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Practical application of CSR complex evaluation system

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ABSTRACT

When the things go towards CSR, measuring and evaluating have became one of the key goals for researchers and practitioners. Especially when it is linked to the funders point of view – while funding the companies it became certainly important to practically assess the level of the company's CSR. Therefore, in this paper the multiple criteria decision making (MCDM) methods are suggested and used as the most appropriate tool for solving different kinds of economics and social problems. While using AHP method, a CSR complex evaluation system is formed practically with prioritizing the most important CSR criteria from the funders point of view. Then the rest of the MCDM methods (SAW, TOPSIS, VIKOR and SoR) are used for the comparison of some real companies' CSR level. Finally the compatibility level of the methods is checked, in order to minimize the influence of each MCDM method to the final results.

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1. Introduction

Various economic changes among the different countries in the world, demographical, social and climate changes, government regulations and emergence of international standards together with the stakeholders' interests – all these things strongly affects business environment and the business itself. Funders, especially commercial banks, being as one of the most important part of the whole economy, affects the business mostly by the funding process.

Today including environmental and social aspects into the daily routine is not important only for the business as the key element of growing in a sustainable way, but it also became very important for the funders as well. Commercial banks in order to ensure the financial stability and to contribute in sustainable development process overall, have to expand their attitude towards funding - to evaluate not only the financial standing of the company, but to make a wider and more complex picture of the company. Therefore, applying CSR in the business has became one of the core guarantees for the sustinable banking. And although the researches about CSR are very wide, however the debates about CSR evaluation from the funder's point of view are rather new area of interest and quite limited on ways how the CSR level of the companies should be measured.

Research object is corporate social responsibility from the funder's point of view.

The goals are to conclude the theorethical background for forming a CSR complex evaluation system, to practically form the system by applying AHP method – for weightening each of the CSR criteria and the rest of the methods (SAW, TOPSIS, VIKOR and SoR) - for applying the system practically on the basis of the particular example.

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The main findings. In this paper there are presented general recommendations for the funders how to measure CSR level of the companies that are applying commercial bank for the loans. The CSR complex evaluation system is based on MCDM methods.

Research limitations. This research includes CSR evaluation only from the funder's point of view but the system's platform can be adapted and accordingly modified to any other stakeholder's interests.

1.1. Previous researches and theoretical background

Earlier researches about multiple criteria decision making (MCDM) methods' and their application cases has proved the versatility of using mathematical methods in economics. One of the most often used method is Analitic Hierarchy Process method (AHP) concluded by T. L. Saaty. This method is based on weightening of each criteria by comparing every single pair of criteria in respect of the objective set. AHP method is widely used among lithuanian researches: Ginevičius and Podvezko (2008a), Ginevičius, Podvezko, and Andruškevičius (2004a), Rakauskienė and Tamošiūnienė (2013), Tvaronavičienė, Ginevičius, and Grybaitė (2008), Zavadskas and Turskis (2011), and though the method is mainly used for the quantitative primary data to be evaluated, however it is theoretically based on the qualitative data evaluation (Zavadskas & Turskis, 2011; Saaty, 1994).

Other MCDM methods are no less important in solving different kind of scientific problems. As this article is more focused on the methods that are based on qualitative initial data (that later can be transformed into quantitative parameters), it is proposed to briefly review such methods:

- Simple Additive Weighting (SAW) method. The main concept of MCDM methods, based on quantitative data is best illustrated by SAW method (Ginevičius & Podvezko, 2008a; Ginevičius & Podvezko, 2008b). This method is on of the most simple and most commonly used for solving economic and social problems (Podvezko, 2011), like rating banks according to their efficiency (Wu, Tzeng, & Chen, 2009), assessing reliability of the commercial banks in Lithuania (Ginevičius & Podvezko, 2008b) or evaluating commercial and economic activity of non-financial companies or evaluating the level of competitiveness of new EU members (Ginevičius & Podvezko, 2008a);
- Sum of all criteria ranks (SR) is one of the most simple methods that can be also used for evaluating commercial and financial activity of different companies or evaluating the level of competitiveness of countries - new EU members (Ginevičius & Podvezko, 2008a);
- In order to assess activity of the companies, SoR method was supplemented by the more sophisticated methods – TOPSIS and VIKOR. TOPSIS and VIKOR are also together used by the same scientists Ginevičius and Podvezko (2008a), Wu et al. (2009) and Ginevičius, Krivka, and Šimkūnaitė (2010);
- COPRAS is also very popular for solving different kind of problems: in construction sector (Užšilaitytė, Martinaitis 2010), in the financial services sector (Ginevičius & Podvezko, 2008b), also for comparing with the other MCDM methods (Podvezko, 2011).

