

VALIDATION OF ECOLOGISTS IN ENTERPRISE MANAGEMENT SYSTEM: A CASE STUDY ANALYSIS

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Abstract: The article is devoted to the study of the influence of personnel validation on the efficiency of the enterprise management system. These components of validity, such as the accordance of a person's qualifications to the position occupied or applied for (vacancy profile), education by specialty and other characteristics of an individual labor supply, etc., are the key determinants in the selection of managers and contribute to the effective application of their specific management functions and the transformation of the latter through the management methods into effective management decisions. Confirmation of the certainty of such an impact are the results of applied research in the area of responsibility of environmental managers (for example, the dependence of the level of environmental safety of the enterprise on the validity of environmentalists). The management of railway transport enterprises (RTE) of the joint stock company "Ukrainska zaliznytsia" (JSC "Ukrzaliznytsia") was selected for analysis, the competence of which concerns the use of natural resources and environmental protection (environmentalists) as one of the components of sustainable development. The method of integrated assessment of the level of ecological safety is proposed based on the application of taxonomic analysis, which provides the opportunity to use a scenario approach to the development of situations taking into account the different levels of validity of RTE environmentalists.

Key words: sustainable development, management, railway companies, personnel validation, environmental safety

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Introduction

Issues of staff validation, validation in personnel selection methods and practical validation tests were investigated by many scientists and researchers (Oh et al., 2011; Ones et al., 1993; Schmidt and Hunter, 1998; Schmidt et al., 2016; Schmidt, 2012). It is a common knowledge that validation is understood as a procedure which gives a high degree of certainty that a particular process, indicator, method, or system is in accordance with predetermined eligibility criteria. On the other hand, it should be noted that due to the lack of coverage of the problem in the scientific works in general, the issue of the influence of the validity of specialists

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and environmental specialists dealing with the use of natural resources and environmental protection on the ecological safety of railway enterprises, in order to ensure their sustainable development, has remained unexplored. Given the deliberations presented, the purpose of the research is to confirm the hypothesis of the existence of a relationship between the degree of the validity of human resources component and the level of environmental safety of railway enterprises to ensure their sustainable development.

Literature Review

Analysis of literary sources on the given problem has made it possible to develop the notion of validation of personnel and treat it as a confirmation on the basis of providing objective evidence that the qualification requirements (competencies, experience in the profession, full or partial employment, qualification improvement, education level, etc.), put forward for a particular position, are executed. Regarding a particular study, validation of the personnel is considered by us as a process of ensuring the compliance of the competences of environmental specialists with the occupied positions (including the increase of the share of full-time employees) in relation to the overall safety of enterprises in order to prevent negative effects on the security of the enterprise due to the risks (Meyer et al., 2017; Dvorsky et al., 2018; Oláh et al., 2019) and threats that arise as a result of deformation of such structure. and the discrepancy of the enterprise's activities with the principles of sustainable development (Androniceanu and Popescu, 2017).

The main factors of validity are the accordance of a person's qualifications to the position he occupies or claims to be (job profile), education by specialty (Schüller et al., 2013) and other characteristics of the individual supply of labor. Accordingly, internal dangers in personnel provision may be the mismatch of the qualifications of employees in the position occupied, the disadvantages of the personnel management system in general (Ciobanu et al., 2019). Therefore, it is logical to assume that the validation of staffing is an important factor in ensuring the effectiveness of the enterprise management system in general, including the overall security of enterprises. Under the level of validity refers to the ratio of the proportion of specialists who deal with the use of natural resources and environmental protection on the railways of Ukraine by combining jobs, to their total number. The conducted research confirms that the level of staff validation affects the successful activity of the enterprise and its harmonious development.

The high level of validity shows not only the positive impact, but also the competent level of management decisions at different levels of management. As you know, in order to ensure sustainable development of an enterprise, besides economic and social, there is a need and importance of taking into account the ecological component. Investigating the management system of JSC Ukrzaliznytsya, which consists of six regional railways and other enterprises with significant negative environmental impacts, the influence of environmentalists'

validation on the level of environmental safety of railway transport of Ukraine was studied.

