Journal of Theoretical and Applied Information Technology
28th February 2025. Vol.103. No.4

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

THE IMPACT OF ARTIFICIAL INTELLIGENCE ON THE GLOBAL COMPETITIVENESS OF LABOUR MARKETS

YURII SIKORSKYI[1], RITA ZABLOTSKA[2], MARIIA ZUB[3], HANNA BRATUS[4], KAMALA DADASHOVA[5]

[1]Taras Shevchenko National University of Kyiv, Institute of International Relations, Ukraine

[2]Taras Shevchenko National University of Kyiv, Department of World Economy and International Economic Relations, Ukraine

[3]A Separate Structural Unit of the «Khmelnytskyi Trade and Economics College of the State Trade and Economics University», Ukraine

[4]Interregional Academy of Personnel Management, Ukraine

[5]Western Caspian University, School of Economics and Business, Tourism and Economic Sectors Azerbaijan

E-mail: [1]farber.1r1@gmail.com, [2]ritazablotska@knu.ua, [3]545mysteryshevchuk@gmail.com, [4]bratus.hanna@gmail.com, [5]kdadasheva10@gmail.com

ABSTRACT

The aim of the research is to analytically determine and assess the impact of artificial intelligence (AI) on the global competitiveness of labour markets across the world, the United States, the European Union (EU), and China. It also implies the assessment of the impact of the AI development on the global competitiveness of the labour market of the information technology (IT) industry. The research employed the methods of regression analysis, pairwise correlation analysis, and calculation of the dynamics of changes in the studied indicators. The correlation is 0.87 for the world and 0.88 for China, indicating a strong impact of AI on GDP in these regions. In contrast, the figure is 0.53 for the EU, indicating a weaker relationship. The results of the regression analysis give grounds to state that the tendency to increase unemployment against the background of the AI growth is observed only in the USA and the EU. Therefore, it can be argued that AI is having a noticeable impact on economic performance in the US, China, and the world in general among countries that have not been studied. At the same time, its influence in the EU is less pronounced despite the fact that GDP is the result of the activity of all labour markets. An important area of further research should be the study of the global competitiveness of labour markets in India, the Middle East and Africa, which may open up new opportunities for understanding the dynamics of employment and economic development in these regions.

Keywords: *Competitiveness, Correlation, Investment In AI, Regression, Unemployment Rate In The IT Industry.*

1. INTRODUCTION

1.1. Relevance

The global labour market is a complex system of socio-economic relations at the international level, which constantly undergoes dynamic transformations caused by changing factors of the modern environment. That is why it is necessary to carefully study and manage it, examine its competitiveness in order to effectively adapt to new challenges and trends. The priority direction of the development of the labour market is the formation of high-tech and knowledge-intensive production, which will contribute to the strengthening of global competitiveness and ensure further employment growth.

The AI development leads to significant changes in the structure of jobs, requiring a thorough study and effective management of the labour market in order to ensure sustainable economic development and social stability in view of the technological revolution. Rapid technological progress poses new challenges for governments, employers and workers, as it is necessary to adapt

education and retraining systems in time, develop appropriate regulatory mechanisms and social guarantees to mitigate the negative consequences of automation and robotization, and create a favourable environment for productive use of the advantages of digital transformation in the public interest.

In 2024, ignoring the issue of introducing AI into economic processes around the world reached a point that determined the global debate. On the one hand, such a rapid AI development affects the rapid growth of technological progress. On the other hand, AI affects the labour market and global competitiveness as new professions emerge and others rapidly disappear. Moreover, AI actively competes in the labour market as well. The development of generative artificial intelligence (GenAI) undoubtedly brings both significant opportunities and serious challenges for the global labour market.

The Goldman Sachs [1] notes that while these technologies have the potential to create new jobs and increase overall productivity, they also threaten the automation of around 300 million existing jobs. Similarly, British Telecom [2] plans to cut 55,000 jobs by 2030, with 10,000 of those jobs potentially being replaced by AI. These alarming trends require a comprehensive approach from employers, governments and society in general to mitigate the potential socio-economic consequences of rapid automation and ensure balanced development of the labour market in an era of transformation caused by revolutionary technological innovations.

1.2. Unexplored issues

The review of various literature gave grounds to conclude that the impact of AI on the global competitiveness of labour markets is poorly covered. The situation on the labour market is analysed for a separate state only, there is no comparison between the markets of different countries at the global level.

1.3. Aim

The aim of the research is to analytically determine and assess the impact of AI on the global competitiveness of labour markets throughout the world.

1.4. Objectives/questions

The aim was achieved through the fulfilment of the following research objectives:

1) analyse the dynamics of the development of the global labour market based on the unemployment rate, taking into account the dynamics of the AI investment volume;

2) study the dynamics of the labour market development of the IT industry at the global level;

3) identify a correlation between AI investment and GDP and between AI investment and the unemployment rate;

4) assess the quantitative impact of the AI development on the global competitiveness of labour markets.

