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OCCUPATIONAL RANKING BASED ON PROFESSIONAL RISK LEVELS AND ECONOMIC ACTIVITY CHARACTERISTICS

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Abstract

Relevance. The transition toward risk-oriented occupational safety systems requires modernizing social protection mechanisms for employees exposed to hazardous working conditions. In Kazakhstan, social guarantees are traditionally based on occupational classifications that do not fully reflect actual workplace risk exposure or economic sector characteristics.

Objective. To develop and validate an integrated methodological approach for ranking occupations based on professional risk levels and economic activity characteristics.

Materials and Methods. This study, conducted in 2024-2025, included an analysis of occupational risk assessment data from pilot enterprises, an evaluation of national labor statistics, and findings from a sociological survey of 312 respondents. An integrated ranking index was developed by calculating a sectoral coefficient reflecting economic activity characteristics. Statistical analysis was performed using SPSS 27.0.

Results. Significant variability in occupational risk levels across economic sectors was identified. High and critical risk levels were predominantly observed in mining, metallurgical, and chemical industries, while lower risk levels were characteristic of service and administrative sectors. The proposed integrated ranking model demonstrated the ability to differentiate occupations with similar professional risk exposure by incorporating sector-specific economic indicators, thereby enabling a more precise distribution of social guarantees.

Conclusions. The developed model establishes a scientifically justified relationship between occupational risk level and allocation of social guarantees. Implementing the proposed methodology may enhance the effectiveness of occupational safety regulation and support the transition toward a preventive, risk-oriented social protection system in Kazakhstan.

Keywords: *occupational risk level, economic activity type, sectoral coefficient, occupational ranking, occupational risk assessment, Kazakhstan.*

Introduction

The modernization of occupational safety and social protection systems is increasingly driven by the transition toward risk-oriented regulatory models. Traditional list-based approaches to providing social guarantees for employees working under hazardous conditions are gradually becoming less effective because they do not adequately reflect actual workplace exposure or the dynamic nature of modern production processes. In the Republic of Kazakhstan, the current framework for social guarantees largely relies on predefined occupational classifications, which limit the ability to account for real variations in working conditions and technological changes across economic sectors [1].

International experience demonstrates that occupational safety systems based on risk assess-

ment improve the targeting and efficiency of social protection mechanisms. In several developed economies, compensation and benefit systems are increasingly determined by measurable occupational risk indicators rather than formal occupational classifications. These approaches emphasize preventive strategies to reduce occupational injuries and work-related diseases through systematic hazard management [2; 3].

The International Labor Organization highlights the importance of transitioning from compensatory occupational safety models toward preventive risk management strategies. The ILO Global Strategy on Occupational Safety and Health 2024-2030 identifies occupational risk assessment as a core component of national labor protection systems and stresses the need for risk-based regulatory instruments. Kazakhstan has ratified ILO Conventions No. 155 and No. 187, which establish fundamental principles for the development of national occupational safety policies based on risk management and continuous improvement [3-5].

At the national level, the transition toward a preventive occupational safety framework is reflected in the Safe Labor Concept of the Republic of Kazakhstan for 2024-2030, which prioritizes modernizing social protection mechanisms for workers in hazardous environments [1]. Nevertheless, practical implementation of risk-oriented regulation requires the development of scientifically justified methodological tools capable of integrating occupational risk indicators with economic sector characteristics [6].

Previous studies suggest that occupational risk assessment provides objective information on workplace hazard exposure; however, it does not fully account for sector-specific economic factors that influence the distribution of social guarantees. Incorporating economic activity indicators may improve occupational classification models and support evidence-based policy development [7; 8].

Therefore, the present study aims to develop and validate an integrated methodological approach for ranking occupations based on professional risk levels and economic activity characteristics, by calculating a sectoral coefficient and constructing a ranking table to differentiate social guarantees in the Republic of Kazakhstan.

