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METHODICAL APPROACHES TO ASSESSING THE SOCIAL RESPONSIBILITY LEVEL

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Currently, many different methods for assessing the effectiveness of corporative social responsibility (CSR) of enterprises have been developed and applied. It should be noted that there is no single approach and a unified method for assessing CSR. However, further attempts are being made to find new methods and approaches that would assess the company's social responsibility within the adopted valuation system, and improve existing ones. The article is devoted to the development of scientific and practical recommendations for determining the assessment of the level of social responsibility. An algorithm for calculating the level of corporate social responsibility of enterprises has been proposed. After analyzing the existing methods for determining the level of corporate social responsibility, it has been proved that there are no ideal modern methodological approaches to measuring the effectiveness of CSR, since the importance of certain areas of CSR is still the subject of scientific discussion. Some of the methods of assessing CSR are to match the results obtained with the established standards. Other methods are based on the addition of the characteristics obtained through the use of standard assessments, which also describe the effectiveness of CSR through the prism of its impact on stakeholders, but which are not always measured in quantitative indicators. The peculiarity of assessing the effectiveness of social responsibility relations is the low level of manufacturability of management in this area. The development of an assessment of the effectiveness of social technologies, despite all their diversity and diversity of social investments, lags far behind the requests of practice. Assessment of corporate social responsibility should be considered as a process of evaluation as well as quantitative or qualitative expression of the state of socially responsible activity of the company. The Harrington's desirability function is proposed for building a generalized indicator of corporate social responsibility of enterprises.

МЕТОДИЧНІ ПІДХОДИ ДО ОЦІНКИ РІВНЯ СОЦІАЛЬНОЇ ВІДПОВІДАЛЬНОСТІ

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Ключові слова:
корпоративна соціальна відповідальність (КСВ),оцінка рівня КСВ, методика,методологія, модель,рівень корпоративної соціальної відповідальності, функція бажаності Харрінгтона

В даний час розроблено і застосовується безліч різних методик оцінки рівня ефективності +корпоративної соціальної відповідальності (КСВ) компаній. В даний час не існує єдиного підходу і єдиної методики оцінки КСВ, проте, здійснюються подальші спроби пошуку нових методів і підходів, які дозволили б оцінити соціальну відповідальність компанії в рамках прийнятої оціночної системи, і вдосконалити вже існуючі. Статтю присвячено розробці науково-практичних рекомендацій щодо визначення оцінки рівня соціальної відповідальності та запропоновано алгоритм розрахунку рівня корпоративної соціальної відповідальності підприємств. В результаті аналізу існуючих методів визначення рівня корпоративної соціальної відповідальності, доведено, що ідеальних сучасних методологічних підходів до вимірювання ефективності КСВ немає, оскільки важливість окремих напрямків КСВ все ще є предметом наукової дискусії. Деякі з методик оцінки КСВ полягають в зіставленні отриманих результатів з встановленими стандартами. Інші методики ґрунтуються на доповненні отриманих за допомогою застосування стандартних оцінок характеристик, які також описують результативність КСВ через призму її впливу на стейкхолдерів, але які при цьому не завжди

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вимірюються в кількісних показниках. Особливістю оцінки ефективності відносин соціальної відповідальності є низький рівень технологічності управління в даній сфері. Розробка оцінки ефективності соціальних технологій, незважаючи на всі їх різноманіття і різноманіття соціальних інвестицій, значно відстає від запитів практики. Оцінку корпоративної соціальної відповідальності потрібно розглядати як процес оцінювання та кількісне або якісне вираження стану соціально відповідальної діяльності компанії. В статті запропоновано використовувати для побудови узагальненого показника корпоративної соціальної відповідальності підприємств функцію бажаності Харрінгтона.

Analysis of recent researches and publications

The works of foreign scientists such as: W. Fredenburg, D. Emerson, K. Clark, B. Ruf, K. Muralidhar, K. Paul and other authors are devoted to the issues of social efficiency, social effectiveness, social impact of investments. An interesting approach to evaluating the effectiveness and measuring the socially responsible activities of companies is the methodology has been proposed by Ruf, Muralidhar and Paul. This approach is based on the distribution of the significance of CSR indicators and meets the basic requirements for CSR measurement tools. The methodology provides a reflection of various parameters of social responsibility of business, and does not depend on the characteristics of the company; it's based on measuring not perceptions and ideas but the socially oriented activities results, and reflects the values of the stakeholder groups chosen for analysis [1, p. 119–133].

