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ORGANIZATIONAL AND ECONOMIC MECHANISM OF STRATEGIC MANAGEMENT OF SUSTAINABILITY OF SUPPLY CHAINS OF INDUSTRIAL ENTERPRISES

Mariia Hryhorak, Nataliia Trushkina, Kateryna Kitrish. «Organizational and economic mechanism of strategic management of sustainability of supply chains of industrial enterprises». *The article deepens the theoretical and methodological foundations of the organization of strategic management of industrial enterprises` supply chains sustainability. The evolution of the concept of supply chain management is considered from the standpoint of the institutional theory, as well as the influencing of various factors on its development and integration with the concept of sustainable development is determined. The conceptual and categorical apparatus for researching supply chain sustainability management from the standpoint of network theory and stakeholder theory has been developed.*

On the example of a metallurgical enterprise, a system of indicators of sustainable development is proposed and strategic guidelines for three scenarios of sustainable development of an enterprise are determined. These three scenarios take into account the conditions for future development, which are defined as pessimistic, optimistic and such as to ensure balanced sustainable development. Calculations of strategic scenarios for sustainable development were based on the determination of threshold values of indicators for three components: economic (including the quality of corporate governance), environmental and social. Strategic benchmarks have been developed for each of the scenarios.

In the course of the study, it was found that it is inappropriate to calculate the integral sustainability index for the entire supply chain as a whole. Such a calculation has no informative value and is technically practically impossible due to the incomparability of indicators of different business units included in the supply chain. A conclusion is drawn from this that the sustainability of each individual business unit in the chain should be assessed separately.

An organizational and economic mechanism for managing the sustainability of the supply chain in a hybrid form is proposed, which provides for a combination of decentralized development of sustainable development strategies by individual enterprises and organizations within the supply chain and centralized coordination and monitoring of the implementation of strategies by a focal company based on a digital platform. The concept of this mechanism is based on a network approach and provides for the organization of collaboration of participants in the supply chain with the involvement of a wide range of stakeholders.

The directions in which various digital technologies can be applied in managing the sustainability of the supply chain are considered, among which blockchain technology is recognized as the most suitable for use at the moment.

***Keywords**:* supply chain, networks, management, sustainable development, indicators, strategic benchmarks, organizational and economic mechanism, stakeholders, digital platform, digital technologies.

Марія Григорак, Наталія Трушкіна, Катерина Кітріш. "Організаційно-економічний механізм стратегічного управління сталістю ланцюгів постачань промислових підприємств". *У статті поглиблено теоретико-методологічні основи організації стратегічного управління сталістю ланцюгів постачань промислових підприємств. Розглянуто еволюцію концепцій управління ланцюгом постачання з позицій інституційної теорії, а також визначено вплив різних факторів на їх розвиток та інтеграцію з концепцією сталого розвитку. Розроблено концептуально-категоріальний апарат дослідження управління сталістю ланцюгів постачань з позицій теорії мереж та теорії зацікавлених сторін.*

На прикладі металургійного підприємства запропоновано систему показників сталого розвитку та визначено стратегічні орієнтири для трьох сценаріїв сталого розвитку підприємства. Ці три сценарії враховують умови майбутнього розвитку, які визначаються як песимістичні, оптимістичні та найбільш ймовірні сценарії, що забезпечують збалансований сталий розвиток. Розрахунки стратегічних сценаріїв сталого розвитку базувалися на визначенні порогових значень показників для трьох компонентів: економічної (включаючи якість корпоративного управління), екологічної та соціальної складових. Для кожного зі сценаріїв розроблено стратегічні орієнтири.

У ході дослідження було зроблено висновок про недоцільність розрахунку інтегрального індексу сталості для всього ланцюга постачання в цілому. Такий розрахунок не має інформаційної цінності і технічно практично неможливий через непорівнянність показників різних бізнес-одиниць, що входять до ланцюга поставок. Запропоновано оцінювати сталість бізнес-одиниць в ланцюзі постачання та здійснювати координацію їх стратегій сталого розвитку.

Запропоновано організаційно-економічний механізм управління сталістю ланцюга постачання у гібридній формі, який передбачає поєднання децентралізованої розробки стратегій сталого розвитку окремими підприємствами й організаціями в межах ланцюга постачання та централізованої координації і моніторингу виконання стратегії фокусної компанії на основі цифрової платформи. Концепція цього механізму заснована на мережевому підході і передбачає організацію співпраці учасників ланцюга постачання із залученням широкого кола зацікавлених сторін.

Визначено основні напрямки застосування сучасних цифрових технологій в управлінні сталістю ланцюгів постачань.

Ключові слова: ланцюг постачання, мережі постачання, управління сталістю ланцюга постачання, сталий розвиток промислових підприємств, індикатори сталого розвитку, організаційно-економічний механізм управління сталістю ланцюга.

