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THE DECISION-MAKING PROCESS OF PEOPLE WITH DISABILITIES EMPLOYMENT IN THE CONTEXT OF OCCUPATIONAL SAFETY AND SUSTAINABLE DEVELOPMENT

Labor diversity in the human resources is a competitive advantage, but ensuring this requires from organization management to make the managerial decisions, as this may need the additional financial costs. An example of this can be the employment of persons with disabilities and the further decision of issues of ensuring their safety in the process of work. The main focus of the article is to study the decision-making process for employment of persons with disabilities using the basic principles of game theory.

Keywords: *disability, sustainable development, occupational safety, game theory.*

Introduction

Ensuring sustainable business development is impossible without the efficient use of human resources. The World Development Report [1] emphasizes that investing in people through granting of quality education, workplaces creation and professional skills training contributes to the development of human capital, which is a key condition for building a more socially cohesive society. Current trends of the development this issue are closely connected with the granting of an equal rights and the involvement of a diverse human resources, which means the employment of workers of different ages, races, religions, genders, sexual orientations, physical abilities, etc. This approach allows the company entering new markets, implement strategies with different target audiences, etc.

One of the ways to ensure the diversity of human resources is to involve people with disabilities to the workplaces. On the one hand, the company thus proves its leadership in human rights and labor law. On the other hand, hiring people with disabilities is a challenge for the occupational safety and health management system, as safety issues become extremely important, because the physical or mental flaws of people with disabilities create an additional risk of injury to the disabled worker. To solve such a multiple-aspect problem, it is necessary to use appropriate approaches. Thus, to effectively solve this issue, it is advisable to use elements of decision making theory, in particular – game theory.

Game theory allows creating and exploring mathematical models of optimal decision-making in conflict conditions. Because the parties to most conflicts

have an interest in concealing their intentions from the adversary, decision-making in conflict situations usually takes place in conditions of uncertainty, which should be reflected in the study.

The aim of the article is to study the possibility of using the game theory in the study of the process of making managerial decisions regarding to the employment of an employee with a disability, taking into account his health state and ensuring of occupational safety. The goal of the article is to analyze alternatives and determine the priority strategy characterized by the maximum gain.

Analysis of the Latest Researches and Publications

Achieving the goals of sustainable business development is ensured by the effective solution of issues in the following main areas: environmental protection and rational use of the resource base, including human resources [2, 3]. At the same time, the company's policy in solving environmental issues and social responsibility for staff retention is becoming increasingly relevant and largely ensures the competitiveness and investment attractiveness of the business [4, 5].

The diversity of the human resources makes it heterogeneous. In the current scenario, the use of diversified human resources is a necessity for every organization, but managing such a diversified human resources is also a significant challenge for management [6]. Because there are certain groups of workers who are "vulnerable" from the point of view of occupational safety, for whom ensuring the safety issues at the workplaces are difficult to solve, but are extremely

important: workers with disabilities; workers who perform high-risk work; outsourcing workers [7]. These vulnerable workers often become unemployed and move from one category of work to another. There is also no control over vulnerable workers who move to a new employer, change their job status or leave work due to poor health or other reasons [8, 9].

Thus, there is a certain conflict in the issue of ensuring the diversity of human resources at the employment of people with disabilities: on the one hand, diversification of human resources is a competitive advantage of the company, on the other hand, the need to take into account the health state of workers with disabilities at adaptation of workplace and technological process creates an additional burden on the management system, and also requires additional financial costs [10, 11].

In [12], an approach to the use the game theory in the study of occupational safety problems at the workplaces of workers working in small and medium-sized business enterprises in China, which are identified as the most vulnerable in terms of compliance with occupational safety requirements. Given the difficulties associated with a low level of safety management due to insufficient funding, an imperfect system of training employees in the rules of occupational safety, safety levels in such enterprises are lower than in large ones.

Traditional game theory aims to analyze the conflict and interaction between two players to mathematically substantiate a strategic decision. However, players must be completely rational and have complete information about the features of the object of study, which in practice is quite rare. Therefore, in the study, the authors added specific parameters and coefficients to reflect the characteristics of safety management and defined the strategy of players in accordance with the characteristics of safety management.

Models based on game theory may have some diagnostic uncertainty due to the difficulty of modeling individual variables on the other party's intentions to comply with occupational safety requirements, but this interaction can be modeled by games with incomplete information [12, 14].

In the process of organizing the functioning of the occupational safety and health management system, employers, employees and other stakeholders try to achieve their goals by choosing rational actions based on conclusions about possible steps by the other party, based on the following assumptions [13]: each player (decision maker) has information about the rules and conditions of the game; players are rational, they consistently make decisions to achieve their goals; players seek to maximize their winnings, which can be described by the utility function.

This allows taking into account the interests of all stakeholders and organizing an effective occupational safety management system.

Purpose of the article and research objectives

The process of making managerial decisions about the employment and ensuring the safety of a worker with disability is accompanied by a high degree of uncertainty, as the employer may not have the complete information about the health state of a person with disability and the possibilities of the influence of work environment and process factors in the context of occupational injuries increasing. Thus, this situation can be presented as a "game with nature", where the work environment is presented in the form of "nature", which allows reflecting the state of compliance or non-compliance of working conditions with regulatory requirements and determine the optimal employer strategy. The aim of the article is to study the decision-making process for employment of disabled persons using the basic principles of game theory.

Presentation of the basic material

The process of the employer's decision making on the choice of workplace for an employee with a disability in order to ensure the best compliance with the level of his ability to work to the requirements of the technological process and equipment, as well as safety reasons, can be analyzed from the point of view of game theory, which methodology used for research of the process of making managerial decisions in conditions of uncertainty. The use of the basic principles of game theory is an effective mechanism in the decision-making process, in particular in the field of occupational safety.

A formalized description of the participants of the game, as well as their strategies under the influence of external and internal factors allows identifying the key aspects to determine the priority strategy of the decision-making management process. Suppose that two players take part in the game: the employer and the production environment (nature). The choice of strategies for each of the players creates a situation that is characterized by a certain conditional gain or its monetary equivalent [15].

Consider the situation of the employer's decision to ensure safety at the workplace of a person with a disability.

Based on the results of the analytical work of the expert group, let's define possible alternatives with a finite set of alternatives of the type

$$A = \{A_1, A_2, A_3\}, \quad (1)$$

where A_1 – the alternative, which consists in the fact that the employer makes the decision to give the workplace to worker with a disability with assessment of his psycho-physiological state and adaptation of the workplace and technological process to his special needs;

A_2 – the alternative, in which the employer also makes the decision to give the workplace to worker with a disability, at the same time he does not implement the measures to adapt the workplace to achieve the required safety level, and therefore does not incur additional financial costs;

A_3 – the alternative not to employ an employee with a disability, instead to employ an employee without life restrictions. In this case, the employer does not need to adapt the workplace, does not incur additional financial costs, but loses competitive advantage and leadership positions.

The influence of factors of the working environment and process is considered as an action of nature, which may be antagonistic to the interests of the employer, as dangerous and harmful production factors accompanying the working process can lead to increased production risk, favorable or neutral.

Let's admit that the employer assumes that hiring a person with a disability is associated with a possible increasing of the risk of occupational injuries. However, the decision making is made in a situation of uncertainty, because the employer does not have sufficient information about the state of health of a person with a disability, as well as the level of his working ability. In addition, the influence of the environment in the presence of a number of dangerous and harmful production factors even not high levels at the workplace can adversely affect on the health state and working ability of a worker with a disability, and thus create the preconditions for an accident.

According to the current legislation, the employer must create the conditions set by the medical and social expert commission in the individual rehabilitation program of person with disability, as well as make additional occupational safety measures to compensate life restrictions caused by persistent functional changes in the health of person with disability. However, it is not uncommon for employers to dishonestly comply with legal requirements and knowingly violate employees' rights on safe working conditions.

Suppose that in the process of making a management decision on the employment of a person with a disability, the employer may choose one of the strategies A .

