ИРИТ-РТФ

Инновационные подходы в высшем образовании в сфере компьютерных наук

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«MODELING THE TARGET ARCHITECTURE OF AN ENTREPRENEURIAL NETWORK AS A COMPLEX SYSTEM OF INTERACTION»

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Introduction

These studies represent a comprehensive methodology for a modern analysis of the problems of forming the strategic architecture and corporate dynamics of an enterprise, effective inventory management in logistics systems, as well as the ability to predict the nature and structure of regional systems, identify imbalances in the development of countries and territories, balanced management in the architecture of interaction processes. The presented results, as a rule, do not consider the system as a black box, and the analysis of the structure and its previous states becomes the basis for the development of control actions, interaction rules that can maintain stability and balance, as well as the specified parameters of the system's functioning as the target states of its architecture.

The latter is a fixed characteristic of the system, capable of ensuring the efficiency of the organization of the processes that are realized in it in dynamics - the processes of interaction.

Methodology and calculation

The company's image, information exchange and logistics resources are defined as relative indicators (from 1 to 10 dimensionless units), a comparison of which determines the proportionality of the contribution of a new participant in the interaction to the existing assets of company 1. The dynamics of the image of company 1 is described by the formula:

$$L1(t) = \int_{t_0}^{t_k} F1(\tau)d\tau + L1(t_0),\ t = \underline{t_0..t_k}, \qquad *$$

where L1(t) is the current image of the company at time t;

*t0– initial moment of simulation;

*tk – final moment of modeling;

*F1() is the intensity of the change in the company's image at time τ.

Methodology and calculation

The initial value of the company image (which also corresponds to the model parameter in the absence of network interaction)L1t0=1.

The level of information exchange in the main sources of information of financial statements:

$$L2(t) = \int_{t_0}^{t_k} F2(\tau)d\tau + L2(t_0),\ t = \underline{t_0..t_k},$$

*where L2(t) is the current level of information exchange in the main sources of information at time t

Methodology and calculation

F2() is the change in the intensity of information exchange at time τ.

The initial value of the intensity of information exchange (which also corresponds to the model parameter in the absence of network interaction) L2t0=1.

The level aggregating changes of company resources in the system of logistic interaction:

$$L3(t) = \int_{t_0}^{t_k} F3(\tau)d\tau + L3(t_0), t = \underline{t_0..t_k},$$

*where L3(t) is the current value of the level that aggregates changes in the resources of logistic interaction at time t.

Methodology and calculation

F3() is the rate (intensity) of the exchange of resources of the logistic interaction of companies at time τ.

The initial value of logistic interaction resources (which also corresponds to the model parameter in the absence of network interaction) L3t0=1.

Level of growth / decrease in additional sales volumes:

$$L4(t) = \int_{t_0}^{t_k} F4(\tau)d\tau + L4(t_0) = \int_{t_0}^{t} (D1(\tau) - D2(\tau))d\tau + L4(t_0),\ t = \underline{t_0..t_k},$$

*where L4(t) is the accumulated value of the level of additional sales volumes (achieved by the company only if it enters into network interaction with other participants), at time t.

Methodology and calculation

F3() is the rate (intensity) of the exchange of resources of the logistic interaction of companies at time τ.

The initial value of logistic interaction resources (which also corresponds to the model parameter in the absence of network interaction) L3t0=1.

Level of growth / decrease in additional sales volumes:

$$L4(t) = \int_{t_0}^{t_k} F4(\tau)d\tau + L4(t_0) = \int_{t_0}^{t} (D1(\tau) - D2(\tau))d\tau + L4(t_0), t = \underline{t_0..t_k},$$

Where:

*L4(t) is the accumulated value of the level of additional sales volumes (achieved by the company only if it enters into network interaction with other participants), at time t;

*D1 (τ) is the monthly income of a company that has entered into network interaction;

*D2 (τ) is the monthly income of a company that does not enter into network interaction;

*F4()- the current (monthly) additional sales volume at time τ, is determined as follows:F4=D1-D2.

