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# MODEL FOR ENHANCING QUALITY OF WORKING LIFE AND LABOR POTENTIAL IN KYRGYZSTAN'S HIGH-TECH MARKET 5.0

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A B S T R A C T

*The research aims to establish and substantiate the prospects of enhancing the quality of working life and unlocking labor potential through the governance of sustainable development in Kyrgyzstan's high-tech market 5.0. Based on regression analysis of international statistics available at the beginning of 2025, the authors developed an econometric model to assess the impact of governance measures for sustainable development in the high-tech market 5.0 on achieving SDG 8. The model has led to a novel theoretical conclusion that while the implementation of these governance measures has a contradictory effect on the quality of working life and the unlocking of labor potential, they can be optimized to align with SDG 8. The practical value lies in the recommendations provided for optimizing the application of governance measures in the high-tech market and the forecast of sustainable development for the high-tech market 5.0 and the labor market in Kyrgyzstan over the next 15 years (2025–2040). These contributions have established the theoretical and methodological foundation for the comprehensive implementation of Kyrgyzstan's national socio-economic progress directives with a strategic outlook until 2040, ensuring better coordination among these directives.*

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## 1. INTRODUCTION

In 2015, the global labor market witnessed a pivotal shift from quantitative benchmarks to qualitative ones, spurred by the adoption of SDG 8, which set a worldwide course toward "decent work" (UN, 2025). Until that moment, despite some progressive ideas from individual market agents, the global labor market largely viewed human resources merely as a production factor essential for business operations. Consequently, HRM was designed to extract benefits for companies.

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Progressive HRM practices imposed constraints on businesses by necessitating corporate social responsibility and discouraging management measures that harmed employees (e.g., through layoffs, demotions, or wage reductions). Following global endorsement and universal commitment to SDG 8, the new guiding principle for the global labor market became ensuring that HRM benefits workers.

This shift led to the emergence of HRM evaluation criteria such as the quality of working life and the extent of labor potential realized by employees. However, the introduction of these criteria produced only a modestly positive effect on workers, as the launch of SDG 8 coincided with the onset of the fifth industrial revolution. The challenge lies in that while socially oriented priorities for the global labor market were proclaimed and widely endorsed, adhering to these priorities has proven difficult amid complete automation.

The transition to Industry 5.0 over the past decade (2015–2025) has sharply diminished the significance of human resources within the production factors. This has further widened the gap between the interests of employees and employers. In cyber-social systems within the high-tech market, human resources are being increasingly relegated to a secondary role, with automation tools assuming a greater functional load. This highlights the necessity of developing a scientific and methodological approach to managing the high-tech market that can most effectively support the implementation of SDG 8.

This issue is particularly evident in Kyrgyzstan, where a presidential decree (No. 221, October 31, 2018) was issued by the country's top leadership. Yet, the national directives for socio-economic progress – one aimed at enhancing the quality of working life and unlocking labor potential, and another focused on developing the high-tech market 5.0 – are not mutually aligned for the strategic outlook up to 2040 (President of the Kyrgyz Republic, 2018). This discord motivated the objective of this study: to assess the prospects for enhancing the quality of working life and unlocking labor potential through the governance of sustainable development in Kyrgyzstan's high-tech market 5.0.

## 2. LITERATURE REVIEW

This research is theoretically based on two scientific concepts that have evolved over time and are individually represented in the existing literature. The first concept is that of socially oriented HRM, which supports decent employment in line with SDG 8 (Popkova et al., 2021). According to this concept, HRM is meant to benefit workers by, first, improving the quality of their working lives, with key indicators including:

- Employment in Industry 5.0 ($LB_1$), which, as noted by Ergasheva et al. (2024), declines as Industry 5.0 develops;
- The share of youth who are neither in education nor employed ($LB_2$), which, according to Buitek et al. (2025), increases with the advancement of Industry 5.0.

Furthermore, HRM is intended to foster the realization of workers' labor potential, measured by the following key indicators:

- Unemployment among employees with higher education ($LB_3$), which, as reported by Popkova et al. (2017), rises with the development of Industry 5.0;
- Labor productivity ($LB_4$), which, as stated by Karbekova et al. (2023), increases with the advancement of Industry 5.0;
- The proportion of underutilized worker capacity ($LB_5$), which, as suggested by Mkrtchyan et al. (2024), also increases as Industry 5.0 evolves.

The second concept is that of the sustainable development of the high-tech market, whose core idea is to enhance the economic outcomes of this market (Abdusalomova et al., 2024; Bogoviz et al., 2018; Cimini et al., 2024; Kachkanbaeva et al., 2025). In the era of the Fifth Industrial Revolution, sustainable development of the high-tech market 5.0 is particularly vital, necessitating the market's specialization in Industry 5.0. The key indicators of sustainable development for the high-tech market 5.0 are as follows:

- The share of high-tech trade ($HTMD_1$) (Kobilov et al., 2023);
- The share of medium- and high-tech manufacturing in the structure of industrial added value ($HTMD_2$) (Raymbaev et al., 2017).

