

**CIEDR 2018**  
**The International Scientific and Practical Conference**  
**"Contemporary Issues of Economic Development of Russia:**  
**Challenges and Opportunities"**

**LABOR PRODUCTIVITY IN RUSSIAN'S REGIONS: PROBLEMS**  
**AND GROWTH PERSPECTIVES**

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*Abstract*

This article is devoted to the studying of the problem of labor productivity and opportunities of labor productivity growth in regions of Russia. Methodological issues of measuring labor productivity in regions of Russia are considered. Key problems in statistical measurement of productivity in order to carry out comparative regional researchers are defined. The comparative characteristic of regions on labor productivity level and its dynamics is carried out. The author has implemented classification of regions based on the studying of dynamics of labor productivity for the last six years. It was revealed that there is a decrease in regional differentiation to the labor productivity index. The author identifies the key factors affecting labor productivity in regions. The high role of the mining industry in increasing of labor productivity level is proved. It is determined that parameters characterizing the innovative development of regions do not make a significant contribution in improving of labor productivity. An analysis of connection between the growth rates of labor productivity and the growth rates of actual income level of population has shown that the quality of remuneration system, applied by enterprises, is increasing. The increase in labor productivity is possible with the renewal of fixed assets, Improvement of education level, strengthening of correlation degree between salaries and level of efficiency of enterprise structures.

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**Keywords:** Economic growth, interregional differentiation, labor productivity, manufacturing, regions, wages.



## 1. Introduction

Labor productivity is one of the key indicators influencing economic growth as in overall in the country and in regions that is proved by both Russian and foreign scientists (Polovkina & Savdur, 2016). The labor productivity index refers to indicators of achievement of the goals of sustainable development of the Russian Federation.

Labor productivity characterizes the measure of efficiency, effectiveness of human labor. It expresses the degree of fruitfulness of the expedient activity of people in the production of material and spiritual goods.

Despite the importance of researching labor productivity and identifying the reserves of its growth, the number of publications on this subject is small. Thus, for the period 2000-2009 the publications in the key words “labor productivity” and “region” are only 8, and with the keywords “labor productivity” – 929. In the period 2010-2018, 6850 and 94 are responsible, which clearly demonstrates the inadequacy of research of regional specifics.

Many researchers formulate a conclusion about low labor productivity in Russia in comparison with developed and many developing countries. The average annual growth rate of labor productivity in 2003-2008 was 6.5%, in 2010-2012 - 3.3%, in 2013-2016 this indicator was 0.1%. In 2015, productivity declined by 1.9%, in 2016 - by 0.3%. In 2015 and 2016 productivity growth was observed in agriculture, hunting and forestry, in construction and real estate operations. This determines the relevance of the problems under research.

## 2. Problem Statement

The productivity of labor and its dynamics is determined by numerous factors. Kapelyushnikov (2009) carried out statistical comparisons of trends in productivity growth and the level of salaries, having drawn a conclusion on reduction of labor costs during 2004-2007, along with productivity growth. A similar conclusion was done by the team of authors under the supervision of E.G. Yasina in 2009 who have analysed the labor productivity and long-term development factors (Bessonov, 2009). The authors proved that the main reason for the low level of labor productivity is inefficiency of market economy institutions, non-compliance with laws, low level of competition, low level of protection of the property rights. In 2016, the group of authors (Zarova et al., 2016) undertook studies on labor productivity, special attention was paid to the problems of assessing the impact of migration processes on transformation of the labor structure of society and influence of these processes on labor productivity. All researches pay attention to revealing of reserves of labor productivity growth.

Even less attention is paid to regional specifics of labor productivity within the existing research. Miroyubova (2016) examines the relationship between the productivity of social labor and national information resources and their spatial distribution in Russia. In 2014, Mikheeva (2016) continued her earlier research on regional aspects of labor productivity. She concluded that a high share of mining sector is the determining factor of high labor productivity in the region, which is related to the capital intensity of this sector. The level and dynamics of labor productivity are strongly differentiated by industry. Nevertheless the current economic situation in Russia proves need to take into account the

territorial and sectoral factors in productivity researches in order to formulate directions for their improvement. The difference in labor productivity level in regions of Russia to two and a half times, in various industries more than 6 times.

