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Książka

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Rozdziały **Non-material factors of employee motivation – sex aspects (s. 2704-2716)**
Towards smart and sustainable manufacturing – an overview (s. 2908-2919)
Logistics maturity in service enterprises – research results (s. 3619-3634)
Incentivizing accessibility evaluation and its role in understanding process of overcoming barriers (s. 3827-3834)
Development of framework for safety culture improvement by an ISM approach – pilot survey (s. 5412-5424)
Assessment of the machining centre effectiveness on the basis of measures used by an enterprise (s. 7228-7237)

Chat-bots in Marketing: Review of Russian and International Companies Activities	5580
<i>Olesya V. IVANCHENKO, Armen S. SAGOYAN and Elena V. BARAULYA</i>	
External and Internal Gamification in the Marketing Practice of Companies Using Digital Communication Channels	5590
<i>Olesya V. IVANCHENKO, Olga N. MIRGORODSKAYA and Narine A. DADAYAN</i>	
Improving Educational Management in Russia Based on Information and Communication Technologies	5598
<i>Lyudmila I. MIRONOVA and Olga V. RUZAKOVA</i>	
Currency Exchange and Compensation Transactions on A Non-Currency Basis	5607
<i>Mavlit AKHTYAMOV, Natalia ZAVYALOVA, Valery LIKHOLETOV, Olga NIKOLAEVSKAYA and Upasak BOSE</i>	
Methodological Approaches to System Analysis of Socio-Economic Systems	5615
<i>Yuri DOROSHENKO, Sergey KALENTEEV, Irina SMIRNOVA and Denis STUKALOV</i>	
Supreme Audit Institutions and Importance of Their Trustworthiness	5623
<i>Zbyslaw DOBROWOLSKI and Lukasz SULKOWSKI</i>	
The Impact of New Technologies on Labor Productivity and Wages in Kazakhstan	5638
<i>Seisembay JUMAMBAYEV, Aidana DOSMBEK and Guliya ILYASHOVA</i>	
Human Capital as The Basis for The Formation and Development of Post-Industrial Society	5644
<i>Olga RUDAKOVA, Elena KOLESNICHENKO, Lyudmila KUZNETSOVA, Natalia PYANOVA and Nadezhda STEBLETSOVA</i>	
Efficiency of The Higher Education System, Scientific and Pedagogical Workers: Russia In Comparison with Global Trends	5653
<i>Nelly ORLOVA, Olga RUDAKOVA, Olga SMIRNOVA and Svetlana GLAZUNOVA</i>	
The Role of Non-Financial Sector Deposits in The Activity of Commercial Banks on The Example of The Polish Banking Sector	5663
<i>Sylwia STACHERA-WLODARCZYK</i>	
Continuous Improvement Model Based on Lean Tools to Reduce Cost Overruns in Power Transformer Assembly Projects	5673
<i>Maria GUTIERREZ-CASTRO, Martin COLLAO-DIAZ and Wilder NAMAY</i>	
Improvement Proposal to Increase an Electric Conductor Company's Profitability Through the Implementation of 5S and TPM	5684
<i>Maria OLAECHEA-CHAVEZ, Ana OROZCO-BALLIVIAN, Martin COLLAO-DIAZ and Wilder NAMAY</i>	
Motion Capture Systems as A Tool for Inclusive Design Strategies at Work with People with Disabilities ...	5692
<i>Jan STASIENKO and Piotr PARA</i>	
The Impact of Consumer Engagement with Social Media and Social Media Advertising on Advertising Evaluation and Purchase Intention	5708
<i>Himmatul ULYA and Yeshika ALVERSIA</i>	
Analysis of Markets and Development Trends of Green Energy Efficiency Technologies in The Context of Sustainable Development	5717
<i>Ekaterina VASIUTINA, Mariya KASHTANOVA and Sergey EROKHIN</i>	

The Impact of New Technologies on Labor Productivity and Wages in Kazakhstan

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Abstract

Wages and labor productivity are important indicators of the standard of living and economic development of the country. Based on data on the manufacturing industry and the economy of Kazakhstan, the article analyzes the dynamics of labor productivity and average wages under the influence of the introduction of new technologies. The results show that there is a gap in labor productivity and wages depending on the degree of diffusion of new technologies in various sectors of the economy. Analysis of statistical data on wages and other indicators was carried out for the period 2010—2018. A relatively stable level of wage inequality was discovered, which was largely due to the influence of new technologies.