The methodology of S. Waddock and S. Graves uses KLD Index (Kinder, Lydenberg, and Domini), which is one of the most used indexes. All fixed indicators inside the directions are assigned equal significance (weight of the indicator), and weight (significance) of all negative indicators are deducted from the amount of weights of positive indicators. As a result, the company's social responsibility index is calculated. It could be showed that companies effectively implementing corporative social responsibility can be ineffective in terms of other ratings [2, p. 303–319].

Foreign scientists Krychevsky N.A. and Goncharov S.F. [3, p. 130–148] offer a system for assessing the level of enterprises corporate social responsibility on the basis of quantitative and qualitative indicators. Quantitative indicators include social responsibility indicators to employees, social responsibility indicators to society (community) and indicators of environmental responsibility. The authors attributed to the qualitative indicators: a presence or absence of a valid collective agreement at the enterprise; a presence or absence of a separate structure responsible for the implementation of social responsibility measures; the existing practice of social reports compiling, etc.

Domestic scientists also pay a lot of attention to determining the level of corporate social responsibility. For example, Hrytsina L.A. proposes to apply a normative and indicative approach to the assessment of corporate social responsibility [4, p. 9–10].

Berezina O.Y. [5, p. 98–100] proposes a methodology for determining the rating of social responsibility of the corporation in the field of labor relations on the basis of quantitative assessment of CSR, which allows to compare incomparable partial indicators (by units of measurement).

The purpose of the article

The purpose of the article is the analysis of methods for assessing corporate social responsibility and assessment of corporate social responsibility of enterprises of the Zaporozhzhia region using the Harrington desirability function.

Presentation of the main material

As a result of the review and analysis of existing methods of enterprise corporate social responsibility level estimation the methods that can be used were revealed:

- method of enterprise corporate social responsibility level integral estimation;
- rating of corporate social responsibility level of enterprises, branches, regions and entities;
- matrix modelling of enterprise corporate social responsibility level estimation.

At the same time, when analyzing the main advantages and disadvantages of these methods, it was found that the best method for our research is to use a combined method of integrated assessment of enterprises corporate social responsibility level.

The use of this method and the design of enterprises corporate social responsibility model uses financial reporting indicators, inputs: staff working hours using as percentage of working time fund (*x1*), unemployment level, % (*x2*), employment level, % (*x3*), average monthly wage per employee, UAH (*x4*), *wage arrears* as percentage of average annual payroll (*x5*), part of workers who have not been paid their wages on time as percentage of average number (*x6*), number of workers employed in conditions that do not correspond to hygienic conditions (as percentage of average staff number) (*x7*), number of work-related injuries per 1000 employeers (*x8*), number of workers who have learned new occupations (as percentage of average staff number) (*x9*), staff turnover (as percentage of average staff number) (*x10*), number of employees covered by collective agreements, % (*x11*), level of fulfilment of collective bargaining obligations, % (*x12*), level of fulfilment of collective wage obligations, % (*x13*), level of compliance with labour protection obligations under collective agreements, % (*x14).*

Based on these indicators the integral estimation of enterprise corporate social responsibility level based on expert peer rewiews has been performed.

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For analysis the activities of enterprises Dniprospetsstal, ZTMK, ZTZ, Zaporishkoks for the length of 2015–2017 years were reviewed.

Formation of main requirements to corporate social responsibility model is one of the first stages of researches. For this model to be usable for further analysis of corporate social responsibility level, it must correspond to its attributes.

The main corporate social responsibility level estimation model requirements are:

• it should reflect common features of review of enterprises corporate social responsibility;
• be adequate and produce results close to reality;
• use of the model for management decision-making;
• enable the comparison of several enterprises;
• enable identification of the most responsible objects.

In addition, the model should be implemented in a preferably accessible software environment and, if input data are changed, it should generate a correct response to the task.

