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Contents

INTRODUCTION	6
KOULIK V.A. PhD (Economics), Professor, Professor of Logistics Department National Aviation University (Ukraine), ZAMIAR Zenon Dr. hab. Inż, Professor, Vice-Rector The International University of Logistics and Transport in Wroclaw (Poland) <i>SUPPLY CHAIN SPIRAL DYNAMICS</i>	7 – 16
MARCHUK V.Ye. Doctor of Engineering, Associate Professor, Professor of Logistics Department National Aviation University (Ukraine), Henryk DŹWIGOŁ PhD DSc, Associate professor, Professor - Organization and Management Silesian University of Technology in Gliwice (Poland) <i>INTEGRATED LOGISTICS SUPPORT FOR THE LIFE CYCLE OF BUILDING OBJECTS</i>	17 – 25
CHORNOPYSKA N.V. PhD of Economics, Associate Professor, Associate Professor at department marketing and logistics at Lviv Polytechnic National University (Ukraine), STASIUK K.Z. PhD student at department marketing and logistics at Lviv Polytechnic National University (Ukraine) <i>LOGISTICS POTENTIAL USAGE FOR RAILWAY TRANSPORT ENTERPRISES COMPETITIVNESS ASSESSMENT</i>	26 – 38
PRYMACHENKO H.O. PhD in Engineering sciences, Associate Professor, Associate Professor of the Department of Transport Systems and Logistics Ukrainian State University of Railway Transport (Ukraine), HRYHOROVA Ye.I. PhD student of the Department of Transport Systems and Logistics Ukrainian State University of Railway Transport (Ukraine) <i>RESEARCH STATUS OF AUTOMATION OF LOGISTICS TRANSPORT AND DISTRIBUTION PROCESSES</i>	39 – 50
DAVIDENKO V.V. PhD (Economics), Associate Professor, Associate Professor of Logistics Department National Aviation University (Ukraine), RISTVEJ Jozef PhD (Economics), Professor, Vice-Rector University of Zilina (Slovakia), STRELCOVÁ Stanislava PhD (Economics), Associate professor, Vice head of Department of Crisis Management University of Zilina (Slovakia) <i>UPDATING THE IMPLEMENTATION OF LEAN LOGISTICS IN A CHANGING ENVIRONMENT</i>	51 – 56



- HRYHORAK M.Yu.** Doctor of Economics, Associate Professor, Head of Logistics Department National Aviation University (Ukraine), **TRUSHKINA N.V.** PhD (Economics), Associate Professor, Senior Research Fellow, Regulatory Policy and Entrepreneurship Development Institute of Industrial Economics of the National Academy of Sciences of Ukraine (Ukraine), **Tadeusz POPKOWSKI** PhD (Engineering), Associate Professor, Head of the IT team the International university of logistics and transport in Wroclaw (Poland), **MOLCHANOVA K.M.** Senior lecturer at the Department of Logistics National Aviation University (Ukraine)
DIGITAL TRANSFORMATIONS OF LOGISTICS CUSTOMER SERVICE BUSINESS MODELS 57 – 75
- GOROKHOVA T.V.** PhD (Economics), Associate Professor, Associate Professor of Marketing and Business Administration Department State Higher Educational Establishment «Priazovskiy State Technical University» (Ukraine), **MAMATOVA L.Sh.** PhD (Economics), Senior lecturer of Economics of Enterprises Department State Higher Educational Establishment «Priazovskiy State Technical University» (Ukraine)
THE IMPACT OF E-COMMERCE DEVELOPMENT ON LOGISTIC SERVICE IN UKRAINE: PERSPECTIVES AND CHALLENGES 76 – 90
- KOSTYUCHENKO L.V.** PhD (Economics), Associate Professor, Associate Professor of Logistics Department National Aviation University (Ukraine), **SOLOMON D.I.** Doctor of Engineering, Professor, Rector Academy of Transport, Informatics and Communications (Moldova),
THE BASIC TERMINOLOGY OF THE MODERN MILITARY LOGISTICS 91 – 98
- LYTVYENKO S.L.** PhD (Economics), Associate Professor, Associate Professor of International Economics Department National Aviation University (Ukraine), **PANASIUK I.V.** Students of International Economics Department National Aviation University (Ukraine)
TRENDS AND PROSPECTS OF DEVELOPMENT OF THE GLOBAL AND NATIONAL AIR TRANSPORT MARKETS 99 – 109

INTRODUCTION

We are happy to invite you to get acquainted with the first issue of the new scientific and practical publication "Intellectualization of Logistics and Supply Chain Management".

