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TRANSPORT-LOGISTIC MODEL OF INTEGRATED PRODUCTION STRUCTURE OF FOOD PRODUCTION

The issue of solving problems of optimization of production and transport processes in raw material and processing sectors of the economy of Ukraine today are at the center of attention. So, in the scientific works of Babenko V.O. and Vitlinsky V.V. [1], Nakonechny S.I. [2] and Naumova L.M. [3] shows the simulation and optimization of transport-logistics processes in the industry.

The necessity of mathematical modeling of the planning work of the enterprises of transport, industry and raw material base is caused first of all by the possibility in this case of more rational use of available resources and optimization of commodity-cash flows [4].

The purpose of our research is to study the transport-logistical side of the rational organization of the integrated complex of enterprises "raw material base - procurement/primary processing - industry enterprises". The objectives of the research are: the identification of production, economic and transport factors of the interaction of production in the technological chain of goods production and the mathematical formulation of the task of minimum costs for the transportation of raw materials.

The tasks of logistic management of commodity flows in order to minimize costs and maximize profits in the production system is a complex methodological task, as the technological chain of production usually involves a large number of actors that enter into interaction. Consequently, it is necessary to take into account the whole set of participants in production and to coordinate their numerous interactions, taking into account their functional features of their organization and the technology of the work.

To solve this problem, we used the instrumental apparatus of mathematical modeling, namely - setting up an optimization problem Z-type with a system of constraints, which allows the most adequately describe the investigated technological and logistic system. During the study was developed the model of optimization of capacities of production units and minimization of expenses for transportation of raw materials. Limitations of the model are the volumes of raw material production, the quantities of raw materials delivered between the stages of the technological process and the volume of raw materials transported between all the links of the production-technological chain. Method of formation and structural composition of the model are shown on the fig 1.

The offered mathematical model allows to carry out planning and programming of processes of development of the new integrated food production system, to estimate influence of changes in system parameters and to make adjustments of plan

For the practical use of this model, the formation of an appropriate information environment is required by monitoring and accumulating the statistical base of parameters that characterize the use of resources, costs, production and logistics and transport and logistics flows.

The offered transport-logistic model of the integrated structure of goods production should be used in practice in the activity of the enterprise.

With the help of Statgraphics, Statistica, Excel software, and based on the enterprise data array, it is possible to plan and program the development processes of the integrated production system, to evaluate the impact of changes in the parameters of the system, to make adjustments to the plans.
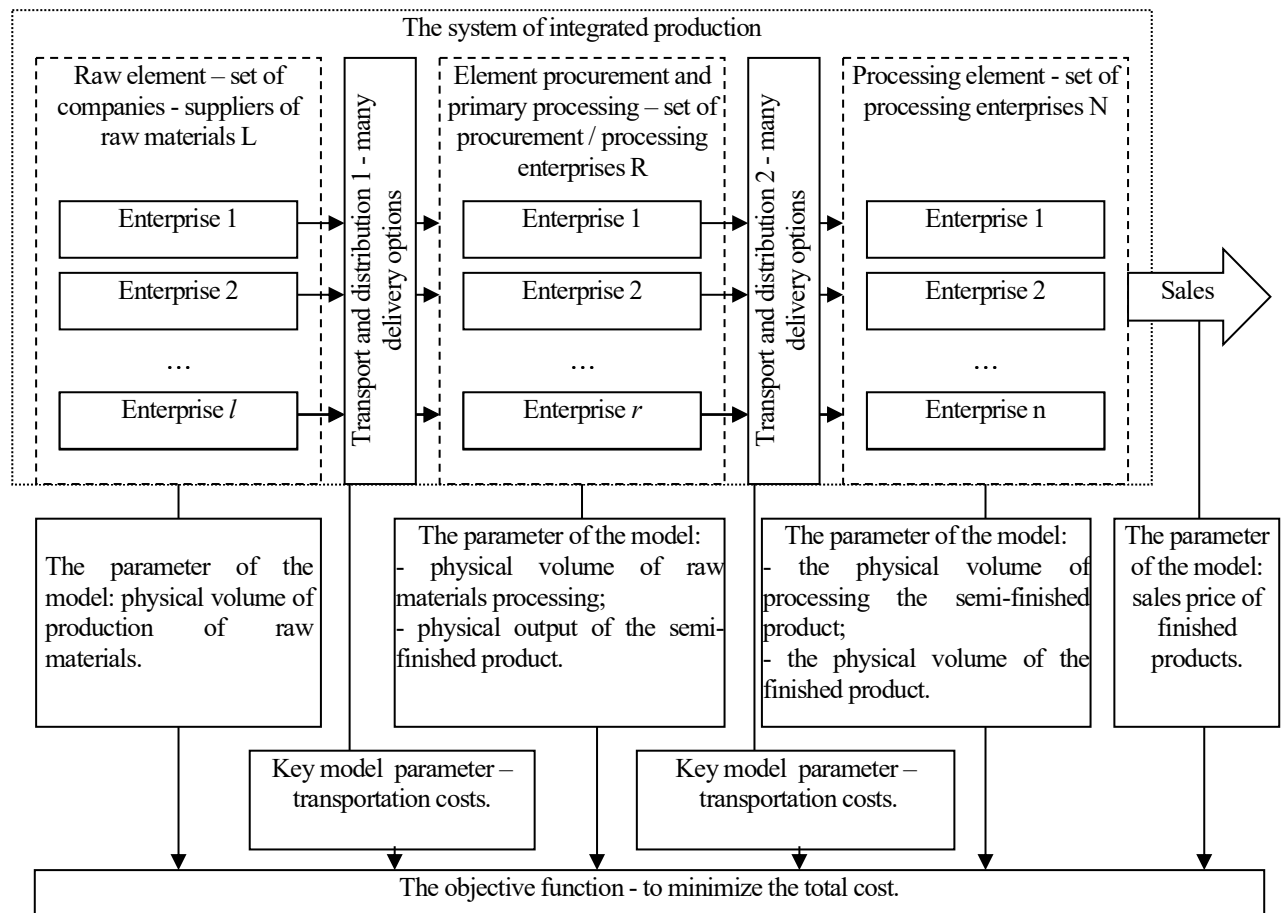

Fig 1. Component of the model for optimizing transport-logistics chains of an integrated production structure

The system should strive to get close to the ideal state of operation, which will ensure the economy of resources and maximize returns.

The presented model allows to specify the technological complex of works and the need for raw materials, provide an opportunity to establish boundaries between the complex of works, for which the producers-executors and transport companies are responsible and, in general, the responsibility of the entire corporate structure of production.

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