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LABOR MARKET FORECASTING AND INVESTMENT POLICIES REGARDING DIRECTIONS OF EDUCATION AT HIGHER EDUCATION INSTITUTIONS

Abstract: There are considers the possibility of using the Delphi method in order to develop a strategic plan for the investment policy of the region and a list of relevant competencies of graduates in order to increase the competitiveness of the region in this article.

Keywords: investment policy, of relevant competencies, the Delphi method, labor market, employment, competency-based approach, multicriteria analysis.

ПРОГНОЗИРОВАНИЕ РЫНКА ТРУДА И ИНВЕСТИЦИОННАЯ ПОЛИТИКА В ОТНОШЕНИИ НАПРАВЛЕНИЯ ОБРАЗОВАНИЯ В ВУЗАХ

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Аннотация. В статье рассматривается возможность использования метода Delphi для разработки стратегического плана инвестиционной политики региона и перечень соответствующих компетенций выпускников с целью повышения конкурентоспособности региона.

Ключевые слова: инвестиционная политика, восстребованные компетенции, метод Delphi, рынок труда, трудоустройство, компетентностный подход, многокритериальный анализ.
The development of innovative activities of the regions is an urgent task of modern regional management, as a result of which the question of competency-based approach to the preparation of university graduates with the aim of their employment in the employers’ market becomes a matter of principle.

In the framework of this study, based on Foresight technologies, a methodology for the application of the Delphi method for accessing and forecasting the labor market and accordingly the competencies of graduates for the purpose of their employment was built.

As a result of the analysis of foreign countries, it was found that economies can differ in the degree of development of four types of structures in them: raw materials, industrial, post-industrial (innovative), resource.

Our task is to find out the priority areas of the economy in the region, as well as to assess the current and predicted demands of employers for the competencies of university graduates. Determining the priority areas of the economy for the purpose of employing university graduates is an urgent scientific and practical task both in our country and abroad.

Foresight studies, along with traditional ones, use creative methods developed empirically. Conventionally, they are divided into groups: providing forecast, analysis, creativity, communication [1].

The Delphi research method under consideration simultaneously supports the last three types of methods and consists of two-level (immediate, prospective) questionnaire. The step-by-step algorithm of the questionnaire closest in terms of time is presented in Figure-1.

![Figure-1. The first level algorithm.](image-url)
At the 1st step, a set of economic spheres is formed for their subsequent expert evaluation.

An analysis of the region of the Republic of Uzbekistan revealed that the region is tied to two sectors – automotive and textile manufacturing.

In Andijan region 236 new projects have been developed with an implementation period of up to 2022, which implies the creation of 41 thousand permanent jobs in the region and the development of foreign direct investment worth $1 billion 87 million. Presumably, their implementation will increase production 4 times in the building materials industry, 2.1 times in the electrical, leather and shoe and chemical industries, 3 times in the food industry [2].

So, experts can be invited to assess the prospects of these industries for the development of Andijan region on a one-point scale in the near future (until 2022) and in the future (until 2025). The number of experts is not regulated.

At the 2nd step, a survey is conducted. At the 3rd step statistical processing is carried out and the results of a first level survey are analyzed in clusters in order to establish “feedback” with experts.

Figure-2 schematically shows the results of processing the survey of the first level.

![Figure 2. First level survey analysis result.](image)

The experts’ opinion is presented in the form of a correlation of three sectors: raw materials, industrial and post-industrial. As a result, we have a 3-d model – coordinates with values at three points. The calculation of the coordinate
values’ performed as the average value of expert opinions by sectors and their percentage ratio.

Let the point $a_i (x_i, y_i, z_i)$ be the ratio of industries of different directions, corresponding to the assessment of expert $i$ where $x_i, y_i, z_i$ are, respectively, according to the sectors of raw materials, industrial and post-industrial orientation.

To divide the space from many points into groups according to the direction of the economy, we used the cluster analysis method, which is a set of methods that allow us to classify multidimensional observations, each of which is described by a set of initial variables.

Cluster analysis allows us to combine clusters – similar objects into scientifically based groups, to identify internal relationships between units of a control data set.

The similarity or difference between the clusters is determined by the metric distance between them. For example, in the industrial sector of economy, similarities and differences between clusters are established depending on the metric distance between them.

For two objects $y_i$ and $y_j$, a non-negative function $d(y_i, y_j)$ is called a distance function of metric if:

1. $d(y_i, y_j) \geq 0,$ for all $y_i$ and $y_j$ from the n-dimensional Euclidean space;
2. $d(y_i, y_j) = 0,$ if and only if $y_i = y_j$;
3. $d(y_i, y_j) = d(y_j, y_i)$;
4. $d(y_i, y_j) \leq d(y_i, y_k) + d(y_k, y_j),$ where $y_i, y_j$ and $y_k$ are any three vectors from an n-dimensional Euclidean space.

As a function of distance, the Euclidean distance is used, which is calculated by the formula:

$$d(y_i, y_j) = \left[ \sum_{k=1}^{p} (y_{ki} - y_{kj})^2 \right]^{1/2},$$

where $p$ is the number of compared expert values. If $n$ is the number of experts, then $\frac{n!}{2!(n-2)!}$.

Similarly, the distance between clusters’ determined by industrial and post-industrial economies. As a result of cluster analysis, the prevailing opinion of
experts on the prospective employment sectors of future graduates is revealed. The second level of the Foresight study is similar to the first with a difference in the timing of the forecast – a prospective forecast.

Thus, the application of one of the methods of Foresight technology – the Delphi method – in order to establish feedback with the local expert community, which allows us to develop a strategic plan that changes the structure of the regional economy and the list of required competencies of graduates in order to increase the competitiveness of the region.

**Conclusion**

As a result of the research a forecasting methodology was developed for the prevailing areas of education in higher education institutions using a cluster analysis of the result of a survey conducted among employers in the public and private sectors of the regional economy.

Summarizing, it should be noted that this methodology enables higher educations to prepare graduates for the predicted order of employers, to conduct joint research with them to study the labor market and the required competencies of graduates.

**References:**