Keywords: Product and Process Innovation, New Technologies, Wage, Labor Productivity, Kazakhstan

Introduction

In developed countries, there is a process of structural transformation of the economy under the influence, first of all, of the introduction of the latest technologies. Technological innovation has been identified as a key driver of long-term macroeconomic growth (P. Romer, 1986). Kazakhstan has focused on the transfer and development of new technologies and achieving sustainable economic growth based on them (Nazarbayev N. (2017)). But its practical implementation has revealed a number of complex problems. New technologies are created mainly in leading developed countries of the West. Transfer and development of new technologies, the subsequent creation of local technologies based on them turned out to be a long process. Until now, the innovative component of the Kazakhstani economy remains insignificant. According to the WEF Global Competitiveness Report 2019, Kazakhstan ranked 95th in the “Innovation capability” indicator (The Global Competitiveness Report, 2019).

Researchers typically classify innovation as process innovation and product innovation. Enterprises are introducing technological innovations to save costs, product innovations - to expand demand. A large amount of research is devoted to the above considerations, a small number of studies examine the impact of process innovations on wages and labor productivity.

In this regard, the study of the impact of technological innovation on labor productivity and wages in Kazakhstani practice is of particular interest. In our study, we used empirical data on the effect of technological innovation on the wages and labor productivity at the level of the economy as a whole

and of an individual industry for a comparative analysis. Studying the relationship between the variables in question makes it possible to identify many different factors that impede the development of an innovative economy in Kazakhstan.

Methodology and Analysis

It is well known, that in recent years in the developed countries of the world there has been a high rate of introduction of the latest technologies. In the extensive literature on this topic, the main attention is focused on employment and unemployment, the creation and destruction of jobs. And the important issues of the impact of new technologies on wages and labor productivity are not sufficiently explored. The work of a number of researchers, including D. Acemoglu, and D. Autor (2011), G. Cortes, N. Jaimovich and H. Siu (2017), G. Lordan and D. Neumark (2018), OECD (2017), B. Dachs (2017), Ya. Kuzminov, L. Ovcharova, L. Jacobson (2015) and others. New technologies mean new more productive jobs, that require high professional skills and knowledge from workers. It can be said that in the final analysis, economic growth depends to a decisive degree on the number of created new jobs. The use of new technologies is associated with an increase in labor productivity and with a higher level of wages. New technologies affect labor remuneration in the industries where they are applied: professional diversification in the labor market is deepening, new activities are emerging, etc. It is also important to emphasize one feature of the Kazakhstan model of the labor market. It consists in the fact that the adaptation of the labor market to changes in the economic situation occurs mainly due to changes in wages, and not due to changes in employment. But high employment and low unemployment is achieved due to low labor productivity and low wages, insufficient investment in new technologies.

We are investigating the question of whether technological innovations play a significant role in increasing labor productivity and wages in Kazakhstan. Does our assumption that the difference in productivity and wages in sectors of the economy is generated by the different scales of the funds they spend on the development and development of new technologies is confirmed. For analysis, we used statistics from 2010-2018, which cover the manufacturing industry and the economy as a whole (Statistics Committee of the Republic of Kazakhstan). Labor productivity we measured the ratio of production to the number of employees.

We limited ourselves to comparing the paths of changes in the average nominal wage in the economy of Kazakhstan and in the most innovative industry - manufacturing. Figure 1 shows that 71.32% of the total cost of innovation in the economy is in manufacturing.