Мария Григорак, Наталия Трушкина, Екатерина Китриш. «***Организационно-экономический механизм стратегического управления устойчивостью цепей поставок промышленных предприятий".*** *В статье развиты теоретико-методологические основы организации стратегического управления устойчивостью цепей поставок промышленных предприятий. Рассмотрена эволюция концепций управления цепью поставок с позиций институционной теории, а также определено влияние различных факторов на их развитие и интеграцию с концепцией устойчивого развития. Разработан концептуально-категориальный аппарат исследования управления устойчивостью цепей поставок с позиций теории сетей и теории заинтересованных сторон.*

На примере металлургического предприятия предложена система показателей устойчивого развития и определены стратегические ориентиры для трех сценариев устойчивого развития предприятия. Эти три сценария учитывают условия будущего развития, которые определяются как пессимистические, оптимистичные и наиболее вероятные сценарии, обеспечивающие сбалансированное устойчивое развитие. Расчеты стратегических сценариев устойчивого развития базировались на определении пороговых значений показателей для трех компонентов: экономической (включая качество корпоративного управления), экологической и социальной составляющих. Для каждого из сценариев разработаны стратегические ориентиры.

В ходе исследования было сделано заключение о нецелесообразности расчета интегрального индекса устойчивости для всей цепи поставок в целом. Такой расчет не имеет информационной ценности и технически практически невозможен из-за несравнимости показателей различных бизнес-единиц, входящих в цепь поставок. Предложено оценивать постоянство бизнес-единиц в цепи поставок и координировать их стратегии устойчивого развития.

Предложен организационно-экономический механизм управления устойчивостью цепи поставок в гибридной форме, предусматривающий сочетание децентрализованной разработки стратегий устойчивого развития отдельными предприятиями и организациями в рамках цепи поставок и централизованной координации и мониторинга выполнения стратегии фокусной компании на основе цифровой платформы. Концепция этого механизма основана на сетевом подходе и предполагает организацию сотрудничества участников цепи поставок с привлечением широкого круга заинтересованных сторон.

Определены основные направления применения современных цифровых технологий в управлении устойчивостью цепей поставок

Ключевые слова: цепь снабжения, сети снабжения, управление постоянством цепи снабжения, устойчивое развитие промышленных предприятий, индикаторы устойчивого развития, организационно-экономический механизм управления постоянством цепи.

Introduction. Supply chains are an integral part of modern business in a globalized economy. The development of globalization has gradually led to a change in the format of competition: today in global and increasingly national markets compete not individual companies that provide retail chains, mass consumers or industrial customers with specific goods or services, and integrated supply chains. The global economy and, consequently, the business environment continue to evolve under the influence of modern megatrends, including climate change, resource scarcity, and the transformation of consumer preferences, accompanied by increasing demands on goods and services for environmental and social standards. Under the influence of these

megatrends, the institutional environment of companies and their networks is changing, creating integrated supply chains. As a result, meeting the requirements of sustainable development becomes a key factor in competitiveness and a strategic goal of managing both the companies themselves and their supply chains.

However, the implementation of sustainable business practices in supply chain management requires the development of the necessary methodological and methodological support for relevant processes. This task is the integration of two concepts: sustainable development and supply chain management. These concepts are under development, and their supporters have conflicting views on certain basic provisions, including the conceptual and categorical apparatus. This indicates the increased complexity of the scientific substantiation of a holistic and consistent concept of sustainability of supply chain management.

Literature and researches review. Methodological, methodological and practical aspects of the formation of institutional and organizational conditions for the dissemination of practices of social responsibility of business entities, as well as the achievement of sustainable development in the environmental, economic and social dimensions at the global, macro, meso and microlevels are devoted to the works of such scientists as O. Amosha [1], I. Bulyeyev [2], B. Danylyshyn [3], O. Hrishnova [4], A. Kasych [5], Yu. Kharazishvili [6], C. Kroll [7], O. Lyakh [8], V. Lyashenko [9], K. Murphy [10], D. Myers [11], Yu. Pohorelov [12], R. Sroufe [13], G. Unruh [14], V. Vyshnevskyi [15], M. Zhurovskyi [16] et al.

The following foreign and domestic scientists have made a significant contribution to improving the management of economic processes based on the logistics approach, in particular by developing the concept of supply chain management of industrial enterprises and other economic activities: S. Chopra [17], N. Chornopyska [18], M. Christopher [19], N. Chukhray [20], M. Cooper [21], M. Habib [22], O. Hirna [23], M. Hugos [24], T. Kolodizieva [25], Ye. Krykavskyy [26; 27], D. Lambert [28], P. Meindl [17], D. Mentzer [29], H. Min [30], M. Müller [31], R. Oliver [32], S. Seuring [31], J. Stock [33], M. Webber [32], A. Wieland [34] et al.