2. LITERATURE REVIEW

Recent AI advances could significantly impact established perceptions of the risks of automation and job loss. The beginning of a new AI development wave can be traced back to around 2011, when the field of machine learning — a field of computational statistics that applies forecasting methods based on the analysis of unstructured data — has become significantly popular. This progress has made it possible to implement AI technologies in a wide range of industries and practical application scenarios. Along with the automation of individual routine operations, modern AI systems demonstrate growing capabilities in analytics, decision-making and solving complex tasks, which goes beyond traditional ideas about the consequences of technological progress for the employment of the population. Rethinking the impact of automation on the labour market in the context of rapid innovations in the field of AI is an important task for academics, politicians and society in general in order to develop adequate strategies and policies in this field [3], [4].

The discourse that has developed among leading economists and political figures regarding the previous stages of the development of automation technologies indicates a general consensus in terms of the labour market prospects. It is generally accepted that the demand for human labour will remain high, as new technologies and means of automation act as a complement to human labour rather than a substitute for it. The introduction of innovative technological solutions not only contributes to the creation of new jobs, but also increases overall productivity, which in turn leads to an increase in aggregate demand for employees. So, the consensus among leading experts is that automation and the introduction of the latest technologies do not pose a threat to the labour market, but, on the contrary, are a catalyst for its further development and diversification [5].

It is an indisputable fact that the development and implementation of AI

technologies, despite their numerous advantages and significant potential in various fields, can cause a disproportionate and negative impact on those socio-economic groups that have historically faced the greatest difficulties in the labour market. The authors [6] even note that it is the development and intensified use of IT that will contribute to the reduction of crime. At the same time, the reseachers in [7] explore the development of the e-commerce services market. This is the result of the development of the technological market and the expansion of the global labour market. It should be noted that there are currently widespread studies of the impact of digitalization and AI on various management tools [8] and different sectors of the economy [9].

Researchers and analysts are increasingly emphasizing the need for thorough comprehensive research aimed at identifying and eliminating gender and racial biases in AI systems. Real balanced progress can be achieved only if social, ethical and regulatory aspects are fully taken into account that will ensure equal opportunities for all members of society, regardless of their social position or origin. Addressing this issue urgently should be a priority for government institutions, AI developers and all stakeholders interested in building a more just and inclusive digital future [10].

Although trends predict significant changes in most industries due to the rapid progress of generative AI systems capable of performing complex cognitive tasks, recent studies on the gender impact of AI indicate that occupational segregation remains a serious and unresolved problem that causes reasonable concern. The introduction of advanced technologies can lead to the transformation of traditional professions, but it is important to consider the social consequences of this process, in particular, in terms of ensuring equal opportunities for workers of different genders. A comprehensive approach to change management, based on a deep understanding of gender aspects, is necessary to minimize the risks of discrimination and promote fair socio-economic development in the context of rapid technological progress [11].

The studies [5], [12], confirm that the implementation of AI systems in production processes leads to significant shifts in the labour market. In particular, there is a decrease in the relative need for low-skilled workers, while the demand for highly skilled labour is increasing. This phenomenon is particularly noticeable in technologically advanced countries such as the US and China. Their significant investment in the AI lead to increased share of educated workers and a corresponding increase in skilled employment. Obviously, this will have a significant impact on the structure of the labour market, making it necessary to review approaches to training and retraining of the workforce in the future.

The most acute situation is in the IT labour market, as such a tool as GTP chat eliminates the need to hire a staff of programmers. As a result, one employee who can correctly make requests to write code of any complexity is enough. Rapid technological progress is radically changing the social context of work biographies. These changes create new opportunities and challenges to which modern workers must urgently adapt [13]. In particular, the emergence and rapid spread of innovative AI systems, such as ChatGPT, significantly transforms the social landscape surrounding the professional activities of software engineers. ChatGPT is causing a profound digitalization that is radically redefining the work tasks and responsibilities of engineering and technical personnel. This necessitates comprehensive retraining and advanced qualification of specialists [14]. Moreover, ChatGPT can take on a number of tasks that have hitherto been the prerogative of software engineers, thereby potentially halting the career trajectories of some of them [15]. At the same time, these technological innovations are able to generate new types of activities or even completely new professions, thereby creating innovative employment profiles and employment opportunities for engineering and technical specialists [16]. All this leads to shifts in the global labour market and determines additional research on competitiveness in the global context.

3. METHODS AND MATERIALS

3.1. Research design

The research design involves three main stages, which ensure the consistency and validity of the obtained results. Each of these stages performs its specific function in the overall process of academic analysis. The first stage involves determining the main trends in the development of the level, the second stage provides for the direct evaluation of the obtained results (Figure 1).