### **3. Research Questions**

How is productivity measured?

What methods can be used to evaluate labor productivity for regional comparisons?

What is the level of labor productivity in regions and its dynamics?

What factors influence regional differences in labor productivity?

What are the points of growth in labor productivity in regions of Russia?

### **4. Purpose of the Study**

In Russia inter-regional comparative studies gain special importance in connection with the territorial dispersion of the country, with a high differentiation of regions in different parameters. Labor productivity is an important factor of economic growth (Linz, 2000). The increase in labor productivity can lead the economy to a new level and contribute to the modernization of economic system. With this regard the goal of the research was an analysis of differences in labor productivity in regions of Russia, as well as in identification of the factors forming this differentiation.

### **5. Research Methods**

We use comparative analysis of statistical data, logical modelling to achieve the goal of research. The official statistical data of the Federal Service of State Statistics of Russia describing the level and dynamics of labor productivity on the main macroeconomic indicators of production and services in the sectoral and regional sections were used as an information base (Zarova et al., 2016).

Correlation analysis was used to identify the relationship between the parameters that characterize various aspects of development of regional economy of labor productivity level (Benndorf, Normann, & Kübler, 2015; Dykha, Tanasienko, & Kolisnyk, 2017; Ikeda, Souma, Aoyama, Fujiwara, & Iyetomi, 2010; Titon, 2001).

### **6. Findings**

#### **6.1. Measurement of labor productivity**

Analysis of labor productivity and carrying out comparative studies present severes methodological problems. Difficulties of assessment of labor productivity in statistics have been studied in detail by Uzyakova & Uzyakov (2011) and Mikheeva (2016).

Rosstat and economic science have so far developed approaches to measure labor productivity, including at the regional level. However, evaluation of specific data is accompanied by many unresolved issues. Rosstat defines the labor productivity index as the ratio of the GDP index to the index of total labor costs. According to the subjects of the Russian Federation, the labor productivity index is calculated

as the ratio of the GRP physical volume index in basic prices to the index of total labor costs. Existence of undistributed GDP creates difficulties in the formation of comparable data on dynamics of labor productivity.

Since 2010 labor productivity in Russia in comparable prices has increased by 11.38%, the average annual growth rate was 1.8%. The highest growth rates of productivity in general were observed in 2010-2012, followed by a serious slowdown in growth rates. If in 2010 productivity increased in seven enlarged groups of industries out of ten, in 2011 and 2012 it increased in all sectors, then by 2015 only three branches showed an increase in labor productivity (agriculture, construction, real estate operations).

During 2010-2016, the largest annual growth rates were shown by agriculture (3.2%), manufacturing (2.7%). Negative rates of growth were observed for the indicated period in wholesale trade and in the industry of "hotels and restaurants": 1.2% and 0.6% respectively.

## **6.2. Assessment of labor productivity in the regions and its dynamics**

Due to difficulties in assessing of labor productivity at the regional level, we used the following data to estimate labor productivity:

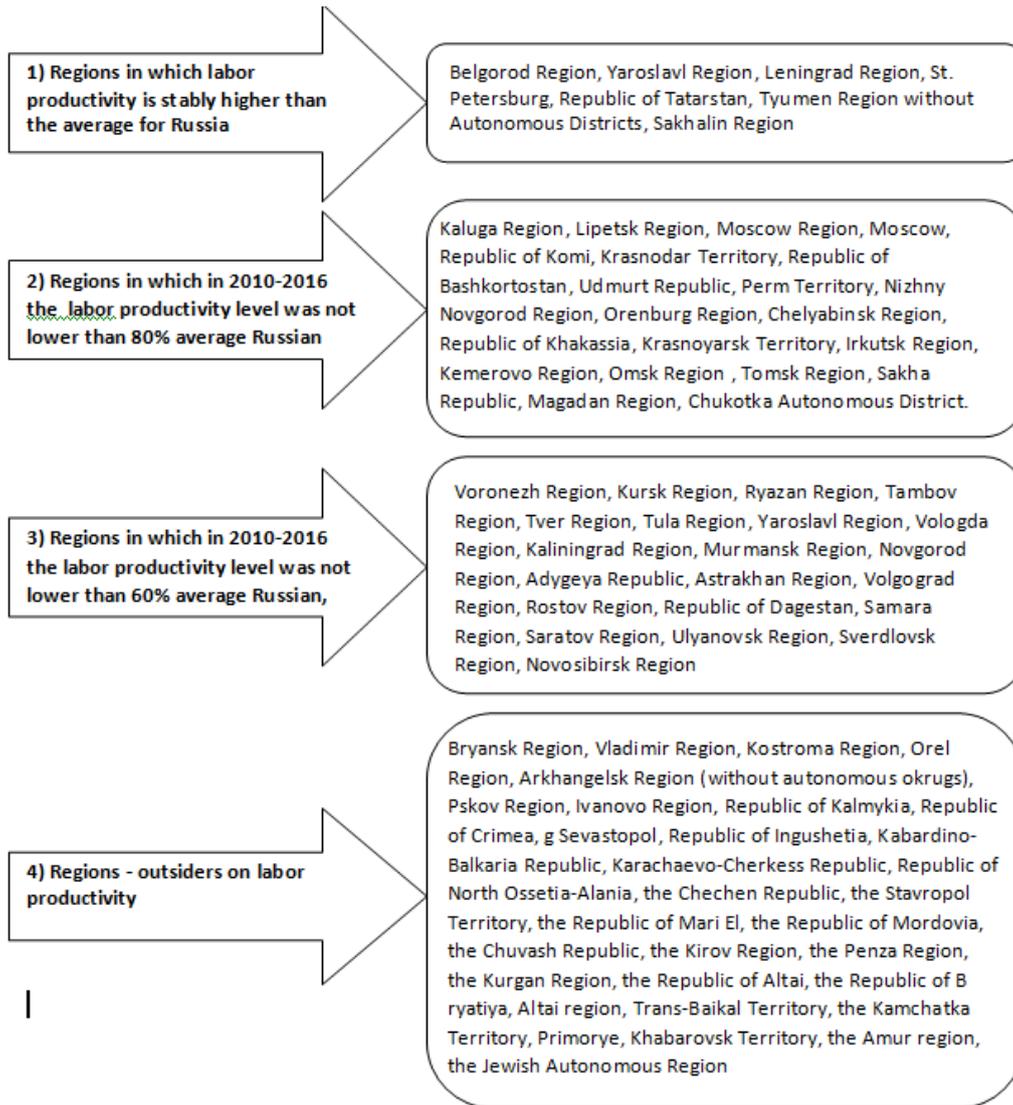
$$IIT_i = GRP_i / E_i / K, \text{ where}$$

GRP<sub>i</sub> - level of labor productivity in the region i

E<sub>i</sub> –the average annual number of employed in the economy in the region;

K – the ratio of the minimum subsistence in the region to the minimum subsistence level in Russia on average.

A comparative analysis of labor productivity level in regions has allowed to draw the following conclusions. Regions where only a high level of productivity (above the average Russian level) was stable during 2010-2016 was only seven: four of them are attributed to central Russia, two to Siberia and one to the Far East (Figure 01). Carrying out the research autonomous okrugs were excluded in which a high level of labor productivity is associated with the specifics of extractive industries, which are capital-intensive, on the one hand, on the other hand, due to the fact that workers often work as shift workers, which creates difficulties in evaluation of labor costs.



**Figure 01.** Distribution of regions in groups in relation to the average Russian level of labor productivity

Figure 01 shows the indicators that characterize the scale of differentiation of regions in terms of labor productivity. In most regions, there is a low level of labor productivity.

In 2015 and 2016, the ratio characterizing the relation of the maximum level of productivity to the minimum has the highest importance in connection with annexation of the Crimea and Sevastopol to the Russian Federation. In these regions the lowest productivity is performed. If we exclude regions from the assessment than the ratio of the maximum to the minimum level does not exceed 5.5, and the coefficient of variation is 25%.