We strongly believe that the launch of this magazine indicates the objective need to rethink a wide range of issues related to the development of theory and practice in logistics and supply chain management, awareness of the need to unite the scientific community and logistics practitioners, dissemination of modern knowledge and best practices for innovative development of the logistics services market.

The first issue of the magazine is published at a difficult time. The global coronavirus pandemic and the deep economic crisis have significantly worsened business activity in the world. Currently, global supply chains are collapsing, international trade is declining, and competition between global and regional logistics operators is intensifying. The most common thesis is that the world will never be the same again. Industry experts predict the emergence of new, more flexible and adaptive supply chain management strategies and approaches to logistics business process management. The trend towards collaborations, cooperation and unification of services is emerging, comprehensive proposals for clients are being developed. There is increasing talk about the need to build bimodal supply chains, which involves the development of different decision-making scenarios: the traditional approach - cost-effective efficiency, low risk, high predictability; a new approach "second mode" - rapid recognition of opportunities, adaptability, willingness to solve unexpected problems and look for new opportunities.

Radical transformations of the global and national markets for logistics services require appropriate scientific support. Logistics science has a special role to play in this process. Initiating the emergence of a new journal, we decided to focus on its coverage of problematic aspects of the formation and development of logistics systems at the micro, mezo and macro levels, supply chain management, digitization of logistics, methods and tools for optimizing processes in logistics and supply chains, sociopsychology relations and network interaction of enterprises using cloud technologies, artificial intelligence, e-learning, neural business process management systems, etc.

Therefore, we invite scientists, researchers and business representatives, as well as our colleagues from abroad, to cooperate and present the results of scientific research, to discuss and debate on them, to work together to develop the scientific theory of logistics and promote mutual intellectual enrichment.

We hope that the new scientific publication will become a theoretical guide for young researchers and representatives of other fields.

HRYHORAK Mariia
Chief Editor



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SUPPLY CHAIN SPIRAL DYNAMICS

Volodymyr Koulik, ZAMIAR Zenon. «Supply chain spiral dynamics». The article is devoted to the research of modern tendencies of defining the essence of supply chain management as an innovative philosophy of spiral business dynamics. The research is based on the generalization and application of the basic principles of wave theory of development, classical theory of marketing, modern provisions of the theory of TQM and conceptual provisions of the theory of spiral dynamics. A new look at supply chain architecture, from identifying growing needs for specific products and ending with utilization, namely the emergence of new links in the chain of transformation of resources such as the stage of intelligent innovation processes to create modifications and upgrades or design a new product to meet growing needs. A multicomponent process of change is considered in view of current trends. The application of the theory of the spiral dynamics of the supply chains is a logical and predictable extrapolation of the general tendencies of the development of the life support system and the growing needs of society, starting from the "subsistence economy" and to the creation of modern global economic associations such as transnational corporations and international transport corridors. economic associations of countries and international programs of scientific search in the field of artificial intelligence and development of the cosmos.

Keywords: strategy, integrated logistics, social psychology, supply chain, spiral dynamics of development, logistics.

Володимир Кулик, ZAMIAR Zenon. «Спиральна динаміка ланцюгів постачань». Стаття присвячена дослідженню сучасних тенденцій визначення сутності управління ланцюгами постачань як інноваційної філософії спіральної динаміки бізнесу. Дослідження базуються на узагальненні та використанні основних положень хвильової теорії розвитку, класичної теорії маркетингу, сучасних положень теорії TQM та концептуальних положень теорії спіральної динаміки. Новий погляд на архітектуру ланцюга постачань, починаючи з виявлення зростаючих потреб в конкретних видах продукції і завершуючи утилізацією, а саме появи в структурі ланцюзі нових ланок трансформації ресурсів таких як етапу інтелектуальних інноваційних процесів створення варіантів модифікації та модернізації або розробки проекту нового продукту для задоволення зростаючих потреб. Розглянуто мультикомпонентний процес змін з огляду на тенденції сучасності. Застосування теорії спіральної динаміки ланцюгів постачань є логічною і передбачуваною екстраполяцією узагальнених



тенденцій розвитку системи забезпечення життєдіяльності та зростаючих потреб суспільства починаючи від «натурального господарства» і до створення сучасних глобальних господарських об'єднань, таких як транснаціональні корпорації та міжнародні транспортні коридори й трансконтинентальні ланцюги постачань, економічні об'єднання держав та міжнародні програми наукового пошуку в галузі штучного інтелекту та освоєння можливостей космосу.