Aspects of integrating sustainable business practices into supply chain management and the formation of more or less established (in various interpretations: "socially inclusive", "green", "reverse", "low carbonized") supply chains are studied by J. Henderson [35], N. Oelze [36], Y. Rasool [37], J. Sarkis [38], R. Sroufe [39], D. Zimon [40] et al.

Substantiation of the need to organize network forms of interaction of participants in sustainable supply chains, ensuring the implementation of focal (central in the supply chain) monitoring and coordination in this process, identifying a wide range of stakeholders in the supply chain and cooperation with them is contained in the works of scientists such as M. Fritz [41], S. Seuring [42], H. Winkler [43] et al.

The issue of using digital technologies in supply chain management is considered by P. Berttram [44], F. Kache [42], W. Kersten [45], K. Kettunen [46], A. Kwilinski [47], J. Marmolejo-Saucedo [48], E. Ndzibah [46], S. Rana [49], A. Shamsuzzoha [46], S. Schrauf [50], Yu. Zaloznova [51; 52; 53] et al.

Despite the large number of works on the concept of sustainability of supply chain management, its further development is at the stage of substantiating the need for this area of management, defining the conceptual and categorical apparatus, and research on important aspects of implementing this concept in business management practice is fragmentary. There is no holistic vision of the management system that ensures the formation and functioning of a network of economic entities that make up a single supply chain, on the basis of sustainable business. There is a lack of scientifically sound recommendations on mechanisms for integrating supply chain sustainability management into the strategic business

management system. The conceptual provisions of the organizational and economic mechanism of strategic management of the sustainability of supply chains of industrial enterprises with the use of digital technologies need to be developed.

Aim and objectives. The purpose of this article is to develop theoretical and methodological and scientific and practical provisions for improving the strategic management of sustainability of industrial supply chains by introducing organizational and economic management mechanism based on a network approach and involving a wide range of stakeholders in mutual coordination of strategic decisions. standards for sustainable development, with the organization of further monitoring of the achievement of these standards, periodic assessment of the level of sustainability of enterprises and organizations included in the single supply chain, and the use of opportunities provided by modern digital technologies.

The methodological basis of this study are:

the evolutionary paradigm of the new institutional theory, according to which the evolution of the concept of sustainability of supply chains and the practice of existing supply chains that are transformed into steel, considered in conjunction with the changing institutional environment of business;

network theory, according to which supply chains are considered as inter-business networks of enterprises and organizations involved in the formation of value (value) and its provision to the final consumer;

stakeholder theory, based on which the development of organizational and economic mechanism of strategic management of sustainability of supply chains takes into account the need to establish mutually beneficial relations between business and stakeholders whose interests are related to the sustainability of a particular supply chain;

methodological approach to the selection of non-financial reporting indicators, adopted by the Global Reporting Initiative (GRI) and the UN Global Compact, which defines a system of sustainable development indicators that reflect the state of its components (ESG): environmental, social and economic (including the quality of corporate risk management).

The information base of the study is laws and regulations of Ukraine, data of the State Statistics Service of Ukraine, open reporting of enterprises, materials of scientific periodicals, monographs, analytical materials, reports, publications on the Internet of international organizations and consulting firms, other reference sources.

The main material and results of the research. Based on the generalization of literature sources, materials of consulting agencies and the results of their own research [54-61], it is established that the organizational and economic mechanism for managing the sustainability of supply chains can take three forms: centralized, when the focal company undertakes to develop strategies and tactical measures to ensure sustainable development supply chain; decentralized, when sustainable development strategies and tactical plans are developed by each participant in the chain separately, and the focal company on the basis of reporting information assesses the compliance of indicators of a participant in the chain to its requirements; hybrid, when strategic documents are developed by each participant in the chain separately, but then they are agreed with the focal company, which then monitors their implementation. The choice of the form of the mechanism depends on the characteristics of the product or service produced or provided by the focal enterprise, the nature of relations with suppliers and so on.

A hybrid form of this mechanism has been developed for a metallurgical enterprise (Fig. 1).

The essence of the proposed organizational and economic mechanism for managing the sustainability of supply chains is that according to the network approach,

the focal company carries out coordination and control actions in relation to its direct suppliers and intermediaries (first tier companies).