**Table 01.** Indicators of differentiation of regions in terms of labor productivity

Indicators	2010	2011	2012	2013	2014	2015	2016
The number of regions with the labor productivity level is higher than the average Russian	13	12	11	9	9	15	13
The number of regions in which the productivity level is from 80	9	11	18	19	20	18	22

to 100% average Russian							
The number of regions in which the productivity level ranges from 60 to 80% average Russian	27	33	26	31	26	22	28
Number of regions in which the productivity level is lower than 60% average Russian	30	24	25	21	25	27	19
The ratio of the maximum to the lowest	4.5	5.0	5.0	4.6	6.0	8.9	5.6
The coefficient of variation, %	27.7	27.9	28.2	26.5	27.4	27.6	25.6

Since 2010 the uneven dynamics of labor productivity has been observed. The number of regions where the productivity index is above the Russian average in 2010 was 48, in 2016 - 57. In 2012 such regions there were only 38.

The crisis factor in the economy seriously affected the change of labor productivity. At the same time we observe the slowed-down effect of this factor: approximately three to four years after the crisis (in the period of crisis we refer to 2008 and 2014), the economy is experiencing a serious slowdown in labor productivity.

In 2010, the Chukotka Autonomous Okrug, the Chechen Republic, the Republic of Kalmykia, the Tambov Region, the performance growth rates are significantly lower than the average Russian level (the productivity index is below 0.97). In 2012, such regions included Ivanovo region, Kemerovo region, Primorsky Krai. In 2013, the Amur Region, the Jewish Autonomous Region. In 2014 - Ivanovo region, Tyumen region (without autonomous districts).

**Table 02.** Regional differentiation of regions by the labor productivity index

Indicators	2010	2011	2012	2013	2014	2015	2016
Number of regions in which the labor productivity index is above the national average	48	59	38	46	64	75	57
Number of regions in which the labor productivity index is below the national average by less than 3%	22	18	32	24	13	6	19
The number of regions in which the labor productivity index ranges from 94% to 96.9% average Russian	5	3	7	8	1	1	6
The number of regions in which the labor productivity index is lower than the average Russian by more than 6%	4	0	3	2	2	0	0
The ratio of the maximum to the lowest	1.4	1.1	1.2	1.3	1.4	1.1	1.1
Number of regions in which the labor productivity index is above the national average	48	59	38	46	64	75	57

Comparative analysis of average annual growth rates by regions has shown that the relatively high growth rates (more than 6%) in Belgorod region (6.1%), Bryansk region (6.6%), Tambov region (6.2%). The decline in labor productivity within the previous six years has occurred in the Republic of Buryatia, Ivanovo region. In the Republic of Kalmykia, the Kemerovo Region, the Primorsky Territory, the Jewish Autonomous Region, productivity has not changed much.

Analysis of Table 03 shows that there is a decrease in the differentiation of regions to the labor productivity index. In 2010, the ratio of the maximum and minimum values of index was 1.4. In 2016 this indicator decreased to 1.1.

### 6.3. Assessment of factors affecting the level of labor productivity in the regions of Russia

The factor analysis was carried out on the basis of the methods of correlation-regression analysis. It can be assumed that the structure of factors of regional differentiation of labor productivity includes the sectoral structure of the region, the level of the innovation potential development, the labor remuneration level in the region, condition of material and technical resources of industries, and availability of the required labor force qualification. Indicators used to assess the relevant groups of factors are presented in Table 03.

**Table 03.** Scorecard for assessing the relationship between productivity and groups of influencing factors

Factors	The indicators used to assess the impact
Branch structure of region's economy	Share of manufacturing industries; share of extractive industry; share of paid services in GRP
Level of development of innovative potential	The share of high-tech and knowledge-intensive industries in GRP; the proportion of organizations that carried out technological, organizational, marketing innovations in the reporting year, in the total number of organizations surveyed; share of domestic expenditure on research and development in GRP
Condition of material and technical base	Share of investments in fixed assets, depreciation of fixed assets
Availability of required skills	Number of high-productivity jobs per employee

The system of indicators has been chosen taking into account need to use relative indicators, availability of indicators used, coverage of the most important parties influencing productivity of labor. Results of evaluation are presented in Table 04.