Ключові слова: стратегія, інтегрована логістика, соціальна психологія, ланцюг постачань, спіральна динаміка розвитку, логістика.

Владимир Кулик, ZAMIAR Zenon. «Спиральная динамика цепей поставок». Стаття посвящена исследованию современных тенденций определения сущности управления цепями поставок как инновационной философии спиральной динамики бизнеса. Исследования базируются на обобщении и использовании основных положений волновой теории развития, классической теории маркетинга, современных положений теории TQM и концептуальных положений теории спиральной динамики. Новый взгляд на архитектуру цепи поставок, начиная с выявления растущих потребностей в конкретных видах продукции и заканчивая утилизацией, а именно появление в структуре цепи новых звеньев трансформации ресурсов как этапа интеллектуальных инновационных процессов создания вариантов модификации и модернизации или разработки проекта нового продукта для удовлетворения растущих потребностей. Рассмотрены мультикомпонентный процесс изменений учитывая тенденции современности. Применение теории спиральной динамики цепей поставок является логичной и предсказуемой экстраполяцией обобщенных тенденций развития системы обеспечения жизнедеятельности и растущих потребностей общества начиная от «натурального хозяйства» и к созданию современных глобальных хозяйственных объединений, таких как транснациональные корпорации и международные транспортные коридоры и трансконтинентальные цепи поставок, экономические объединения государств и международные программы научного поиска в области искусственного интеллекта и освоения возможностей космоса.

Ключевые слова: стратегия, интегрированная логистика, социальная психология, цепь поставок, спиральная динамика развития, логистика.

Logistics' rapid development in the modern world economy is a critical factor in the cost and products value building that meet the growing needs of society and consumers. Management of the business processes in cross-cutting integration through the supply chain and the transformation of primary resources into final products creates the necessary conditions for the continual development and improvement of logistics activities. According to Donald Bowersox and David Closs, the main paradigm of modern logistics is the creation of a logistic system in the form of a unified holistic association, the integration of which provides a much more prominent performance than a separate management of individual logistic functions [2]. After all, when every business process and operation is integrated into interrelated flows, chains, and networks, they create the key area of logistical

competence in the economy, being the source of the competitive advantages formation for certain types of products and their producers [1].

The theory of integrated logistics was formed in the end of the last century. Integrated logistics involves the creation of a holistic cross-flow control system that passes through all integrated chain's links, which goes through the stages of product's life cycle starting with design, supply of resources, then production and straight to the end user and after-sales service. The integrated logistics concept relies on the enterprises personnel' efforts unification - logistic partners and their concerted action based on the common goals and the entire supply chain efficiency criteria [12].

The integrated logistics concept has been transformed into business-concept Supply Chain Management (SCM). Douglas M.



Lambert and Stoke J.R. define supply chain management as the integration of key business processes that begin with the end-user and cover all suppliers and goods, services and information manufacturers, add value to consumers and other stakeholders [10]. This business concept develops on the basis of inter-functional and inter-organizational coordination of interconnected and consistently ordered elements of a complex logistics system - the supply chain.

Supply chains' functioning is associated with considerable uncertainty. Uncertainty is a general indication of various kinds of random events that violate the normal operation of the system and create the risk of not receiving the expected results. The reasons for the uncertainty may be: changing needs, changing requirements for a product that is designed to meet the need, science and technology innovations, as well as demand fluctuations, forecast errors, loss of resources, data inaccuracy, managers' miscalculations, inaccurate transmission of information and the interpretation of various events, delayed receipt of an order from the client, unexpected production failure, damage to the goods at delivery to the consumer or delivery outside the place of destination, targeted actions on the destruction of the supply chain (terrorism, goods' thefts), and such contingencies as political or natural conditions changes.