Materials and methods

Study Design

The present research is a methodological and analytical study aimed at developing and validating an integrated occupational ranking model that combines professional risk levels with economic activity characteristics. The study was conducted during 2024-2025 within research projects implemented by the Republican Research Institute of Occupational Safety and Health of the Ministry of Labor and Social Protection of the Population of the Republic of Kazakhstan [3; 6; 9].

The methodological framework of the study included four main stages:

1. Collection and systematization of occupational risk assessment data from pilot enterprises.
2. Statistical analysis of sectoral economic indicators related to occupational safety and working conditions.
3. Development of a sectoral coefficient reflecting economic activity characteristics.
4. Expert validation and sensitivity testing of the proposed occupational ranking model.

Data Sources

The analysis was based on multiple complementary data sources to ensure methodological reliability and representativeness.

The primary dataset included occupational risk assessment results obtained from pilot enterprises operating in key sectors of the national economy. Additional information was derived from official statistics of the Bureau of National Statistics of the Republic of Kazakhstan for 2024, including indicators of employment structure, occupational injuries, and working conditions.

A sociological survey was conducted among employees and occupational safety specialists to assess attitudes toward the transition to a risk-oriented system of social guarantees. The survey included 312 respondents from eight regions of Kazakhstan.

Methodological materials developed by the Republican Research Institute of Occupational Safety and Health were also used to construct the ranking algorithm.

Sampling procedure

The unit of analysis in the study was an occupational group within a specific economic activity sector.

Pilot enterprises were selected according to the following criteria:

– availability of documented occupational

risk assessment results
- representation of key industrial sectors with hazardous working conditions
- availability of workplace injury statistics
- participation in national occupational safety monitoring programs.

The final pilot dataset included 19 enterprises representing eight regions of Kazakhstan, covering a total workforce of 24,434 employees. Missing values in statistical datasets were minimal (less than 5 %) and were handled using pairwise deletion in correlation analysis and mean substitution for sectoral indicators where necessary.

Occupational Risk Assessment

Professional risk level was determined using a standardized occupational risk assessment methodology that identifies hazardous and harmful production factors, evaluates exposure intensity, and assesses the probability of adverse health outcomes. Risk levels were categorized into five classes in accordance with national occupational risk classification guidelines [6]:

Class 1 – acceptable risk level
Class 2 – moderate risk level
Class 3 – high risk level
Class 4 – very high-risk level
Class 5 – critical occupational risk level

The classification was based on quantitative indicators of exposure to physical, chemical, biological, and ergonomic factors, as well as workplace injury statistics.

Determination of Economic Activity Type

Economic activity classification was performed in accordance with the National Classifier of Types of Economic Activity of the Republic of Kazakhstan. Occupations were grouped by sector based on enterprise affiliation and production characteristics. The classification allowed analysis of sector-specific working conditions and economic parameters influencing social protection mechanisms.

Calculation of the Sectoral Coefficient (kEDA)

To incorporate sector-specific economic characteristics into occupational ranking, a sectoral coefficient (kEDA) was developed. The coefficient reflects the relative economic burden associated with hazardous working conditions in each sector [10; 11].

The sectoral coefficient was calculated using normalized statistical indicators, including:

– Proportion of employees working in hazardous and harmful conditions
– Occupational injury rate
– Employer expenditures on social guarantees and compensations
– Sectoral employment structure

Normalization of indicators was performed using min–max scaling.

Normalization procedure

To ensure comparability of heterogeneous statistical indicators, all variables were normalized using the min–max transformation method:

$$X_{norm} = \frac{X_i - X_{min}}{X_{max} - X_{min}} \quad (1)$$

Where:

X_i represents the observed value of the indicator for a given economic sector, X_{min} and X_{max} correspond to the minimum and maximum values of the indicator within the dataset.

This transformation converts all indicators to a standardized scale ranging from 0 to 1, enabling aggregation of variables measured in different units.