**Table 04.** Results of the correlation analysis of labor productivity and indicators reflecting various aspects of functioning of regional economy

Coefficient of correlation of labor productivity in the region and indicators	2010	2011	2012	2013	2014	2015	2016
Share of extractive industries in GRP	0.52	0.49	0.44	0.42	0.53	0.54	0.51
Share of processing industries in GRP	0.29	0.11	0.14	0.09	0.13	0.06	0.15

Share of paid services to the population	-0.50	-0.56	-0.54	-0.61	-0.62	-0.60	-0.62
Share of high-tech and knowledge-intensive industries in GRP	-0.32	-0.35	-0.33	-0.37	-0.35	-0.33	-0.26
Share of organizations that carried out technological, organizational, marketing innovations in the reporting year, in the total number of organizations surveyed	0.13	0.15	0.09	0.20	0.31	0.28	0.29
Share of domestic expenditure on research and development in GRP	0.19	0.16	0.16	0.22	0.15	0.11	0.16
Share of investments in fixed assets in GRP	-0.09	-0.13	-0.06	-0.04	-0.10	0.09	0.06
Degree of depreciation of fixed assets	-0.26	-0.30	-0.22	-0.12	-0.04	0.01	0.03
Number of high-productivity jobs per employee	x*	x	x	0.27	0.35	0.37	0.45

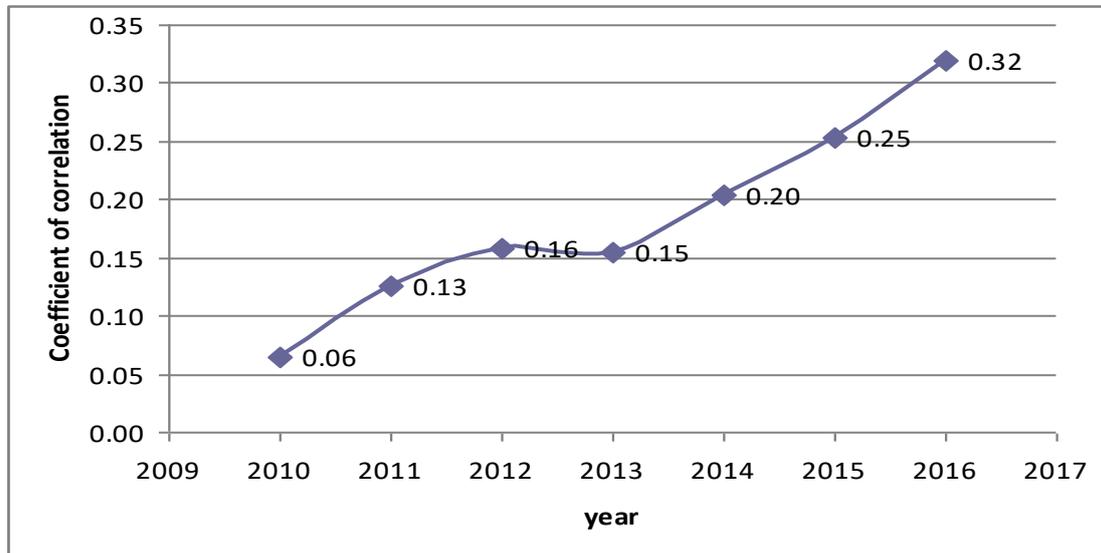
\*Note: no data

On the basis of the analysis, the following conclusions can be formulated. First. Following Mikheeva (2016) we can admit the high influence of the share of extractive (mining) industry in the growth of labor productivity. Second, high feedback is observed with the number of paid services in the region. In this case, it's wise to draw attention to importance of stimulating the introduction of innovative technologies in a service sector, on the one hand. On the other hand, this indicates a low level of the additional product in a service sector from the point of view of its potential. The third, extremely low contribution to labor productivity level of development of manufacturing industries. Fourth, the indicators characterizing the innovative development of the region are ambiguously connected with labor productivity level in the region. The share of high-tech and science-intensive industries has negative impact, indeed indicators of share of organizations that carried out technological, organizational and marketing innovations and share of internal costs for research and development in GRP - positive. Fifth, indicative is the lack of a link between the share of investment in fixed assets and labor productivity level. And the lack of a stable relationship with degree of depreciation of fixed assets. And, finally, the sixth, it is important that the number of high-performance jobs is closely related to labor productivity level in the region.