Considering these indicators, the governance measures for the sustainable development of the high-tech market 5.0 consist of increasing the share of high-tech trade and boosting the proportion of medium- and high-tech manufacturing in the industrial added value structure.
In summary, the literature review reveals a significant shortcoming: the accumulated publications are divided between the two distinct scientific paradigms – the socially oriented HRM concept supporting decent employment under SDG 8 and the sustainable development concept of the high-tech market. This division creates a gap at the intersection of these concepts.

The identified gap lies in the uncertainty regarding the consequences of implementing governance measures for the sustainable development of the high-tech market 5.0 on the quality of working life and the realization of labor potential (Amangeldiev et al., 2025). The necessity to address this gap in the literature for crisis management in cyber-social systems within Industry 5.0 has led to the formulation of the research question (RQ): "How does the application of governance measures for the sustainable development of the high-tech market 5.0

impact the quality of working life and the realization of labor potential?"

## 3. MATERIALS AND METHODS

To obtain an answer to the research question relevant to the contemporary economy of Kyrgyzstan, the sample for this research included ten countries with Human Development Index values similar to Kyrgyzstan's (0.701, ranging from 0.70 to 0.76) and classified as "high human development" according to UNDP (2024), as of early 2025.

The investigation employs regression analysis to determine the relationships between the indicators of working life quality ($LB_{1-2}$), the degree of labor potential realization ($LB_{3-5}$), and the governance measures for the sustainable development of the high-tech market 5.0 ($HTMD_{1-2}$). This analysis is based on data from UNDP and MBRF (2023), current as of early 2025 (Table 1)

**Table 1.** Qualitative labor market characteristics and the sustainability of the high-tech market 5.0 in 2025

| Country | Manufacturing employment, % | Youth not in employment, education, and training, % | Unemployment rate with advanced education, % | Output per worker, GDP constant 2017 international PPP$) | Labor underutilization rate, % | High-technology trade, % of total trade | Medium and high-tech activities value added, % of total manufacturing value added |
|---|---|---|---|---|---|---|---|
| | $LB_1$ | $LB_2$ | $LB_3$ | $LB_4$ | $LB_5$ | $HTMD_1$ | $HTMD_2$ |
| Botswana | 20.8 | 22.0 | 33.8 | 17.6 | 22.1 | 9.6 | 34.9 |
| Indonesia | 51.7 | 50.7 | 87.0 | 10.1 | 67.7 | 32.2 | 37.7 |
| Kyrgyzstan | 38.4 | 66.7 | 80.7 | 5 | 89.6 | 34.6 | 2.3 |
| Philippines | 27.2 | 63.5 | 88.4 | 8.2 | 71.0 | 100.0 | 50.9 |
| South Africa | 30.8 | 18.0 | 48.5 | 1.9 | 0.8 | 25.1 | 29.6 |
| Tunisia | 68.8 | 27.3 | 5.8 | 14.4 | 34.3 | 25.4 | 33.5 |
| Uzbekistan | 41.2 | 51.3 | 95.8 | 8.6 | 79.6 | 23.8 | 21.9 |
| Viet Nam | 81.7 | 64.4 | 90.8 | 7.7 | 95.2 | 100.0 | 48.6 |
| Mongolia | 32.3 | 62.4 | 80.3 | 12.7 | 71.2 | 14.5 | 5.0 |
| Brazil | 42.2 | 54.3 | 83.7 | 13.0 | 53.2 | 33.8 | 37.3 |

Source: Developed by the authors based on the materials from the UNDP and MBRF (2023).

Guided by the identified regression relationships, the prospects for enhancing the quality of working life and unlocking labor potential through the governance of sustainable development in Kyrgyzstan's high-tech market 5.0 are established. To this end, an optimal combination of governance measures is selected, under which Kyrgyzstan can achieve the highest possible quality of working life and the greatest realization of labor potential. A forecast is then developed for the sustainable development of the high-tech market 5.0 and the labor market in Kyrgyzstan for the next 15 years (2025–2040).

