

*Alvan Suleymanova (Альван Сулейманова)*

Institute for Scientific Research on Economic Reforms

Ministry of Economy, head of department

*Elnur Alakbarov (Ельнур Алекберов)*

Institute for Scientific Research on Economic

Reforms Ministry of Economy, head of department

Baku, Azerbaijan

## **EVALUATION OF TECHNOLOGICAL INTENSITY OF THE MANUFACTURING INDUSTRY**

### **(ОЦЕНКА ТЕХНОЛОГИЧЕСКИХ ИНТЕНСИВНОСТЕЙ ПЕРЕРАБАТЫВАЮЩЕЙ ПРОМЫШЛЕННОСТИ)**

The expectation of proportionality in the proportion of productive and non-productive labor is typical for the modern economic development period. Also, the proportions of labor in industry and other sectors have become the criterion for evaluating existing socio-economic forms. These approaches, which are the determinants of the functioning of existing economic systems, naturally influence the financing of jobs in the industry and differentiate newly-created jobs from traditional businesses. American economist C. K. Helbreit wrote in 1967 in the book "New Industrial Society" that industrial civilization has created a suitable labor force. He noted, the main reasons for unemployment include lack of education, mechanization, industrial renovation and so on [1, 7]. The information society set up by A. Toffler radically changes labor relations, new types of labor and new specialties are created [2, 23]. The changing socio-economic environment has also caused to the technological intensity of the workplaces created in the industry.

Investigation of the topic is conditioned by the determination of the exact dimensions of the concept of "high and medium-high-tech industry". Operation and development of the high and medium-high-tech industry concept is linked to the name of American socialist Daniel Bell. Bell supported the idea of post-community society in the United States that workers are moving towards the field of knowledge-based and higher knowledge-intensive industries that require a high level of skill and low added value to the development of the economy. Bell's low and up-to-date concepts were subsequently interpreted as low and high-tech, and measured by the intensity of research and development costs (R & D) at total costs [3, 22]. Nelson and Wright pointed out two factors in US technological development – the relative superiority of production over large natural resources and the high-tech manufacturing industry. The devel-

opment of high technologies is linked to the investment in higher education and the effective use of industry research and development [4, 335]. One of the main distinguishing characteristics of the high-tech industry is that R&D costs are mostly comparable to capacity costs even though they significantly affect the firm's overall value [5, 138]. Baldwin and Cellatly, however, classify high-tech companies based on innovative technology production, new product and process innovation [6]. Hecker determines high-tech employment with jobs in relevant industries. Hecker classifies these industries based on the costs of developing enterprises.

Hatzikronoglu determines the division of high-tech industries based on research and development costs. The OECD's (Organization for Economic Co-operation and Development) Science, Technology and Industry Scoreboard (Science, Technology, and Industry Scoreboard) are based on the methodology it sets. Hecker has identified the industrial divisions in three groups (1 level, 2 levels, 3 levels), and Hatzikronoglu has identified four division rates (low, middle-low, middle-high and high) [7]. DeSilver notes that, high-tech workplaces are not jobs that are not necessarily computer-based, but jobs created by technology. It also deals with technologies that provide services (such as repairing and installing computers) [6].

To determine the most important micro environment factors that directly and indirectly affect the financing of innovation-type employment in the industry in order to assess the technological intensity of manufacturing industry. The current level of fixed capital and investment in fixed capital is a prerequisite for creating jobs in the industry. Because the use of fixed capital makes it necessary to engage in labor. At the same time, theoretically and practically it is known that the rising volume of national income stimulates net investments. As the increase in net investment drives more products, production or new workforce is involved or production technology is improved. Improving production technology makes technological innovation costs an attractive factor in financing. In addition, the impact of technological advancement increases productivity and provides production that is more productive without increasing the number of jobs. Considering the impact of these factors (the fixed assets, industrial product, labor productivity and fixed capital investments) on the number of employed in the industry, (EMPLOYMENT =  $X_0 + X_1 * \text{FIXED ASSETS} + X_2 * \text{INDUSTRIAL PRODUCTS} - X_3 * \text{LABOR PRODUCTIVITY} + X_4 * \text{FIXED CAPITAL INVESTMENTS}$  / Here, the  $X_0$  and  $X_1, X_2, X_3, X_4$  regression coefficients,  $N = 16$  years) the econometric assessment shows that:

- Increasing labor productivity in any area leads to a decline in employment and an increase in industrial output. Labor productivity in

the country's industry has the effect of reducing the number of jobs in the medium to high-tech industry.