However, having a large number of output indicators makes corporate social responsibility analysis difficult, cumbersome, less informative and has a negative impact on weights. To address this problem, it was suggested that a consecutive matching mechanism be used, with inputs grouped into four core groupings. A summary indicator is defined for each group, which contains a number of calculated outputs. Based on research, corporate social responsibility indicators groups were allocated:

• indicators of production development and employment efficiency ($\kappa 1$) – indicators *x1 – x3*;
• indicators of timeliness and pay ($\kappa 2$) – indicators *x4 – x6*;
• indicators on working conditions and social protection ($\kappa 3$) – indicators *x7 – x10*;
• indicators that describe the extent and level of collective bargaining ($\kappa 4$) – indicators *x11 – x14*;

After each indicator is determined, taking into account their weights, the integrative corporate social responsibility indicator is determined. A description of the model domain space is presented in the Tab. 1.

One of the most convenient ways of constructing a generic corporate social responsibility indicator is the Harrington desirability function. The general function is based on the idea of converting the natural values of the individual indicators into an unambiguous scale of desirability. The generalized desirability function is the geometric mean of the individual optimization parameters:

$$D = \sqrt[m]{\prod_{i=1}^{m} d_i}, \quad (1)$$

where D – generalized desirability function (generalized corporate social responsibility indicator); $m = 4$ – sets of factors number (see. tab. 1); d_i – partial desirability

$$d_i = \exp(-\exp(-G_i)), \quad (2)$$

where G_i – group-based integrative indicator of i-th group.

As a result, the description of the model structure (Fig. 1), in which the weights of inputs are calculated according to the Fischburn rule has been built:

$$w_j = \frac{2\left(n - N_j + 1\right)}{n\left(n+1\right)}, \quad j = \overline{1, n}, \quad (3)$$

where w_j – weight of j-th indicator; N_j – range of j-th indicator (table 1 shows ranked figures); n – total amount of indicators.

Normalized values of j-th indicators are calculated by formula:

$$\tilde{x}_j = \frac{x_j - x_j^{\min}}{x_j^{\max} - x_j^{\min}}, \quad j = \overline{1, n},$$

where $x_j^{\max}$, $x_j^{\min}$ – the maximum and minimum value of all similar enterprise inputs.

Based on the model structure, an algorithm for calculating the level of corporate social responsibility of enterprises has been developed and is shown in the fig. 2.

The model interface is implemented with the program MS Excel.

The model provides the following results:

• identification of indicators for measuring corporate social responsibility;
• establishing standard indicators for measuring corporate social responsibility;

Table 1 – Forming the feature space of the corporate social responsibility level estimation model

Indicator	Weights	Dniprospetsstal			ZTMK			ZTZ			Zaporishkoks		
		15	16	17	15	16	17	15	16	17	15	16	17
x1	0,5	86,4	88,2	86,8	79,3	80,5	81,5	86,6	85,3	86,3	87,2	85,5	86,4
x2	0,33	7,2	7,9	8,5	13,8	14,1	14,6	9,7	10,0	10,7	7,1	6,4	6,1
x3	0,17	60,9	59,1	58,0	50,3	50,0	49,4	56,4	56,0	55,2	59,3	59,7	60,6
x4	0,5	4,4	5,1	6,9	5,0	6,0	7,8	4,2	5,1	6,9	3,7	4,5	6,3
x5	0,33	3,0	3,0	1,9	7,9	11,4	12,3	3,0	4,1	1,0	7,2	5,3	0,8
x6	0,17	1,6	1,0	0,3	12,3	4,8	12,1	1,0	2,1	1,0	0,8	1,7	0,6
x7	0,4	40,8	41,6	42,1	43,9	51,2	47,1	35,0	37,6	36,8	22,5	23,0	24,0
x8	0,3	0,6	0,7	0,4	0,6	0,5	0,7	0,6	0,7	0,5	0,7	0,5	0,6
x9	0,2	3,0	2,9	2,6	3,6	3,2	1,1	2,8	2,3	2,2	1,7	1,6	1,5
x10	0,1	26,2	25,8	28,6	24,0	17,8	21,0	21,5	23,4	25,1	27,6	24,2	26,9
x11	0,4	78,2	81,8	75,1	84,6	85,7	84,0	85,0	81,5	82,7	82,2	84,1	84,4
x12	0,3	87,2	93,6	89,9	95,0	93,5	94,0	81,6	85,8	84,7	98,1	83,4	86,2
x13	0,2	88,1	98,0	99,9	83,1	85,9	84,7	84,7	98,8	96,4	90,7	97,1	90,9
x14	0,1	89,4	99,3	87,7	85,1	86,9	99,1	82,6	88,0	96,9	88,3	80,0	84,1