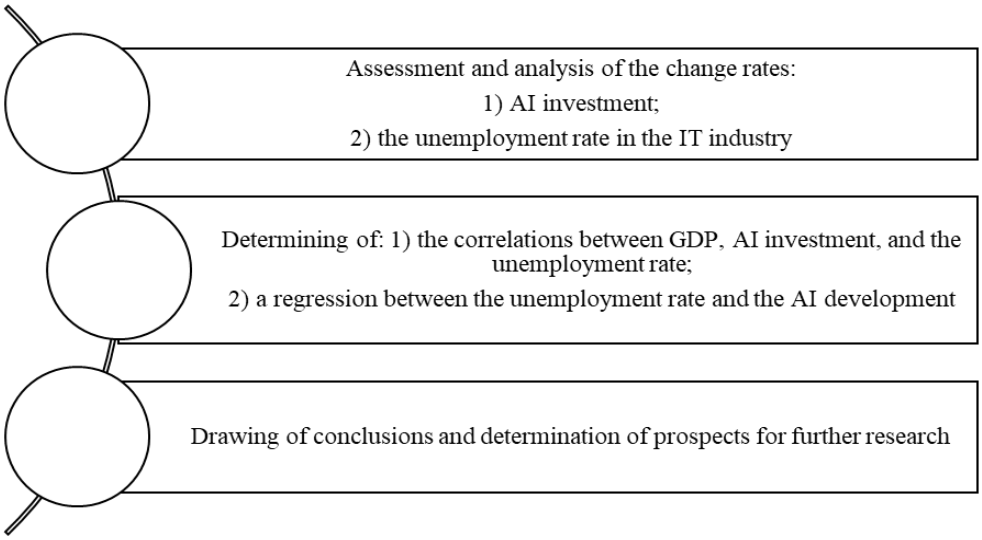

Figure 1: Research Stages

The final — third — stage involves interpretation of the collected data, drawing conclusions and providing recommendations based on the conducted analysis. Therefore, it allows to generalize the results and evaluate their influence on the existing scientific paradigm. Such a structured approach ensures high accuracy and reliability of results, which is critically important for the research.

3.2. Sampling

The objectives were fulfilled by using, statistics of the USA, the EU, China, as well as the world in general from 2013 to 2023 on the amount of AI investment [17] as an indicator of the AI development in general, while unemployment rate is an indicator of the state of labour markets in general [18].

In particular, the state of the labour market of the IT industry is analysed, as, in our opinion, this industry most vividly illustrates the general trends of competitiveness in the labour market. The international analytical company KPMG estimated the structural transformation of the labour market of the technology and information industry by 24%, which is the largest indicator among existing studies [19]. That is why the labour market of the IT industry was chosen for research. The change in the GDP of the specified countries in general [20], and GDP created by the IT industry are also analysed (Table 1).

Table 1: Output Data

AI Investment, milliard US dollars				
	World	**USA**	**EU**	**China**
2013	6.01	4.21	0.62	0.72
2014	10.94	7.97	1.37	0.76689
2015	15.26	10.63	2.39	0.90317
2016	19.34	11.46	5.1	1.31
2017	28.43	15.55	7.32	2.63
2018	46.51	22.72	15.08	2.96
2019	61.66	33.99	14.89	6.23
2020	67.03	37.87	17.13	5.64
2021	132.36	79.56	23.08	12.55
2022	95.74	50.99	12.88	11.86
2023	85.36	56.78	9.78	6.9
Unemployment rate				
	World	**USA**	**EU**	**China**
2013	6.16	7.4	10.80	4.60
2014	6.02	6.2	11.4	4.63
2015	6.06	5.3	10.7	4.65
2016	6.02	4.9	9.6	4.56

2017	5.93	4.4	8.7	4.47
2018	5.77	3.9	8.2	4.31
2019	5.59	3.7	7.4	4.56
2020	6.6	8.1	6.8	5
2021	6.06	5.3	6.2	4.55
2022	5.27	3.6	6	4.98
2023	5.12	3.6	6.4	5.1
Unemployment rate in the IT industry				
	World	**USA**	**EU**	**China**
2013	4.3	5.2	7.6	3.2
2014	5.0	5.1	9.4	3.8
2015	3.4	3.0	6.1	2.6
2016	5.4	4.4	8.6	4.1
2017	5.4	4.0	7.9	4.1
2018	6.1	4.1	8.6	4.5
2019	6.0	4.0	8.0	4.9
2020	1.5	1.8	1.5	1.1
2021	7.3	6.4	7.5	5.5
2022	7.2	4.9	8.2	6.8
2023	4.4	3.1	5.5	4.4
GDP trillion US dollars				
	World	**USA**	**EU**	**China**
2013	82.6	18.6	16.1	10.9
2014	84.9	19.4	16.6	12.0
2015	80.1	20.1	14.3	12.6
2016	81.4	20.7	14.7	12.8
2017	86.7	21.6	15.6	14.1
2018	92.2	22.7	16.9	15.9
2019	93.5	23.7	16.6	16.3
2020	91.0	23.5	16.2	16.8
2021	103.7	25.9	18.3	20.4
2022	107.6	28.3	17.7	20.4
2023	112.1	30.1	19.3	20.3

Therefore, in our opinion, the selected sample will best demonstrate the presence or absence of an impact of AI on the global competitiveness of labour markets. The reason is that it includes various segments of the economy, which allows us to identify both positive and negative aspects of the integration of technologies into modern work processes. The variety of data presented, covering regions with different levels of development, as well as industries at different stages of technological progress, creates an opportunity for a comprehensive analysis of the AI impact on employment.

