



RELIABILITY PROVISION FOR SUPPLIES PLAN IN LOGISTIC CHAINS

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ABSTRACT. Background: The economics globalization led to the growth of the number of international and global supply chains, possessing potentially vulnerable places due to the reason of their high duration and existence of cultural and other barriers between the participants of supply chains. Intensification of international competition, in its turn, conditioned the increase of supply intensity, reduction of logistic chains links number and decrease in them of material reserves. Potential instability and unreliability of supply chains as well as their vulnerability also increased.

Methods: The basic aspects of supply reliability provision in logistic networks based on planning decisions were discussed.

Results and conclusions: There is grounded the necessity for accounting in supply plans of integral qualities of logistic systems, their functioning modes and life cycles of their elements relations. There is suggested the instrument for planning of maneuvers in supply networks in conditions of indeterminacy of future parameters of demand and resources deficit.

Key words: supplies reliability factor, logistic chains and networks, flexibility of logistic system, reliability of planning decisions, supply chains, supply plan.

World financial crisis, bans for flights due to Island volcano - all these events, that hourly destabilized the activity of many logistic chains. The row of such events only today marked the appearance of new priorities in supply chains management, such as safety and viability provision for supply chains, i.e. forming in them of quality for rapid recovery of normal activity after external and internal influences [Sheffi 2006]. Though the ground for recognition of these priorities was formed long ago before the coming of the above mentioned events. Namely, economics globalization led to the growth of the number of international and global supply chains, possessing potentially vulnerable places due to the reason of their high duration and existence of cultural and other barriers between the participants of supply chains [Kanchan 2011]. Intensification of international competition, in its turn, conditioned the increase of supply intensity, reduction of logistic chains links number and decrease in them of material reserves. Potential instability and unreliability of supply chains, and, correspondingly, their vulnerability in these conditions, also increased [Sakchutchawan et al. 2011].

The aim of this study was to discuss the basic aspects of supply reliability provision in logistic networks and the influence of planning decisions on them.

Practical and scientific interest to the questions of safety and viability of supply chains shall be first of all estimated as a step to the fuller application of system approach to supply chains management. It is appropriate to remind, that in correspondence with the general theory of systems it is necessary to distinguish between integral qualities of systems, which determine its behavior: effectiveness, self-organization, security, stability, manageability, reliability, viability. We shall notice, that in theory of systems the concept of effectiveness differs from corresponding concept in economics. It is considered as a complex operational property ("quality") of the process of system functioning, which characterizes its fitness to operations aim achievement, i.e. to fulfillment of system task. Self-

organization in systems theory is usually considered from position of availability of the following properties: ability for recognition of situations, adaptation, self-protection and others.

Account of integral properties of logistic systems shall be performed during planning of supplies in logistic chains (networks). The last notice, in our opinion, is the key notice, first of all from position of necessity for management with supply chains on the basis of normative models [Stock, Lambert 2005]. In the basis of these modules shall lay supply contracts, general totality of which provides coordinated actions of participants of logistic chains. Mission of logistic coordination in supply chains and, correspondingly, responsibility for supplies planning - is the prerogative of the focal company. Logistic "power" of focal company is predominantly determined by the fact, that it is the owner of goods movement channels in the sphere of finished product distribution. Such channels are the principal routes for transportation of products to consumer, and their personalization determines elementary content of supply chains. Exactly availability of rights for full control over products movement, though in some cases and limited (for example, in case of transfer by supplier of monopoly right for the selling of finished product to distributor in the certain territory), makes supply planning of focal company a prioritized type of logistic management.

Analysis of publications on logistics and management by supply chains allows to make at least one conclusion. Scientific discussion of question of supplies planning in logistic chains of-ten comes to the problem of material reserve management on the basis of economic order quantity (EOQ) and EPR-system modified model. Modification of EOQ model is performed by line of full record of all special supply cases for its general application as connecting agent, which means planning beginning also in supply chains [Roorda et. al 2010]. Such approach seems to be limited, at least due to three reasons. First of all, EOQ model a priori satisfies consumer's demands, i.e. does not consider possibilities and profit of supplier. This does not exclude exceed of minimal amount of goods shipment, calculated on the basis of EOQ model. Secondly, EOQ model correlates with condition of "perfect" order, which is often violated in practice. Parameters of such order are:

1. delivery in the day, specified by customer;
2. supply of everything that was ordered by the customer;
3. proper documentation for supply;
4. absence of damages in the process of transportation.