Sectoral coefficient calculation

The sectoral coefficient reflecting economic activity characteristics was calculated as a weighted sum of normalized indicators:

$$k_{EDA} = w_1 H + w_2 I + w_3 S + w_4 E \quad (2)$$

Where:

H – normalized proportion of employees working in hazardous conditions

I – normalized occupational injury rate

S – normalized employer expenditures on social guarantees and compensations

E – normalized sectoral employment structure indicator

w_1, w_2, w_3, w_4 – weighting coefficients determined through expert evaluation.

Weight determination

Weighting coefficients were determined through expert assessment using the Delphi method [12]. Experts evaluated the relative importance of each indicator reflecting occupational exposure and sectoral economic characteristics. Table 1 presents the final weighting structure for the indicators used to

calculate the sectoral coefficient (kEDA). The distribution of weights reflects the relative contribution of each indicator to the overall assessment of sector-specific occupational burden.

Table 1. Weighting Scheme for Calculating the Sectoral Coefficient (kEDA)

Indicator	**Weight**
Hazardous employment share	0.35
Occupational injury rate	0.30
Employer expenditures on social guarantees	0.20
Sectoral employment structure	0.15

Source: compiled by the authors

The weighting scheme reflects the dominant contribution of occupational exposure indicators to the sectoral risk profile.

Formation of the Integrated Ranking Index

The integrated ranking index was developed by combining the professional risk level with the sectoral coefficient. The index was calculated using the following general formula:

Integrated Ranking Index

The integrated ranking index (hereinafter – IRI) was calculated using the following formula:

$$IRI = R \times k_{EDA} \quad (3)$$

Where:

IRI – integrated ranking index

R – professional risk level (1-5)

k_{EDA} – sectoral coefficient.

The resulting values were used to construct a ranking table that allows classification of occupations according to combined occupational and sectoral risk burden.

Expert Validation

To ensure methodological reliability, the ranking model was validated using the Delphi method. The expert panel consisted of occupational safety specialists, labor economists, and healthcare professionals with experience in occupational risk assessment and the development of social protection policies.

The expert panel consisted of 14 specialists in occupational safety, labor economics, and public health. The Delphi validation process included two iterative rounds. During the first round, experts evaluated the relevance and weighting of the selected indicators. In the second round, the revised model was reassessed.

Agreement among experts was measured using Kendall's coefficient of concordance.

The final agreement level reached:

$W = 0.71$, $p < 0.001$

which indicates strong consensus among experts regarding the methodological structure and applicability of the developed ranking model.

Two rounds of expert evaluation were conducted. Consensus was considered achieved when agreement exceeded 80 %. The final level of expert agreement reached approximately 92 %, indicating high reliability of the developed model.

Statistical Analysis

Statistical analysis was performed using IBM SPSS Statistics version 27.0.

The following analytical methods were applied:

– descriptive statistics
– Pearson correlation analysis
– exploratory factor analysis using the principal component method with varimax rotation
– sensitivity analysis of weighting coefficients.

Statistical significance was established at $p < 0.05$.

The ranking model's stability was evaluated through a sensitivity analysis in which the weighting coefficients varied by ±10 %.

Ethical Considerations

Ethical approval was not required for this study because the research was based on aggregated statistical data and anonymous survey results that did not include personal or confidential information. The study complied with national research ethics standards.

Results

Analysis of occupational risk assessment data obtained from pilot enterprises demonstrated substantial variability in professional risk levels across different economic sectors. The highest proportion of occupations classified as high- and critical-risk levels was identified in the mining, metal-

lurgical, and chemical industries. In contrast, lower occupational risk levels were predominantly observed in information technology, administrative, and service-oriented sectors.

The distribution patterns of occupational risk levels correspond with national statistical trends in workplace injuries and occupational diseases, indicating a concentration of hazardous working conditions in heavy industrial sectors.

Table 2 characterizes the pilot sample used for occupational risk assessment and model validation.