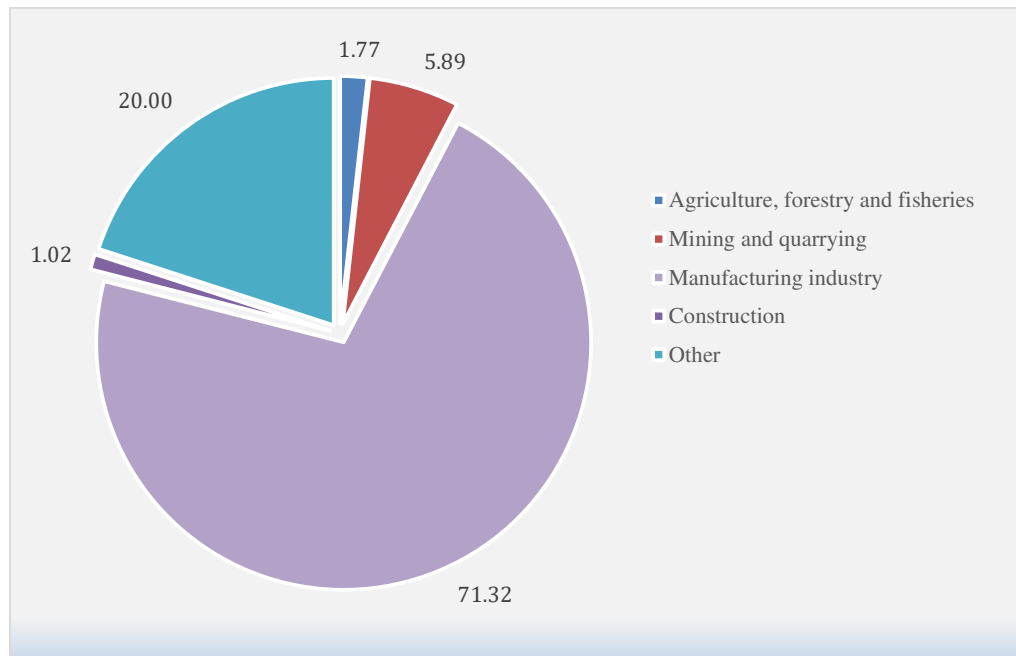


Figure 1: The share of costs for product and process innovations by type of economic activity, % (2018)

(Created by authors based on data of Committee on Statistics of the Ministry of National Economy of Kazakhstan Republic)

Figure 2 presents data characterizing the following data in dynamics: the sum of the costs of technological innovation in the economy and manufacturing industry in absolute figures (billion tenge) and, accordingly, their ratio as a percentage of GDP and the volume of manufacturing industry output. As we see, over the period under review, the average annual value of the growth of costs for technological innovations in the manufacturing industry exceeded 4.5 times that of the economy as a whole. Nationwide, manufacturing is the most active innovation industry.

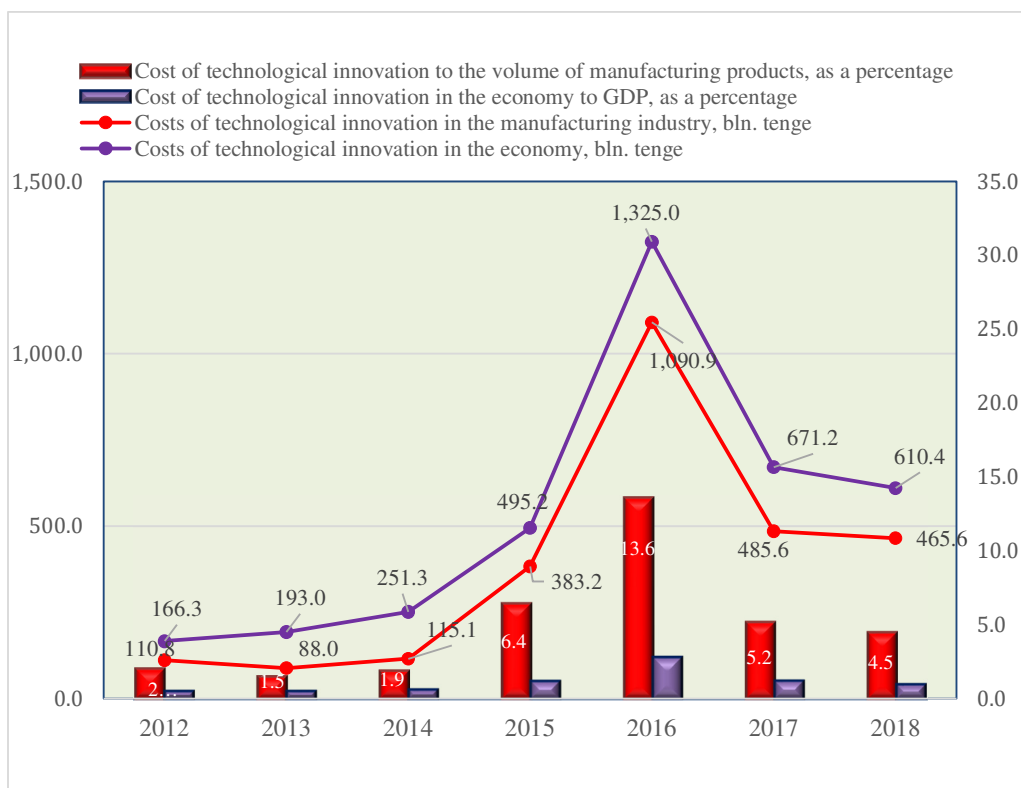


Figure 2: The costs of technological innovation in the economy and manufacturing of Kazakhstan