## 4. RESULTS

Based on the regression analysis of the data from Table 1, an econometric model has been developed to evaluate the impact of governance measures for the sustainable development of the high-tech market 5.0 on achieving SDG 8. The author's model comprises, first, the following two relationships between the indicators of working-life quality and the implementation of governance measures for the sustainable development of the high-tech market 5.0:

$$LB_1=32.44+0.18*HTMD_1+0.13*HTMD_2 \quad (1)$$

Equation (1) indicates that a 1% increase in the share of high-tech trade results in a 0.18% rise in employment within Industry 5.0, while a 1% increase in the share of medium- and high-tech manufacturing in the structure of industrial added value leads to a 0.13% increase in employment in Industry 5.0.

$$LB_2=51.83+0.57*HTMD_1-0.89*HTMD_2 \quad (2)$$

Equation (2) shows that a 1% increase in the share of high-tech trade causes a 0.57% rise in the proportion of youth who are neither in education nor employed, whereas a 1% increase in the share of medium- and high-tech manufacturing within industrial added value results in a 0.57% decrease in that proportion.

Second, the model also includes the following three relationships between the indicators of labor potential realization and the implementation of governance measures for the sustainable development of the high-tech market 5.0:

$$LB_3=69.96+0.67*HTMD_1-0.91HTMD_2 \quad (3)$$

Equation (3) suggests that a 1% increase in the share of high-tech trade leads to a 0.67% rise in unemployment among employees with higher education, while a 1% increase in the share of medium- and high-tech manufacturing in industrial added value causes a 0.91% decrease in such unemployment:

$$LB_4=9.11-0.41*HTMD_1+0.15HTMD_2 \quad (4)$$

Equation (4) indicates that a 1% increase in the share of high-tech trade results in a decline in labor productivity of 0.41 GDP constant 2017 international PPP$, whereas a 1% increase in the share of medium- and high-tech

manufacturing contributes to a rise in labor productivity of 0.15 GDP constant 2017 international PPP$:

$$LB_5=64.32+0.88*HTMD_1-1.36*HTMD_2 \quad (5)$$

Equation (5) reveals that a 1% increase in the share of high-tech trade leads to a 0.88% increase in the proportion of underutilized worker potential, whereas a 1% increase in the share of medium- and high-tech manufacturing results in a 1.36% reduction in that proportion.

Based on equations (1)–(5) incorporated into the model, the prospects for enhancing the quality of working life and realizing labor potential through the governance of sustainable development of the 5.0 high-tech market in Kyrgyzstan have been identified (Figure 1).

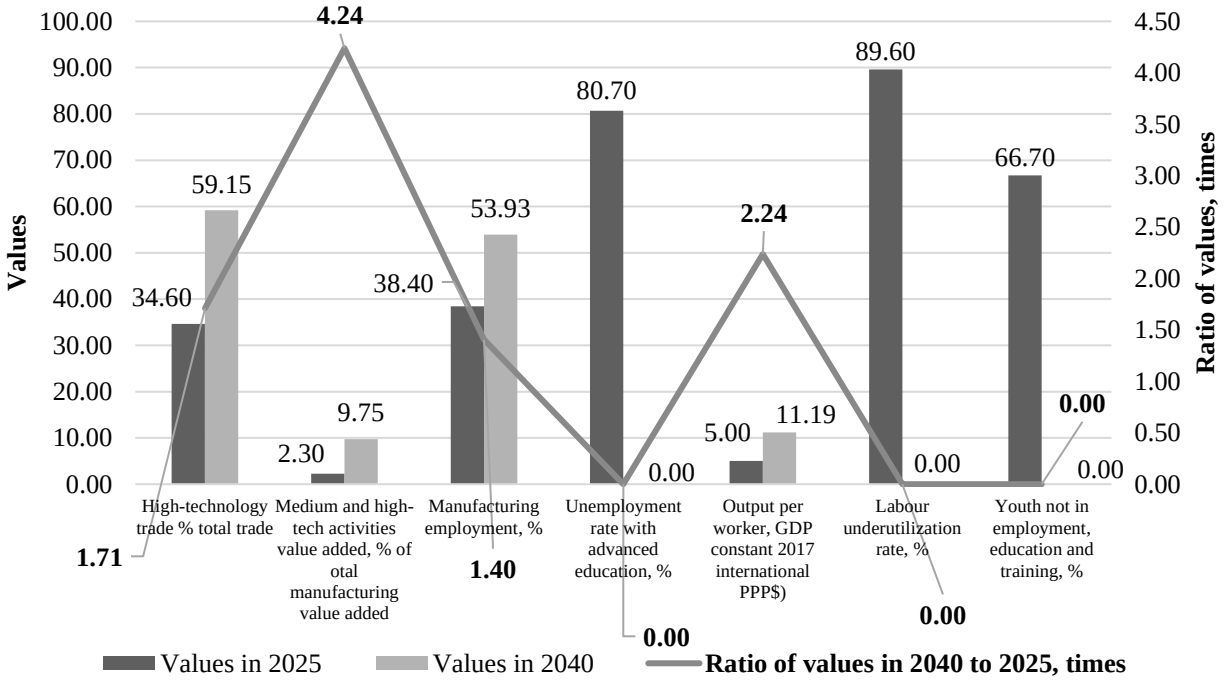



**Figure 1.** Forecast of sustainable development of the high-tech market 5.0 and labor market in Kyrgyzstan for the next 15 years (2025–2040). Source: Developed by the authors.