3.3. Methods

The first stage of the study is to determine the rate of growth of AI investment and the rate of change in the unemployment rate. This research method was selected due to the fact that the technological sector is undergoing the greatest structural changes in the labour market. So, the general state of the labour market in the country is analysed, as well as a separate labour market, which is undergoing transformations to the greatest extent.

The second stage of the research is to determine a correlation between the dependent indicator Y and the independent indicator X based on the construction of two dependence models. The first model checks the correlation between the amount of GDP and the AI investment volume. The second model is designed to check the correlation between AI investment and the unemployment rate in general. The correlation is calculated by using the formula [21]:

$$r = \frac{n(\sum XY) - (\sum X)(\sum Y)}{\sqrt{(n\sum X^2 - (\sum X)^2)\,(n\sum Y^2 - (\sum Y)^2)}}, \quad (1)$$

where X – AI investment in the world and the largest countries for 2013 to 2023, milliard US dollars.

Y (for Model 1) – GDP in the world and the largest countries for 2013 to 2023, trillion US dollars USA;

Y (for Model 2) — unemployment rate in the world and the largest countries for 2013 to 2023.

The next stage of the research is the construction of regression models by using the formula [22]:

$$Y = \beta 0 + \beta 1X, \quad (2)$$

where Y –unemployment rate in the global labour market;

X — the AI investment volume, milliard US dollars.

When the value of X is zero, the value of Y is β0 (the intercept of the line) and β1 is the slope, which gives us information about the magnitude and direction of the relationship between X and Y, similar to the correlation coefficient. When β1 = 0, there is no correlation between X and Y. When β1 > 0 or β1 < 0, the correlation between X and Y is positive or negative, respectively. Important assumptions of linear regression are normality and linearity of the resultant variable, independence between the two variables, and equal variance of the outcome variable along the regression line.

4. RESULTS

On the basis of the proposed research procedure, charts of the dynamics of AI investment in 2013-2023 and a chart of the dynamics of the unemployment rate were built based on data from the international statistical data portal Statista.com [18]. The charts are aimed at visual verification of the hypothesis of the existence of similar trends between the growth of the unemployment rate and the AI development in the world. Analysis of these visualizations reveals potential correlations between the mentioned factors.

The first stage of the research involved identifying the correlation between AI and the state of development directly in labour markets. This means that the competition between AI and human labour is considered. The first preliminary stage illustrates the connection between labour markets and AI.