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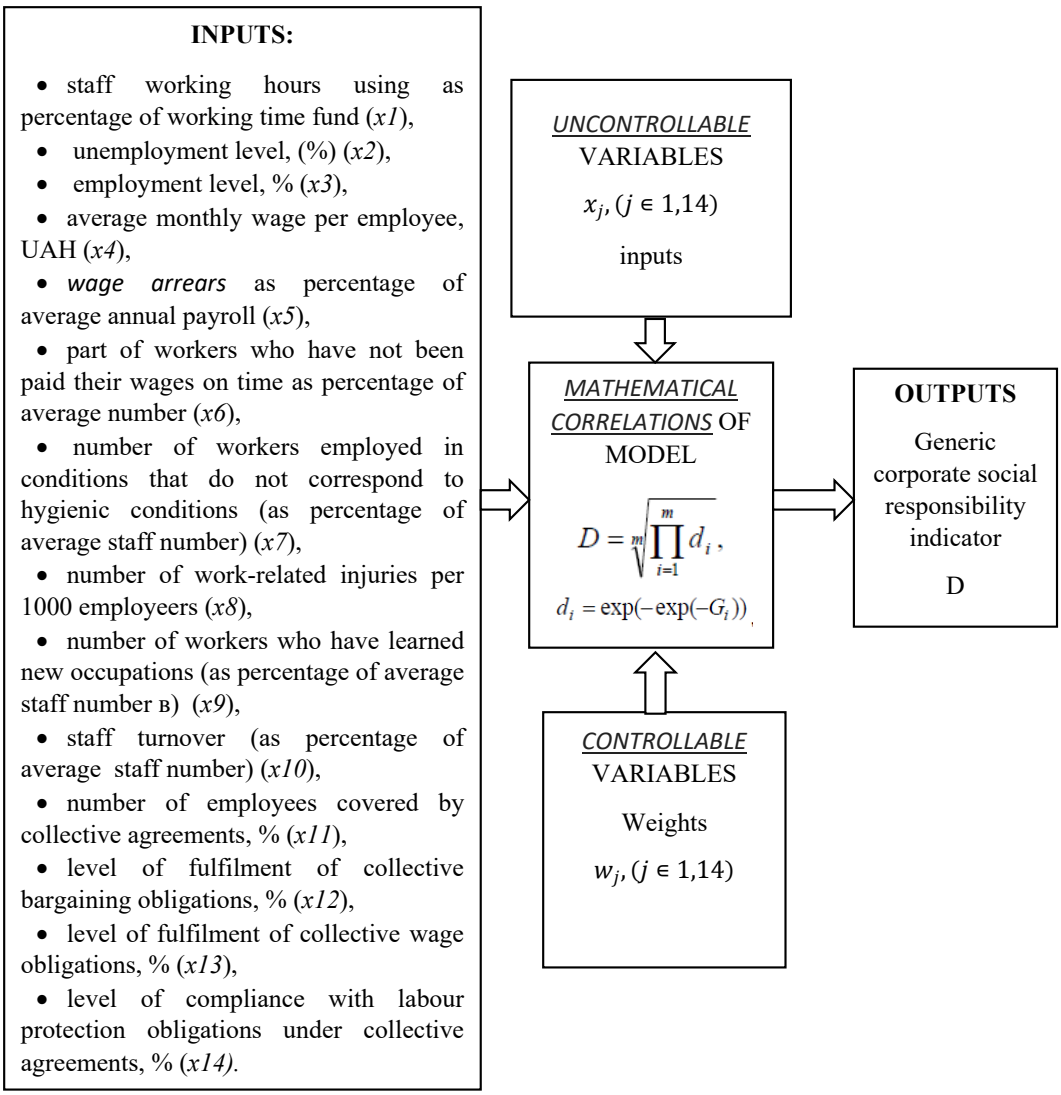