The next stage of analysis has become the studying of relationship between the labor productivity index and certain parameters characterizing various aspects of the socio-economic development of the region.

It is economically feasible to build remuneration system which is connected with productivity, while it is important that labor productivity grows at higher rates. Otherwise, there are negative consequences: unjustified costs for labor force, strengthening of inflationary component, personnel demotivation, devaluation of career development system and etc.

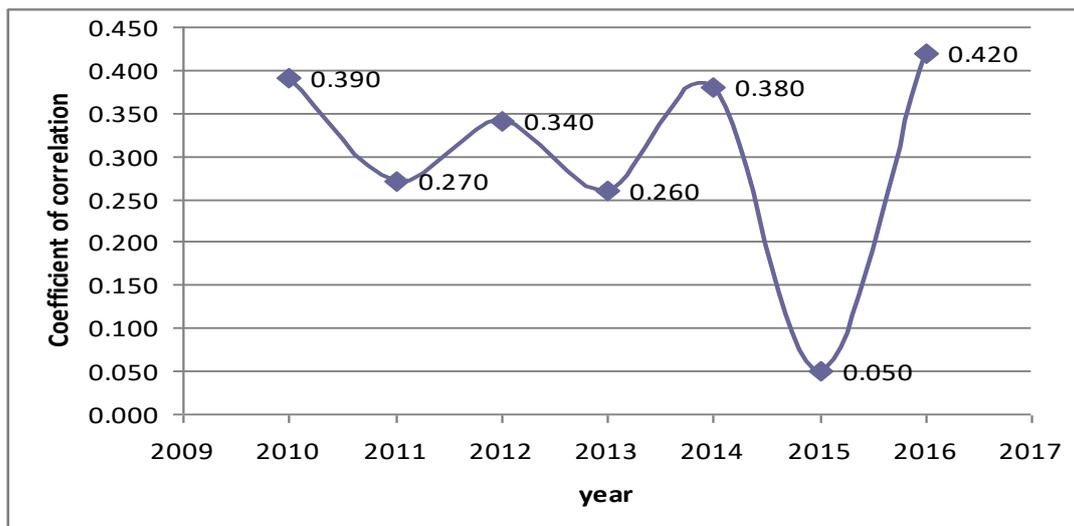
An analysis of relationship between growth rates of labor productivity and growth rates of real incomes showed that the quality of payroll system is increasing (Figure 02).



**Figure 02.** Coefficient of correlation of the labor productivity index and the real wage index

The quality of personnel management system both on small and large companies increases. Since the beginning of the second decade of 21st century, state-owned companies have begun to actively switch to so-called effective contracts. Commercial companies build a KPI system, i.e. a system of balanced performance indicators, which seriously improves the quality of management system both at micro and macro levels (Burenina & Varakina, 2014; Konovalova, 2011; Kotik, 2015).

The index of industrial production and labor productivity index as a whole have close interrelation, however, there is a strong recession in 2015 (Figure 03).



**Figure 03.** Relationship between the labor productivity index and industrial production index

Our estimates show that there is no link between the growth of high-productivity industries and labor productivity index.

## 7. Conclusion

At the present stage of Russia's development, there is a serious problem of economic modernization which has been in place since early 1990s and has not yet been properly resolved. Increase in labor productivity is possible with the renewal of fixed assets, increase in level of education, strengthening of degree of correlation between compensation and performance level. The negative factor is high influence of extractive (mining) industry in productivity increase. Short-term focus on increasing profitability and efficiency at the expense of extractive industries does not provide an opportunity to implement long-term projects related to innovations development. If such are realized, they are not systemic, point-like.

Thus (literally) increase in labor productivity in regions of Russia is impossible without structural changes and diversification of economy, increase in a share of services in GRP, reforming and modernization of infrastructure industries, corporate management based on comprehensive standards to its control, involvement of competition, improving the effectiveness of antimonopoly regulation, modernization, introduction of labor-saving technologies, modern forms of rendering services.

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