# THE MATHEMATICAL MODELING OF THE DYNAMICS OF HUMAN CAPITAL WITH DEMOGRAPHIC DYNAMICS ON THE EXAMPLE OF VOLGA FEDERAL DISTRICT

**Saburova E. A., Ketova K. V., Rusyak I. G.**

Kalashnikov ISTU, Russia, 426069, the Udmurt Republic, Izhevsk, Studencheskaya str., 7, 89512069504, saburovaea@inbox.ru

B he relevance of the study of human capital on the basis of economic-mathematical modeling is primarily due to its significant influence on the development of the economic system, ensuring the competitiveness and accelerate the economy's transition to innovative way of development. It should also be noted that another important factor is a population-based, and is the carrier of human capital and resource, providing output.

Human capital consists of demographic and qualitative components. The demographic component of human capital takes into account the numerical reproduction of the population; the quality of human capital consists of investments in health, education, science and culture.

Mathematical modeling of the distribution of the demographic elements of age is based on the equations of dynamics of age structure, based on finite-difference method of shifting ages, the theory of differential equations and the hypothesis of continuity. In the description of qualitative component of human capital assumes that it consists of three components: capital, education, health and culture. To describe the evolution of the human capital components is used, the equation of the transport equation [1]. A feature of the model is that it takes into account the quantitative (demographic) and qualitative components of human capital.

For the implementation of the considered models was developed a software package that includes a database of demographic and economic indicators and numerical solution of models of population dynamics and magnitude of human capital.

This paper presents the results of the numerical magnitude of human capital for the subjects of the Volga Federal district according to the statistical data for the period 1996-2015years.

**References**

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