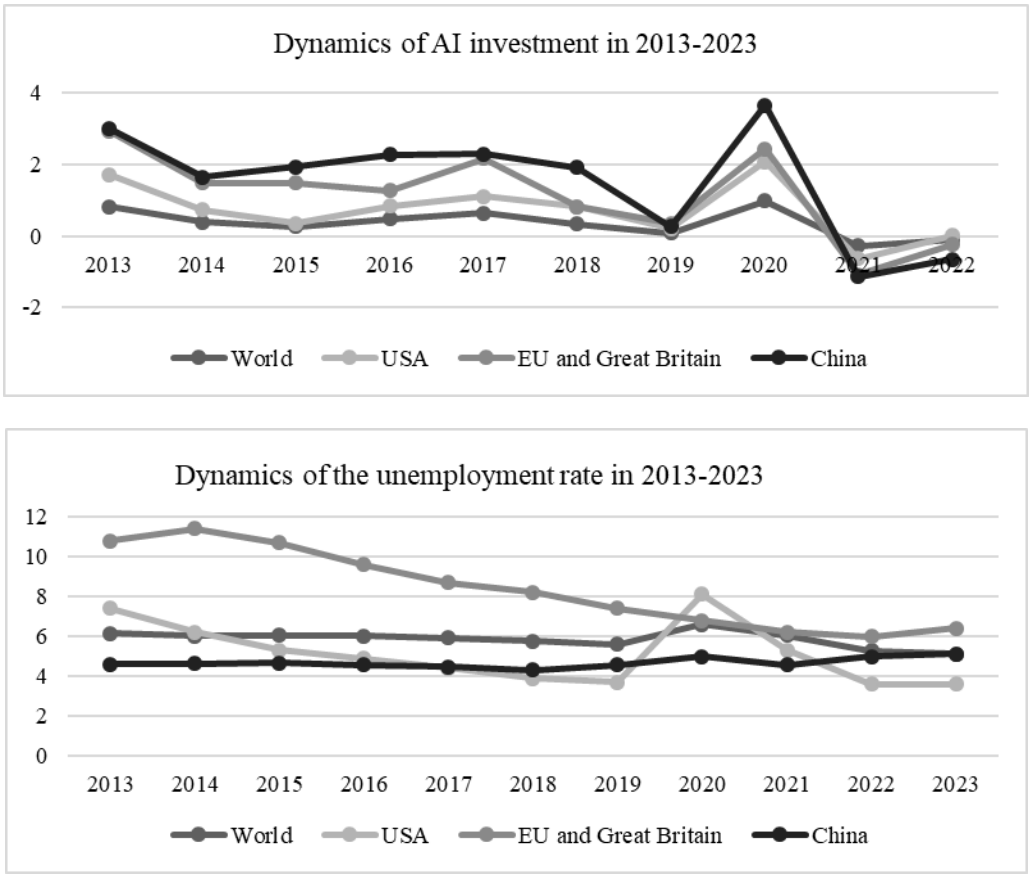

Figure 2: Dynamics Of The Unemployment Rate And Ai Investment In 2013-2023

The charts presented in Figure 2 show a correlation between the growth of AI investment and unemployment rates, especially in the USA. The significant increase in investment in this technology, which occurred in 2020, was paralleled by a noticeable increase in the unemployment rate. It is important to note that 2020 also coincided with the spread of the COVID-19 pandemic, which had a profound impact on society and the economy, making it necessary to find new forms of

interaction between people during social isolation. The consequence was the activation of innovations in the field of AI, as companies needed to adapt their business processes to new conditions. However, if we look at the overall picture, it is worth noting that in other periods, regardless of 2020, fluctuations in the unemployment rate did not acquire such a significant scale. In turn, AI investment show a steady upward trend from 2022, which raises questions about their impact on the labour market. In parallel, we observe that the unemployment rate tends to decrease at those moments when the AI investment volume begins to decrease, which indicates a possible indirect connection between the development of this technology and competitiveness in labour markets. These observations give grounds to draw an important conclusion that AI investment can significantly affect the employment structure, opening up new opportunities for the workforce in the era of digitization and automation.

The next stage of the research was the construction of three correlation models. They aim to identify and analyse relationships between the selected variables. This step is extremely important, because correlation models assess the strength of the dependencies that exist between the elements of the studied system. Data for calculating the first correlation model are given in Table 2.

Table 2: The Data For Calculating The First Correlation Model For The US

Year	X	Y	X × Y	X^2	Y^2
2013	4.21	18.6	78.17128	17.7241	344.8
2014	7.97	19.4	154.3869	63.5209	375.2
2015	10.63	20.1	213.9819	112.9969	405.2
2016	11.46	20.7	236.9928	131.3316	427.7
2017	15.55	21.6	335.4291	241.8025	465.3
2018	22.72	22.7	516.3347	516.1984	516.5
2019	33.99	23.7	804.6113	1155.32	560.4
2020	37.87	23.5	888.1272	1434.137	550.0
2021	79.56	25.9	2064.502	6329.794	673.4
2022	50.99	28.3	1443.731	2599.98	801.7
2023	56.78	30.1	1708.851	3223.968	905.8
Total	331.73	254.529	8,445.119	15,826.77	6,025.827

Given the calculation of the correlation coefficient of the first model, which is r1=0.86, it can be confidently stated that there is a direct close correlation between AI investment and GDP. This indicator show a very pronounced correlation between the specified variables. It may be determined by the fact that significant capital infusions into the AI development contribute to increased labour productivity, optimization of production processes, and general economic growth. Such growth can be explained not only by the direct impact of innovative technologies on certain sectors of the economy, but also by their ability to create new markets and business models, which, in turn, lead to an increase in economic activity and the overall level of well-being of the national economy. So, the results of the analysis indicate the importance of further AI investment as a strategically important sector that can become a catalyst for economic development in the modern global market environment. The correlation is determined for the EU, China and the whole world in general using the same model. This indicator for the whole world is 0.87, for China — 0.88. However, this indicator is 0.53 for the EU: the correlation is weaker. Based on this model, it can be concluded that AI affects GDP in the US, globally and China, but to a lesser extent in the EU. It should also be noted that GDP is the aggregate result of the activity of all labour markets in the world, and by country, in particular.

The second correlation model is designed to determine the correlation between AI investment and the unemployment rate in general (Table 3).

Table 3: The Data To Calculate The Second Correlation Model For The USA

Year	X	Y	X × Y	X^2	Y^2
2013	4.21	7.4	31.154	17.7241	54.76
2014	7.97	6.2	49.414	63.5209	38.44
2015	10.63	5.3	56.339	112.9969	28.09
2016	11.46	4.9	56.154	131.3316	24.01
2017	15.55	4.4	68.42	241.8025	19.36
2018	22.72	3.9	88.608	516.1984	15.21
2019	33.99	3.7	125.763	1155.32	13.69
2020	37.87	8.1	306.747	1434.137	65.61
2021	79.56	5.3	421.668	6329.794	28.09
2022	50.99	3.6	183.564	2599.98	12.96
2023	56.78	3.6	204.408	3223.968	12.96
Total	331.73	56.4	1592.239	15826.77	313.18