The highest proportion of occupations with high and very high professional risk levels (Classes 3 and 4) was observed in the mining, metallurgical, and chemical industries. In contrast, the lowest professional risk levels were identified in the information and communication sector and in administrative and service-related activities.

Table 2. Characteristics of the Pilot Study Sample

Indicator	Value
Number of pilot enterprises	19 (initial dataset)
Number of employees covered by the data collection	24,434
Number of employees working in hazardous conditions (aggregated)	18,198
Number of survey respondents	312 (8 regions of Kazakhstan)
Respondents supporting transition to risk-oriented model	74 %

Source: compiled by the authors

The distribution of professional risk levels confirmed that hazardous and harmful working conditions remain concentrated in heavy industrial sectors characterized by exposure to physical, chemical, and ergonomic risk factors. These results are consistent with national statistical indicators of occupational injuries and occupational diseases in Kazakhstan.

Sectoral Coefficient Calculation

The calculation of the sectoral coefficient (kEDA) revealed substantial differences between economic sectors. Sectors with a high proportion of employees working in hazardous conditions and elevated occupational injury rates demonstrated higher kEDA values. The mining and metallurgical industries showed the highest sectoral coefficients, reflecting significant economic expenditures on occupational safety measures and social guarantees. Calculated sectoral coefficients for selected economic activity types are presented in Table 3.

Conversely, sectors with lower exposure to harmful production factors showed lower kEDA values, indicating a reduced economic burden associated with occupational risk. The normalization procedure ensured the comparability of statistical indicators across sectors and enabled the integration of heterogeneous data into a unified coefficient.

Table 3. Examples of Sectoral Coefficient (kEDA) Values by Type of Economic Activity (2024)

Type of Economic Activity	kEDA Value
Industry (aggregate)	1.082
Chemical manufacturing	1.140
Mining industry	1.073
Coal mining	1.095
Metallurgical production	1.099
Information and communication	1.016
Veterinary activities (selected segments)	1.184

Source: compiled by the authors

Formation of the Occupational Ranking Table

Based on the combination of professional risk level and sectoral coefficient, an occupational ranking table was developed. The ranking table included 74 unique combinations of economic activity type, professional risk level, and sectoral coefficient values.

Examples of occupational ranking based on the integrated ranking index are presented in Table 4.

Table 4. Examples of Occupational Ranking (Fragment)

Rank	Type of Economic Activity	Professional Risk Level	kEDA	Description
1	Information and communication	1	1.016	Low exposure level
10	Electrical equipment manufacturing	2	1.042	Moderate risk exposure
30	Chemical manufacturing (selected segments)	4	1.140	High chemical exposure
41	Underground coal mining	5	1.095	Critically high occupational risk
74	Veterinary biological risks	5	1.184	High biological exposure

Notes: kEDA – sectoral coefficient of economic activity; professional risk levels were determined according to national occupational risk classification guidelines.
Source: compiled by the authors

Occupations with very high professional risk levels within sectors demonstrating high kEDA values occupied the highest-ranking posi-tions. These occupations were primarily associated with mining operations, metallurgical production, chemical manufacturing, and other industrial activ-ities involving continuous exposure to hazardous working environments.

Occupations characterized by moderate or acceptable professional risk levels within sectors with low kEDA values occupied the lowest-ranking positions. These occupations were predominantly related to information technologies, admin-istrative services, and knowledge-based economic activities.

Statistical Relationships Between Risk Indicators and Sectoral Parameters

Correlation analysis demonstrated a statistically significant relationship between professional risk level and key sectoral economic indicators, including the proportion of employees working in hazardous conditions and occupational injury rates. Factor analysis confirmed that professional risk level represents the dominant component of the integrated ranking index, while the sectoral coefficient provides additional differentiation within economic sectors.