The railway enterprises in the JSC "Ukrzaliznytsia" is one of the priority directions of cooperation between Ukraine and the European Union (Shpak et al., 2018). It should be noted that the main constituents of the damage caused by this type of transport to the environment are the use of land, the significant consumption of water resources and their discharges into water facilities, air pollution by various emissions from stationary and mobile sources, the formation of waste of various classes of danger, acoustic impact (noise) of rolling stock and road equipment, electromagnetic radiation, negative impact on the environment during transportation of hazardous substances, including during emergency pollution, etc. The development of literary sources made it possible to conclude that the above mentioned problems and possible theoretical and practical ways of their solution are not sufficiently investigated. In particular, Pop and Boyle (2017) and Tvaronaviciene (2018) in their work substantiate the need for further research on the ecology of railways. On the other hand, Sobczak (2014) underlines an advantage of railway transport, i.e. its eco-friendly nature and minimal emissions to the atmosphere. Similarly, Kliestikova et al. (2018) highlight the need of real, not only formal ecological orientation of transport companies. Their research is developed by Valaskova et al. (2018) who declare importance of this issue in scope of brand value building and managing. Tuler and Kaewunruen (2017) investigated the methodology for reducing the negative effects of factors such as noise and vibration from railways. Other scholars, e.g. Maclachlan et al., (2018) investigated this problem in the context of human health. The issue of environmental and safety risks for high-speed railways in China, where the longest high-speed rail network is planned to build by 2020, is described in detail by He et al. (2015). Problems of environmental safety on the basis of the relationship between landscape models and ecological processes are covered in the work of Peng et al. (2018). In turn, Gao et al. (1998) proposed a method for forecasting environmental safety in railroad construction projects.

The effectiveness of environmental activities of RTE largely depends on the level of competence of employees, which are directly related to the adoption of management decisions in this direction. From the correspondence of their level of qualification, the availability of environmental education, qualification improvement depends on the quality of environmental safety management at enterprises. One should also mention external factors, including state policy towards railway companies, regional and state legislative activity, and fiscal policy of the state (Kowalska, 2014). It should be noted, however, that the above questions did not receive the proper attention of scientists and practitioners.

The Murphy's work (Murphy, 2008) is dedicated to the modeling of competencies and the correctness of recruiting procedures. It should be noted that in Ahmad's work (2015) various environmental measures are being studied which are used in practice by well-known world companies, in particular, it concerns the main

advantages of an environmentally friendly team that allows achieving and continuously improving the environmental safety of the enterprise.

The study of the state of the problem of raising the skills of environmentalists and specialists of the six railways of "Ukrzaliznytsia" JSC: Donetska, Lvivska, Odeska, Pivdennia, Pivdenno-Zakhidna and Prydniprovska is presented in previous studies (Dvulit and Levchenko, 2017). The training and validation of highly skilled personnel is seen as an essential component of the environmental management system for RTE for its sustainable development. Thus, the level of modern state of personnel provision of ecological activity as a component of sustainable development of railways, greatly affects the level of environmental safety of such enterprises. The issue of sustainable development and its practical environmental implications has been highlighted also by Moravcikova et al. (2017).

The actuality of the study is confirmed with the fact that during the period of 2012-2016, the number of staff members whose competence was the issues of rational use of nature and nature protection activities was averagely 9% during the period under study (Kravets et al., 2018). The rest, perform the duties of specialists who deal with the use of natural resources and the protection of the environment on the railways of Ukraine only by combining jobs. In general one can state that the topic under investigation is multidimensional and analyzed by the particular scholars on multi-level perspectives.

Research Methods

A sample of statistical data was used for the research (the proportion of regular specialists dealing with the use of natural resources and environmental protection, the cost of measures to comply with environmental norms (capital investment and current costs for environmental protection, environmental tax, payment for environmental protection services); losses from penalties for breach of environmental norms; the number of accidental pollution during the transportation of dangerous goods) for 6 regional railways of Ukraine. Structural-dynamic analysis of the degree of staff validity and the state of environmental safety at the RTE for ensuring their sustainable development for 2007-2018 has been applied. The taxonomic analysis apparatus was used for the integral assessment of the degree of environmental safety for 2008-2017. The methods of correlation-regression analysis are used to determine the effect of the degree of validity of personnel on the state of environmental safety for 2008-2017. Scientific publications on the subject, domestic legislation, reporting of RTE, content of job descriptions of environmental engineers served as the information basis of the research.

Results and Discussion

Validation of the personnel is considered by us as a process of ensuring the compliance of the competences of environmental specialists with the positions

occupied (including the increase of the share of staff members) regarding the overall safety of the enterprises in order to prevent negative impacts on the security of the enterprise due to the risks and threats that arise as a result of the deformation of such structure and inconsistency of enterprise activity principles of sustainable development. The main factors of validity are the suitability of a person's qualifications for the position he occupies or claims to be (job profile), education by specialty, and other characteristics of the individual supply of labor. Accordingly, internal dangers in personnel provision may be the mismatch of the qualifications of employees in the position occupied, and the shortcomings of the personnel management system in general. Therefore, it is logical to assume that the personnel validation is an important factor in ensuring the overall security of enterprises. The level of validity refers to the ratio of the proportion of specialists who deal with the use of natural resources and environmental protection on the railways of Ukraine by combining jobs, to their total number.

The elements of enterprise security are: socio-economic security (techno-technological, intellectual, personnel), information security, market and foreign economic safety; financial security; political and legal, power and environmental components (Meyer and Meyer, 2017; Drahan and Maznyk, 2018). In addition, Meyer and Meyer (2016) state that for an enterprise to function properly an external enabling environment is also needed and environmental safety can be influenced internally and externally. Ensuring the appropriate level of environmental safety depends to a large extent on the competence, professionalism of workers, their intellectual and professional skills, that is, on the level of validity.

Analysis of the practice of RTE activity proves that one of the sources of environmental risk is a conflict of interest. Confirmation of this conclusion is the discrepancy of the structure of management of ecological activities on railways to the requirements of the present. Thus, the conflict of interests arising from the existing organization of environmental activity on the railroad is manifested in the fact that the official position (ecologist) is present in the organizational structure of the enterprise, but engaged by combining jobs or by specialist with an incompatible level of competence. Proceeding from the above interpretation of the conflict of interests and their manifestations in the investigated branch, it is assumed that in practice the top management of railways is not interested in proper financing and high-quality human resources management of environmental safety. Proceeding from the above, the content of the process of ensuring environmental safety of the enterprise can be expressed as a function of this type:

$$\text{LES}(C, P, V, EP) \rightarrow \max, \quad (1)$$

where LES – the level of environmental safety, C – costs for measures to comply with environmental norms (capital investments and current expenses for environmental protection, environmental tax, payment for services of environmental protection purposes), P – losses from penalties for violation of environmental norms, V – the personnel validity (the proportion of regular staff

dealing with the use of natural resources and the protection of the natural environment), EP – the number of emergency pollutions during dangerous goods transportation.

The dynamics of these factors on six Ukrainian railways during the studied period of time is considered. The dynamics of the cost indicator according to official data of JSC "Ukrzaliznytsia" (Kravets et al., 2018) and the official yearly average exchange rate of UAH/EURO for 2007-2017 (Official website of The National Bank of Ukraine, 2019) for measures to comply with environmental norms on the railways of Ukraine (Figure 1) suggests a irregular downward trend, and even the inflationary component does not affect the artificial growth of these costs. Consequently, this is evidence of an inadequate level of environmental safety management.

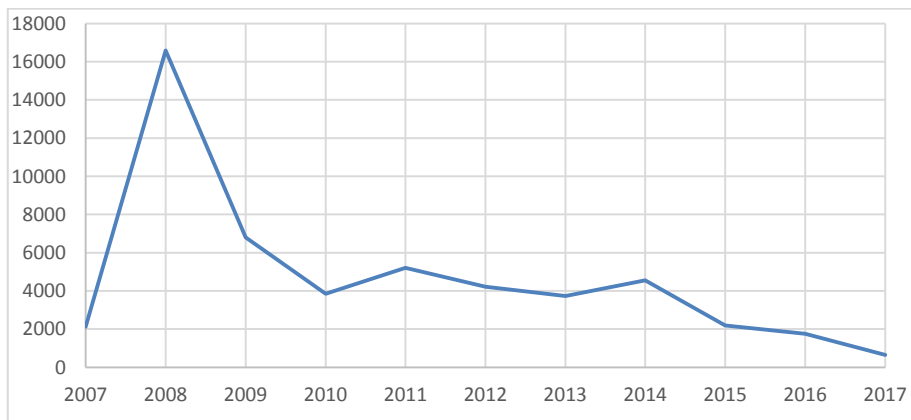


Figure 1. Total costs for compliance with environmental norms measures on six Ukrainian railways for 2007-2017, ths. EURO