The conditional benefit that can be obtained by the employer in the situation under consideration is defined as:

$$U = S - S_w - S_p - H + I, \quad (2)$$

where S – the income received by the employer from the fulfillment by the employee of his duties, its level depends on the state of health of the employee with a disability, qualifications, level of work ability and other factors;

S_w – the costs for adapting the workplace to the special needs of an employee with a disability. The amount of costs depends on the level of non-compliance of the employee with a disability to the requirements of the workplace and working process;

S_p – fine for violation of the law on non-assignment to provide a workplace to a person with a disability;

H – injury and illness-related costs that depend on the working conditions at the workplace;

I – the income received from corporate social responsibility.

The strategy of the environment (nature) is based on the following assumptions:

B_1 – working conditions at the workplace of a person with a disability correspond with his special needs, as well as the requirements of current regulations;

B_2 – working conditions at the workplace in general correspond with the requirements of current regulations, but measures of adaptation the workplace have not been implemented;

B_3 – working conditions at the workplace do not correspond with the requirements of current regulations on certain characteristics.

To form the game matrix, statistical information was processed regarding to the productivity of one employee. The information was received from representatives of four machine-building enterprises in Kharkiv based on the results of 2021. The cost of adapting a workplace for an employee with a disability was taken as a one-time cost in the amount of 20% of the output of one employee. The fine for non-compliance with the norm of workplaces for the employment of persons with disabilities, established by the Ukraine legislation, is equal to the average annual salary of a full-time employee. Data on average salary were also obtained directly from enterprises. Accident payments are also based on company statistics. At the same time, due to the lack of statistically reliable information on sick-leave certificate payments for employees with disabilities, they were taken in 1.5-3 times more than accidental payments for employees without disabilities, depending on working conditions. The implementation of corporate social responsibility practices in the development of business processes shows that positive changes, both long-term and short-term, are observed in most cases, but it is difficult to evaluate them numerically [16-19]. In this regard, the assessment of the role of corporate social responsibility was determined based on the data that consumers of

products who are aware of the company's desire to carry on their business in accordance with social responsibility choose this particular product or service, which is estimated by an increase in sales revenue by 2.8 % [19].

As a result, according to formula 1, the size of possible winnings for different strategies of each of the players was calculated, which is shown in table 1.

Table 1
Game win scheme, thousand UAH

	Nature (B ₁)	Nature (B ₂)	Nature (B ₃)
Employer (A ₁)	352	294	188
Employer (A ₂)	298	260	127
Employer (A ₃)	420	359	296

The strategies were analyzed according to the following criteria [20]:

1. Laplace criterion. This criterion allows making assumptions about the equally probable states of nature.

2. Wald's criterion. This criterion reflects the principle of a guaranteed result in a situation where predictions of winnings may be minimal in an adverse situation. This criterion reflects the pessimistic mood of decision maker in conditions of uncertainty, i.e. is close to the situation under consideration in this case.

3. Savage's criterion. This criterion also reflects the pessimistic mood of the decision maker and allows choosing a strategy in which losses will be minimized in the event of an erroneous decision.

4. Optimistic criterion, according to which the decision maker assumes that the conditions will be most favorable.

5. Hurwitz criterion. Using this criterion allows setting the expectations of the decision maker about the size of the gain in the form of a compromise between an optimistic and pessimistic position.

The analysis of five criteria showed that from all of them the optimal strategy for the employer is the A₃ strategy, i.e. employment of the employee without a disability. The maximum winning is set on the A₃B₁ strategy, according to which the employee does not have stable functional changes in the health state, and the most favorable working conditions are created at his workplace. At the same time, the employment of a worker with a disability and adapting the workplace taking into account the life limitations not only increases the level of work capacity and minimizes the risk of occupational injuries, but also compensates the costs by increasing competitiveness and investment attractiveness resulting from the benefit scheme according to the table. 1.

Employment of people with disabilities is an important socio-economic issue for every country. At the same time, the negative attitude of employers to providing a workplace to a person with a disability is due to the expectations of an increase in the level of occupational injuries, additional financial costs and insufficient efficiency of the employee and other factors. This is confirmed by the results of research presented in the article.