Thirdly, realization of EOQ model supposes allocation in planned order of corresponding cash assets, which is also not always possible. But the problem of this model usage as an approach for supplies planning is not in that. We share the opinion, that influence of reserves on reliability of supplies plan principally is possible only within certain limits [Inyutina 1983]. These limits are well seen in case of determinate demand. Absence of orientation for these limits or their ignorance leads to increase of reserve role in increase of supplies reliability level, and consequently, to formation of excess reserves. In relation to ERP-system we shall notice, that their application leads to growth of business-processes controllability. But they do not answer to supply chains management tasks. And they are not always effective by themselves.

The questions of supplies planning today are not passed over. For example, in [Wollas, Stal 2010] is supposed concept of volume planning of sales and operations. According to this concept is required periodical revision of sales plans (sales), manufacturing, forming of production and goods stocks of all supply chains participants. And it is necessary to refuse from excessive detalization of assortment politics. The main argument for benefit of such steps serves the following fact. Increase of „selling ability" of goods due to deep analysis of goods assortment and reflection of its results in procurement policy is not always possible. It is explained by the fact, that there exist special, time and other limitations of supply system reorganization. Also, unprepared changes in assortment policy often turn out to growth of goods reserve due to exit from circulation of part of finished product suggested for sale. Thus, the concept of volume planning foresees provision of balance between demand and supplies. Execution of this condition shall be performed by the way of regulation of sales speed, production rhythm, volumes of reserve and obligations by supplies [Schulz, Blecken 2001, Done 2011].

The concept of volume planning of sales and operations by itself is not new. And recommendations, given in [Wollas, Stal 2010] are quite general. But the work [Wollas, Stal 2010] is anyway very important, since it draws attention to the problem of logistic chains and networks management on the basis of supplies adaptive planning. We shall notice, that this problem is researched not for the first time. Namely, it was brought up in works [Inyutina 1983, Sokolov, Smirnov 1990 and others], in which was formulated the row of important statements, having direct attention to the theory of adaptive planning of supplies in logistic chains.

In work [Inyutina 1983] is proved, that exactly fluctuation of supply parameters determines the level of real, actual supply reliability. That's why during supplies planning it is necessary:

1. to consider confidence intervals for every plan condition of supply;
2. to foresee in supply contracts the system of indexes, allowing to consider both in detailed nomenclature and by types of material resources timeliness and degree of supplies plan fulfillment, i.e. supplies reliability;
3. to foresee in supply contracts possibility of making changes in supply plans.

In work [Kornai 1990] are comprehensively researched peculiarities of suppliers adaptation to deficit in economics, where predominate resource limitations. According to [Kornai 1990] there exist three types of such adaptation:

1. production volumes reduction (adaptation of production to "narrow places");
2. forced replacement of one material resources by others;
3. adaptation of manufactured production structure to the structure of available resources.

Demonstration of this regularity, as the world financial crisis showed, is possible even in the countries with developed market economics. In particular, deficit can appear also due to absence of production by the reason of incorrect or prepared late in time supply orders. That is why it shall be taken into consideration in the process of supplies planning. Apart from that in [Kornai 1990] draws attention statement, in which is grounded positive relation between intensity of production plan and frequency of resources limitations appearance. In other words, the higher is production plan intensity, the more possible, that shipment will be performed with deviations from planned supply conditions. It is necessary to notice, that in work [Inyutina 1983] analogous conclusion is made in relation to supply (procurement) plan.

One of significant statements of work, in our opinion, is grounding of reasonability of direct planning addition with reverse. Execution of this condition allows to move from planning of "logical" future to planning of desirable future. Application of such approach to adaptive supplies planning in logistic chains seems extremely necessary. This creates objective prerequisites for orientation of logistic chains on client, which means and for their successful functioning. Here it is appropriate to remind, that a start point in the question of supplies reliability provision is determination of logistic services norms, rendered by logistic chain to final consumers of material resources [Das, Sengupta 2010].

