EE&AE
2024 9th International Conference
on Energy Efficiency and Agricultural Engineering
27-29 June 2024, Ruse, Bulgaria
IEEE

Modeling of business processes in the conditions of green economy growth

Marat V. Mardanov, Nadezhda K. Kozar, Lyudmila A. Gainulova, Alexander N. Kozar, Farit M. Nurgaliev

Kazan Cooperative Institute (branch) Russian University of Cooperation
mmv_kzn@mail.ru

GOAL OF THE STUDY

The research problem is the question of the impact of green economy growth on the representativeness of classical mathematical models. The aim of the study is to analyze changes in the parameters of economic and mathematical modeling in the conditions of the green economy growth trend.

The main purpose of the study was to identify the features of production in the aspect of the green economy, generalize and clarify the accents of the application of mathematical modeling to optimize production based on a modified model of the transport problem in the context of the growth of the green economy.

METHODOLOGY OF THE INVESTIGATION

Green growth of the economy implies a comprehensive growth promotion program aimed at reducing anthropogenic impacts by moving towards environmentally friendly and climate-resilient development through ecological modernization of the economy, as well as social practices on which the well-being of society depends.

The complexity of the economy, business processes for their model description requires the use of various approaches, one of which is linear programming. Part of linear programming are transportation problems, which play a special role in reducing the transportation costs of the enterprise, and hence reducing the anthropogenic impact.

This is a relevant issue in the growth of green economy, when any environmental pollution, costs should be minimized, then the costs are covered by a smaller part of the profit, which reduces both the cost of production in the market and the impact on the environment, which makes the enterprise more competitive.

It should be noted that the economic-mathematical model of the transportation problem allows us to describe many situations very far from the transportation problem, in particular, to find the optimal placement of orders for the production of products with different production costs, with optimal utilization costs, etc.

A modification of the transport task model has been developed to optimize output from the position of maximizing profits in a growing green economy.

MAIN RESULTS FROM THE STUDY

To reduce the cost of production, it is necessary to model business processes taking into account the differentiation of production costs: production costs, tax costs, waste disposal costs, environmental payments, etc. for their more detailed analysis. The use of recycling technologies in production will also allow for the possible profit from their implementation.
The resulting solution allows us to determine the raw material balances, the output plan for each type of product and the resulting projected maximum profit.
This task can be modified and solved under the conditions of green economy growth. For this purpose, the matrices of raw material consumption, profit should be transformed.
For example, aij - consumption of raw materials in the manufacture of suits and cij - profit from production should be deterministic and adjusted: $a_{ij=} p_{ij} + e_{ij} - r_{ij}$, $c_{ij=} m_{ij} + r_{ij}$, where p_{ij} is total production costs, m_{ij} is unit profit, e_{ij} is environmental fees and r_{ij} is recycling revenue.
Allocation of matrices of production costs (P), environmental charges (E), unit profit (M) and recycling profit (R) as separate parameters in the model allows to build and optimize production separately on minimization of production costs, environmental charges, maximization on recycling profit.
Application of such determination and differentiation of parameters of mathematical models allows us to justify and forecast the development of production, assess the feasibility of including new products or raw materials in production, estimate profits and costs.
It should be noted that when training specialists of economic specialties it is necessary to include mathematical methods and models, their application in economics in the content of professional training, which will allow to achieve greater professional competence of graduates and their competitiveness in the labor market.

CONCLUSIONS

Such ramified external and internal relations determining their state and behavior that it is impossible to manage them effectively without the use of modern mathematical apparatus and information technologies characterize modern socio-economic systems in the conditions of green economy growth.

The widespread use of computers in mathematical information processing also requires the use of new approaches in teaching mathematics to economic specialists.

Business processes and the classical mathematical models built on them can be modified and transformed to give economically important results in various practice-oriented economic research. The modifications of the models given in the paper imply modeling of business processes taking into account the environmental friendliness of production, which allows us to put this parameter as a condition for optimization.