Fig. 1 – Description of the model structure

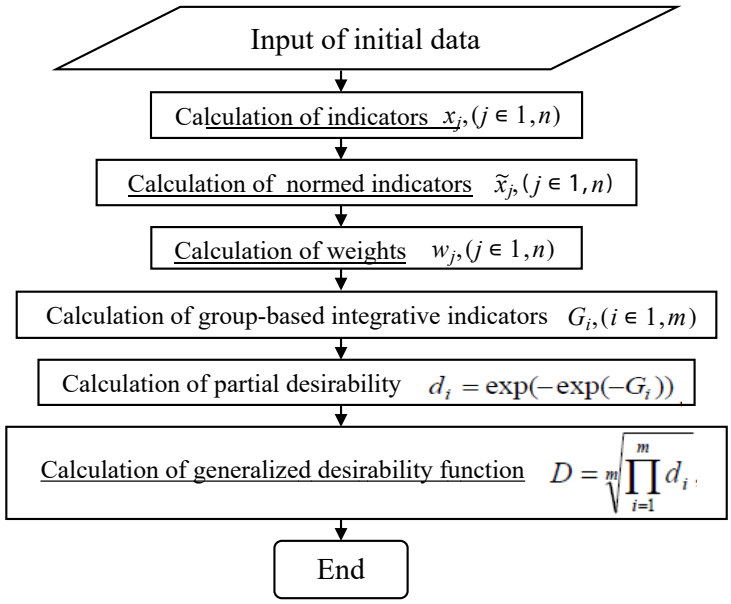

Fig. 2 – Corporate social responsibility ratio calculation algorithm

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• identification of integrated indicators to measure corporate social responsibility;

• using Fischburn rule for weight indicators estimation;

• using general desirability function Hurrington for rating creation.

The obtained model then produced such results:

• a table construction with the input data of a number of Ukrainian enterprises, which will be used for further analysis;

• a table calculation with modelled indicators for each research subject;

• calculation of the standard values of the level of corporate social responsibility;

• calculation of the Fishburn Rule weights was carried out to proceed to the calculation of the group summaries by an additive matching;

• integrated indicator calculation using Harrington desirability function, that allows the numerical quality of the object to match the verbal value of desirability.

Calculations are shown in the following tables 2–4.

Enterprises with low corporate social responsibility, must show a negative result at the end of the calculation, namely – on the Harrington desirable scale, the function interval shall be between 0 and 0,37. A diagram showing the level of corporate social responsibility of enterprises was constructed on the basis of research data (Fig. 3).

Analysing the results of calculations and studies on the basis of the built model for the evaluation of integrated indicators of corporate social responsibility of Zaporizhzhia enterprises it can be concluded that under the Harrington Universal Scale, the enterprises reviewed provide an adequate level of corporate social responsibility.

Conclusions. After analyzing the existing methods for determining the level of corporate social responsibility, one can see that there is no ideal methodological approach the CSR effectiveness measuring, since the significance of certain areas of CSR is still the subject of scientific discussion. The results of statistical analysis of the application of the Data Envelopment Analysis (DEA) methodology and methods based on the distribution of the indicators significance (the method of equal significance, the method of Ruff, Muralidhar and Paul, the Waddock and Graves technique using KLD data), show that companies effectively implement CSR in accordance with DEA can be ineffective in terms of other ratings.

Table 2 – Weighted scores

Indicator	Dniprospetsstal			ZTMK			ZTZ			Zaporishkoks		
	15	16	17	15	16	17	15	16	17	15	16	17
x1	43,2	44,1	43,4	39,65	40,25	40,75	43,3	42,65	43,15	43,6	42,75	43,2
x2	3,6	3,95	4,25	6,9	7,05	7,3	4,85	5	5,35	3,55	3,2	3,05
x3	30,4	29,55	29	25,15	25	24,7	28,2	28	27,6	29,65	29,85	30,3
x4	2,2	2,55	3,45	2,5	3	3,9	2,1	2,55	3,45	1,85	2,25	3,15
x5	1,5	1,5	0,95	3,95	5,7	6,15	1,5	2,05	0,5	3,6	2,65	0,4
x6	0,8	0,5	0,15	6,15	2,4	6,05	0,5	1,05	0,5	0,4	0,85	0,3
x7	20,4	20,8	21,05	21,95	25,6	23,55	17,5	18,8	18,4	11,25	11,5	12
x8	0,3	0,35	0,2	0,3	0,25	0,35	0,3	0,35	0,25	0,35	0,25	0,3
x9	1,5	1,45	1,3	1,8	1,6	0,55	1,4	1,15	1,1	0,85	0,8	0,75
x10	13,1	12,9	14,3	12	8,9	10,5	10,75	11,7	12,55	13,8	12,1	13,4
x11	39,1	40,9	37,55	42,3	42,85	42	42,5	40,75	41,35	41,1	42,05	42,2
x12	43,6	46,8	44,95	47,5	46,75	47	40,8	42,9	42,35	49,05	41,7	43,1
x13	44,05	49	49,95	41,6	42,95	42,35	42,35	49,4	48,2	45,35	48,55	45,5
x14	44,7	49,65	43,85	42,55	43,45	49,55	41,3	44	48,45	44,15	40	42,1