Practical and scientific interest for improvement of supplies planning in logistic chains presents work [Sokolov, Smirnov 1990], in which is considered a wide circle of questions, connected with plan decisions reliability. There is developed the idea, that reality of these decisions greatly depends on whether they possess manoeuvre properties or not. Applicably to supplies planning it can be interpreted in the following way. Maneuver properties of supplies plan reflect speed possibilities of reorganization (adaptation) of logistic chain (network) and its component objects. Evaluation of such properties shall be performed with consideration of at least two scenarios of disturbances development:

1. disturbances, inducted by suppliers (incomplete deliveries and other deviations of supply conditions from contract obligations);
2. "counter" disturbances, created by changes of supplies (sales) plans for final (end) participants of logistic chains.

Here it is appropriate to remember the effect of "stick", which appears during inappropriate interpretation by logistic chain participants of changes in supply orders for supply of material resources [Sheffi 2006]. It is obvious, that the basic reason of such effect appearance serves the absence of due supplies planning, not foreseeing coordinated actions of logistic chain participants during appearance in it of "counter" disturbances. It is logical to suppose, that prerequisites for "stick" effect appearance may be eliminated by the way of provision of information transparency of logistic chains. Logistic chains participants in this case should submit each other the following information:

1. forecast evaluations in relation to procurements, production and sales;
2. plans of procurements, production and sales;
3. actual data on supplies, shipments and stocks. Unfortunately practice shows, that many enterprises just are not ready for this step.

There are known attempts to establish information transparency in supply chains by means of state administration programs. For example, in its time in one of Russian state programs was foreseen elaboration and introduction of obligatory statistical report forms for observation under participants of trade markets through the whole chain of goods movement: "raw material producer → finish product manufacturer → trade organizations → consumers".

Supply chains information transparency has direct relation to provision of demand "transparency". In the basis of such a task decision lay certain points of demand "intrusion" up flow in logistic chain [Sheffi 2006]. This point is dislocated where actual demand corresponds to plan. Maximal movement of this point to the beginning of supplies chain is one of the actual and complicated problems of modern logistic management. One of the ways to achieve this goal is delay of order execution till revelation of actual demand. This variant shall be considered during supplies planning.

As the base for supplies plans elaboration in logistic chains serve results of design of such structures, steps of which are rather detailed described in [Bauercocks, Kloss 2001; Stock, Lambert 2005]. Anyway it is still seems necessary to draw attention to some economical peculiarities of their design. First of all, it is reasonable to foresee the appearance of double marginalization effect (mark-up). Such marup appears in case of consequence maximalization of profit by good manufacturer and its seller. And it conditions excess reduction of demand. Neutralization of this effect, as known, is possible with the help of vertical limitations:

1. establishment of non-linear price;
2. limitation of competition by means of establishment of exclusive territories for distributors.

Secondly, special attention during design of logistical chains shall be paid to transaction nature of adhesive powers in supply chains. Research object in this case shall be transaction expenses and specific investments of logistic chain participants.

Forecasting of transaction expenses allows more exactly establish interconnection between expenses in supply chains and effectiveness of their functioning. Apart from that it helps to objective establishment of term, required for elaboration of supply chains project. Receipt of such result is achieved due to understanding in particular of demand in conduct of negotiations with potential participants of supply chains and time expenses for these negotiations . Understanding of maximum transaction expenses allows to determine structural boundaries of logistic chains, in which is kept its controllability.

Specific investments are connected with forming of special types of assets, which include:

1. specificity of enterprise dislocation;
2. specificity of material assets;
3. specificity of human assets;
4. target assets, created on condition of availability of perspectives for their usage in the process of serving for certain consumer [Williamson 1996].

Capital, growth of which is increased by such investments, provides unstable position of enterprise in the market, since alternative usage of specific asset is accompanied by abrupt fall of its value. Specific investments may create significant growth of quasirent for that participant of supplies chain, that has less complication for the replacement of logistic partner. Such quasirent creates prerequisites for racket. Neutralization of such threat stimulates vertical integration in supply chains, i.e. amalgamation of business.

Conferring to supplies plans of maneuver qualities admits, that logistic chains participants content and relations between them may vary. That's way during grounding of these properties it is necessary to forecast depreciation of gains from maneuvering with supplies at the expense of inducted deformations of logistic chain of specific investments.

