CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES
http://doi.org/10.5281/zenodo.2597482

Available online at: http://www.iajps.com ***Research Article***

MATHEMATICAL MODELING AS A METHOD TO MANAGE THE LABOR POTENTIAL

Svetlana Bogdanova[1*], Vladimir Berezhnoy[2], Tatyana Minkina[3], Marina Barabanova[4] , Svetlana Molchanenko[1]

[1]Stavropol State Agrarian University, Stavropol, Russia, [2]Stavropol Institute of Cooperation (branch) of Belgorod University of Cooperation, Stavropol, Russia, [3]North-Caucasian Federal University, Stavropol, Russia, [4]Saint-Petersburg State University of Economics, St. Petersburg, Russia.

Article Received: December 2018 **Accepted:** February 2019 **Published:** March 2019

Abstract:

This article discusses the task of managing labor potential, which is to develop and use a management tool. The system of mathematical models is considered as such a tool describing the processes of functioning of the labor potential. In developing such models, a systematic approach was taken into account. The basic principles of this approach should be unity and coherence. The paper describes the methodology of mathematical modeling of labor potential. At the same time, the basic model should be taken as a basis, which is characterized by the possibility of obtaining qualification growth, direct intellectual development of labor resources directly in the process of labor activity with its increasing complexity. Management of the state of the labor potential of the region is preceded by a comprehensive analysis of the state of factors affecting its change. The next step is the construction of economic and mathematical models, allowing to determine ways of managing labor potential.

Key words: *labor potential, region, management, modeling.*

Corresponding author:

Svetlana Bogdanova,

Stavropol State Agrarian University, Stavropol, Russia.

QR code

Please cite this article in press Svetlana Bogdanova et al., ***Mathematical Modeling As A Method To Manage The Labor Potential.,*** *Indo Am. J. P. Sci, 2019; 06(03).*

INTRODUCTION:

The current contradictions in the sphere of labor and employment of the labor force arise from the imperfection of the economic mechanism and the system of labor management in general, as a result of which a number of new problems appear in its formation and use. These contradictions and possible ways to solve them require a global restructuring of the management system, the formation and use of labor potential, their correlation in accordance with the goals and objectives of the socio-economic development of the enterprise, the region and the state as a whole.

There is a need for effective use of labor potential, one of the components of which is the development of a management mechanism. Management of labor potential in accordance with the objectives of socio-economic development should systematically unite the subject and the object of management, reflecting the integrity of their movement.

Changes in the economy are impossible without the effective realization of the labor potential of the country and its regions. The human resources that form the basis of the country's economic development are manifested in the labor potential of the population. In developing regional employment policies, it is necessary to use the labor potential to improve quantitative and qualitative changes in the composition of the labor force [5]. Managing labor potential is a complex process.

It should be noted that the problems of labor potential management are not sufficiently covered in the modern economic literature, it becomes necessary to analyze the task of managing labor potential in order to develop a constructive approach to its solution.

In the theory of management, the management process is considered as a series of continuous and interrelated actions of the management cycle, taking into account the target orientation. Each economic process has its own key goal, from which other goals are formed in a logical sequence. To effectively manage a process, it is necessary not only to study the process itself and its goals, but also to build its management itself as a process [7].

Naturally, any economic process is not complete without a person and the results of his activities. It is important to study this activity: its course and patterns of flow. Therefore, in order to manage, you need to know at least the basic components of the controlled process, which will significantly reduce costs: the essence of a phenomenon or process, what it is aimed at, and who its main laws are.

You can also clarify the following: the conditions of occurrence and existence of the phenomenon, whether there are additional or related moments in these conditions; connection of the goal with the given phenomenon and with the given moments, whether the goal changes in the process or not; what negative and positive consequences are characterized by changes and what can strengthen or weaken them. Only after a detailed study of the process is it possible to talk about management.

The authors have studied in some detail the process of the essence and functioning of the labor potential. In particular, in the works [2, 3, 4] the issues of the development of the concept “labor potential” as a socio-economic category, assessment and quality of the labor potential of the region are covered in detail. Currently, there is a question of labor potential management. If the essence of the labor potential management process is clear, then its basic laws should be studied and identified.

It should be noted that labor potential is a changing category with ups and downs. To achieve the main goal in the economic process, it is necessary to implement the sub-goals taking into account the laws of change and development of labor potential.
In [7] there are special zones or transitional stages of development or changes in the labor potential:
1) the period of adaptation or workability of workers to new conditions from the moment they began their work;
2) the period of the labor process routineization, when workers have skills that ensures the implementation of a given activity at the level of performance;
3) the period of delay of professional growth in the accelerated formation of qualifying conservatism of workers;
4) the period of transformation of professional conservatism into the qualifying dogmatism of workers.

Thus, the process of development and changes in labor potential appears as a successive change of periods and stages; economic and psychological ups and downs, which are characterized by rises with different rates and dynamics of the process. From the point of view of production as an organizational-economic process, the activity of the labor potential is expressed in the quantitative and qualitative characteristics of products created over a certain time interval.

The basis of labor potential is labor. The main component of labor management is the management of the formation, distribution and use of labor resources, as well as the labor potential in them. At present, it is necessary to consider the management of labor potential in terms of consistency. A systematic approach involves a scientifically based, systematic and directional impact on the functioning of labor resources to ensure effective work and the best reproduction of labor potential. It contains the target control installation, thereby ensuring the appropriate structure and dynamics of employment.