The second correlation model involves determining the correlation between AI investment and the unemployment rate. The result of the

evaluation of the second model is a correlation coefficient equal to -0.91. The correlation coefficient, which has a value of -0.91, indicates a strong negative correlation between the two studied variables. This means that with an increase in the value of one variable, there is a tendency for the value of the other variable to decrease, which may indicate an inverse relationship between them. In the context of statistical analysis, this number indicates that a change in one variable can significantly affect the behaviour of another, allowing researchers or analysts to make informed conclusions and predictions. Such a high level of correlation can have applied significance in various fields, such as economics, sociology, psychology, and the natural sciences, where it is important to understand the nature and strength of correlations between factors. The estimation of correlation results in the world was -0.53, for China - 0.41 and -0.86 for the EU. Therefore, the obtained results illustrate contradictory data. So, there is a very close inverse relationship between AI investment and the unemployment rate in the US and the EU. That is, the increase in AI investment in these states leads to a decrease in the competitiveness of their labour markets. The situation is different in China, as there is a relationship between unemployment and AI is there, but it is insignificant. So, we can say that AI is definitely developing very actively, but it has different effects on different labour markets in different countries. The next stage of the research was a regression calculation, where the unemployment rate on the global market is the dependent factor and the amount of AI investment is the independent factor. According to the results of the built model, the equations given in Table 4 were obtained.

Table 4: The Results Of The Estimation Of The Regression Model

Region	R^2	Regression equation
World	0.82	Y=253.07-34.29X
USA	0.84	Y=5.68+0.0186X
EU	0.75	Y=10.73+0.235X
China	0.64	Y=4.56-0.023X

Based on the calculations, we can conclude that the R^2 is greater than 0.5, which indicates that the built model is reliable. The results of the assessment reveal that China has an inverse relationship between the increase in unemployment and AI investment. Such a result may be due to the characteristics of the Chinese national economy. This dependence is direct in other studied regions. That means that with an increase in investment by 1 milliard US dollars, unemployment in the USA will increase by 0.0186 points, and in the EU — by 0.235 points. As for the whole world in general, due to the presence of countries in which the development of AI acts as a catalyst for the development of new professions and new competitive advantages in the global labour market.

The calculations based on the analysis of the impact of AI on the global competitiveness of labour markets give grounds to conclude that this impact is uneven depending on the region. In particular, AI has the most significant impact on the EU labour markets and the USA, where the active implementation of technologies that contribute to increasing labour productivity and creating new jobs in innovative sectors is noted. At the same time, when the global scale is considered, the impact of AI appears to be moderate and even insignificant for many countries that do not have sufficient funding or investment in this area, in particular a number of countries in Africa, where there is a lack of technological infrastructure and a shortage of skilled labour significantly limit the possibilities for the development and adaptation of the latest technologies. So, despite the obvious advantages that AI can bring in economic development, there is a risk of increasing inequality between countries that actively invest in these technologies and those that remain outside this progress.

5. DISCUSSION

The results of this study provide valuable information about the impact of AI on the global competitiveness of labour markets. They also determine the competitiveness between AI and human labour within labour markets. It is important to compare these findings with existing research in the field. The study by the authors [23] partially confirms our hypothesis regarding a significant impact of AI on the competition between AI and human labour. The impact of AI on the employment structure of the labour force is proven to reflect the uniqueness of China, as it determines the employment structure of the medium and high-skilled workforce. This is consistent with existing research by [24], [25] demonstrating that AI can replace routine and repetitive tasks. This phenomenon, in turn, causes structural changes in the labour market, because there is a growing demand for a highly qualified workforce that has the skills necessary to perform more complex and non-standard tasks. So, adaptation to these technological changes becomes a key factor for

professional training and development of personnel in modern society.

At the same time, there are studies that confirm our hypothesis regarding competition in the EU market (first correlation model r=0.53). The research [26], [27] shows the non-linear relationship between AI and the employment structure of the workforce. When AI exceeds a certain threshold of industrial structure optimization, its impact on the employment of high-skilled and low-skilled labour becomes more pronounced. This finding supports the view that AI technologies are likely to augment rather than completely replace highly skilled workers [28].

At the same time, we are forced to state that there is not enough research on the global competitiveness of labour markets. However, we can partially note that researchers [29] indicate that the expansion of digital capabilities can increase employment. However, expansion of digital opportunities cannot reduce total employment, contrary to some studies [30], [31]. The main reason for this difference may be that these authors used all listed companies in China as their research sample, while our paper focuses on manufacturing companies. So, our study helps to enrich and refine research on the impact of global competitiveness on labour markets.

In the process of digital transformation of enterprises, improving investment in R&D and human capital as indirect effects can significantly increase their overall competitiveness [32] and optimize the industry structure [33]. Therefore, companies should not worry about the costs of increasing human capital, as the benefits are clearly greater. The expansion of digital opportunities can improve human capital by increasing managerial efficiency and economies scale [34].

6. CONCLUSIONS

6.1. Relevance

The relevance of this research on AI today is caused by the rapid development of technologies and their impact on various aspects of society. In particular, special attention should be paid to the impact of AI on the global competitiveness of labour markets. The obtained results confirm a significant correlation between the AI development and changing trends in the global labour market. As a result, the relevance of this research is becoming more and more obvious, as society faces challenges that require complex solutions and effective strategies for adapting to new conditions.