The above mentioned MCDM methods are chosen according to their popularity and relevance to this topic. Also it is important that these methods can be used for the data that are qualitative first and later transformed into quantitative parameters.

Further application of MCDM methods will be used in such logic:

1. AHP method will be used for setting the weights of each criteria and for forming the final CSR complex evaluation system;
2. SAW, SoR, TOPSIS, VIKOR and COPRAS methods will be used for comparing different companies by using CSR complex evaluation system.

2. Forming a CSR complex evaluation system

2.1. Prioritizing the criteria by AHP method

In order to form a CSR complex evaluation system by using AHP method, there were set up a group of 9 experts from 4 different commercial banks in Lithuania. The experts were chosen according to their professional field and level of competence – most of the experts are managers or executives in the field of the companies' financing (lending).

Set of the criteria that could be potentially important for the commercial banks when evaluating CSR level of the companies, were formed on the different scientific researches' basis (Antanavičienė & Šimelytė, 2014; Daujotaitė, 2006; Elena, 2012; Elkington, 1997; Goel, 2010; Juozaitienė, 2007; Kneževic, Rakočevic, & Duric, 2011; Kotane & Kuzmina-Merlino, 2012; Krivka & Stonkutė, 2015; Wang ir Lee, 2010; Šapalienė, Valentukevičienė, & Zakarienė, 2014; Monea, 2009; Slaper, Hall 2011) and practical guideline about the sustainable financing for the commercial banks (REPORT 2014: Environmental, Social and Governance: Integration for Banks: a Guide to Starting Implementation (WWF Global, 2014)). Setup of the criteria consists of 4 groups of criteria (financial, environmental, social and governance) that includes 29 different criteria.

Table 1
Kendell's *W* and its significance calculations.

Criteria		*S*	*W*	χ^2	χ_{kr}
Financial	Profitability r.	1307	0.58	31.12	12.59
	Liquidity r.	12.50	0.08	1.39	5.99
	Debt r.	234	0.58	15.60	7.81
Environmental		1328	0.59	31.62	12.59
Social		587	0.72	26.09	9.49
Governance		134	0.83	14.89	5.99
Group of financial criteria		126	0.78	14	5.99
Group of CSR criteria		249.50	0.62	22.18	7.81

Source: author.

As the set of criteria is combined by relatively big number of the criteria, in this case, direct evaluation when each criteria can be weighted directly is not the most suitable (Ginevičius, 2006). AHP method can solve this problem - every experts has to compare each pair of the criteria in order to find out how much each of the criteria is important comparing to another criterion in respect of CSR evaluation of the companies' from the bank's side. The results of the expert survey are summarized by setting weights for the criteria and forming the hierarchy structure (Saaty, 1994, 2008) in such logics:

It is obvious from the hierarchy structure, that the most important group of criteria is financial. The significance of this group takes 0.534 from the total set of groups and this means that even if the rest of the groups were estimated with the higher points, it probably will not be enough to approve that the company is socially responsible enough. The most important from the financial group of criteria is debt ratio group (0.617) with the dominant debt to EBITDA ratio (0.564). As this ratio is one of the most important for the commercial banks when evaluating the company before lending, it remains the most important when evaluating company's CSR as well. Other two groups of financial ratios – liquidity and profitability are quite similarly important (0.177 and 0.206 respectively). The most dominant financial ratios in this group are EBITDA margin (0.330), net profit ratio (0.124), operating profit ratio (0.215) and ROE (0.127). From the liquidity group the most significant ratio is quick ratio (0.425).

Other group as the most important when evaluating CSR of the company while lending is governance group of criteria (0.227) with the most important criteria – corruption and bribery (0.557) and reputation (0.360). Although these two criteria are not so significant comparing to the financial ones, nevertheless, they are essential to be in an acceptable level for the bank because otherwise the company cannot be financed at all.

From the social group of criteria (0.135) the most important are the ratios closely related to the employees – labour and worker rights, compliance with labour standards etc. (0.306), labour and community health and safety (0.412). These criteria are essential because they might be closely related to the before mentioned reputation ratio from the social group of criteria.

From the environmental group of criteria (0.104) the most important are pollution and pollution abatement (0.197), air emmission (0.186), solid and other waste stresams (0.204) criteria. These criteria are closely related to the law regulations, therefore, even if these ratios are not so significant comparing with the previous, nevertheless they must be implemented enough by the company.

2.2. Compatibility of MCDM methods

It is very usual to use various multicriteria evaluation methods to evaluate different kind of objects. The biggest problem appears when the methods tend to have rather different characteristics, therefore the compatibility (Kendall's coefficient of concordance – *W*) of the chosen methods that helps prioritizing the criteria for CSR complex evaluation system (Fig. 1), has to be verified.

So, in order to check if the chosen methods can be used in one 'package', the criteria must be ranged by importance first. The the sums of squared deviations (*S*) and Kendall's *W* is calcucalted (Table 1):

The significance of Kendell's *W* must be also checked by counting χ^2 that should be respectively compared to the critical meaning of χ_{kr} distribution (with an appropriate degree of freedom and significance level 0.5). If χ^2 meaning exceeds χ_{kr} meaning - the significance of *W* is confirmed.

Although the counted *W* shows average reliability, the results are still acceptable (except group of liquidity ratios), therefore the expert evaluation can be confirmed as reliable and completed, and the results can be used for the empirical verification of CSR complex evaluation system. Also, it is important to mention that the liquidity group must be eliminated from the system as not reliable enough ($W = 0.08$) in CSR evaluation process.

Relatively low Kendell's *W* for the rest of criteria may be influenced by the further reasons:

1. Even if there are lots of researches made on the link of CSR and financial performance, still lots of discussions arise that prove that incorporating financial ratios in CSR evaluation process is relatively new standpoint for both sides – researchers and practitioners;
2. As the previous researches related to this topic show that differences between the maturity levels in CSR of commercial banks in Lithuania really exists. One thing is that the bigger the bank, the higher maturity level of CSR. Another thing

