate functions. With this approach, the following functions can be structured (decomposed) in ITS: the information function of ITS, which consists of creating a behavioral readiness of the client to make a purchase decision in the process of communication; the settlement and payment function of ITS, which consists in carrying out calculations for the purchased goods or services (product) (carrying out and confirming the completion of calculations); the function of logistics services to the buyer in the interests of transferring paid goods to him or rendering paid services; the control and fiscal function of ITS, which consists in controlling commodity and cash flows and their taxation (confirmation of the completion of the transaction and ensuring its taxation).

FDR can be considered as the basis of ITS modular architecture. The architecture of ITS (and/or ITS software) is understood as a set of such components: the fundamental organization of ITS, reflected in its functions and embodied in its elements; algorithms for the operation (functioning) of ITS; algorithms for the interaction of ITS and its external environment; interaction of subsystems (elements) ITS, systems (software) with each other; ITS design principles; methods of development (evolution) ITS and other.

Experts believe that the content of the concept of "architecture" concerning ITS is to a certain extent subjective. Experts believe that each ITS development team (or ITS software) has its point of view on the content of the term "ITS architecture" and its impact on the results of ITS design.

The most generalized algorithm of ITS functioning includes the following: communications for informing the prospective buyer about the products offered a decision by the buyer (client) about the purchase-making payments for the purchased product (product or service)-confirmation by the seller of receipt of payment-execution of logistics operations - transfer of the product (goods or services)-confirmation of legality and the fact of completion of the act of purchase / sale-transfer of ITS taxes to the state budget system. As you know, ITS is a tax agent of the state.

The proposed general theory of ITS (GT ITS) can be the basis for the formation of ITS scientific and educational platforms. As you know, scientific theories can be of the following types: mathematical, descriptive, inductive and deductive, fundamental and applied, formal and substantive, "open" and "closed", explaining and describing (phenomenological), and more. The general theory of information and trading systems described in this article can simultaneously be attributed to the following types of theories: descriptive, applied, open, etc.

The process of designing ITS based on the general theory of ITS can be described by the following algorithm: the study and classification of the market in which ITS will work; the formation of the image of a typical buyer of this ITS (or nomenclature of typical buyers); the study of the general theory of ITS; the choice of the type of ITS being designed; the definition of the appearance (structure and main characteristics) of the created ITS; the development of a functional-decomposition of ITS representation; formation of ITS architecture; definition of the appearance of ITS functional subsystems (information, calculation, logistics, control and fiscal, etc.); software development of these subsystems; development of ITS operation project; formation of ITS technical service project and others.

At the same time, it should be borne in mind that, as already noted, at the beginning of the 21st century, the design of information and trading systems was mainly carried out by heuristic methods, the method of "trial and error". This increases the costs of creating such systems (ITS), which (costs) ultimately fall on consumers within the framework of the well-known principle of a market economy: will the consumer pay for everything?

The analysis shows that one of the reasons for the insufficient development of scientific support for information and trading systems may be related to the real paradigm of creating such ITS, namely, considering the process of designing ITS as a process of automation of trade, e-commerce. Presumably, this is why information and trading systems have not been considered complex systems for a long time. This may also be because the customers and developers of ITS were economists and programmers who were not familiar with the concepts of "complex system", "system engineering", etc. For this reason, until now (2023), the scientific tools for creating complex systems - system engineering - could not be in demand.

The general theory of ITS (GT ITS) can be attributed to system engineering. As you know, systems engineering is a field of scientific and technical activity integratively covering a complex of scientific, engineering, and management disciplines. System engineering also covers the following issues:

(i) Setting and studying the problems of customers (consumers), users, and other stakeholders (stakeholders);
(ii) Searching and analyzing options for engineering solutions to customer life support problems;
(iii) Choosing an engineering alternative that allows, taking into account the limitations, to solve the life support problem in the best way;
(iv) Designing ITS;
(v) Ensuring effective implementation, verification and validation of ITS design solution;
(vi) Forming a scheme for rational operation of ITS;
(vii) Supporting the evolution and termination of ITS use in a certain operating environment, and more.

The category of key tasks of system engineering in the field of ITS creation includes: integrated, coordinated use of achievements of systems sciences, mathematics, computer science, management theory, decision theory, computer modeling, achievements of traditional engineering, and other disciplines. The main goal of system engineering is to create and apply cost-effective, high-quality, reliable systems (ITS) that meet the needs of society and individual citizens. One of the most important results of the application of system engineering in the field of ITS will be to reduce the risks of engineering projects, including the risk of insufficient satisfaction of the needs and requirements of stakeholders (stakeholders), the risk of late delivery of the system, the risk of cost overruns and the risk of negative unintended consequences of creating a certain ITS.