Economical basement of logistic chain project supposes evaluation of correlation between different levels of logistic service and corresponding expenses, which foresees the following stages:

1. determination of logistic chain configuration with the lowest general expenses;
2. evaluation of consumers service level and service possibilities of logistic chain, providing for minimal general expenses;
3. performance of sensitivity analysis to increase of service level and expenses, directly connected with creation of additional profit;
4. completion of logistic chain design. As indicators of logistic service level serve: accessibility (criteria: possibility of reserve lack; demand saturation norm, fullness of coverage with orders); functionality of logistic cycle (criteria: speed; regularity; flexibility; level of defects/elimination of deficiencies); reliability of supplies [Bauercocks, Kloss 2001].

Ways of supplies reliability provision may be classified in the following way:

1. forming of insurance reserve;
2. reserve (structural or with replacement);
3. usage of interchangeable material resources;
4. qualification control of supplier or logistic audit;
5. establishment with supplier of long-term economical relations or his enterprise acquisition.

Provision of logistic balance between demand and supplies

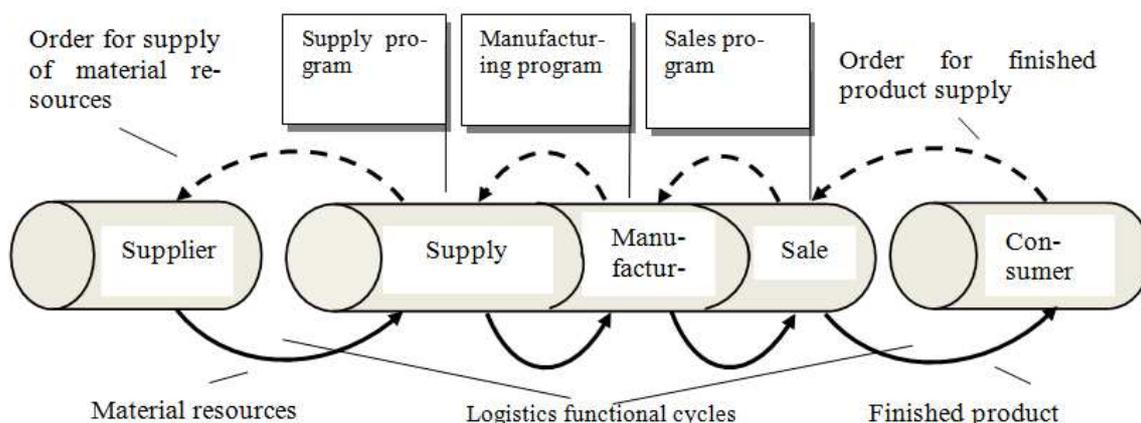


Fig. 1. Model of logistic chain as base for forming of integrated supplies plan

Rys. 1. Model łańcucha logistycznego jako podstawa do tworzenia zintegrowanego planu zaopatrzenia

Submission of logistic service at project (normative) level is a priority goal of logistic chain. And its fitness to achievement of such a goal characterizes effectiveness of such logistic system, which is

one of its integral properties. Important reserve for increase of this effectiveness is grounded choice of rational forms of supply and sales, and also development of progressive forms of logistic interactions in supply chains.

Results verification of logistic chain design shall be performed on the basis of integrated supplies plan reliability, considering local plans of supply, production and sales (figure 1). This plan shall provide logistic balance between demand and supplies, i.e. stability of supply chain under external and internal disturbances. And mission of such provision by its nature is greater than support of financial balance of enterprise [Shirenbek 2005].

Reliability of integrated supplies plan, as we have mentioned, depends on:

1. reliability of planning decisions for supplies realization;
2. availability at plan of maneuver qualities.

Fulfillment of the first condition supposes:

1. determination of possible deviations of design supply conditions from actual;
2. calculation of losses due to such deviations;
3. elaboration of suggestions on elimination of such deviations.

In other words, in this case is solved the question of increase of execution probability by suppliers of their contract obligations. Admittance of supply parameters deviations from contract conditions simplifies formalization of supplier reliability determination. It is appropriate to notice, that, for example, exact interval of supply for planned period is not always possible to determine. And instability of order execution time is frequent enough phenomenon [Stock, Lambert 2005].