- The growth of existing fixed assets has a positive impact on the high and medium to high-tech industry, while in the low and middle-low tech industry there is a negative impact on the number of jobs
- Investments in fixed capital have a more positive impact on the number of jobs in low-tech industries (0.04 units) compared to others [8].

It is clear from the assessments made in the industry of Azerbaijan that, compare to 2005, up to a period of 2017, the level of employment in the high and medium- to high-tech industry continued to decline. During the period under review, employment in the high-tech manufacturing industry decreased by about 28 percent and in the medium to high-tech industry by 13.4 percent (Table 1). In addition, the share of the total employed population decreased from 0.8 percent in 2005 to 0.6 percent in 2017. This downward trend requires significant changes in the structure of the industrial sector for a country aiming for innovative economic development. Considering these dynamics, we can point out that the reason for the downward trend in innovation-type employment in the industry-oriented is that the innovation factor in industrial policy is out of attention.

*Table 1*

**Employment in the high and medium to high-tech manufacturing industry of Azerbaijan**

	High-tech industry employment, a thousand people	Medium to -high-tech industry employment, a thousand people	Employment, in the high and medium to -high-tech manufacturing industry by the total employed population, percent
<b>2005</b>	2,5	31,3	0.8
<b>2006</b>	2,3	30,8	0.8
<b>2007</b>	2,1	31,2	0.8
<b>2008</b>	2,1	29,6	0.8
<b>2009</b>	2,3	25,1	0.6
<b>2010</b>	2,3	23,5	0.6
<b>2011</b>	2,3	20,6	0.5
<b>2012</b>	1,8	21,3	0.5
<b>2013</b>	1,9	26,3	0.6
<b>2014</b>	1,8	25,5	0.6
<b>2015</b>	1,6	25,9	0.6
<b>2016</b>	1,7	23,6	0.5
<b>2017</b>	1,8	27,1	0,6

According to statistics provided by Eurostat, in 2015, the employment in the high and medium to high-tech manufacturing industry differs significantly in the Czech Republic (11.2%), Slovakia (10.6%), Germany (9.9%), Italy (6.1%), Austria (6.2%), Switzerland (5.6%), Romania (5.6%), Poland (5.3%), Ireland (5.2%), Denmark (5.1%), Finland (4.7), France (4.4%), Sweden (4.4%) and Spain (4.0%) [10]. In the United States, in 2014, 9.3 percent of the total employed population is active in high-tech industries [6, 22]. Apparently, countries with a high level of development in the high and medium-to-high-tech manufacturing industry are in the first place in the evaluation of the innovation index. For example, Switzerland, Sweden, USA, Finland, Denmark, etc. are in the top ten of the innovation index. According to the innovation index, Azerbaijan ranks 119th in the import of high-tech industries and 105th in exports [11]. It should be noted that, in these countries, economic policy, the development of new mechanisms in innovation financing, and concessions in the production and export process have provided a high and medium-to-high-technology industry sustainability and increased employment.

Forecasting the number of jobs by taking into account the technological intensity in the manufacturing industry for the 2019-2020 through the proposed econometric model shows that the number of jobs in the medium-low technology industry is expected to grow (33.1 thousand people in 2019 and 34.0 thousand in 2020) (in the Republic of Azerbaijan production of oil products, production of rubber and plastic products, production of construction materials, metallurgical industry, production of finished metal products, except machinery and equipment belong to the middle-low tech industry).

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