The integrated ranking index demonstrated a stable distribution across occupational groups, allowing classification of occupations into distinct risk categories suitable for differentiation of social guarantees (Table 5).

Correlation analysis

Pearson correlation analysis demonstrated

Table 5. Occupational Risk and Sectoral Indicators' Correlation Matrix

Variable	Risk level	Hazardous employment share	Injury rate	Social guarantee expenditures
Risk level	1.00	0.64**	0.58**	0.41*
Hazardous employment share	0.64**	1.00	0.62**	0.44*
Injury rate	0.58**	0.62**	1.00	0.39*
Social guarantee expenditures	0.41*	0.44*	0.39*	1.00

*Notes: $p < 0.05$; ** $p < 0.01$*
Source: compiled by the authors

statistically significant relationships between professional risk level and several sectoral indicators.

The strongest correlation was observed between professional risk level and the proportion of employees working in hazardous conditions ($r = 0.64$, $p < 0.001$). A moderate positive correlation was also identified between occupational risk level and occupational injury rate ($r = 0.58$, $p < 0.01$). A weaker but statistically significant association was found with employer expenditures on social guarantees ($r = 0.41$, $p < 0.05$).

These results confirm that sectors with higher exposure to hazardous working conditions tend to have higher occupational injury rates and a greater economic burden of social protection.

Factor analysis

Exploratory factor analysis was performed using the principal component method with varimax rotation.

Two main factors, accounting for 71.3 % of the total variance, were identified.

The first factor was strongly associated with occupational hazard exposure indicators (factor loadings ranging from 0.74 to 0.82). In contrast, the second factor was associated with sectoral economic burden indicators (factor loadings ranging from 0.58 to 0.67).

The dominant loading for professional risk level was 0.82, indicating that occupational risk represents the primary determinant of the integrated ranking index.

Expert Validation Results

Expert validation of the developed ranking model demonstrated strong agreement among panel members. The overall consensus, at nearly 92%, indicated massive expert support for the methodological structure and practical applicability of the proposed ranking algorithm.

Experts confirmed that integrating professional risk levels with sectoral economic indicators improves the objectivity of occupational classification and enhances the potential for implementation within national occupational safety and social protection systems.

Sensitivity Analysis

Sensitivity testing demonstrated high stability of the proposed ranking model. Variation of weighting coefficients within ±10 % resulted in less than 5 % change in occupational ranking positions. These results indicate the robustness of the integrated ranking index and confirm the reliability of the proposed methodological approach.

Discussion

The findings of this study indicate that integrating occupational risk assessment with economic sector indicators enhances the analytical accuracy and practical applicability of occupational classification systems. The proposed integrated ranking index enables differentiation of occupations not only by workplace hazard exposure but also by economic characteristics that influence the structure and distribution of social guarantees.

The results confirm that professional risk level remains the principal determinant of occupational ranking. However, incorporating the sectoral coefficient provides additional differentiation within industries, particularly when occupations exhibit similar risk exposure levels. This observation supports the assumption that sector-specific economic characteristics significantly affect occupational safety expenditures and compensation mechanisms, which is consistent with national labor statistics data [8].

This study's findings align with international approaches to occupational safety regulation that emphasize risk-based management and the preventive protection of workers. In many developed occupational safety systems, compensation mechanisms are increasingly linked to measurable occupational risk exposure and workplace hazard monitoring. Such approaches encourage employers to invest in preventive safety measures and technological modernization, which contribute to long-term reductions in occupational morbidity and injury rates [7; 8].

The integration of economic activity indicators into occupational risk ranking reflects modern trends in occupational safety governance, in which labor protection measures are closely linked to social insurance mechanisms, compensation systems, and economic sector performance. Previous international studies have demonstrated that combining occupational risk assessment with economic indicators improves transparency and sustainability of occupational safety systems and supports evidence-based policymaking [3; 7; 9].