The performed calculations give grounds for making a conclusion about the uneven impact of AI on the global competitiveness of labour markets. So, AI has the greatest impact on the US and the EU markets (correlation coefficient -0.86 and -0.91, respectively). Completely different conclusions can be drawn from the results of calculating the AI impact on the competitiveness of labour markets in China. The conducted regression analysis confirms the results of the correlation analysis, as the development of AI has a direct impact on the growth of the unemployment rate in the USA and the EU, while it is the opposite for China. So, we confirm that there is competition between human labour and AI in the labour markets. But this impact is within the markets and does not determine changes in global competitiveness. In the world, this impact is moderate and insignificant given the global scale, because there are countries without AI investment.

However, it should be noted that this study has a research limitation, namely, the data are used for the IT industry only and the world in general. It is promising to study not only the technological market of the IT industry, but also less technological ones, for example, the social sector or industry. It is also appropriate to study the global competitiveness of labour markets in India, the Middle East, and Africa in the future.

REFERENCES:

[1] Goldman Sachs, “Home page”, 2024. Available in: https://www.goldmansachs.com/ (06.12.2024).

[2] British Telecom, “Home page”, 2024. Available in: https://www.bt.com/ (06.12.2024).

[3] A. Agrawal, J. Gans, and A. Goldfarb. (2019). *“Introduction to “The economics of artificial intelligence: An agenda”,* The Economics of Artificial Intelligence: An Agenda. Chicago: University of Chicago Press, 2019. Available in: http://www.nber.org/books/agra-1 (05.12.2024).

[4] OECD, “Artificial intelligence in society”. Paris OECD Publishing, 2019. doi: 10.1787/f169ea9d-en.

[5] F. Giwa, and N. Ngepah, “Artificial intelligence and skilled employment in South Africa: Exploring key variables”, *Research in Globalization,* Vol. 8, 2024, art. 100231. doi: 10.1016/j.resglo.2024.100231

[6] T. Hubanova, R. Shchokin, O. Hubanov, V. Antonov, P. Slobodianiuk, and S. Podolyaka, “Information technologies in improving crime

prevention mechanisms in the border regions of southern Ukraine", *Journal of Information Technology Management,* Vol. 13, 2021, pp. 75-90. doi: 10.22059/JITM.2021.80738.

[7] F. A. F. Alazzam, H. J. M. Shakhatreh, Z. I. Y. Gharaibeh, I. Didiuk, and O. Sylkin, "Developing an information model for e-commerce platforms: A study on modern socioeconomic systems in the context of global digitalization and legal compliance", *Ingenierie des Systemes d'Information,* Vol. 28, No. 4, 2023, pp. 969-974. doi: 10.18280/isi.280417.

[8] S. K. Gupta, N. Nagar, S. Srivastava, P. Somvanshi, and L. Akimova, "An application of structure equation modelling in determinants of customer-based brand equity (CBBE) in the banking area", *Studies in Systems, Decision and Control,* Vol. 489, 2024, pp. 399-411. doi: 10.1007/978-3-031-36895-0_32.

[9] N. Gavkalova, L. Akimova, A. Zilinska, S. Lukashev, L. Avedyan, and O. Akimov, "Functioning of united territorial communities and identification of main problems of organizational support of local budget management", *Financial and Credit Activity: Problems of Theory and Practice,* Vol. 2, No. 43, 2022, pp. 107-117. doi: 10.55643/fcaptp.2.43.2022.3708.

[10] K. Milanovic, "Artificial Intelligence and the Labor Market", *Women in Business Chair*, 2024. Available in: https://www.sciencespo.fr/women-in-business/en/news/article-artificial-intelligence-and-the-labor-market/ (06.12.2024).

[11] E. Gomez-Herrera, and S. T. Köszeg, "A gender perspective on artificial intelligence and jobs: The vicious cycle of digital inequality", *Working Paper 15*, 2022. Available in: https://www.bruegel.org/working-paper/gender-perspective-artificial-intelligence-and-jobs-vicious-cycle-digital-inequality (06.12.2024).

[12] P. Plumwongrot, and P. Pholphirul, "Are Robots stealing jobs? Empirical evidencefrom ten developing countries", *Economics of Innovation and New Technology,* Vol. 32, No. 2, 2022, pp. 1-17. doi: 10.1080/10438599.2022.2051020.

[13] K. Komp-Leukkunen, "A life-course perspective on older workers in workplaces undergoing transformative digitalization", *The Gerontologist,* Vol. 63, No. 9, 2023, pp. 1413-1418. doi: 10.1093/geront/gnac181.

[14] K. Komp-Leukkunen, A. Poli, T. Hellevik, K. Herlofson, A. Heuer, R. Norum, P. E. Solem, J. Khan, V. Rantanen, and A. Motel-Klingebiel, "Older workers in digitalizing workplaces: A systematic literature review", *Journal of Aging and Social Change,* Vol. 12, No. 2, 2022, pp. 37-59. doi: 10.18848/2576-5310/CGP/v12i02/37-59.