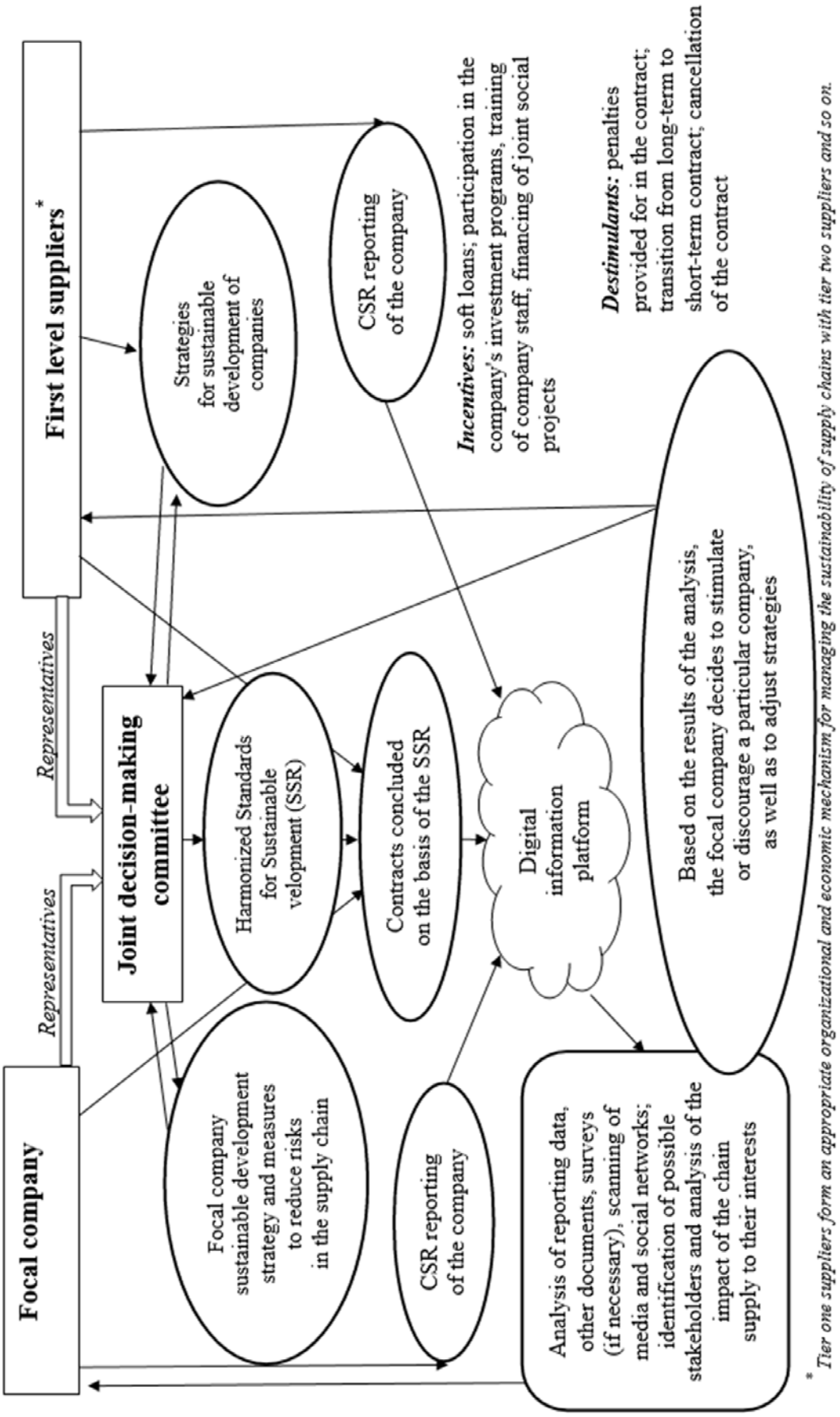

Figure 1 – Organizational and economic mechanism for managing the sustainability of supply chains of metallurgical enterprises (built by the authors on the basis [62-69])

In turn, the companies of the first level of the chain carry out coordination and control actions concerning the companies of the second level for which this company plays the role of focal, and so on. Meetings of the joint committee consisting of representatives of the focal company and its direct suppliers and intermediaries are held periodically to inform the latter about the sustainable development strategy adopted by the focal company, its implementation and harmonization of requirements (standards) for suppliers, their strategy.

Necessary for control and decision-making information on strategic documents, reports, analysis of the degree of compliance of supply chain participants with the established standards of sustainable development (SSD) is accumulated on a specially created digital platform.

SSD contain the following characteristics:

1) Environmental component:

- the volume of emissions of pollutants into the atmosphere, including CO2;
- the amount of solid waste generated;
- share of recycled or transferred to third-party organizations for recycling waste;
- volume of disposed production waste;
- norms of total consumption of drinking and technical water;
- volume of discharge of polluted waters into surface water bodies, including untreated ones;
- the amount of harmful substances in the effluent;
- electricity consumption per unit of main products;
- electricity consumption per UAH 1 million of manufactured products;

2) Social component:

- the share of wages in the issue;
- the ratio of the average at the enterprise and the official minimum wage;
- the level of compliance of workplaces with the established sanitary and hygienic norms;
- costs of the enterprise for social purposes;
- the company's costs for social purposes in relation to profits (in annual terms);

3) Economic component:

- annual sales;
- the level of return on sales and return on equity;
- indicators adopted to assess the risk in the enterprise;
- indicators on the basis of which the level of threat of bankruptcy of the enterprise is forecasted.