Methodology and calculation

The initial value of the level of additional volume of sales of goods (which also corresponds to the parameter of the model in the absence of network interaction) L4t0=0.

The effect of creating a supply-implementation value chain (cost-cutting effect):

$$L5(t) = \int_{t_0}^{t_k} F5(\tau)d\tau + L5(t_0) = \int_{t_0}^{t} (D1(\tau) * (UR2(\tau) - UR1(\tau)))d\tau + L5(t_0),\ t = \underline{t_0..t_k}$$

Where:

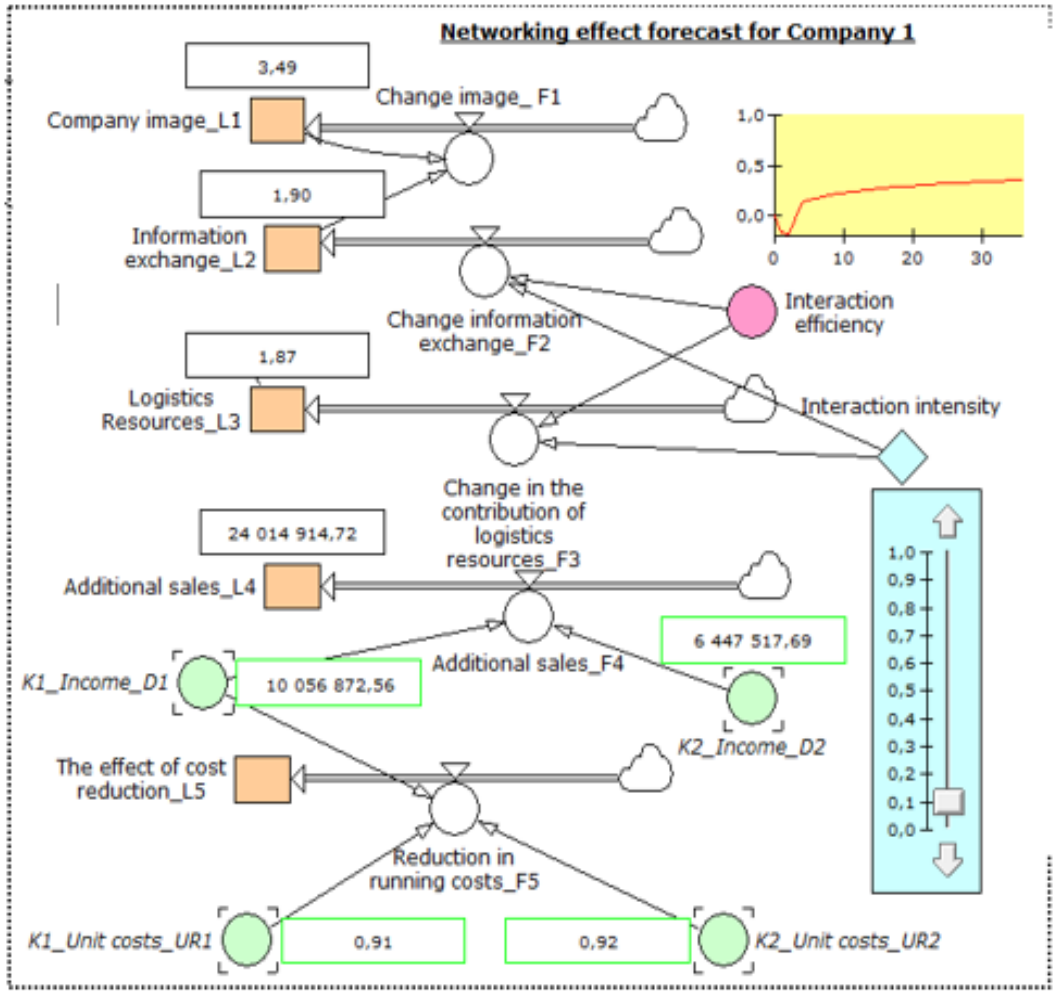
*L5(t) is the accumulated value of cost reduction (achieved by the company only if it enters into network interaction), at time t;