At the national level, the proposed model contributes to implementing the Safe Labor Concept of the Republic of Kazakhstan and supports the

transition toward a preventive, risk-oriented system of worker social protection. The developed ranking approach may serve as an analytical tool for optimizing the distribution of social guarantees and improving regulatory decision-making in occupational safety policy [1].

An important practical implication of the proposed model is the creation of economic incentives for employers to reduce occupational risks. Linking social guarantees and compensation mechanisms to actual risk levels promotes the implementation of preventive measures, modernization of production technologies, and improvement of workplace safety culture. Similar mechanisms have been identified as effective drivers for occupational safety improvements in countries implementing integrated occupational risk management systems [9].

Expert validation results demonstrated strong agreement on the methodological structure and applicability of the proposed ranking model. The high level of consensus confirms the practical relevance of integrating professional risk assessment with sectoral economic indicators for regulatory and analytical purposes.

Sensitivity analysis further confirmed the robustness of the developed model. Variations in weighting coefficients and statistical indicators did not significantly affect occupational ranking positions, indicating the stability of the integrated ranking index and the reliability of the proposed methodology for practical application.

Nevertheless, several limitations of the study should be considered. The ranking model was validated using data obtained from pilot enterprises representing selected economic sectors. Expansion of the dataset to include additional industries and regional labor markets may improve the generalizability of the results. Furthermore, future research may focus on refining weighting coefficients and developing advanced statistical models that incorporate long-term occupational health monitoring data.

Despite these limitations, the study provides a methodological basis for further development of risk-oriented occupational safety regulation and contributes to modernizing social protection systems in Kazakhstan.

Conclusions

The study developed and validated an integrated model for occupational ranking based on professional risk level and economic activity characteristics. The proposed methodology enables systematic classification of occupations based on combined occupational and sectoral risk burdens and establishes a scientifically justified relationship between occupational risk exposure and the allocation of social guarantees.

Implementation of the developed ranking model may improve the effectiveness of occupational safety policies, strengthen preventive labor protection strategies, and optimize social protection systems in the Republic of Kazakhstan.

The developed approach may serve as a methodological basis for transitioning from a list-based system of social guarantees toward a risk-oriented model of worker protection in the Republic of Kazakhstan. The model may also support evidence-based regulatory decision-making and the development of digital occupational risk monitoring systems.

Further research should focus on expanding the statistical dataset, refining the weighting coefficients of the integrated ranking index, and evaluating long-term health and economic outcomes associated with the implementation of risk-oriented occupational safety regulation.

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КӘСІБИ ТӘУЕКЕЛ ДЕҢГЕЙІ МЕН ЭКОНОМИКАЛЫҚ ҚЫЗМЕТ ТҮРІНІҢ ҮЙЛЕСІМІНЕ НЕГІЗДЕЛГЕН МАМАНДЫҚТАРДЫ РАНЖИРЛЕУ

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Аннотация

Өзектілігі. Қазақстан Республикасында әлеуметтік кепілдіктерді ұсынудың ұлттық жүйесі негізінен тізбелік тәсілге сүйенеді, бұл жұмыс орындарының нақты кәсіби тәуекел деңгейін және салалық ерекшеліктерін толық көрсетпейді.

Мақсаты. Кәсіби тәуекел деңгейі мен экономикалық қызмет түрінің үйлесіміне негізделген мамандықтарды ранжирлеудің ғылыми негізделген моделін әзірлеу және сынақтан өткізу, салалық коэффициентті есептеу және әлеуметтік кепілдіктерді саралау үшін рангілік кесте қалыптастыру.