Practical interest in this context is in the usage of integral reliability coefficient, which reflects supplies timeliness, parameters of repeated supply, fullness of volume, absence of assortment shifts in supplies structure (incompleteness) [Inyutina 1983]. Operational control of actual supply conditions deviations from contract in logistic chains creates possibility for rapid reaction for supply failures. Apart from that, it creates objective prerequisites for timely performance of logistic maneuvers in supply chains.

In order to give to supply plan maneuver qualities, first of all, it is necessary to present visually interactions in logistic chains. Matrix structure-flow model, present at figure 2 corresponds to this requirement [Tkacz 2010].

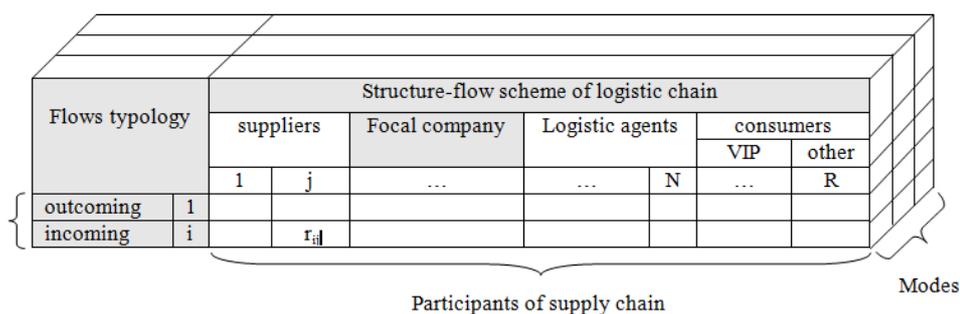


Fig. 2. Reflection of interconnections in logistic chain
 Rys. 2. Model wzajemnych powiązań w obrębie łańcucha logistycznego

Structure-flow scheme of logistic chain foresees accounting of its functioning different modes, which form space for supplies maneuver (Fig. 2). Logistic chain configuration for different functioning modes may vary, since changing of requires to flows (supplies) often causes structural

reorganization. And multitude of such modes may lead to structural excessiveness of logistic chain, i.e. to structural reserves. These reserves are latent expenses, for example, during certain violations of supply plans. Optimization of structural reserves is related by us with consideration of "functional cut" principle, which consists in the following. In this scheme are included only that material formations and only in such relations, which have some significance in formation of considered effect [Kartashev 1995].

Assigning to supplies plan of maneuver properties makes necessary formalization:

1. of border conditions for transfer from one mode of logistic chain functioning to another (i.e. rules for achievement of new state of logistic chain or maneuver "corridor");
2. speed characteristics of such transfer [Sokolov, Smirnov 1990].

Problem of maneuver "corridors" establishment may be brought to establishment for every logistic chain participant of regulations for transfer to new supply plans. And such regulations may allow both full refuse from certain suppliers services (i.e. passive maneuver), and attraction of new logistic partners. Complexity of such regulations forming is conditioned by the number of factors, which include:

1. demand in standardization of limit deviations of supply plan from regular trajectory;
2. supplies nonstationarity in the period of transfer to the new mode of logistic chain functioning;
3. "irreversibility" of certain supplies during the transfers of such modes;
4. limitedness of allowable transfers to new functioning modes of logistic chains.

Design of supplies plan maneuver properties shall suppose provision of logistic chain security for all its functioning modes. Shall be distinguished two types of such security:

1. internal (ability of logistic chain to keep its normal functioning in conditions of external and internal influences);
2. external (ability of logistic chain to interact with the environment, preserving its integrity, i.e. excluding its "collapse") [Mogilevskiy 1999].

General task for security provision of logistic chain consists in exclusion of all its functioning modes, leading to collapse. One of the principles of its decision is consideration of consequential deterioration of logistic chain parameters, conditioned by its "ageing". To ageing are subject not only material resources. Flows, as structures also, which limit that, do not stay static in time, that is why logistic chains periodically need reorganization. Invariant principles of supply chains security provision are:

1. application of multi-level and balanced methods;
2. establishment of distinction between threatening situations and normal;
3. development of partnership and collaboration relationship;
4. forming of relation culture to security questions [Sheffi 2006].