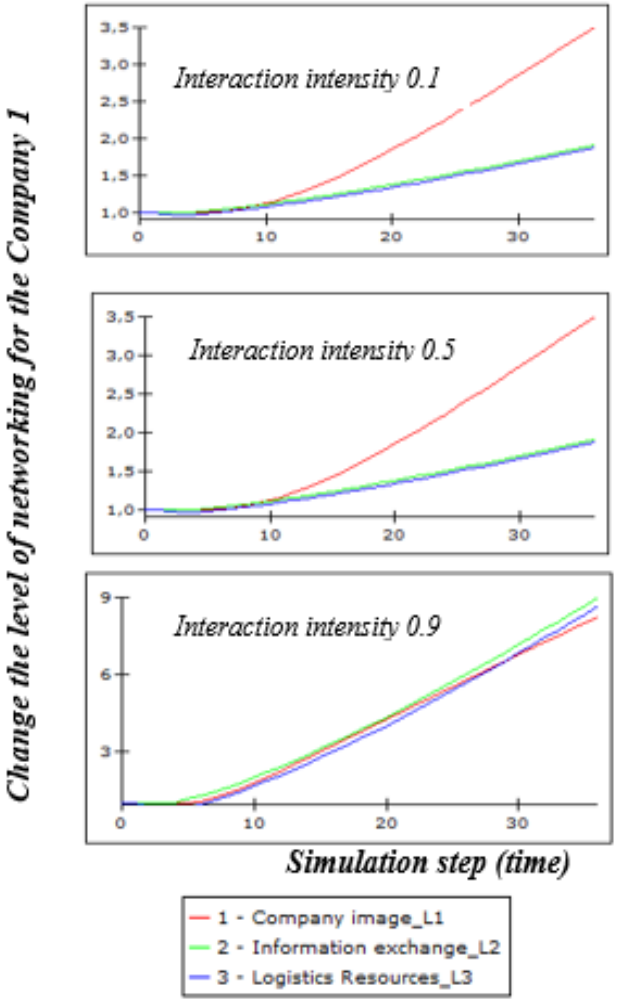
*UR1(τ) - unit costs (the sum of expenses per 1 ruble of revenues) of the company that entered into network interaction

*UR2(τ) - unit costs (the sum of expenses per 1 ruble of revenues) of a company that does not enter into network interaction;

The initial value is $L5(t_0) = 0$

Methodology and calculation





Basic structural elements and simulation results of a system-dynamic model for analyzing the effect of networking companies

Results

The subsequent increase in the interaction efficiency indicator, which is set at 0.36, has a damping tendency, since the distribution of resources within the network reaches an optimal equilibrium state, and the network acquires a new equilibrium state (taking into account the contribution of the assets of the new participating company). Also, this decaying trend may be caused by conflicting behavior of participants or a low degree of market loyalty, which does not welcome the emergence of a new organizational form. The study of these aspects of networking is the basis for further research.

Conclusion

The testing of the presented system-dynamic model confirms the possibility of using it as an analytical tool in substantiating managerial decisions in the system of digging interaction. Interaction: coalition, cooperative, intercompany, market or project needs to be developed in such a way that the economic efficiency of neither the company that accepts the resources and assets nor the one that provides them is reduced.

The system dynamics method and feedback loops obtained during the simulation allow us to optimize the network architecture, as well as the necessary balance of resources of all participants in network interaction. The growth of basic and controlled parameters is the main condition for maintaining sustainable interaction effects, forming the basis for the formation of the target architecture of the enterprise network.

Thank you for attention