The rapid decrease in the mentioned indicator in the period of 2007-2017 did not contribute to the improvement of the state of ecological activity and executive discipline in view of the reduction of financing of environmental activities. This is another indication that the relevant valid ecological activity is simply not enough. Moreover, the dynamics of monetary measurement of the corresponding penalties (Figure 2 and Figure 3) is difficult to describe by a certain mathematical dependence (the linear filtering for certain oscillations is proposed).

Such unstable and turbulent phenomena in the field of environmental safety management can be explained by exploring the structure of personnel dealing with the use of natural resources and the protection of the environment (Figure 4). The share of staff who deals with those issues by combining jobs is threateningly increasing. This is evidence of lowering the validity of the personnel and the overall level of environmental safety. The analysis of the dynamics of the number of emergency contaminants indicates unstable dynamics, but the trend is dangerous in 2015 and 2016 (Figure 5).

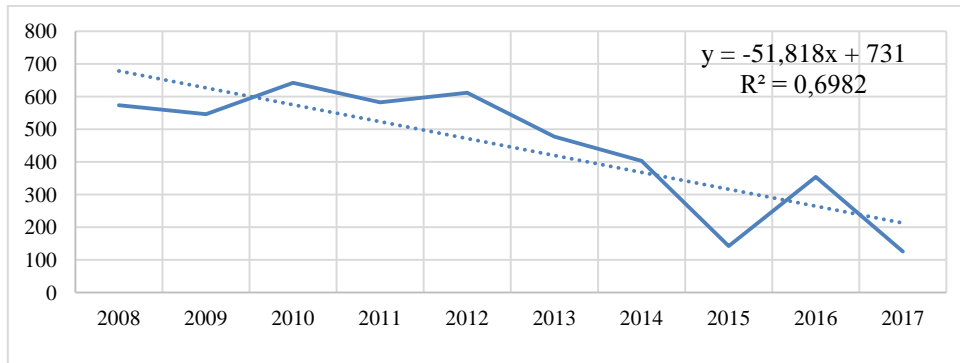


Figure 2. Total administrative penalties (imposed), claims for damages, disciplinary penalties, departmental control of six railways for 2008-2017, units

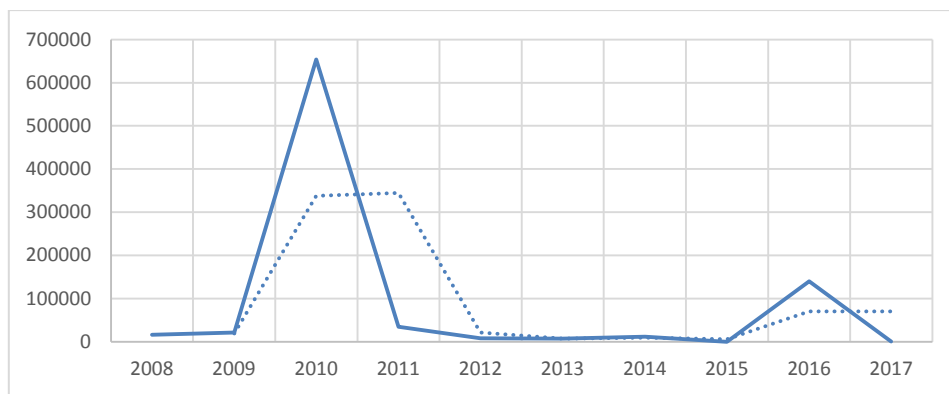


Figure 3. Total administrative penalties (imposed), claims for compensation of losses of six railways for 2008-2017, EURO

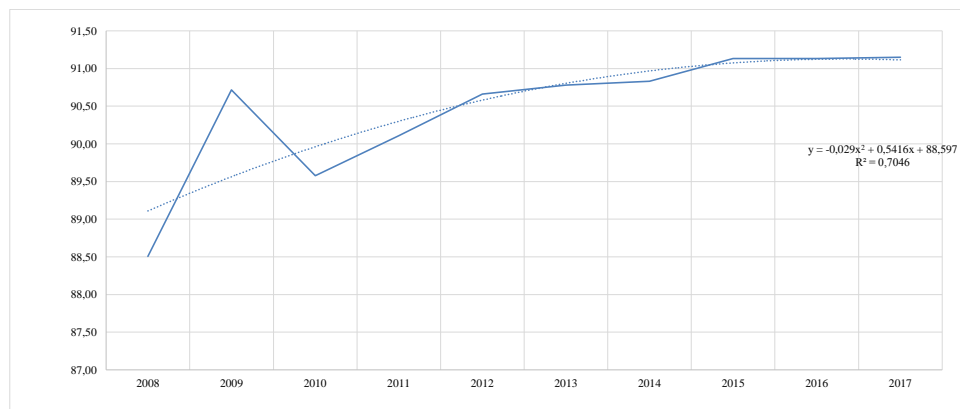


Figure 4. The share of specialists of the railways who work by combining jobs in the sphere of dealing with the use of natural resources and the protection of the environment (total for six railways) for 2008-2017

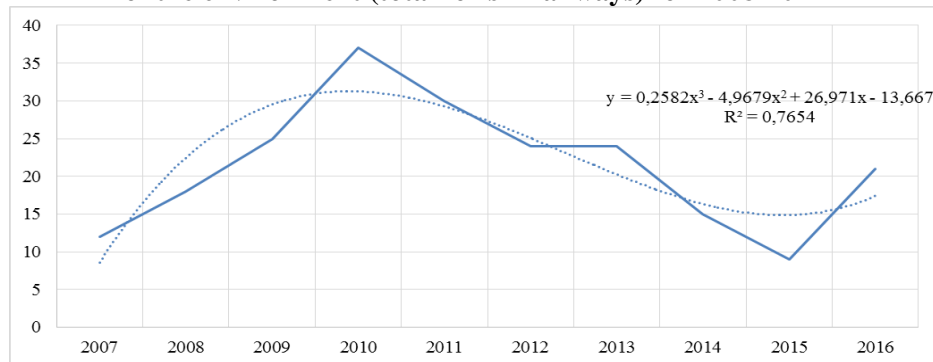


Figure 5. The total number of emergency pollutions in the transportation of dangerous goods by six railroads for 2008-2017, un

The study of the dependence of the number of accidental contaminants in the transport of dangerous goods from the share of environmentalists who work by combining jobs in railways in 2008-2017, using a correlation-regression analysis, allowed to form the following model:

$$Y = a + bx + cx^2 \quad (2)$$

where Y – the number of emergency pollutions during dangerous goods transportation,

x – the share of environmentalists of the railways who work by combining jobs.

As a result of the calculations obtained the following parameters:

$$Y = -85890,4 + 1911,4529x - 10,63071859x^2 \quad (3)$$

The tightness of the connection between variables is estimated by the coefficient of determination $R^2=0,6701$. This means that more than 67% of the variation of emergency pollutions is due to the degree of validity of personnel engaged in environmental activities. The adequacy of the model is estimated using the relevant statistical criteria and can be used to make appropriate managerial decisions with a probability of 0.95. Thus, reducing the level of validity of the staff can lead to adverse environmental effects. The integral assessment of the level of environmental safety was carried out on the basis of the taxonomic index construction in a phased manner.

Table 1. Formation of the matrix of observations (X)

Years	C, thousand EURO	P, EURO	V	EP, un.
2008	16593	16378	0,8851	12
2009	6799	21469	0,9072	18
2010	3856	653696	0,8958	25
2011	5204	34730	0,9011	37

2012	4216	7564	0,9066	30
2013	3728	7238	0,9078	24
2014	4549	11426	0,9083	24
2015	2189	39	0,9113	15
2016	1759	139966	0,9113	9
2017	643	166	0,9115	21

Stage 2. Standardization of the values of elements of the matrix of observations. For this purpose, the average value for each indicator is determined by the formula of the average geometric value (if there are normative values of the indicator, then it should be used):

$$\bar{X}_i = \sqrt[n]{X_1 \cdot X_2 \cdot \dots \cdot X_n} \quad (4)$$

As a result, we get the following values of the matrix elements for each year:

X1=2,4709; 1,4275; 0,7846; 1,115; 0,8365; 0,7642; 1,381; 1,0245; 0,9612; 0,3728.

X2 = 1,1; 0,1956; 5,7732; 0,323; 0,0651; 0,0644; 0,1506; 0,0008; 3,3203; 0,0011.

X3 = 0,978; 1,0029; 0,9903; 0,9961; 1,0022; 1,0035; 1,0041; 1,007; 1,007; 1,0076

X4 = 0,558; 0,8372; 1,1628; 1,7209; 1,3953; 1,116; 1,116; 0,6977; 0,4186; 0,9767

Elements are divided into stimulators (+) and de-stimulators (-). This procedure is the basis for constructing a vector-standard. Elements of this vector have coordinates X_{0i} and are formed from the determined indicators by the formula:

$$\left. \begin{aligned} X_{0i} &= \max X_{ij} \text{ (for stimulative indicators)} \\ X_{0i} &= \min X_{ij} \text{ (for de-stimulative indicators)} \end{aligned} \right\} \quad (5)$$

$P_0 = (X_1^+, X_2^-, X_3^-, X_4^-)$, де X_1^+ , – stimulator, X_2^-, X_3^-, X_4^- – de-stimulator.

The coordinates of the vector-standard for the six Ukrainian railways are the following: $P_0 = (2,4709; 0,0008; 0,9784; 0,4186)$.

Step 4. Determine the distance between the actual indicator of the level of environmental safety and the vector-standard. The distance between the starting point and the point P_0 is calculated by the formula:

$$C_{io} = \sqrt{\sum_{i=1}^m (z_{ij} - z_{oj})^2}, \quad (6)$$

where z_{ij} – standardized value of j-th indicator in period of time i;

z_{oj} – standardized value of the j-th indicator for the reference value.

Values for each year are following:

$C_{i02008} = 1,1081$; $C_{i02009} = 1,1412$; $C_{i02010} = 6,0596$; $C_{i02011} = 1,9075$; $C_{i02012} = 1,9053$;

$C_{i02013} = 1,8450$; $C_{i02014} = 1,3029$; $C_{i02015} = 1,4733$; $C_{i02016} = 3,6468$; $C_{i02017} = 2,1713$.

These results are the basis for calculating the level of environmental safety.

Stage 5. Calculate the taxonomic indicator of the level of environmental safety management. To do this, we will calculate the following indicators and generalize them to the Table 2.

Stage 6. The conclusions of the calculations are based on the fact that the taxonomy coefficient varies from 0 to 1, and the indicator of the level of environmental safety, calculated according to the appropriate methodology, has a positive increment.

Table 2. Intermediate calculations for determination the taxonomy coefficient

Years	$s_0 = \sqrt{\frac{1}{m} \sum (c_{i0} - \bar{c}_0)^2}$	$c_0 = \bar{c}_0 + 2s_0$	$d_i = \frac{c_{i0}}{c_0}$	$Ki = 1 - d_i$			
				Basic scenario	Scenario 1	Scenario 2	Scenario 3
2008	0,7261	3,7083	0,2988	0,7012	0,9436	0,9531	0,9538
2009	0,7051	3,6663	0,3113	0,6887	0,8960	0,8957	0,8961
2010	2,4055	7,0672	0,8574	0,1426	0,1770	0,1774	0,1774
2011	0,2205	2,6971	0,7072	0,2928	0,7548	0,8098	0,8097
2012	0,2219	2,6999	0,7057	0,2943	0,9089	0,9094	0,9093
2013	0,2600	2,7761	0,6646	0,3354	0,9127	0,9126	0,9130
2014	0,6028	3,4618	0,3764	0,6236	0,9110	0,9093	0,9099
2015	0,4951	3,2463	0,4538	0,5462	0,9376	0,9357	0,9366
2016	0,8796	4,0153	0,9082	0,0918	0,1514	0,1520	0,1520
2017	0,0537	2,3634	0,9187	0,0813	0,9042	0,9027	0,9021