For the study and subsequent management of labor potential, it is necessary to develop and apply several models of labor change. At the same time, the basic model should be taken as a basis, which is characterized by the possibility of obtaining qualification growth, direct intellectual development of labor resources in the process of labor activity with its increasing complexity. The human intellect in such a process is the leading component that will allow to solve more complex tasks in the process of labor activity.

It will be possible to predict the process of a worker's transition from less complex to more complex labor based on an analysis of his quality characteristics. Here it is necessary to define a system of analytical indicators.
The authors [6] proposed a system of classification of indicators by components of the labor potential of the region to assess the performance of regional government bodies: indicators of the final effect; immediate result indicators; process indicators.

In the economic literature discusses a systematic approach to the management of labor potential. For management purposes, the labor potential in [7] considers and describes in detail as a system consisting of six subsystems: demographic, social, economic, psychological, spatial and institutional.

The overall task of managing labor potential is to develop and use a management tool. Such a tool can be a system of mathematical models describing the processes of functioning of the labor potential. In developing such models, the complexity of the systems under consideration should be taken into account and system approaches should be used. The main principles of this approach should be: the principle of unity, i.e. joint consideration of the system as a whole, on the one hand, and as an interconnected set of system elements, on the other; the principle of connectedness, which consists in the consideration of its relations with the environment; structural description of the system, the construction of its elements on a hierarchical principle.
The model for describing the balance of labor potential is the inter-sectoral balance in the formation and distribution of labor resources. To understand the processes of changing the state of labor potential and determine ways to influence the nature of the dynamics of these processes, characteristics should be selected that quantitatively determine the state of labor potential, and its constituent parts should be identified, the interaction of which determines the nature of these processes [1].

The complex nature of the problem of modeling dependencies of the socio-economic situation of a region to support decision-making in managing key parameters, in particular, labor potential, requires uniform modeling methods applicable for the study of indicators and factors of regional studies.

The authors have developed an economic-mathematical model for the optimal distribution of the labor potential of the region across sectors of the economy, which has been tested on statistical data for the Stavropol Territory [11]. The model makes it possible, using statistical data on its labor resources and economic indicators, to optimally distribute the labor potential of the region under consideration. The developed model takes into account the number of industries in the region, the state of its economy, the income that a worker of the i-th industry brings to the region if his sector of the economy is in the j-th state (i = 1, ..., n; j = 1,. .., m) .. The parameters of the model are the total amount of investments in one employee of the industry and the amount of profit it brings to the industry. They are calculated on the basis of statistical data provided by the state statistical bodies of the region. As a target function in the presented model, the utility function is used, which is defined on a set of human resources of various sectors of the economy. Having compiled a matrix of consequences, with a minimum income per employee of the Stavropol Territory, it is possible to plan the distribution of labor resources by branches of the regional economy.

To manage the labor potential of the region, we highlight the various socio-economic processes in the region, which include: the number of non-working people of working age who have found work; the amount of emigration; the amount of immigration of the population; the number of persons before and after working age; the number of persons who died at working age; the number of persons who have retired; the number of people of working age who went into the army or went to study at educational

institutions for full-time education.
Studies on the formation and use of the labor potential of the region are few and descriptive in nature. However, they should be expanded and use various methods: economic, social, mathematical, etc., which allow to evaluate the impact of labor potential on economic development and justify ways to manage it [8, 9].

In [10], the main socio-economic processes occurring in the region that affect changes in its labor potential are noted. A differential equation has been constructed that describes these changes and represents, together with the initial conditions given for its solution, a mathematical model of the dynamics of the labor potential. Within this model, the problem of optimal control of the number of unemployed people of working age who have not found a job has been studied. The proposed economic and mathematical model of the labor potential of the region was tested on the statistical data of the economy of the Stavropol Territory.

The solution of complex problems associated with the management of labor potential, refers to the development of a new theoretical and methodological approach to building a management system that is adequate to the properties of the labor potential system. To do this, it is necessary to create an appropriate economic and mathematical apparatus for modeling, control and optimization procedures, with the definition of criteria for the quality of transient processes and prospective control laws.

CONCLUSION:

Thus, to manage the state of the labor potential of the region, constant monitoring of the state of factors affecting its change is necessary. Comprehensive analysis involves the construction of economic and mathematical models, allowing to determine the quantitative measure of these factors and how to manage them.

REFERENCES:

1 Zaitseva IV. Balance models as the basis of economic and mathematical methods for the study of labor resources. Bulletin of Stavropol State University. 2012; 79(2): 38-43.
2 Zaitseva IV, Popova MV. Qualitative state of the labor potential of the Stavropol Territory. Bulletin of the APK of Stavropol. ” 2013; 2(10): 157-160.
3 Zaitseva IV, Semenchin EA, Gimbitsky VA. Mathematical model of the optimal distribution of the labor potential of the region by industry. Fundamental research. 2013; 8(2): 413-416.
4 Zaitseva IV. Assessment of the labor potential of the Stavropol Territory. Regional Economics: Theory and Practice. 2013; 43:26-31.
5 Korovkin AG. Employment and labor market dynamics: issues of macroeconomic analysis and forecasting. M. MAKS Press, 2001.
6 Tyazhov A, Kolodiy L, Berkovich M. The labor potential of the regional economy (industrial production): monograph. Kostroma, KSTU Publishing House, 2008.