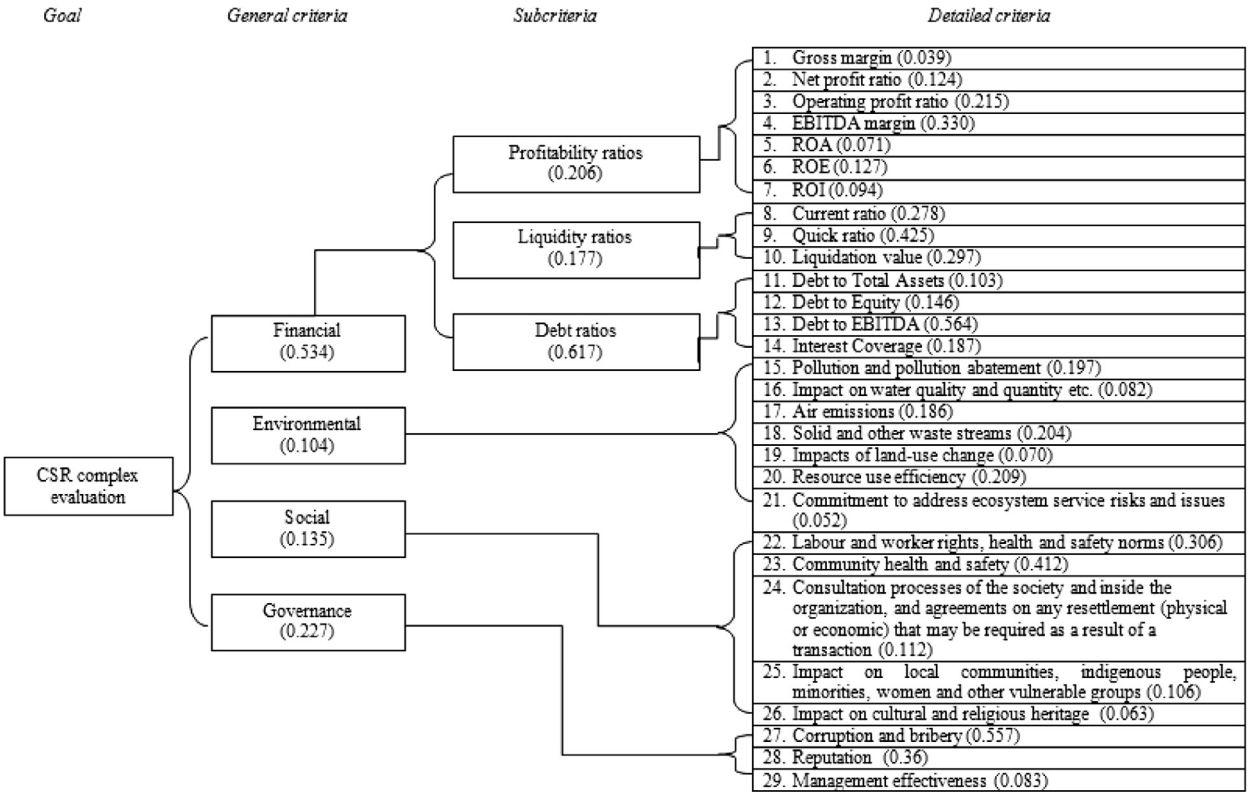


Fig. 1. Prioritizing the criteria to be used in CSR complex evaluation system (**Source:** author).

is that though the attitude and consciousness are at the highest level, practically implementation of environmental, social ang governance aspects in bank's daily routine stand behind.

3. Practical usability of CSR complex evaluation system

Practical application of CSR complex evaluation system is no less important than the theoretical formation. It is foreseen that practically CSR complex evaluation system could be used for three purposes:

1 for comparing companies to each other in the field of CSR;
2 for determining a CSR rating of the single company or companies;
3 for identifying CSR strenghts and weaknesses of the company (SWOT analysis).

When the final set of criteria is formed, further it is important to foresee how the criteria could be measured. In very similar cases (Gutierrez-Nieto, Serrano-Cinca, & Camon-Cala, 2016) the Likert scale is used. Also, it is very important that measuring the criteria is not overloaded with redundant information and that is clear enough for the users. It is considered that the higher number of options – the more system gets complicated and may have a negative impact for the users (banks). Therefore a 5-point Likert scale is used in order to measure the certain company's each CSR criteria where (distance among each of the means is equal):

1 means the lowest level when the company does not meet or almost does not meet the certain CSR criterion;
2 means average level or not applicable when the company meets the certain criterion because of the law regulations or the criterion cannot be measured because of the company's specifics, idustry etc.;
3 means high level when the reactive behaviour of the company is changing to the proactive;
4 means very high level when the company is proactive and almost meets the criterion;
5 means excellent level when the company fully meets the criterion and the question is included in the bank's strategic questions.

After determining the valuation method, a high qualified in companies' lending expert (that had also participated while theoretically forming CSR complex evaluation system) assessed three real SME companies. Companies are real one of the

Table 2
'Package' of MCDM methods with normalized data.

MCDM method		Companies		
		A	B	C
SAW	Mean	1.862	1.832	1.299
	Rank	1	2	3
TOPSIS	Mean	0.601	0.427	0.500
	Rank	1	3	2
VIKOR	Mean	0.000	0.563	1.000
	Rank	1	2	3
SoR	Mean	58.500	59.500	38.000
	Rank	2	3	1
Average rank		1.25	2.50	2.25
Final rank		1	3	2
Average rank without TOPSIS		1.33	2.33	2.33
Final rank without TOPSIS		1	2–3	2–3

Source: author.

Table 3
Correlation coefficients when data is normalized.

Methods	SAW/TOPSIS	SAW/VIKOR	SAW/SoR
ρ	0.14	−0.85	1.00
Methods	TOPSIS / VIKOR	TOPSIS / SoR	VIKOR / SoR
ρ	−0.64	0.05	−0.80

Source: author.

Table 4
'Package' of MCDM methods with not normalized data.

MCDM method		Companies		
		A	B	C
SAW	Mean	3.223	3.132	2.233
	Rank	1	2	3
TOPSIS	Mean	0.612	0.431	0.063
	Rank	1	2	3
VIKOR	Mean	1.051	0.952	0.295
	Rank	3	2	1
SoR	Mean	45.500	44.500	66.000
	Rank	2	1	3
Average rank		1.75	1.75	2.5
Final rank		1–2	1–2	3

Source: author

biggest bank's in Lithuania clients that operates in different sectors: company A – plastic production manufacturing / trade; company B – vehicles manufacturing / trade; company C – oil production trade.

As one of the purposes for using CSR complex evaluation system practically is determining a CSR rating of the company, there are made two steps in data transformation:

(a) each expert's evaluation of criteria is transformed into single point system where 1 is equal to 0.2; 2–0.4; 3–0.6; 4–0.8; 5–1 (min evaluation – 0.2, max evaluation – 1);
(b) weights of the criteria are transformed into 5-level CSR maturity system.