Therefore, it is desirable to increase the value of the indicator of the level of environmental safety (the closer to 1, the level of security is higher, the closer to 0, the the level of security is lower). The dynamics of the change in the taxonomy coefficient and, accordingly, the level of environmental safety shows that this indicator was the highest in 2008. This can be explained by the favorable values of the components of the taxonomic indicator: the highest level of environmental protection expenditures, the highest level of personnel validity of environmental services, a small number of emergency pollutions.

We will use the scenario approach to compare the empirical dynamics of the level of environmental safety with the adjusted dynamics of this indicator, calculated for different levels of validity of environmentalists in the constancy of other components of the taxonomic indicator. The baseline scenario is presented in the graph (see Fig. 6) (average annual validity is 9%, that is, the share of ecologists combining jobs is about 91%).

Scenario 1 provides for almost 99% of the validity of employees of environmental units (the share of environmental specialists who works by combining jobs – 1-2%). Scenario 2 assumes 50% validity (the share of environmental specialists by combining jobs – 45-55%). Scenario 3 under the condition of 25% validity (the share of environmentalists by combining jobs – 65-75%). We use the Harrington scale to assess the priority of a certain level of environmental safety on the basis of

the correspondences between the priorities of relations in numerical and psychological systems (Table 3).

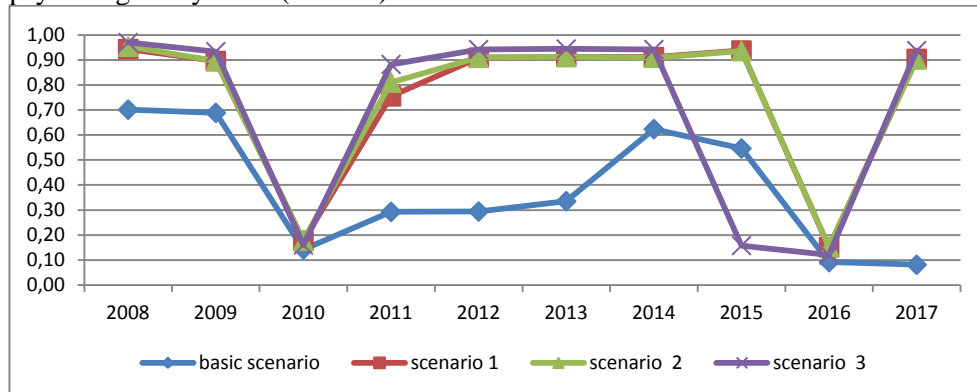


Figure 6. Indicators of the level of environmental safety of six Ukrainian railways in 2008-2017 with 4 validity scenarios

Table 3. Scale of Harrington's desirability for assessing the level of environmental safety

Value interval of taxonomic index	1,0 – 0,81	0,80 – 0,64	0,63 – 0,38	0,37 – 0,21	0,20 – 0
Grade	Very good	Good	Satisfactorily	Bad	Very bad
Years, scenarios	2008, 2009, 2012, 2013, 2014, 2015, 2017 for scenarios 1, 2, 3; 2011 for – 2 and 3	2008, 2009 for basic scenario; 2011 for scenario 1	2014, 2015 for basic scenario	2011-2013 for basic scenario	2010, 2016 all years, 2017 for basic scenario

The calculations show that an increase in personnel validity leads to an increase in the level of environmental safety when comparing the baseline and proposed scenarios. Moreover, the high values of the estimates are achieved with 25% validity. This means that it is not needed to focus on almost 100% validity. It is enough to ensure an increase in the actual validity (today it is about 9%) to 30% for the transition of the level of environmental safety from the rating "very bad" to the ratings "good" and "very good".