Based on Figure 1, to achieve the highest possible quality of working life and the fullest realization of labor potential in Kyrgyzstan, the following combination of governance measures for sustainable development of the high-tech market 5.0 is recommended:

- Increase the share of high-tech trade to 59.15% Increase the share of high-tech trade to 59.15% by 2040, which is 1.71 times higher than the 34.60% recorded in 2025;
- Raise the proportion of medium- and high-tech manufacturing in the structure of industrial added value to 9.75% by 2040, representing a 4.24-fold increase compared to the 2.30% in 2025.

Implementing these recommendations will enable Kyrgyzstan to achieve the following progress in reaching SDG 8 over the next 15 years (2025–2040):

- An increase in employment within Industry 5.0 by 1.40 times, from 38.40% in 2025 to 53.93% by 2040;
- Elimination of the proportion of youth who are neither in education nor employed;
- Elimination of unemployment among employees with higher education;
- A 2.24-fold growth in labor productivity, from 5.00 GDP constant 2017 international PPP$ in 2025 to 11.19 GDP constant 2017 international PPP$ by 2040;
- Elimination of the proportion of underutilized worker potential.

## 5. DISCUSSION

The contribution of this research to the literature lies in bridging the gap and filling the void in scientific knowledge at the intersection of two theoretical paradigms: the concept of socially oriented HRM in support of decent employment in accordance with SDG 8 (building on Popkova et al. (2021)) and the concept of sustainable development of the high-tech market (building on Bogoviz et al. (2018), Kobilov et al. (2023), and Raymbaev et al. (2017)). This is reflected in the answer obtained to the research question posed in this research (Table 2).

According to the summarized results in Table 2, the main conclusion of this research is that the implementation of governance measures for the sustainable development of the high-tech market 5.0 exerts a mixed influence on the

quality of working life and the realization of labor potential. However, these measures can be optimized to align with SDG 8.

**Table 2.** The resulting answer to the research question contrasted with past literature

| Supporting HRM for decent employment in line with SDG 8 | | Disclosure in the literature | Clarification in this research |
|---|---|---|---|
| Quality of working life | Employment in the Industry 5.0 | Ergasheva et al. (2024) | Rises as the Industry 5.0 evolves |
| | Share of young people not in education and not employed | Buitek et al. (2025) | Increases with the development of high-tech trade but decreases with the development of medium- and high-tech industries |
| Degree of labor potential disclosure | Unemployment among workers with higher education | Popkova et al. (2017) | |
| | Percentage of underutilization of employees' capabilities | Mkrtchyan et al. (2024) | |
| | Labor productivity | Karbekova et al. (2023) | Decreases with the development of high-tech trade but increases with the development of medium- and high-tech industries |

Source: Developed by the authors.

Contrary to the findings of Ergasheva et al. (2024), it was revealed that employment in Industry 5.0 does not decline but instead rises as Industry 5.0 develops. In contrast to Karbekova et al. (2023), it has been demonstrated that labor productivity decreases with the expansion of high-tech trade and increases as medium- and high-tech manufacturing grows.

It was also established that, as high-tech trade develops, the share of youth who are neither in education nor employed, unemployment among workers with higher education (in contrast to Buitek et al. (2025) and Popkova et al. (2017)) and the proportion of underutilized worker potential all increase, whereas these indicators decrease with the expansion of medium- and high-tech manufacturing (in contrast to Mkrtchyan et al. (2024)).

## 6. CONCLUSION

In summary, the main findings of the research are as follows. First, an econometric model has been developed to assess the impact of governance measures for the sustainable development of the high-tech market 5.0 on the achievement of SDG 8. The theoretical significance of the model lies in its establishment of a theoretical and methodological foundation for the subsequent development of a scientific approach to managing the high-tech market that will comprehensively support the implementation of SDG 8.

Second, the research has identified the prospects for enhancing the quality of working life and unlocking labor potential through the governance of sustainable development in Kyrgyzstan's high-tech market 5.0. The proposed recommendations for optimizing the application of governance measures, along with the author's forecast for the sustainable development of the high-tech market 5.0 and the labor market in Kyrgyzstan over the next 15 years (2025–2040), hold practical significance. They support the implementation of Kyrgyzstan's national socio-economic progress directives with a strategic outlook until 2040 (President of the Kyrgyz Republic, 2018), as established by Decree No. 221 dated October 31, 2018, through coordinated alignment of these directives.

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