Материалдарменәдістер. Зерттеуде пилоттық кәсіпорындарда жүргізілген кәсіби тәуекелдерді бағалау деректері, социологиялық сауалнама нәтижелері (n = 312), Қазақстан Республикасы Ұлттық статистика бюросының 2024 жылғы ресми статистикалық мәліметтері және Еңбек қауіпсіздігі және еңбекті қорғау жөніндегі республикалық ғылыми-зерттеу институтының әдістемелік әзірлемелері пайдаланылды. Кәсіптерді экономикалық қызмет түрлері бойынша топтастыруды, кәсіби тәуекел дәрежесін белгілеуді, салалық коэффициентті есептеуді және интегралды рангілік индексті қалыптастыруды қамтитын алгоритм ұсынылды. Сипаттамалық статистика, корреляциялық және факторлық талдау, Delphi әдісі бойынша сараптамалық валидация және сезімталдық талдауы қолданылды.

Нәтижелері. Экономикалық қызмет түрі, кәсіби тәуекел дәрежесі және салалық коэффициент бойынша 74 бірегей комбинацияны қамтитын рангілік кесте қалыптастырылды. Ең жоғары рангтер тау-кен өндіру, химия және металлургия салаларында, ал ең төменгі рангтер ақпарат және байланыс саласында анықталды. Сараптамалық валидация бағалаулардың жоғары келісімділігін көрсетті (шамамен 92 %), ал сезімталдық талдауы модельдің орнықтылығын растады.

Қорытындылар. Ұсынылған модель әлеуметтік кепілдіктер көлемін нақты кәсіби тәуекелдермен және салалық ерекшеліктермен ғылыми негізде байланыстыруды қамтамасыз етеді және Қазақстан Республикасында жұмысшыларды әлеуметтік қорғаудың тәуекелге бағдарланған жүйесіне көшу кезінде пайдаланылуы мүмкін.

Түйін сөздер: *кәсіби тәуекел дәрежесі, экономикалық қызмет түрі, кЭҚТ, мамандықтарды ранжирлеу, кәсіби тәуекелдерді бағалау, Қазақстан.*

РАНЖИРОВАНИЕ ПРОФЕССИЙ ПО СОЧЕТАНИЮ СТЕПЕНИ ПРОФЕССИОНАЛЬНОГО РИСКА И ВИДА ЭКОНОМИЧЕСКОЙ ДЕЯТЕЛЬНОСТИ

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Аннотация

Актуальность. Национальная система предоставления социальных гарантий в Республике Казахстан преимущественно основана на списочном подходе, который не отражает реальную степень профессионального риска и отраслевую специфику рабочих мест.

Цель. Разработать и апробировать научно обоснованную модель ранжирования профессий по сочетанию степени профессионального риска и вида экономической деятельности с расчётом отраслевого коэффициента и формированием ранговой таблицы для дифференциации социальных гарантий.

Материалы и методы. Использованы данные оценки профессиональных рисков на пилотных предприятиях, результаты социологического опроса (n = 312),официальная статистика Бюро национальной статистики Республики Казахстан за 2024 год и методические разработки Республиканского научно-исследовательского института по охране труда. Предложен алгоритм, включающий группировку профессий по видам экономической деятельности, присвоение степени профессионального риска, расчёт коэффициента вида экономической деятельности и формирование интегрального индекса ранга. Применены методы описательной статистики, корреляционного и факторного анализа, экспертная валидация по методу Delphi и анализ чувствительности.

Результаты. Сформирована ранговая таблица, включающая 74 уникальные комбинации вида экономической деятельности, степени профессионального риска и коэффициента kВЭД. Наивысшие ранги выявлены в горнодобывающей, химической и металлургической отраслях, наименьшие – в сфере информации и связи. Экспертная валидация показала высокий уровень согласованности оценок (около 92 %), а чувствительный анализ подтвердил устойчивость модели.

Выводы. Предложенная модель обеспечивает научно обоснованную привязку объёма социальных гарантий к реальным профессиональным рискам и отраслевым особенностям и может быть использована при переходе к риск-ориентированной системе социальной защиты работников в Республике Казахстан.

Ключевые слова: *степень профессионального риска, вид экономической деятельности, kВЭД, ранжирование профессий, оценка профессиональных рисков, Казахстан.*

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