Table 3 – The results of the sequential matching procedure

Indicator	Dniprospetsstal			ZTMK			ZTZ			Zaporishkoks		
	15	16	17	15	16	17	15	16	17	15	16	17
K1	77,25	77,6	76,7	71,7	72,3	72,75	76,35	75,65	76,1	76,8	75,8	76,55
K2	4,5	4,55	4,55	12,6	11,1	16,1	4,1	5,65	4,45	5,85	5,75	3,85
K3	35,3	35,5	36,85	36,05	36,35	34,95	29,95	32	32,3	26,25	24,65	26,5
K4	171,5	186,4	176,3	173,9	176	180,9	167,0	177,1	180,35	179,65	172,3	172,8

Table 4 – Calculation of desirability function

Indicator	Dniprospetsstal			ZTMK			ZTZ			Zaporishkoks		
	15	16	17	15	16	17	15	16	17	15	16	17
Normalized values												
K1	0,63	1,00	0,00	0,00	0,57	1,00	1,00	0,00	0,64	1,00	0,00	0,75
K2	0,00	1,00	1,00	0,30	0,00	1,00	0,00	1,00	0,23	1,00	0,95	0,00
K3	0,00	0,13	1,00	0,79	1,00	0,00	0,00	0,87	1,00	0,86	0,00	1,00
K4	0,00	1,00	0,33	0,00	0,30	1,00	0,00	0,75	1,00	1,00	0,00	0,07
Desirability function												
	0,41	0,61	0,54	0,45	0,51	0,59	0,43	0,57	0,60	0,68	0,43	0,50

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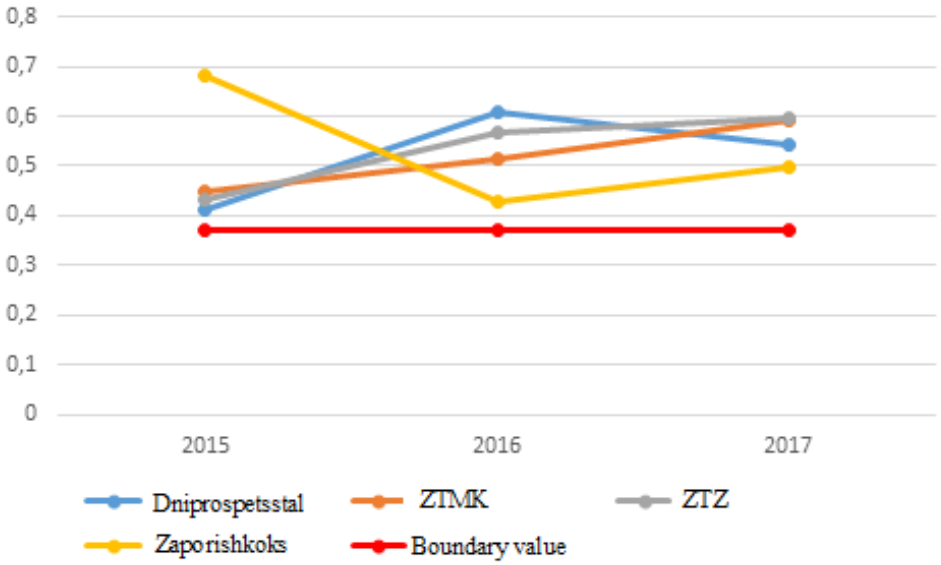

Fig. 3 – Desirability function of corporate social responsibility

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