The digital platform collects all the necessary statistical information to assess the state of sustainable development by its components and obtain an integrated assessment (integrated index) for each enterprise participating in the supply chain according to the methodology of identification and strategy developed at the Institute of Industrial Economics. The results of approbation of the methodology for assessing the level of sustainable development at four large metallurgical enterprises, which proved the feasibility and feasibility of its use in the management of sustainability of supply chains. This assessment must be performed separately for each entity in the supply chain. Of particular interest may be the attempt to make such an assessment for the supply chain as a whole in order to determine the dynamic changes in the state of chain stability. However, an analysis of the conditions and possible usefulness of such an assessment shows that attempts to assess the level of sustainable development of the supply chain in general are impractical and almost impossible. The reasons for this are as follows:

different enterprises and organizations have different indicators of environmental and social impact, especially when they are calculated per unit of output, which is incomparable for different enterprises, so it is impossible to integrate these indicators;

many suppliers and intermediaries interact not only with a given focal company and supply products and services not only within a given supply chain, so it is unrealistic to determine, for example, what percentage

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of CO2 emissions in a logistics company that serves many customers falls on this supply chain;

assessing the level of sustainable development of the supply chain generally does not carry a meaningful information load for further decision-making, as it is average.

Based on this, it is advisable to use such an assessment (at least once a year) only in the format of individual enterprises and organizations in the chain. Evaluation results after analysis by an authorized structural unit or a specially created group of specialists from a focal company (for example, for PJSC "MK "Azovstal" it may be a joint group of analysts from the Directorate of Labor Protection, Industrial Safety and Environment, Personnel and Administration Directorate, analysis and management of safety risks), together with analytical conclusions are submitted to the Joint Decision Committee on Sustainability of Supply Chains, which decides on the extension of the contract with a particular participant in the chain, stimulating or discouraging it according to the evaluation results.

The digital platform should also be a platform for providing relevant training and instructional materials, collecting and analyzing the proposals of other stakeholders, including communities in the locations of business, communication with the public.

An important point in ensuring the effectiveness of the organizational and economic mechanism for managing the sustainability of supply chains is its integration into the overall management system of both the focal company and other companies in the supply chain. As a result of the conducted research the place of management of constancy of supply chains in the framework structure of management systems of the enterprises which are a part of a chain is defined. The following blocks are included in this structure:

Business strategies of companies participating in the supply chain;

Strategies for sustainable development of companies participating in supply chains;

Operational plans of companies participating in supply chains, including tasks for the implementation of sustainable development strategies;

Activities during the life cycle of the supply chain: planning; provision; production; delivery; return; processing; repair, update;

Functions that support the development of supply chains: relationship management with suppliers; forecasting supply and demand; inventory management; distribution and logistics management; customer relationship management and service; environmental management; waste management; integration of social responsibility practices into management processes;

Change management;

Performance evaluation;

Enterprise management subsystems that interact with supply chain management subsystems: HR; company sustainability management; risk management; information system management; enterprise infrastructure management;

Supply chain environment: investors; regulatory authorities; social movements, non-governmental organizations; local communities; business associations; Mass media;

Supply chain participants: suppliers; manufacturers; distributors; trade networks; consumers; waste processors.

The key in this context is that the sustainable development strategies of the companies involved in the supply chain should be incorporated into the overall business strategies of the focal company and all other participants in the supply chain, on the basis of which operational plans are developed and implemented. It is also important to involve a wide range of stakeholders in all these processes.

As for the Metinvest Group, it is a network structure that integrates several supply chains. Therefore, the proposed organizational and economic mechanism and structural relationships of the supply chain sustainability management system can be

fully implemented in the Group's management system.

The top executive level of Metinvest Group management is represented by 10 directorates: operational, financial, economics and business system development, logistics and procurement, sales, technical management, sustainable development and cooperation with colleagues, legal support, information technology, internal audit.

One of the strategic goals of the Metinvest Group is to ensure a competitive advantage in steel production. Centralization of procurement and implementation of common procurement standards serve this purpose. These functions belong to the sphere of management of the Logistics and Procurement Directorate, which includes the Marketing and Procurement Strategy Department, the Strategic Raw Materials Procurement Department, and the Energy Procurement Department.

More than 80% of all consumed materials, equipment and services are procured by the Logistics and Procurement Directorate centrally for all Metinvest Group companies. The main focus of Metinvest Group's procurement strategy is to create and maintain a healthy and competitive environment. Metinvest Group's initiatives are aimed at constantly expanding the number of participants in tender procedures to find the most reliable suppliers and build long-term cooperation.

Refractories supplied by the Zaporizhzhya Refractory Plant (Zaporizhvozhnetriv) are used for the production of metallurgical and coke-chemical products. The Group provides four main mining and processing enterprises with iron ore: Central GOK, Northern GOK, Ingulets GOK, and Southern GOK. Coal for coke production is supplied by the American company UCC United Coal Company, as well as the Pokrovsky Coal Group. Slabs, hot-rolled and cold-rolled sheets of enterprises of PJSC "MK Azovstal", PJSC "MMK them Ilyich" are delivered to the rolling plants "Promet Steel" (Bulgaria), Spartan UK (UK), Trametal (Italy), Ferriera Valsider (Italy). Zaporizhstal hot-rolled and cold-rolled sheets are supplied to Unistil.