According to the expert evaluation results, it was noticed that all the criteria are maximizing, there is no single criterion that could be minimizing. Therefore, COPRAS method has to be eliminated from the 'package' of methods (Podvezko, 2011). So, after this elimination and data transformation, previously discussed MCDM methods - SAW, SoR, TOPSIS, VIKOR can be further applied practically:

Means and ranks are calculated according all four methods (Table 2.). In order to check the compatibility of all these methods, correlation coefficient (ρ) among each pair of the methods is calculated. The correlation with TOPSIS method is weakest (in some cases it is even unacceptable – Table 3.), therefore, this method cannot be included in the 'package' of MCDM methods.

Summarizing the results, the highest CSR level meets company A – it takes the first place, the second place goes to company B and the third place – to company C.

As in this CSR complex evaluation system all methods are maximizing, there is an opportunity to calculate means without data normalization. The results are as follows Tables 4 and 5:

Table 5
Correlation coefficients when data is not normalized.

Methods	SAW/TOPSIS	SAW/VIKOR	SAW/SoR
ρ	0.97	1.00	-0.99
Methods	TOPSIS / VIKOR	TOPSIS / SoR	VIKOR / SoR
P	0.98	-0.93	-0.99

Source: author.

If data is not normalized, TOPSIS method can be applicable in one 'package' with the rest of the methods – the correlation coefficient is extremely strong. So, this 'package' of MCDM methods gives the following results:

- the highest CSR level meets company A and company B (sharing 1–2 position), company C has the lowest CSR level;
- using stand-alone SAW method helps to identify CSR maturity level of the certain company or companies, i.e. companies A and B exceed an average level of CSR (3.223 and 3.132 means respectfully) and company C is lower than the average mean (2.233 mean).

4. Conclusions

1. Nowadays one of the most popular method for solving different kind of economic and social problems is AHP method. As this method is based on expert evaluation of different kinds of objects (very often qualitatively based), it has been chosen as the most suitable for this research as well. So, in order to form and practically apply CSR complex evaluation system, weights of the criteria were determined first. For the expert evaluation there were chosen 9 high qualified experts from 4 different commercial banks in Lithuania. The results show that the most important group of criteria when evaluating CSR of the company is financial (with significance of 0.534) with the leading groups of ratios – debt service group (0.617) and profitability (0.206). Accordingly, the most important ratios where those that include EBITDA or EBITDA margin. Group of liquidity ratios was eliminated from the system as not reliable for the system. The second group of criteria according to the importance is governance (0.227) with the leading ratio of corruption and bribery – 0.557. From the third group of criteria – social (0.135) the most important are these that relate to the employees. The last group – less significant when evaluating CSR while lending process is environmental. This structure of importance confirm scientific problem – that there is no single and universal set of CSR criteria. Moreover, the set of criteria must be formed according to the stakeholders demands.
2. In order to check the compatibility of the multiple criteria evaluation methods' package, Kendell's *W* was calculated. Most of the meanings vary between 0.58 and 0.83, therefore the expert evaluation is reliable enough for the system's practical use. Only liquidity group with the concordance coefficient 0.08 was eliminated from the final systems as not sufficient. Generally relatively low means were supposedly influenced by the thing that financial criteria integration into the CSR evaluation system is scienitifically and pratically new phenomenon.
3. Finally the system was tested practically – a high qualified expert in the bank used it for comparing three different SME companies that are engaged in different sectors. The companies' CSR were measured by two 'packages' of MCDM methods – with normalized and not normalized values. In the first case, with normalized values, TOPSIS method was eliminated with the weakest correlation coefficient to other MCDM methods, and the companies according to their CSR level took such places – company A took 1st place, company B and C shared 2nd-3rd places. In the case of not normalized values, all MCDM methods are suitable and the results were: company A and company B shared 1st - 2nd places, company C took 3rd place.
4. CSR complex evaluation system can be characterized with versatility – it can be used not only for comparing several different companies' CSR but also for determining certain company's CSR level. In this case stand-alone SAW method with not normalized values is used – company A and company B were above average level of CSR and company C did not seek average level. Also practical system's application possibilities might be expanded by using the system for identifying CSR strenghts and weaknesses or even accomplishing SSGG matrix.

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