An important component of the creation of ITS should be the theory of queuing and the methodology of operations research (including logistics operations, for example, the well-known traveling salesman problem).

At the end of 2023, a large number of definitions of ITS architecture will be known. This can create risks in the ITS design process. The development of the FDR (functional decomposition representation) allows you to lay the foundation of ITS architecture. The key principles of ITS design that affect ITS architecture include a systematic approach; interaction design; scientific justification of solutions; connection of architecture with the mission (benefit to society) ITS; connection of ITS architecture with the vision (development scenario) ITS; modular construction of ITS; ITS social responsibility and more.

The organizational form of increasing the efficiency of obtaining and using scientific knowledge in the field of ITS can be the creation of a scientific and educational platform for ITS. Under the ITS scientific platform, we agree to understand the system integration of knowledge from the field of system engineering, designed for the design and analysis of ITS

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at all stages of their life cycle. The creation of such a scientific and educational platform of ITS corresponds to the current trend of the development of a new technological order and a network society for the formation of specialized information systems. The creation of such a platform will: increase the demand for system engineering methods when creating ITS; facilitate the analysis of the level of development of scientific support for various stages of the ITS life cycle; increase the likelihood of timely detection of knowledge gaps and necessary knowledge, and more. Such a scientific and educational platform can be structured based on such factors: the functions of the general theory of ITS; the stages of ITS life cycle; methodological approaches to the design of ITS (marketplaces, ecosystems, etc.); the levels of the technological pyramid in ITS and other factors.

It is assumed that the creation of such a platform will help reduce risks and increase the efficiency of projects to create such ITS.

5. CONCLUSION

The article develops a general theory, a paradigm for the creation and functional decomposition representation (FDR) of information and trading systems (ITS), classifies ITS, describes ITS mission and vision, and develops methodological aspects, and principles of designing ITS architecture, this can increase the effectiveness of scientific support for IT design. The paper proposes to create a scientific and educational ITS platform based on the methodology of system engineering. The creation of a general theory of ITS and ITS scientific and educational platform will help to reduce the risks and losses from the design and operation of such ITS compared to the currently used "trial and error" method.

6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

7. REFERENCES

Glushchenko V. V. (1990). Functional-decomposition representation of complex technical systems. *Izvestia of the USSR Academy of Sciences, Technical Cybernetics*, *1990*(2), 184-186.

Glushchenko, V. V. (2023). Formation of a paradigm for designing cyber-physical systems: Educational perspective. *Indonesian Journal of Teaching in Science*, *3*(2), 45-58.

Henshaw, J. L. (2019). Systems thinking for systems making: Joining systems of thought and action. *Systemic Practice and Action Research*, *32*(1), 63-91.

Lohachab, A., Garg, S., Kang, B. H., and Amin, M. B. (2021). Performance evaluation of Hyperledger Fabric-enabled framework for pervasive peer-to-peer energy trading in smart Cyber–Physical Systems. *Future Generation Computer Systems*, *118*, 392-416.

Makeeva T.S. (2023). Electronic commerce: What is it, the principle of operation, types of e-commerce. *Topical Issues of The Modern Economy*, *2023*(2), 20-25.

Mooney, P. H., and Hunt, S. A. (1996). A repertoire of interpretations: Master frames and ideological continuity in US agrarian mobilization. *Sociological Quarterly*, *37*(1), 177-197.

Oney, E., Guven, G. O., and Rizvi, W. H. (2017). The determinants of electronic payment systems usage from consumers' perspective. *Economic Research-Ekonomska Istraživanja*, *30*(1), 394-415.

Shaidullina V.K. (2020). On the issue of distinguishing the terms "electronic commerce" and "electronic commerce". *Eurasian Law Journal*, *7*, 243-245.

Sprano, E., and Zakak, A. (2000). E-commerce capable: competitive advantage for countries in the new world e-conomy. *Competitiveness Review: An International Business Journal*, *10*(2), 114-122.

Sutherland, M., McKenney, M., and Elkbuli, A. (2020). Vehicle related injury patterns during the COVID-19 pandemic: what has changed?. *The American Journal of Emergency Medicine*, *38*(9), 1710-1714.

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