Management of the implementation of development strategies and coordination of actions of all participants in the supply chain in the Metinvest Group is carried out using the CRM system. CRM is software designed to automate customer engagement strategies, including sales, optimize marketing, and improve customer service by storing customer information and customer history, establishing and improving ordering processes, and further analyzing results. CRM is a model of interaction based on the theory that the center of the entire business philosophy is the customer, and the main activities of the company – measures to ensure effective marketing, sales and customer service. Supporting these business goals includes collecting, storing and analyzing information about consumers, suppliers, partners, and the company's internal processes. Functions to support these business goals – sales, marketing, customer support. The CRM system implemented in the Metinvest Group is based on the innovative cloud platform SAP Sales Cloud and consists of two modules: Customer (Cloud for Customer, C4C) and Configure Price Quote (CPQ). SAP Sales Cloud is the largest project to implement this cloud platform in Ukraine, and the CPQ module is the only online product catalog that has the ability to create individual orders for customers. It also systematizes the process of providing discounts, calculating final prices, logistics costs and other costs to provide the best customer service. In 2021, the Metinvest Group continues to develop CRM, including through the implementation of planning, adding products to the configuration, etc. based on user feedback. The company also plans to start distributing modules to other trading companies in Ukraine, Belarus and Western Europe.

According to the Metinvest Group's procurement rules, the supplier may be disqualified for a certain period or indefinitely

in the event of unfair business with the Group's companies. The decision to disqualify a supplier or resume work with a previously disqualified supplier is made by the Metinvest Group's Supplier Cooperation Council. The Council has the right to decide on the disclosure of information on the reasons for disqualification of the supplier.

The following criteria are used to decide on the disqualification of a supplier:

systematic supply of low-quality goods, works, services; supply of counterfeit products;

disruption of terms of delivery of goods, works, services;

violation of labor protection and safety rules on the territory of Metinvest Group enterprises;

refusal to sign a standard supply contract, if this was a prerequisite for the supplier selection procedure;

refusal to sign the specification to the supply contract after the submission of the final price offer (within the tender, competitive processing);

violation of the principle of ethical and open business, including collusion between suppliers to increase or maintain unreasonable prices for goods, works and services;

attempted bribery of Metinvest Group employees;

low level of supplier evaluation based on the results of the year; other criteria (by decision of the Council for interaction with suppliers).

The reasons and the fact of disqualification are entered into the Unified database of suppliers of Metinvest Group and are taken into account in the general history of work of the supplier at all enterprises of Metinvest Group.

The introduction of sustainable development practices and ESG criteria into the activities of the Metinvest Group at all levels will contribute to business stability. This approach will be one of the factors in maintaining the Group's high performance, despite adverse environmental conditions. The group

Metinvest needs not only to strive to integrate the ESG agenda into the strategy, but also to carry out internal ESG transformation, as well as use its unique role and opportunities to create and improve the regulatory environment in the field of ESG, develop and implement best practices.

In order to form a unified approach to sustainable development management and ESG, as well as for the effective implementation of the ESG Strategy, it is necessary to establish an ESG Committee and the ESG Directorate. In addition, an ESG supervisor on the Supervisory Board and a senior vice president will be appointed to be responsible for the ESG order on the board.

The Strategic Planning Committee of the Supervisory Board should be renamed the Strategic Planning and Sustainable Development Committee with the corresponding expansion of its functions. Then the organizational structure of sustainable development management and ESG in the Metinvest Group will be in line with best practice and will cover all levels of government.

The ESG Committee is a working body dedicated to ensuring compliance with the principles of sustainable development and ESG in ecosystem companies. The ESG-Committee should include representatives of all functional units and territorial enterprises of the Metinvest Group, which consider topical issues of sustainable development and ESG at regular meetings.

Within the ESG-committee it is necessary to form thematic working groups that systematize the work in such areas as risk management, practical environment, social decisions, responsible procurement. The work of the ESG-committee will allow to start monitoring the main suppliers according to ESG-criteria.

The ESG Directorate is a key body that will coordinate activities in the field of sustainable development and the ESG. He is responsible for developing and implementing a single,

comprehensive approach to sustainable development and the ESG, which takes into account the interests of all stakeholders, best practices, commitments and goals of the Metinvest Group, traditional and already implemented programs and projects.

To achieve this goal, the ESG will perform the following interrelated tasks:

methodology and management of information flows (Data Management): consolidation of ESG-data and work with them, methodological support of activities, implementation of ESG-standards;

ESG-positioning: presentation of ESG-positions of Metinvest Group on international platforms and investment forums, preparation and holding of targeted events, participation in ESG-ratings, communication support of ESG-initiatives;

GR (government relations) – interaction with public authorities in the field of ESG and coordination of ESG projects: participation in the formation of the regulatory framework of ESG in Ukraine, examination of proposals and replication of best practices, formation of ESG portfolio, consulting on ESG.