[15] V. Taecharungroj, "What can ChatGPT do?' Analyzing early reactions to the innovative AI chatbot on Twitter", *Big Data and Cognitive Computing,* Vol. 7, No. 1, 2023, art. 35. doi: 10.3390/bdcc7010035.

[16] J. Goddard, "Hallucinations in ChatGPT: A cautionary tale for biomedical researchers", *The American Journal of Medicine,* Vol. 136, No. 11, 2023. doi: 10.1016/j.amjmed.2023.06.012.

[17] Our World in Data, "Annual private investment in artificial intelligence, Total", 2023. Available in: https://ourworldindata.org/grapher/private-investment-in-artificial-intelligence (06.12.2024).

[18] Statista, "Unemployment rate in the information industry in the United States from 2010 to 2023, by quarter", 2024. Available in: https://www.statista.com/statistics/199995/rates-of-jobless-persons-in-the-us-information-sector/ (06.12.2024).

[19] KPMG, "Home page", 2024. Available in: https://kpmg.com/ua/uk/home.html (06.07.2024).

[20] World Bank Group, "GDP (current US$) – China", 2024. Available in: https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2023&locations=CN&start=2012 (06.12.2024).

[21] N. Shrestha, "Detecting multicollinearity in regression analysis", *American Journal of Applied Mathematics and Statistics,* Vol. 8, No. 2, 2020, pp. 39-42. doi: 10.12691/ajams-8-2-1/.

[22] S. E. Tanni, C. M. Patino, and J. C. Ferreira, "Correlation vs. regression in association studies", *Journal Brasileiro de Pneumologia,* Vol. 46, No. 1, 2020, art. e20200030. doi: 10.1590/1806-3713/e20200030.

[23] X. Wang, M. Chen, and N. Chen, "How artificial intelligence affects the labour force employment structure from the perspective of industrial structure optimization", *Heliyon,* Vol. 10, No. 5, 2024, art. e26686. doi: 10.1016/j.heliyon.2024.e26686.

[24] H. Ma, Q. Gao, X. Li, and and Y. Zhang, "AI development and employment skill structure: A case study of China", *Economic Analysis Policy,* Vol. 73, 2022, pp. 242-254. doi: 10.1016/j.eap.2021.11.007.

[25] B. Vermeulen, J. Kesselhut, A. Pyka, and P. P. Saviotti, "The impact of automation on employment: Just the usual structural change?" *Sustainability,* Vol. 10, No. 5, 2018, art. 1661. doi: 10.3390/su10051661.

[26] H. Salehi, and R. Burgueno, "Emerging artificial intelligence methods in structural engineering", *Engineering Structures,* Vol. 171, 2018, pp. 170-189. doi: 10.1016/j.engstruct.2018.05.084.

[27] E. Alp Coskun, H. Kahyaoglu, and C. K. M. Lau, "Which return regime induces overconfidence behavior? Artificial intelligence and a nonlinear approach", *Financial Innovation,* Vol. 9, No. 1, 2023, art. 30. doi: 10.1186/s40854-022-00446-2

[28] K. Jeffrey, "Automation and the future of work: How rhetoric shapes the response in policy preferences", *Journal of Economic Behavior and Organization,* Vol. 192, 2021, pp. 417-433. doi: 10.1016/j.jebo.2021.10.019.

[29] L. Qiu, Y. Duan, Y. Zhou, F. Xu, H. Zheng, X. Cai, and Z. Jiang, "Impact of digital empowerment on labor employment in manufacturing enterprises: Evidence from China", *Heliyon,* Vol. 10, No. 8, 2024, e29040. doi: 10.1016/j.heliyon.2024.e29040.

[30] Y. Wu, H. Li, R. Luo, and Y. Yubing, "How digital transformation helps enterprises achieve high- quality development? Empirical evidence from Chinese listed companies", *European Journal of Innovation Management,* 2023. doi: 10.1108/ejim-11-2022-0610.

[31] Y. Han, J. Yang, L. Ying, and Y. Niu, "The impact of corporate digital transformation on labor employment", *Finance Research Letters*, Vol. 60, 2024, art. 104888. doi: 10.1016/j.frl.2023.104888.

[32] X. Sui, S. Jiao, Y. Wang, and H. Wang, "Digital transformation and manufacturing company competitiveness", *Finance Research Letters,* Vol. 59, 2024, art. 104683. doi: 10.1016/j.frl.2023.104683.

[33] Q. Li, and S. Zhao, "The impact of digital economy development on industrial restructuring: Evidence from China", *Sustainability,* Vol. 15, No. 14, 2023, art. 10847. doi: 10.3390/su151410847.

[34] Y. Wu, N. Hao, and Y. Ma, "The effect of digital economy development on labor employment", *Journal of Global Information Management,* Vol. 31, No. 6, 2023, pp. 1-27. doi: 10.4018/ jgim.321180.