Logistic chain security measure serves the guaranty of its stability. As opposed to classical balanced approach, the central element of modern economical views on considered problem is the concept of structural stability. Here the basic task is revelation of qualitative changes in logistic system behavior during its structure change. Also exists concept of related stability, in the basis of which lays supposition, that logistic relations are random variables, described by some known distribution functions [Casti 1982]. Evaluation of adhesive forces in logistic chain may be made on the basis of matrix, characterizing interrelations of this chain participants. Supplies chain shall be considered stable, if for all possible modes of its functioning is provided logistic balance (Fig .1). In Gyg [1981] the ability of system to stay in stability area is called system's "vitality". Close by interpretation to the term "vitality" is another term - "viability", i.e. ability for rapid recovery [Sheffi 2006]. For vitality analysis, in particular of technical systems, are used evaluations, which characterize the share or flow of functioning "refuses" with cascade development of initial disturbance. Close by nature to system stability quality are:

1. system ability for absorption of external disturbances without clearly expressed consequences for its behavior in established or transition conditions (adaptivity);
2. limit allowable ability of system for neutralization of disturbing influences without structural system changes (flexibility).

Flexibility of supplies integrated plans serves the main factor of logistic chains viability provision. Such flexibility is reached through:

1. interchangeability provision for material resources, logistic partners;
2. unification of account - contract units;
3. delays of supply order execution;
4. consideration of preliminary supply orders risk;
5. establishing contacts with consumers after failures in supplies of finished products;
6. elaboration of policy of selective logistic service for consumers;
7. usage of vulnerability maps for logistic chains [Sheffi 2006].

Independent direction for supplies plan reliability provision in logistic chains serves coordination of interaction in such structures. Such coordination strategy may be performed in different ways, which include:

1. interactions forecasting;
2. interactions evaluations;
3. "un-doing" of interactions, i.e. delegation of partial rights to chains participants for independent decision making;
4. vest responsibility to supply chains participants;
5. forming of coalitions in supply chains for simplifications of logistic decision taking.

SUMMARY

The necessity for accounting in supply plans of integral qualities of logistic systems, their functioning modes and life cycles of their elements relations were confirmed during the research. The instrument for planning of maneuvers in supply networks in conditions of indeterminacy of future parameters of demand and resources deficit were indicated. The identification of logistic systems integral properties creates objective prerequisites for assigning to integrated plan of maneuver qualities. Achievement of this goal, in its turn, provides reliability of such plan.

REFERENCES

- Bauercocks D.J., Kloss D.J., 2001. Logistics: integrated supply chain. Close Corp. Olimp-Business.
- Casti J., 1982. Large systems. Connectivity, complexity and catastrophes. Pub. Mir.
- Das K., 2011, A quality integrated strategic level global supply chain model, 49, 1.
- Das K., Sengupta S., 2010, Modelling supply chain network: a quality-oriented approach, International Journal of Quality&Reliability Management, 27, 5, 506-526.
- Done A., 2011, Integrating Supply Chains: An Investigation of Collaborative Knowledge Transfers, [hhht://ssrn.com/abstract=1873226](http://ssrn.com/abstract=1873226).
- Gyg G., van., 1981. Applied general theory system. - Pub. Mir.
- Inyutina K.V., 1983. Increase of supply reliability and quality. Pub.house of Leningrad Univ.

- Kartashev V.L., 1995, System of systems. Essays on general theory and methodology. - Pub.: Progress-Academy, 325 p.
- Kornai Y. Defecit., 1990. Pub.house Science.
- Mogilevskiy V.D., 1999. Systems methodology: verbal approach. Public corp. House Economics.
- Roorda M.J., Cavalcante R., McCabe S., Kwan H., 2010, Transportation Research Part E: Logistics and Transportation Review, 46, 1, 18-31.
- Sakchhutchawan S., Hong P.C., Callaway S.K., Kunnathur A.K., 2011, Innovation and compctitive adavantage: model and implementation for global logistics. Intern. Business Research, 4, 3.
- Sokolov V.G., Smirnov V. A., 1990. Research of flexibility and reliability of economical sys-tems. Pub. Science. Siberian Dept.
- Stock J.R., Lambert D.M., 2005. Strategic management with logistic. INFRA-M.
- Schulz S.F., Blecken A., 2010, Horizontal cooperation in disaster relief logistics: benefits and impediments, International Journal of Physical Distribution & Logistics Management, 40, 8/9, 636-656.
- Williamson O. I., 1996. Economical institutes of capitalism: Companies, markets, "relational" contracting. Lenizdat; CEV Press.
- Wollas T., Stal R., 2010. Planning of sales and operations: Practical guidance. Pub. Piter.
- Sheffi J. 2006. Vigorous enterprise: how to increase reliability of supply chain and preserve competition advantage. Alpina Business Books.
- Shirenbek H., 2005. The basic of economics and enterprice, Pub. Piter.
- Tkacz W.W., 2010. The use of the matrix diagram as a tool for the analysis of effectiveness of supply chain. Log Forum 6,2,4.

ZAPEWNIENIE NIEZAWODNOŚCI PLANÓW ZAOPATRZENIA W OBRĘBIE ŁAŃCUCHÓW LOGISTYCZNYCH

STRESZCZENIE. Wstęp: W rezultacie postępującej globalizacji powstało wiele łańcuchów dostaw o zasięgu międzynarodowym i globalnym, charakteryzujące się wieloma wrażliwymi obszarami ze względu na istnienie różnych barier pomiędzy poszczególnymi uczestnikami łańcucha. Intensyfikacja konkurencji na skalę międzynarodową z kolei powoduje wzrost intensywności dostaw, redukcji ilości ogniw łańcucha oraz rezerw materiałowych. To z kolei zwiększa jeszcze niestabilność i wrażliwość łańcuchów dostaw.

Metody: Dyskusji poddano podstawowe aspekty zapewnienia zaopatrzenia w sieciach logistycznych w oparciu o decyzje planistyczne.

Wyniki i wnioski: W trakcie dyskusji zwrócono uwagę na konieczność uwzględniania w planach zaopatrzenia wartości całkowitych systemów logistycznych, ich funkcjonalnych części oraz cykli życiowych poszczególnych elementów. Zaproponowano narzędzie do planowania w obrębie sieci logistycznych w warunkach niepewności parametrów związanych z przyszłą podażą i popytem.

Słowa kluczowe: czynnik niezawodności zaopatrzenia, łańcuch i sieci logistyczne, elastyczność systemu logistycznego, niezawodność decyzji planistycznych, łańcuch dostaw, plan zaopatrzenia.

GEWÄHRLEISTUNG DER ZUVERLÄSSIGKEIT VON VERSORGUNGSPLÄNEN INNERHALB DER LOGISTIK-KETTEN

ZUSAMMENFASSUNG. Einleitung: Infolge der voranschreitenden Globalisierung sind viele Lieferketten von internationalem und globalem Charakter entstanden. Diese Lieferketten sind wegen des Vorhandenseins von unterschiedlichen Barrieren zwischen den einzelnen Teilnehmern einer Lieferkette durch empfindliche Zonen

gekennzeichnet. Die Zunahme des weltweiten Wettbewerbes hat ein ständiges Anwachsen der Intensität der Lieferungen und Reduktion der Anzahl von Kettengliedern und Materialvorräten zur Folge. Dies verursacht noch zusätzlich Unstabilität und Empfindlichkeit der einzelnen Lieferketten.

Methoden: Es wurden grundlegende Aspekte einer effektiven Gewährleistung der Versorgung innerhalb von Lieferketten wahrgenommen und mit Hilfe von planmäßigen Entscheidungen einer Diskussion unterzogen.

Ergebnisse und Fazit: In der Diskussion hat man bei Erstellung von Versorgungsplänen auf die Notwendigkeit einer Berücksichtigung des Gesamtwertes von Logistik-Systemen und deren Funktionsteilen, ferner der Berücksichtigung von Lebenszyklen der einzelnen Elemente hinzuweisen. Im Zusammenhang damit wurde ein Werkzeug für die Planung innerhalb der Logistik-Netzwerke für den Fall der Unsicherheit hinsichtlich der mit einem zukünftigem Angebot und zukünftiger Nachfrage verbundenen Parametern vorgeschlagen.

Codewörter: Parameter der Versorgungszuverlässigkeit, Logistik-Ketten und -netzwerke, Flexibilität des Logistik-Systems, Zuverlässigkeit von planmäßigen Entscheidungen, Lieferkette, Versorgungsplan.

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