Uncertainty is one of the main problems that could arise in supply chain management. All supply chain links and all functional cycles of logistics exposed to it, that's why the uncertainty factors and risks should be taken into account both when planning the supply chain, and when implementing the plan. This significantly complicates planning in the supply chain, reinforces the requirements for the plans' flexibility and the development of mechanisms for supply chain participants coordinated actions in both regular and extraordinary situations. As uncertainty is eliminating (minimizing), the efficiency of supply chain management is raising.

Thus, minimizing uncertainty and timely adjusting actions through operational changes in the flow of the supply chain and the activities of its business entities are key tasks of SCM.

Logistics Strategic Management Specialists (Stoke and Lambert) argue that managing partner engagement will only succeed if it is perceived as a "multicomponent process of change" that takes into account simultaneously and in the full range all components of the supply chain and on all the links [10].

The implementation of such approach is proposed to be reached using the author's scheme of cascade-integrative method of change management in the supply chain system.

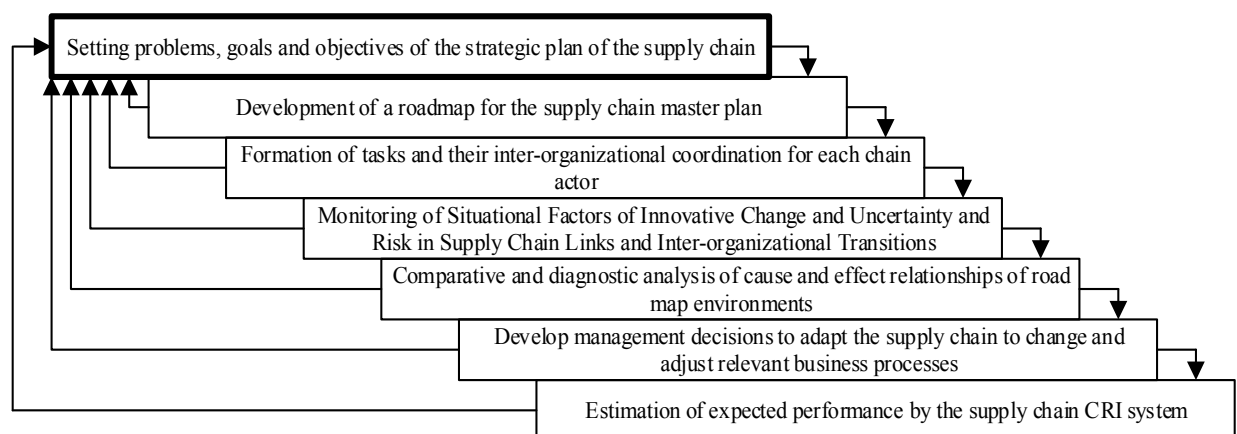


Fig. 1. Cascade-integrative change management in supply chain

Taking into account the accelerating pace of innovation in the development of equipment and machinery, technology and their consumer market, as well as the expedited change in the consumers' needs and preferences, according to many researchers, the business concept of SCM requires a wider interpretation of the concepts and components of integrated logistics in general and the nature and structure of the supply chain before all as a single business complex - systems of resource support for the design, production and consumption of products which are needed to meet the growing demands and new needs of society.

This paper is aimed to study and elaborate separate discussion positions and ideas about changing the paradigm of supply chain formation and its performance management. The research is based on the synthesis and use of the basic provisions:

— the wave theory of development and changes in technological methods (by M. Kondratiev and J. Schumpeter) in the formation of strategic views on the changes dynamics in logistics systems of each layout and the continuous improvement and modernization of subsystems and business processes of functional logistics [11];

— the classic Philip Kotler's Marketing Theory and the Maslow's hierarchy of needs [8]. After all, with a certain stability and persistence of representations about the generalized term "necessity", the complex (spectrum) of "localized needs" is growing constantly for its satisfaction, which in turn are disaggregated into the specified "needs in certain products or services", which individual life cycle continually shrinks while the growth rate of their innovative update increases all the time. Consumption products, in line with the consumer response and the achievements of science and technology, have to constantly improve their functional characteristics, economic parameters by modifying, modernizing or transitioning to a

fundamentally new level of needs' satisfaction [9];

— modern provisions of the TQM theory - the total quality management by W. Edwards. Deming and Joseph Juran, according to which the quality of the product is provided by a closed system - "quality loop" - interconnected processes of managing the technological complexity and quality of all successive stages of the design, production and use of a product or service with their constant changes, improvements and refinements during the life cycle [5, 7];

— the theoretic provisions of the concept of spiral dynamics by Beck and Cowan as an instrument for the formation of the global outlook and system values of individuals and society, as well as changes in priorities in their interrelations for different levels of human development and socio-economic systems [3, 4]. The transfer of these problems from pure sociopsychology into the most pragmatic level of organizational-technological and socio-economic tasks of supply chain management allows us to scientifically substantiate the necessity to change the focus from managerial egocentrism to the integration sociocentrism, which is typical for such virtual associations with the partner heterarchy system in the management of their functioning.

The principles of system integration and globalization can extend the concept of the supply chain, not as a system of successive "door-to-door" movement of supply objects, but as a system of ordered business processes meeting the needs of "0 to 0", that is, from the moment when a need occurs and up its full satisfying by means of the necessary complex of products and services for this purpose - objects of supply. This approach radically changes the architecture of the supply chain due to the emergence of new resources transformation elements in the chain structure:

— separate parts of business processes of resource - material, energy, financial, cognitive - ensuring the state of effective and



competent consumption (use, exploitation) of the product, its recycling and, then, utilization;

— consumers' final assessment stage of the used product conformity level based not only the international standards ISO, but also with the individualized needs and requirements of the client;

— the stage of intellectual innovation processes creating options for modification and modernization or design of a new product to meet the growing needs and requirements of both society and individual consumers [6].

Determining the need for a single common point, "0 → 0*" of the supply chain origin and finalization, fully complies with the SCM concept to begin the supply chain key business processes formation from the end user and its needs.

Since in our case the supply chain end point is its return to its starting "0", but already at the estimated level "0*", as a result of needs' satisfaction or their change, the supply chain graphic representation might be expedient not as a linearly ordered set of stages and logistics business –processes, but as "loop-

spiral" of the full cycle of supply management. This chain form provides implementation of one of the basic requirements for a modern management system - the system's closed contour presence with feedback in conditions of high uncertainty and risk at the business process docking stages and the transition of transformed supply objects in the logistics chain from one economic entity to another.

The global supply chain, focused on the full satisfaction of the generalized need-"necessity", takes into account its differentiation to local needs and, correspondingly, forms a local logistics supply chains system of a specific set of tangible and intangible products for the comprehensive provision of specific needs of consumers.

Thus, the loop-spiral of the supply chain is a complete set of logistic chains and flows of homogeneous supply objects - resources, parts, semi-finished goods, goods, etc., as well as the stages (links) of their gradual technological transformation into final products to meet the needs of consumers (Fig. 2).

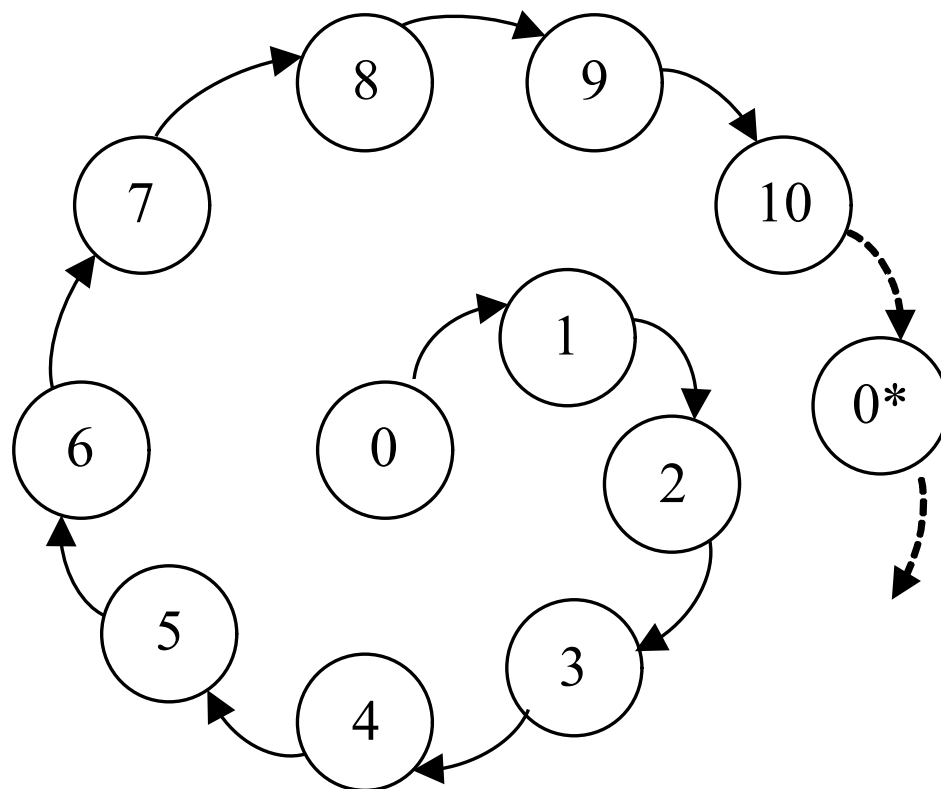


Fig. 2. Loop-spiral of global supply chain

The main stages of the objects transformation in the global supply chain are the following:

0 — identifying specific needs through awareness of its importance for the consumer;

1 — product concept generating to satisfy the need by transforming intellectual search into the product idea;

2 — project development concerning the needed product for consumers through the use of intellectual resources to create the main project components: constructional, technological, resource, investment, informational;

3 — resource source search and order placement by transforming the need in the resources into supply contracts;

4 — product manufacture of the required quality and functionality as a result of the resources transformation into specific products;

5 — product transformation into the good as a result of its commercialization;

6 — good distribution and its delivery to the consumer through order transformation into the object of ownership or leasing;

7 — product effective consumption (use, exploitation);

8 — logistic service and product of consumption recycling through the restoration of lost properties;

9 — product utilization and formation of secondary resources as a result of their processing;

10 — determining the level of customer satisfaction and the need for new products to meet the needs through the formation of new product requirements;

0* — formation of an updated need in a new or upgraded product.

— local logistics flows of displacements of homogeneous objects of supply between the points of their transformation.

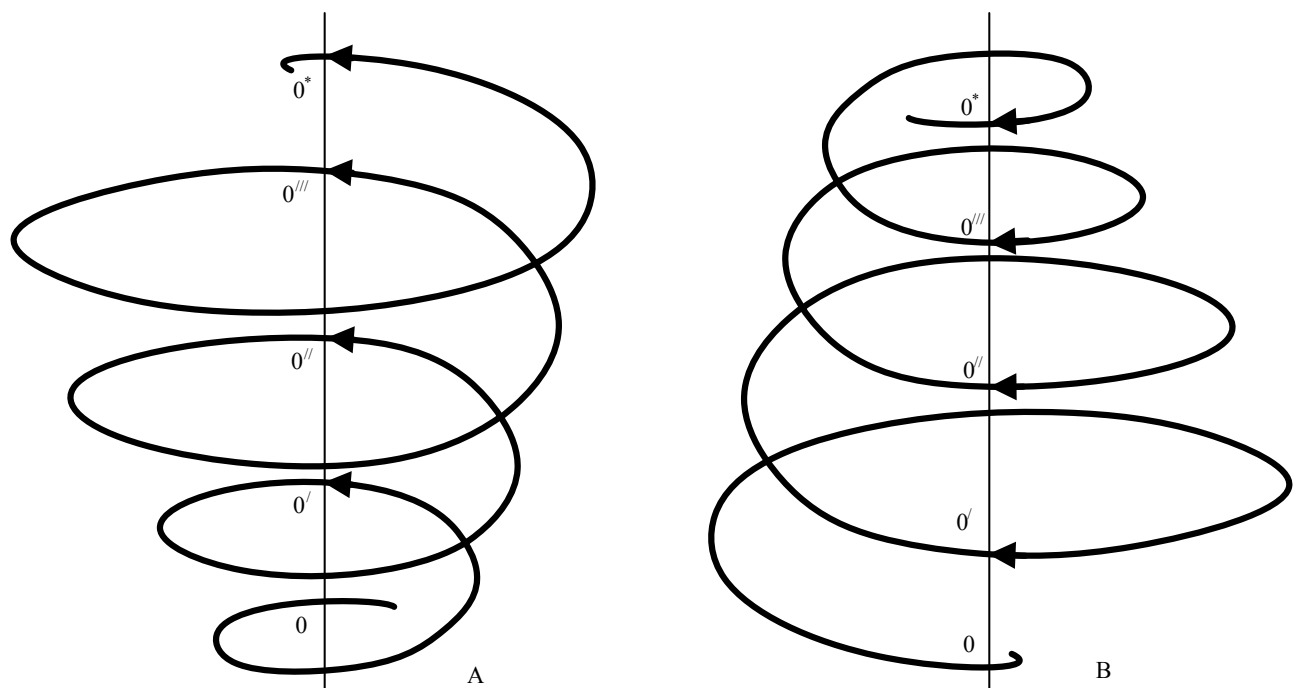


Fig. 3. Spiral funnels for increasing (A) and degrading (B) supply chains

The spiral dynamics concept of development assumes the formation of the next turn of the spiral in accordance with the most currently relevant values for society and individuals, which consistently develop on the basis of the previous values system and become dominant, then to give way to a more progressive stage of development. This means that at each stage of development, a specific system of production relations that corresponds to the level of intellectual, technological, informational state of the technological structure and society as a whole is created.

Clare Graves came to the conclusion that our society has reached the period of the world centered development stage, which has a global systemic vision of the unity of all processes, the flexibility and pluralism of human and inter-organizational relations, the tendency to integration and team work.

Main provisions of the supply chain formation and management concept are consistent with all of these principles. Practice empirically proves the unconditionality of the spiral nature of the movement and the scale

changes of the supply chains loops. These changes, on the one hand, are oriented towards innovative developments of future products and forms and methods of their supply to consumers, and on the other hand, on previous trends in supply chain functioning. Therefore, graphically, the spiral of the chain development has a non-cylindrical, but a cone shape of the "spiral funnel" type of global supply chains. "Spiral funnels" can have different directions and forms of development:

— for degrading chains of fading needs that do not meet the present requirements to products - supply objects, "funnel" is narrowing, and individual links of supply chains are simplified;

— for increasing supply chains of innovative products and meeting new consumer needs, the "funnel" is expanding due to increased demand, the development of effective logistics infrastructure, globalization and the integration of logistics functions.

The needs category inclusion as a source of efficient supply chain management and as

a whole spiral dynamics of integrated logistics concept is based on the voluntary uniting of the all enterprises concerted efforts - supply chain participants to achieve a common final result - meeting the consumers' needs. Harmonization of changes in the functional business processes and actions of the chain participants in space and time in response to updated consumer requests is carried out through logistic coordination based on:

— organizational unity of flow processes in all links and at all stages of local logistics chains and flows;

— the target strategy of the global supply chain spiral dynamics development, fixed in the agreements between its participants;

— technological unity of unified business processes and international standards and logistics requirements;

— diversified activities and conscious responsibility of the supply chain participants;

— economic unity of the entities' efforts in forming the value chain of integrated logistics services;

— information unity of flow processes as a result of business entities participation in the formation and use of a common information platform for global supply chains at all levels of management.

Conclusions The idea of the spiral dynamics of supply chains is a logical and

predictable extrapolation of the generalized tendencies in the development of the system of providing vital functions and growing needs of society from the "natural economy" to the modern global economic associations, such as transnational corporations and international transport corridors and transcontinental supply chains, economic state unification and international research programs in the field of artificial intelligence and development of space capabilities.

All of these trends in the world and regional economies development are directly related to the formation of new perspectives on the current and future needs of society and their satisfaction logistics. Consequently, the concept of spiral dynamics of supply chain development on the principles of globalization, integration and partner interaction could contribute to the search for new forms, methods and tools for supply chain management as a business concept of the economic system of modern logistics.

Certain provisions of this research are only fragmented and sketchy, so they can be controversial and need further development. Interested scholars and practitioners of the logistics community are invited to discussions and debates.

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