In addition to internal governing bodies, Metinvest Group will consolidate its expert and business community to formulate and implement a progressive ESG agenda at the national level. In 2021, the Metinvest Group should develop a policy on sustainable development and ESG criteria, which will establish the main approaches, principles, directions and tasks of the Group in this area, as well as set an approach to interaction with stakeholders. Policy development will be discussed with internal and external stakeholders at the board and supervisory board level.

The Sustainable Development Policy will complement the ESG Strategy, and together they will define the approach, main priorities and goals in the field of ESG until 2023. In managing sustainable development and ESG criteria, including in policy development, it is necessary to analyze and take into account the requirements of international standards. recommendations, as well as best practices of industry companies. Metinvest Group should integrate the ESG Strategy into the overall corporate development strategy until 2023. To formulate the directions and goals of the ESG Strategy, an analysis of standards and best practices, inventory and systematization of current initiatives in the field of sustainable development and ESG was performed.

Key Areas and Objectives of the Metinvest Group's ESG 2021-2023 Strategy:

– increase the share of waste for processing to 40% by 2023;

– increase the share of "green" energy to 30% by 2023;

– calculation and reduction of carbon footprint;

– making 100% of purchases according to ESG criteria;

– development of regulatory framework for the classification of ESG risks and environmental footprint assessment;

– development of comfortable environmental conditions and care for the health of employees and their families in the areas of presence;

– providing flexible work formats for more than 20% of employees;

– maintaining the index of employee involvement at 75%;

– adoption of an industry standard;

– formation of standards of care for the employee and social decisions at the level of the whole country;

– development of educational technologies;

– development of ESG-policy and creation of ESG-risk management system.

Metinvest Group needs to develop a single ESG risk management system, which will be integrated into the overall risk management system. ESG risk is a component of Metinvest Group's high or medium level risks. Working groups need to develop their own expert approaches to integrated Group ESG risk management, including through the development of tools to identify such risks, develop an ESG rating system, and modernize all processes through the integration of ESG

factors, ESG risk monitoring and stress testing under the influence of ESG factors. ESG risks of Metinvest Group:

changes in legislation – untimely adaptation to changes in national and international legislation;

reputational – the probability of reputational losses in the case of ESG-risks;

operational – the probability of late and / or insufficient adaptation of processes to all significant ESG factors;

behavior – losses due to non-compliance with good business practices;

strategic – losses due to changes in consumer models under the influence of ESG-factors and lack of adaptation measures;

investment – change in the value of assets due to ESG factors and reduced investment yield;

model – insufficient introduction of ESG-factors in the current model, the need to develop new models;

liquidity – the potential outflow of liquidity due to the reaction to the violation of the principles of responsible financing, which is realized through the associated risks.

As part of a long-term strategy for the development of zero-emission steel production, the Metinvest Group intends to increase the sustainability of its production facilities and is interested in introducing new technologies to reduce environmental impact. In July 2021, memoranda of cooperation were signed with the international leader in the field of engineering, construction and provision of services for the entire life cycle of equipment of metallurgical enterprises Primetals Technologies and the leading Austrian research center in metallurgy K1 – MET.

In a memorandum with Primetals Technologies, the parties agreed to implement joint projects on sustainable development of the industry. These include research initiatives funded by Horizon Europe and the Coal and Steel Research Fund on climate and environmental issues in the steel industry. The cooperation includes work on technological solutions that can be implemented at Metinvest Group's production facilities, as well as on promising technologies and solutions for the entire supply chain of the metallurgical and mining industries to accelerate the decarbonization process in the Group. Areas of mutual interest include energy-efficient and innovative DRI-based steel production, capture, utilization of carbon and metallurgical gas.

As a result of the study, three scenarios for the sustainable development of the industrial enterprise of PJSC MK Azovstal until 2027 were developed:

realistic – reaching the average level between the lower threshold and lower optimal values, which is ensured by an annual growth of 5%. At the same time, the real output in 2010 prices is 81.3% of the 2010 output level;

optimistic – reaching the level of the lower optimal value (entering the optimal zone of the EU), which is ensured by an annual growth of 7%. At the same time, the real GRP in 2010 prices in 2027 is 94.5% of the GRP level in 2011;

balanced sustainable development – achieving a full level of sustainable development – the average between the lower and upper optimal values (criterion of sustainable development), which is ensured by an annual growth of 10%. At the same time, the real output in 2010 prices in 2027 is 117.9% of the 2010 output level.

Development of scientifically sound strategic scenarios of sustainable development of industrial enterprises is based on a new methodology of identification and strategy developed at the Institute of Industrial Economics of NAS of Ukraine, based on consistent decomposition of integrated indices by solving the inverse problem using adaptive control procedure in C ++ programming language.

The strategic guidelines of key macro indicators have been identified, which together with the strategic values of indicators are the ultimate goal of regulating sustainable development. They can be monitored through monitoring to monitor

the implementation of development strategies and evaluate enterprise management policies.

Disproportions of sustainable development at the level of economic, social and environmental security of the enterprise, subordinate components and at the level of indicators that determine the list of major threats, which according to calculations are indicators of social and economic components of sustainable development.

The organizational and economic mechanism of management of constancy of supply chains constructed taking into account network character of supply chains is offered. The need to involve a wide range of stakeholders in this management process is identified, as well as the scheme of integration of sustainability management of supply chains as a subsystem into the overall management systems of enterprises in the chain.

The stages of digital transformation of supply chain sustainability management, the main directions of digital technologies implementation in this management process are determined; prospects and obstacles to the introduction of blockchain technology in supply chain management as the most technologically and organizationally developed for this purpose are analyzed.

Conclusions. In this paper the actual problem of strategic management of sustainability of supply chains of industrial enterprises is solved. The main scientific and methodological results obtained during the study allowed us to draw the following conclusions.

It is determined that the emergence and evolution of the concept of supply chain management is due to the development of globalization, in particular the spread of global competition, when competing with each other were not so much individual companies as whole supply chains. In the future, the evolution of supply chain management in relation to its integration with the concept of sustainable development began to be influenced by the transformation of the institutional environment, strengthening the requirements for greening production, compliance with certain social standards.

It is proved that a significant evolution has also taken place in the practice of sustainable business development, in particular in the relationship between its economic (financial) and two other components – environmental and social. Traditionally, in the academic literature and business practice, these components were considered to be somewhat conflicting (especially between the cost of reducing environmental impact and financial and economic performance). It is substantiated that the introduction of sustainable business practices in companies leads to increased competitiveness, profitability and market value of these companies under the influence of changes in the institutional environment of business, including strengthening regulatory requirements and changes in consumer preferences in favor of goods and services. who behave as environmentally and socially responsible.

As a result of generalization of scientific publications, analytical materials of consulting firms, conclusions of experts in the field of supply chain management, it is established that a sustainable supply chain should be considered as a network of enterprises and organizations that create value and bring it to the end consumer and other stakeholders. Sustainability of supply chains – as a set of processes for strategic planning, monitoring and control of all activities in this network of enterprises and organizations on how they adhere to the principles and rules of socially responsible business behavior and achieve appropriate standards of sustainable development set by the focal company and agreed with its counterparties.

Based on the methodological approach of the Global Reporting Initiative (GRI) and the UN Global Compact, a system of sustainable development indicators has been identified. It is proved that in order to assess the state of

industrial enterprises and develop strategies for their sustainable development, it is necessary to calculate the threshold values of the relevant indicators of sustainable development. Vectors of such threshold values for metallurgical enterprises are calculated.

As a result of determining the dynamics of integrated indices of sustainable development of metallurgical enterprises of Ukraine and developing three scenarios for sustainable development of the metallurgical plant "Azovstal" until 2027 based on the methodology of evaluation and strategy using a modified rationing method and dynamic weights developed by Yu. Kharazishvili [70] the possibility of applying this methodology for the organization of strategic sustainability management within the metallurgical supply chain.

The necessity of introduction into the practice of sustainable development management of Metinvest Group on the basis of ESG-criteria of the system of risk assessment indicators at all levels is substantiated, which will promote stable business development. This approach will be one of the factors maintaining the Group's high financial and economic performance, despite adverse environmental conditions.

It is proved that the design of organizational and economic mechanism of strategic management of supply chain sustainability in modern conditions should take into account their network nature and connection with a wide range of stakeholders, including communities in business locations, especially large companies with significant urbanization. It is substantiated that such a mechanism should be formed on the basis of cooperation of all participants in the supply chain, mutual coordination of strategic decisions between them, development of appropriate standards for sustainable development with maximum regard to the legitimate interests of stakeholders. An essential element in the functioning of such an organizational and economic mechanism, which creates conditions for the development of a strategy for sustainable development of enterprises within the single supply chain, their implementation and control over the achievement of established indicators and standards, is a specially created digital information platform.

The expediency of using digital technologies in the management of the sustainability of supply chains in the following areas: big data analytics, blockchain, artificial intelligence and machine learning, digital duplicates. Among them, blockchain technology is currently the most prepared for practical application and increases the reliability of the supply chain. This technology can not only ensure open data on compliance with agreed standards of sustainable development in the implementation of contracts, but also strengthen trust between partners in the supply chain and reduce the time and cost of transactions.

Prospects for further research are to substantiate and develop conceptual provisions for the formation and development of green supply chain management in the context of the concepts of circular economy and sustainable development..

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