At the same time, employment of a person with a disability allows the company to gain a number of benefits: to demonstrate leadership skills and an effective management system, to provide a diverse human resources and to cover new market clusters; improve the occupational safety management system and implement the principles of corporate social responsibility.

Thus, to effectively solve this issue, it is important for the company to implement measures to select a workplace according to the capabilities of the employee, as well as to improve the system of injury risks prevention. Collectively, this allows minimizing the level of injuries, increasing the efficiency of work, as demonstrated by the strategy A₁B₁.

Thus, the use of game theory provides the formation of the information base of the decision making management process, which can be used to solve different problems in the field of management. However, in order to increase the accuracy of forecasts, it is necessary to improve the analytical tools to reduce uncertainty. Also to increase the reliability of the results it is necessary to carry out further research on the principles of formation of the components of conditional gain.

Conclusions

The article analyzes the possibility of applying game theory in solving problems of management, including occupational safety management, on the example of making managerial decisions on employment at the enterprise of person with a disability and adaptation of the workplace taking into account the existing limitations of life activity to minimize the risk of increasing of occupational injuries. The problem is considered in the context of "playing with nature", the participants of which are the employer and the environment, which determines the working conditions and affects the level of occupational safety. In this game, the article formulates the strategies of players, identifies the components of the conditional gain that an employer can receive depending on the strategy chosen, as well as the strategy of nature, and identifies the optimal strategy using Laplace, Wald, Savage, Hurwitz and optimistic criteria.

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ПРОЦЕС ПРИЙНЯТТЯ РІШЕНЬ ЩОДО ПРАЦЕВЛАШТУВАННЯ ОСІБ З ІНВАЛІДНІСТЮ У КОНТЕКСТІ ОХОРОНИ ПРАЦІ ТА СТАЛОГО РОЗВИТКУ

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Людський капітал, а саме знання, навички та вміння, дозволяють кожній компанії, регіону та країні загалом забезпечувати стабільність та розвиток. При цьому економічне зростання компанії має здійснюватися з урахуванням необхідності дотримання принципів соціальної відповідальності, у тому числі у напрямку уникнення дискримінації, адже рівність можливостей відіграє важливу роль у забезпеченні сталого розвитку. Диверсифікація робочої сили в людських ресурсах є конкурентною перевагою компанії, забезпечуючи вихід на нові ринки, але при цьому від керівництва може очікуватися як прийняття додаткових управлінських рішень, так і фінансових витрат. Прикладом такої ситуації є процес працевлаштування у компанію осіб з інвалідністю та подальше вирішення питань забезпечення їх безпеки та ефективності трудової діяльності. З одного боку, надання робочих місць особам з обмеженими можливостями сприяє підвищенню ефективності системи менеджменту, зокрема менеджменту безпеки та гігієни праці. З іншого боку, організація безпеки осіб із інвалідністю вимагає додаткових капіталовкладень на адаптацію робочих місць та технологічних процесів під особливі потреби цієї категорії працівників. Основною метою статті є дослідження процесу прийняття рішень щодо працевлаштування осіб з інвалідністю на основі принципів теорії ігор. У статті проаналізовано стратегії, які описують оптимальну стратегію роботодавця щодо організації працевлаштування із стійкими функціональними змінами у стані здоров'я, визначену за допомогою критеріїв Лапласа, Вальда, Севіджа, Гурвіца та критерію оптимізму. Згідно дослідження, за більшістю критеріїв оптимальною була стратегія, за якої роботодавець приймає рішення про надання робочого місця особі, яка не має стійких функціональних змін у стані здоров'я, що підтверджується статистикою зайнятості людей з інвалідністю. При цьому встановлено, що, якщо робоче місце адаптоване до психофізіологічного стану людини з інвалідністю, це не тільки підвищує працездатність самого працівника та мінімізує ризик виробничого травматизму, але й компенсує витрати за рахунок збільшення робочого часу. При цьому конкурентоспроможність та інвестиційна привабливість компанії зростатиме.

Ключові слова: інвалідність, сталий розвиток, охорона праці, теорія ігор.