(Created by authors based on data of Committee on Statistics of the Ministry of National Economy of Kazakhstan Republic)

We examined the issue of the impact of new technology on wages in comparison with the dynamics of its productivity. Figure 3 presents a comparison of the dynamics of labor productivity and wages in the economy and manufacturing in 2010–2018. Over this period, labor productivity in the economy grew by about 1.29 times, in manufacturing - by 1.22 times. The average wage increased 2.10 and 2.36 times, respectively. A phenomenon paradoxical for a market economy is observed: firstly, in both cases, the growth rate of wages is much faster than the growth rate of labor productivity; secondly, in the manufacturing industry, the rate of labor productivity is lower than in the economy, but wages in it are growing faster. That is, the growth rate of wages in the economy lags behind the growth rate of wages of workers in an active innovation industry.

As can be seen in Figure 3, the trend of the long-term relationship between these indicators is almost unchanged. The reasons for this situation can be briefly summarized as follows:

- the increase in labor costs caused by the excess of the growth rate of wages over the growth rate of labor productivity is offset by a more significant increase in prices for manufactured products (see table 1). If the average annual price increase for industrial products of manufacturers in the European Union amounted to 1.2%, in Germany - 1.1%, then in Kazakhstan - 8.2%;
- in developed countries, wage growth is in a more stringent relationship with the growth of labor productivity. In turn, an increase in labor productivity in these countries is achieved on the basis of V and VI technological structures. In Kazakhstan, medium and low technological patterns prevail Dnishhev, F., F. Alzhanova (2014);

- the inertia of the behavior of the subjects of the labor market that has developed under the conditions of the previous labor legislation and the policy of the authorities that prevent dismissals;
- the low level of the competitive environment does not contribute to increasing the interest of the private sector in introducing new technologies, etc.