Summary

The conducted research allowed to confirm the influence of the level of validity of environmental specialists on the management system efficiency in general, in particular, through the applied results regarding the impact of the level of validity of environmental specialists of JSC "Ukrzaliznytsia" on the level of its environmental safety for ensuring the sustainable development. It is substantiated that the correspondence of a person's qualification to a position occupied or for

which he is applying (vacancy profile), education by specialty and other characteristics of an individual supply of labor determine the effectiveness of making managerial decisions in a specific direction at each level of enterprise management. It is proposed to optimize the structure of the researched personnel by monitoring environmental safety according to the developed methodology for railway enterprises of "Ukrzaliznytsia" JSC, for separate enterprises and units to ensure the level of information comparability. Such an approach can be used to rank railway enterprises by the indicator of the level of environmental safety. Reducing the share of specialists dealing with the use of natural resources and environmental protection by combining jobs in the structure of the personnel, can increase the level of environmental safety. The proposed methodology can be used not only to determine the level of environmental safety, but also to assess the level of socioeconomic security of the enterprise as a whole to ensure its sustainable development through the selection of the appropriate system of indicators.

The study has some limitations. The first of them is the analysis of only one company existing in one country. And secondly, our study was quantitative; whereas a qualitative approach might be used in future research to explore the topic. Despite these limitations we believe that the results achieved allowed us to obtain a true picture of the situation in the analyzed sector, and first of all in the company itself. The analysis contributes to the management science in several ways. Though our research adopts a case study analysis, it gives us the possibility of comparing the results with other companies operating in different sectors of the economy. In particular, the proposed method of integrated assessment of the level of environmental safety allows predicting scenarios for the development of situations, taking into account the different levels of validity of environmentalists of the management system of RTE.

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WALIDACJA EKOLOGÓW W SYSTEMIE ZARZĄDZANIA PRZEDSIĘBIORSTWEM: ANALIZA STUDIUM PRZYPADKU

Streszczenie: Artykuł poświęcony jest badaniu wpływu walidacji personelu na efektywność systemu zarządzania przedsiębiorstwem. Elementy ważności, takie jak zgodność kwalifikacji danej osoby z zajmowanym lub wnioskowanym stanowiskiem (profil wakatu), wykształcenie według specjalności i inne cechy indywidualnej podaży pracy itp., są kluczowymi wyznacznikami wyboru menedżerów i przyczyniają się do skutecznego stosowania ich specyficznych funkcji zarządzania i przekształcania tych ostatnich poprzez metody zarządzania w skuteczne decyzje zarządcze. Potwierdzeniem pewności takiego wpływu są wyniki badań prowadzonych w obszarze odpowiedzialności menedżerów środowiska (np. zależność poziomu bezpieczeństwa środowiskowego przedsiębiorstwa od ważności ekologów). Zarządzanie przedsiębiorstwami transportu kolejowego (RTE) spółki akcyjnej „Ukrainska zaliznytsia” (JSC „Ukrzaliznytsia”) zostało wybrane do analizy, której kompetencja dotyczy wykorzystania zasobów naturalnych i ochrony środowiska (ekologów) jako jednego ze składników zrównoważonego rozwoju. Zaproponowano metodę zintegrowanej oceny poziomu bezpieczeństwa ekologicznego w oparciu o analizę taksonomiczną, która daje możliwość zastosowania podejścia scenariuszowego do rozwoju sytuacji z uwzględnieniem różnych poziomów ważności ekologów RTE.

Słowa kluczowe: zrównoważony rozwój, zarządzanie, przedsiębiorstwa kolejowe, walidacja personelu, bezpieczeństwo środowiskowe

在企业管理制度生态学家验证：一个案例分析

摘要：本文致力于企业管理系统。有效性的这些组件，干一个人的资格的按照以占用或申请（空缺配置文件）的位置，教育，专业和个人劳动力供给的其他特性等，都在管理者的选择主要决定因素和有助于有效管理有效的管理决策。确认环境保护对环境的影响。被选作分析的联合股份公司“乌克兰zaliznytsia” JSC “Ukrzaliznytsia”的铁路运输企业（RTE）的管理，能力哪涉及利用自然资源和保护环境（环保）作为组件之一可持续发展。使用RTE环保主义者。

关键词：可持续发展，管理，铁路公司，工作人员验证，环境安全