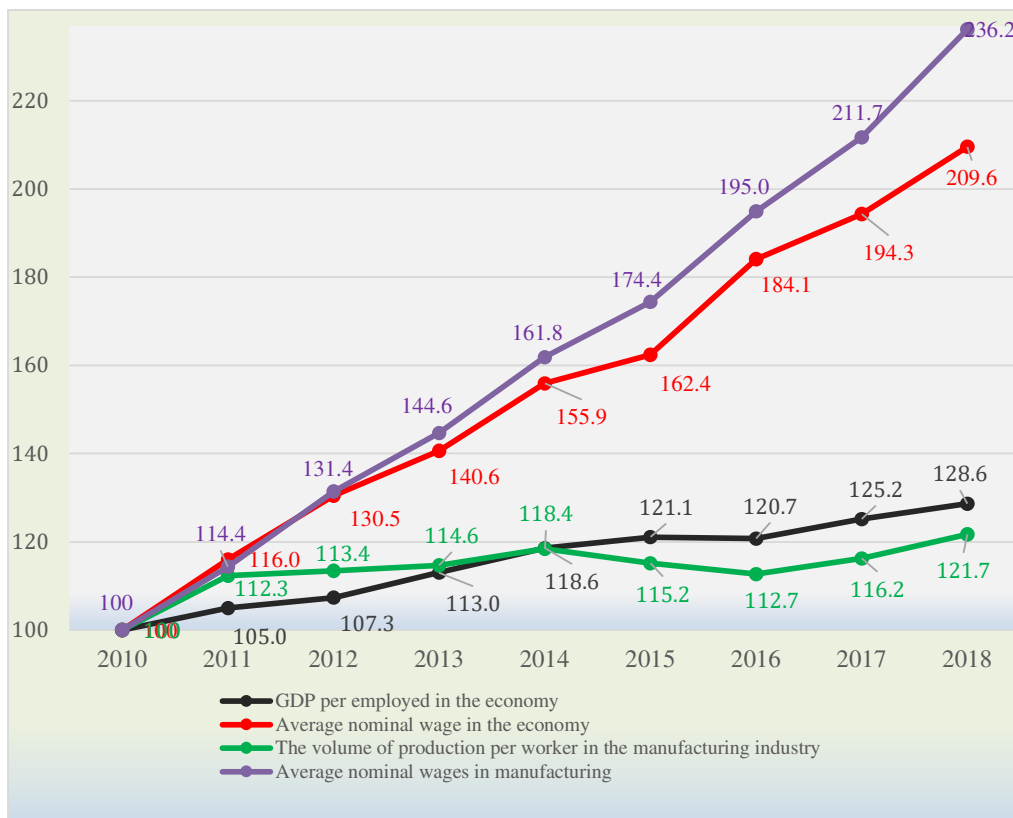


Figure 3: Dynamics of wages and productivity (2010 = 100%) (Created by authors based on data of Committee on Statistics of the Ministry of National Economy of Kazakhstan Republic)

Table 1: Annual increase in industrial producer prices, % (Created by authors based on data OECD and of Committee on Statistics of the Ministry of National Economy of Kazakhstan Republic)

	Annual increase in industrial producer prices, %									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	
European Union (28 countries)	3	4,7	2,3	0	-1,4	-1,6	-0,9	2,9	2,2	
Germany	2,6	3,5	1,5	-0,2	-0,2	0	-0,7	1,9	1,5	
Kazakhstan	12,9	20,3	2,1	-0,5	-1,6	-4,8	15,5	17,6	12,4	

Results

The results of this study as a whole confirms the thesis that wage growth in the innovation industry is ahead of wage growth in the economy as a whole. The impact of new technology on this growth through increased labor productivity was negligible. One of the main reasons is the lack of interest of private sector enterprises in the implementation of the latest technologies in the current conditions.

Summary

There is a non-linear relationship between technological innovation, wages and labor productivity, which depends on the level of implementation costs and the degree of novelty of most technologies. The Kazakhstan example also shows the need to normalize the relationship between the growth rate of labor productivity and wages. This will allow enterprises to pay more attention to accelerated technological modernization of their production. As a result, one can count on sustainable economic growth.

Acknowledgment

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References

- Acemoglu, D. and D. Autor (2011), "Skills, Tasks and Technologies: Implications for Employment and Earnings", *Handbook of Labor Economics*, Vol. 4, pp. 1043-1171, [http://dx.doi.org/10.1016/S0169-7218\(11\)02410-5](http://dx.doi.org/10.1016/S0169-7218(11)02410-5).
- Cortes, G., N. Jaimovich and H. Siu (2017), "Disappearing routine jobs: Who, how, and why?", *Journal of Monetary Economics*, Vol. 91, pp. 69-87, <http://dx.doi.org/10.1016/J.JMONECO.2017.09.006>.
- Dachs, Bernhard. The impact of new technologies on the labour market and the social economy
- Study for the European Parliament Research Service, Scientific Foresight Unit (STOA), July 2017, p. 61. - Online at <https://mpira.ub.uni-muenchen.de/90519/>
- MPRA Paper No. 90519, posted 23 Jan 2019 14:17 UTC
- Dnishhev, F., F. Alzhanova (2014), Tekhnologicheskie układy v ehkonomike Kazakhstana, Almaty, Institut ehkonomiki KN MON RK, pp. 24-25.
- Lordan, G. and D. Neumark (2018), "People versus machines: The impact of The impact of minimum wages on automatable jobs. <http://dx.doi.org/10.1016/J.LABECO.2018.03.006>.
- Nazarbayev N. (2017). 'Third Modernization of Kazakhstan: Global Competitiveness', *The President of Kazakhstan Nursultan Nazarbayev's Address to the Nation of Kazakhstan*. [Online], [Retrieved June 11, 2018], <http://www.akorda.kz>
- OECD (2017), "How technology and globalization are transforming the labour market", in *OECD Employment Outlook 2017*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/empl-outlook-2017-7-en>.
- Romer P.M. Increasing Returns and Long-Run Growth (Возрастающая отдача и экономический рост)// The Journal of Political Economy, October, 1986. — pp. 1002-1037.
- "Social policy: long-term trends and changes in recent years." Responsible editors: Ya.I. Kuzminov, L.N. Ovcharova, L.I. Jacobson. - M.: Publishing House of the Higher School of Economics, 2015. - 51 p.
- Statistics Committee of the Ministry of National Economy of the Republic of Kazakhstan: Official Statistical Information (by industry). Available on: <http://old.stat.gov.kz>
- The Global Competitiveness Report 2019. Klaus Schwab, World Economic Forum. - http://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf