British Journal of Applied Science & Technology
13(6): 1-13, 2016, Article no.BJAST.23031
ISSN: 2231-0843, NLM ID: 101664541

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Multi-criteria Comparison of Sustainability in Brazilian, American and European Banks

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Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/BJAST/2016/23031
Editor(s):
(1) Hui Li, School of Economics and Management, Zhejiang Normal University, China.
Reviewers:
(1) Jurgita Antucheviciene, Vilnius Gediminas Technical University, Lithuania.
(2) Kemal Vatansever, Pamukkale University, Denizli, Turkey.
(3) Sanjay Kanti Das, Lumding College, Assam, India.
Complete Peer review History: http://sciencedomain.org/review-history/12741

Original Research Article

Received 10th November 2015
Accepted 7th December 2015
Published 19th December 2015

ABSTRACT

This paper compares the sustainable development of fifteen important banks that located, in general, in Brazil, United States, and Europe. The banks were chosen from their market value and analyzed about their investor performances. The bank's comparison used indicators extracted from their Global Reporting Initiative, which represent their sustainability reports. For the research robustness the decision support multicriteria analysis was used as methodology, which in the application of the method ELECTRE III was possible to verify the ranking of companies according to direct sustainable reports. The results showed a greater commitment of Brazilian banks to sustainable development, while the others, European and American, were shown to have an equivalent performance in many aspects and indicators, specifically about social impacts. The results also demonstrate that in the banking sector, there is still much space for improvements in relation to sustainability. It was concluded that sustainable strategies allied to the Triple Bottom Line are a corporate and operational differential. Thus, it is expected to contribute to the deepening of enterprise policies across all strategic decisions focused on sustainability. Sustainability is the most important aspect for strategy decisions, nowadays, and this application helps for it.

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Keywords: GRI reports; multi-criteria method; ELECTRE III; banking sector.

1. INTRODUCTION

In recent decades the assessment of risks and opportunities related to sustainability have become very common in industry. It has also reached the services sector, whose influence on the economy is growing [1,2,3,4]. In particular, sustainability assessment has advanced significantly in the financial sector. Financial companies now occupy 22 positions in the 2014 ranking of the Global 100 sustainability index [5]. This tendency can be explained by the weight of the financial decisions in relation to the survival and growth of companies and therefore of sustainable development.

Mere economic optimization is no longer sufficient to assess company performance, since environmental consequences and distributional equity (intra/inter-generational for human and non-humans) also have to be taken into account. Three dimensions need to be considered at present: economic, environmental, and social. Moreover, after making a decision companies have to deal with a plurality of values and legitimate interests. Generally it is necessary to reconcile the restrictions and targets of various stakeholders with at times conflicting objectives and criteria. In this context multi-criteria assessment methods have been shown to be useful and consistent [6]. Multi-criteria tools have been applied to support administrators who need to take decisions related to sustainability, such as: the assessment and selection of socio-environmental responsible suppliers who will be part of their supply chains [7]; the analysis of environmental, social, and economic performance of companies from the oil and gas sector [8]; the selection of remanufacturing technologies as a form of encouraging sustainability in companies [9]; development of systems based on aspects of sustainability to improve financial institutions' credit policies [10].

In each of these applications, multi-criteria tools inevitably assume one of two fundamental approaches to sustainability assessments [11,12]. The first is based on the concept of weak sustainability, which allows replacements between quantities of natural capital and capital produced by man. The second is based on the concept of strong sustainability, which does not admit replacements, or accepts only limited permeability. This requires the method of aggregation used in the assessment to be non-compensatory, in other words, there is no replacement rate between criteria. Problems of this type can be adequately resolved using the multi-criteria methods of support for decisions from the ELECTRE family, which have proved to be rapid and flexible, linking a simple and robust logic to resolve problems in the presence of non-comparables [13].

In this article the sustainable development of fifteen large banks from Brazil, the US, and Europe is compared. The study was carried out based on the analysis of sustainability indicators collected in GRI (Global Reporting Initiative) reports published and made available on corporate sites. In order to make the comparison the ELECTRE III method was used. The rest of the article is as follows: Section 2 presents the data collected; Section 3 describes the analysis; Section 4 presents the results obtained, which are discussed in Section 5; finally, Section 6 summarizes the conclusions of the paper.

2. COLLECTION OF DATA ON THE RESEARCHED BANKS

Non-specialists usually have much difficulty in the use of sustainability indicators. Various frameworks have been created to help them direct the focus to what should be measured and to determine which information will be used later [14]. Each framework possesses its own form of conceptualizing the dimensions of sustainability, the interrelations between these dimensions, the way the questions are grouped, and the concept used to justify the selection and aggregation of indicators [15]. According to [16], frameworks which are not systemic, hierarchical, logical, and communicable can lead to various errors, such as: incapacity to produce clear images of socio-economic and environmental conditions; omission of essential aspects of sustainability; overlapping of components with a consequent dual counting; confusion about what is being measured and with what purpose; unmeasurable indicators; and distortion of assessment through an emphasis on documentation of procedures, instead of searching for results.

Among the frameworks most used to assess sustainability what stand out are sustainability reports. These have developed rapidly, having changed from an ambitious concept to a new practice of corporate communication which integrates the financial, environmental, and

Table 1. Set of GRI indicators selected

Indicator	Description	Normalization
EC1	Economic value generated and distributed	N/A*
EN1	Materials used by weight or volume (paper consumption)	Revenue
EN4	Indirect energy consumption	Revenue
EN8	Total water withdrawal by source	Revenue
EN16	Weight of direct and indirect emissions of gases causing the greenhouse effect	Revenue
EN17	Weight of other relevant indirect emissions of greenhouse gases	Revenue
LA1	Total number of employees	N/A
LA13	Proportion of men and women within the governance bodies	N/A

** N/A – not applied*

social performance of a company in a single report [17]. Their purpose is to represent corporate activities in a just and balanced way, publishing the contribution of the company involved, whether positive or negative, for sustainable development [18].

The framework most used internationally for sustainability reports are the guidelines prepared by the Global Reporting Initiative (GRI) [19]. These include performance indicators and administrative information in key sustainability areas and are now accepted as a de facto standard [20]. According to [21], their widespread adoption is due to the preparation of successive generations of guidelines, as well as sector supplements and national annexes. Not all indicators need to be reported, rather only those which the company considers materially relevant for its business and strategy, and according to its size, sector, and location [22]. Nevertheless, the choice "should cover aspects which reflect significant economic, environmental, and social impacts of organizations, or which substantially influence stakeholder assessments and decisions" [23]. The degree of relevance of each indicator varies much between organizations and the materiality of each must be determined by the Board of Directors and by the management of each company [24]. Although there is no single way to prepare the report, GRI directives recommend that they be kept comparable with each other in order to assess the level of sustainability in the organization. However, no form of synthesizing the indicators in a single index is proposed, rather the information is presented in an isolated way and decision-makers have to make aggregations as they see fit [25].

Selected for the study were five Brazilian banks (identified as BR1 - BR5), five American (US1 - US5), and five European (from Germany, Spain, Scotland, England, and Switzerland - EU1 - EU5). After being selected their sustainable development was compared. The data was obtained in the reports published on the GRI website (https://www.globalreporting.org) or on the bank websites and refers to 2011, since no more recent reports were found for all the banks selected. Only quantitative indicators were considered, which resulted in the construction of a database with the values obtained.

Only the indicators which all the assessed banks deemed relevant (based on tests of materiality) and adequately publicized in their sustainability reports were considered. It was found that the indicators chosen covered central themes of sustainability, including global warming, lack of raw material and water, increases in the price of energy, and growing competition for human capital. Thus, it was possible to obtain a set consisting of eight indicators which represented the three aspects (economic, environmental and social) and seen by the banks as appropriate to represent their sustainable development (above Table 1). Some values were normalized in accordance with 2011 bank revenues.

It should be highlighted that in applications in the area of sustainability, performance indicators are frequently used as organizational assessment criteria [26-28].

3. DATA ANALYSIS

The performance of the selected banks was compared using the ELECTRE III multi-criteria method, as it has a significant capacity to deal with sets of data affected by a high degree of uncertainty and being less sensitive to changes in data [29-31]. ELECTRE III allows the use of inaccurate, indefinite and uncertain criteria, inherent to complex processes in human decision-making, based on the use of pseudo-criteria and thresholds of preference and indifference [32]. Moreover, a veto threshold

hinders a very bad performance in one criterion being offset by good results in another. ELECTRE III has been widely used in classification problems, for example, in the ranking of actions for investments selection [33], the choice for a strategic sustainable management of demolition waste, energy systems selection [34], housing evaluation [35], environment and management of water consumption [36-38], finance [39], economic analysis [40], decision analysis [41-42], education [43] and others [44-46].

The first step in the application of method was the construction of the Performance Table (Table 2) based on data collected in the sustainability reports of the selected banks. In this table the values presented are normalized in accordance with the factors listed in Table 1. The banks correspond to the alternatives and the indicators constitute the set of assessment criteria.

The second phase is the construction and exploitation of some relationships in ELECTRE III. Its phases are depicted in Fig. 1.

Table 2. Companies performance table

Alternative	Evaluation criteria							
	EC1	EN1	EN4	EN8	EN16	EN17	LA1	LA13
BR1	60,757	0.06	37.97	4.19	0.41	0.18	113.81	0.53
BR2	29,073	0.13	51.50	55.78	0.54	6.91	116.27	0.18
BR3	35,365	0.13	57.82	41.69	1.14	7.60	117.40	0.65
BR4	35,535	0.33	62.15	56.68	0.86	5.03	140.10	0.35
BR5	10,237	0.27	39.13	30.85	0.90	0.73	31.59	0.32
US1	19,108	0.82	105.45	229.82	22.58	1.29	63.06	0.96
US2	93,454	0.69	120.97	157.30	18.30	17.12	282.00	0.25
US3	78,36	1.90	97.14	77.15	16.89	1.94	330.00	0.30
US4	78,4	0.28	94.72	78.64	13.72	13.00	88.53	0.18
US5	80,95	0.76	119.06	173.87	19.78	1.40	270.00	0.45
EU1	29,58	0.27	85.07	67.61	8.56	3.72	64.82	0.27
EU2	41,161	0.75	116.80	60.74	15.92	1.97	146.80	0.22
EU3	57,249	0.52	82.19	65.01	7.25	2.63	193.35	0.22
EU4	42,978	0.07	67.75	35.34	7.68	2.28	101.00	0.20
EU5	33,253	0.90	79.35	35.23	11.39	1.28	103.12	0.35
Unit	Million US$	m^3	GJ	t	tCO_2e	tCO_2e	Thousand pure	pure

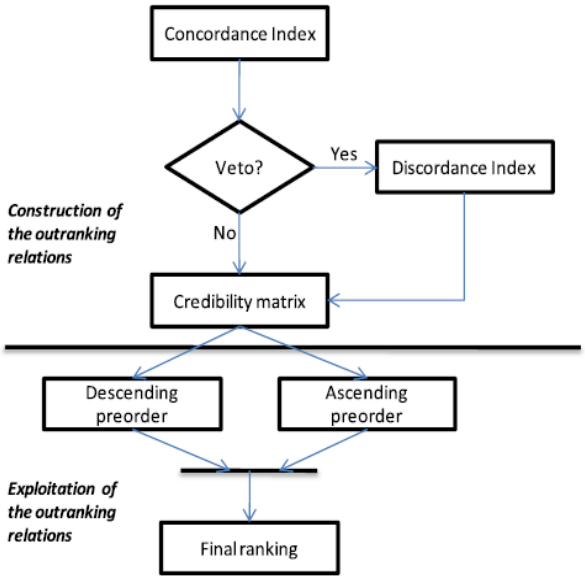

Fig. 1. Electre III flow

- Construction of the ranking relationship: the performance alternatives (the five companies under study) are compared in pairs (A, B). Each pair is characterized by an overcome relationship. Establishing that "the alternative A outperforms alternative B" means "alternative A is at least as good as alternative B". There are three overcome relationships: "indifferent," "weakly preferred" or "strictly preferred", according to the difference between the performance alternatives and thresholds given by the decision maker.
- Exploitation of the ranking relationship: two pre-classifications are constructed with two antagonist procedures (upward and downward distillation). The combination of the two pre-classifications provides the final classification.

The simplest and most traditional criteria are called 'true criteria'. These have no defined limits. Only the difference among criteria scores is used to determine which option is the preferred one. Pseudo-criteria are used in order to take into account the inaccuracy and uncertainty in indeterminacy in complex decision problems. The indifference q and preference p thresholds allow the construction of a pseudo-criterion. Thus, three alternative relationships between alternatives A and B can be considered:

a) A and B are indifferent if the difference between the performance of two alternatives is smaller than the threshold indifference. The indifference between alternatives is denoted as A **I** B.

A I B if; and only if; $z(A) - z(B) \leq q$

where, z(X): alternative X performance; q: indifference threshold.

b) Alternative A has weak preference compared to alternative B if the difference between their performances is between the thresholds of indifference and preference. The notation for weak preference is A **Q** B.

A Q B if; and only if; $q < z(A) - z(B) \leq p$

where, z(X): alternative X performance; q: indifference threshold; p: preference threshold.

c) Alternative A is strictly preferred to alternative B if the difference between the alternative performances is greater than the threshold preference. The notation is strictly preferential A **P** B.

A P B if; and only if; $z(A) - z(B) \geq p$

where, z(X): alternative X performance; p: preference threshold.

The concordance index (Eqs. (4) and (5)) indicates the truth of the statement "alternative A outperforms alternative B" (A S B). C = 1 indicates the full truth of the assertion and C = 0 indicates that the statement is false. The graphic representation is given in Fig. 2.

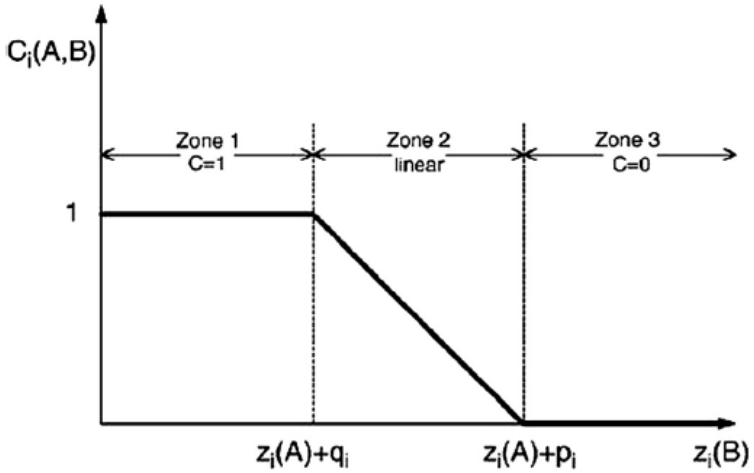

Fig. 2. Concordance index between A and B alternatives

Zone 1. zi(B) - zi(A) ≤ qi, alternatives A and B are indifferent, which means agreement on the statement "The alternative A overcomes alternative B". Zone 2. qi < zi(B) - zi(A) < pi, the alternative B is weakly preferred to A, which means a partial agreement on the statement "The alternative A overcomes the alternative ". Zone 3. zi(B) - zi(A) ≥ pi, alternative B is strictly preferred to A, which means a false agreement on the statement "alternative A overcomes alternative B".

$$C(a,b) = \frac{1}{k} . \sum_{j=1}^{n} k_j \ . c_j \ (a,b)$$

With for each criterion,

$$c(a,b) = \begin{Bmatrix} 1 \ if \ g_j(a) + \ q_j(b) \geq \ g_j(b) \\ 0 \ if \ g_j(a) + \ p_j(b) \leq \ g_j(b) \\ \dfrac{p_j + \ g_j(a)}{p_j - \ g_j}, in \ all \ cases \end{Bmatrix}$$

where, C(a,b): concordance index of actions a and b; K: sum of all weights of criteria; kj: weight of criterion j, for j = 1, 2, 3, ..., n; cj: concordance index of actions a and b, under the criterion j.

If the difference in performances between alternatives A and B in criterion i is greater than the veto threshold vi, it is cautious to refuse the statement "alternative A overcomes alternative B".

The discordance index for each criterion i is given by Eq. (6). Fig. 3 shows the graphic representation of this index.

Zone 1. zi(B) - zi(A) ≤ pi, alternative B is weakly preferable to alternative A, which means no disagreement about the statement "alternative A overcomes alternative B". Zone 2. pi < zi(B) - zi(A) < vi, alternative B is strictly preferred to alternative A, which means weak disagreement with the assertion "alternative A overcomes alternative B". Zone 3. zi(B) - zi(A) ≥ vi, the difference between alternative A and alternative B exceeds the threshold for veto, which means total disagreement with the statement "alternative A overcomes alternative B".

$$d_j(a,b) = \begin{Bmatrix} 1 \ if \ g_j(a) + \ v_j \ \leq \ g_j(b) \\ 0 \ if \ g_j(a) + \ p_j \geq \ g_j(b) \\ \dfrac{g_j(b) - \ g_j(a) - p_j}{v_j - \ p_j}, in \ all \ cases \end{Bmatrix}$$

Where: zi(X): alternative X performance in criterion i; pi: threshold of alternative preference on the criterion i.

Considering the concordance (Eq. (4)) and discordance (Eq. (6)) indexes, the credibility degree (Eq. (7)) indicates whether the ranking hypothesis is true or not. If the concordance index (Eq.(4)) is greater than or equal to the discordance index on all criteria (Eq. (6)), then Eq. (7) is equal to Eq. (4). If Eq. (4) is strictly below Eq.(6) then the reliability degree (Eq. (7)) is equal to Eq. (4). Note the importance of the direct relationship of these indices.

$$S(a,b) = \begin{cases} C(a,b), se \ d_j(a,b) \leq C(a,b) \forall_j \\ C(a,b). \prod_{j \in J(a,b)} \dfrac{1 - \ d_j(a,b)}{1 - C(a,b)} \ otherwise \end{cases}$$

where: J(A,B): is the set of criteria for di(A,B) > C(A,B).

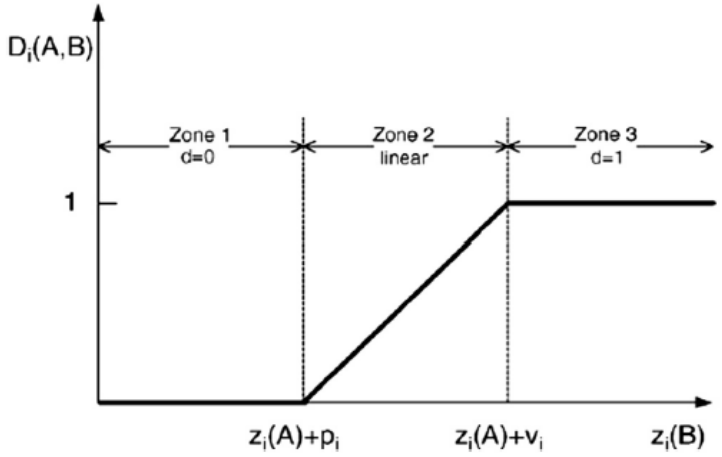

Fig. 3. Disagreement index between A and B alternatives

With the performance matrix constructed, the final step was the definition of some parameters to be used in ELECTRE III to represent the preferences of decision makers. The first is the relative weight of each criterion. For a determined criterion the weight reflects its degree of importance in the creation of a favorable majority in a relationship of over-classification. In agreement with the strong sustainability concept, where it is sought to avoid pre-established preferences between economic, environmental, or social aspects, it was decided to attribute equal weight to all criteria so that they are considered with equal importance in the assessment of sustainability performance. The next parameters established were the indifference, preference, and veto thresholds. The generic linear function for the calculation of thresholds is defined as $\alpha * g(a) + \beta$, where g(a) is the preference function for alternative a. These coefficients allow the definition of the thresholds in a proportional form to the performance of alternative (α) and in absolute values (β). In the study it was decided to use thresholds proportional to performance for all criteria, where $\alpha \neq 0$ and $\beta = 0$. The values attributed to α were 0.1 for the indifference threshold and 0.2 for the preference threshold. This indicates that, for a criterion with a rising preference direction, an alternative can be strictly preferable to another, if its performance is 20% greater. The veto threshold was not adopted because all the criteria are considered to meet the affirmative aSb.

After this, the values of the weights and the thresholds, as well as the elements in the Performance Table (Table 2) were used as input for the ELECTRE III method.

4. RESULTS

In order to determine the sequence of alternatives using the processes assigned to the ELECTRE III, the performance matrix (Table 2) of alternatives for each criterion can be observed taking into account the evolution about the 2011 analysis. For each criterion in Table 2, thresholds and weights were assigned by experts through questionnaires and interviews conducted directly. In the case of weights, all these criteria at this first time, receive the same importance in the analysis, i.e., equal weights were assigned to all of them. The degrees of credibility and indexed to each pair of alternatives do not produce a symmetric matrix.

After applying the procedures of the chosen method and carrying out all the necessary calculations, the final ranking matrix was obtained. Table 3 shows the results of the comparison between the banks. The comparison of each pair of alternatives (a, b) results in one of the following relations: if a is better than b, the symbol of the intersection of line a with column b is P+; if a is equivalent to b, the symbol is I; is a is worse than b, the symbol is P–; if a is incomparable with b, the symbol is R.

The Fig. 4 graphically represents the final order of the alternatives. The company at the top of the ranking is the one with the best general performance in comparison with the others. It can be seen that bank BR1 stands out from the rest, occupying first place in the ranking, followed by another Brazilian bank, BR3. Moreover, it can be seen that of the first five places in the ranking, four are Brazilian banks.

Table 3. Final ordination matrix

	BR1	BR2	BR3	BR4	BR5	US1	US2	US3	US4	US5	EU1	EU2	EU3	EU4	EU5
BR1	I	P^+	P^+	P^+	P^+	P^+	P^+	P^+	P^+	P^+	P^+	P^+	P^+	P^+	P^+
BR2	P^-	I	P^-	P^-	R	P^+	R	P^+	P^+	P^+	P^+	P^+	P^+	P^-	P^+
BR3	P^-	P^+	I	P^-	P^+	P^+	R	P^+	P^+	P^+	P^+	P^+	P^+	P^+	P^+
BR4	P^-	P^+	P^-	I	R	P^+	R	P^+	P^+	P^+	P^+	P^+	P^+	R	P^+
BR5	P^-	R	P^-	R	I	P^+	P^-	R	R	R	R	R	R	P^-	R
US1	P^-	P^-	P^-	I	P^+	I	P^-	P^-	P^-	P^-	P^-	P^-	P^-	P^-	P^-
US2	P^-	R	R	R	P^+	P^+	I	R	P^+	P^+	P^+	P^+	R	R	P^+
US3	P^-	P^-	P^-	P^-	R	P^+	R	I	P^+	P^+	P^+	P^+	R	P^-	P^+
US4	P^-	P^-	P^-	P^-	R	P^+	P^-	P^-	I	P^+	P^+	P^+	P^-	P^-	P^+
US5	P^-	P^-	P^-	P^-	R	P^+	P^-	P^-	P^-	I	R	P^+	P^-	P^-	P^+
EU1	P^-	P^-	P^-	P^-	R	P^+	P^-	P^-	P^-	R	I	R	P^-	P^-	P^+
EU2	P^-	P^-	P^-	P^-	R	P^+	P^-	P^-	P^-	P^-	R	I	P^-	P^-	P^+
EU3	P^-	P^-	P^-	P^-	R	P^+	R	R	P^+	P^+	P^+	P^+	I	P^-	P^+
EU4	P^-	P^+	P^-	R	P^+	P^+	R	P^+	P^+	P^+	P^+	P^+	P^+	I	P^+
EU5	P^-	P^-	P^-	P^-	R	P^+	P^-	P^-	P^-	P^-	P^-	P^-	P^-	P^-	I

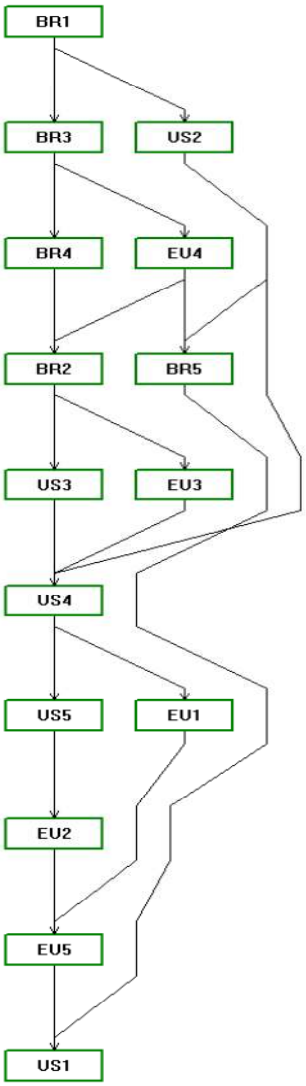

Fig. 4. Final ranking

The European bank EU4 is in third place, and despite being incomparable with the Brazilian bank BR4, it is hierarchically better than the following two (BR2 and BR5, respectively). The American and European banks US3 and EU3 appear in joint fifth position.

The analysis of the sensitivity of the results was carried out by altering the indicator weights, alternately attributing the values 1, 1.5 and 2 to the economic, environmental, and social dimensions, in this order. Six combinations of weights (six cases) were produced in this procedure to be assessed, as shown in Table 4. The numbers presented in this table correspond to the quantity P+ (strict preference) obtained by each alternative on the final ranking matrix (Table 3). The greater the number obtained by a company, the higher its ranking will tend to be.

The data from Table 4 was plotted in Fig. 5 to show how the banks which occupied the highest positions in the ranking behaved in relation to the variation in criteria weight. It can be seen that BR1 and BR3 do not alter due to change in criteria weight, remaining in first and second places, respectively.

The American banks US3 and US2, were the ones with the greatest changes in the ranking. US3 started in seventh place, afterwards moving to fifth, eight, and finally returned to seventh position, where the indicators from the economic sphere had greatest weight, in other words where they were of greater importance. The second bank (US2) started in sixth place and in the two subsequent rankings it oscillated between the fourth and seventh places, finally appearing in fifth place. It was found that when the Brazilian representatives were removed, the others had an equivalent performance.

The results of this sensitivity analysis demonstrate a reasonable constancy in the results, with conformity with the final ranking prevailing. This signifies that the sensitivity analysis confirmed the stability of the ranking result.

5. DISCUSSION AND ADEQUACY OF THE ELECTRE III METHOD

The application of the ELECTRE III method allowed the conjugation of objective data (the criteria values) and subjective linear combinations (weights and thresholds) of the variables, a situation which characterized decision making in complex hierarchical processes. Moreover, since it is a method which does not allow a criteria replacement rate, it permits a greater alignment with the strong sustainability concept.

Moreover, the application of the method showed that it was little sensitive to the variation in criteria weight. Only some banks suffered intense changes. Nevertheless, among those at the top of the ranking there were no variations in their positions.

The weights attributed to the criteria were determinant for the result of the final ranking.

This is shown by the fact that the difference between the first and second placed banks in the final ranking is due to environmental aspects, since their relevance was greater. As can be seen in Table 1, all the environmental indicators have a better performance in bank BR1 (which has a strategic environmental policy), followed by BR3 and US2. In the social aspects, BR3 and US2 stand out, with an equivalent performance. Economic indicators were also determinant in the comparison. In EC1, BR1 was better than BR3, though worse than US2.

It is important to emphasize that all the banks were analyzed peer to peer, based on the application of the selected method. The influence of the weights and the pseudo-criteria causes the equilibrium in the final ranking, seen in Fig. 4.

The final ranking does not permit the identification of which criteria and aspects of each bank should concentrate its efforts on, in order to improve their performance. For this the normalized performance table has to be used (Table 2).

The relationship between sustainability and financial performance is a complex one. To begin with, there is not a standard metric for measuring sustainability since it covers a broad number of socioeconomic and environmental issues. Financial performance, although narrower in scope, can also be measured in different ways, from share price to profits. Electre III, as can be shown, enables the sustainability analysis and measuring.

Table 4. Number of strict preference obtained by each company from weight variation in the economic, environmental and social indicators

Bank	Final	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
	1 - 1 - 1	1 - 1.5 - 2	1 - 2 - 1.5	1.5 - 1 - 2	1.5 - 2 - 1	2 - 1 - 1.5	2 - 1.5 - 1
BR1	14	14	14	14	14	14	14
BR2	8	3	9	5	8	4	7
BR3	11	13	11	12	12	10	11
BR4	9	10	8	11	8	5	8
BR5	1	1	1	0	1	1	1
US1	1	0	0	0	0	0	0
US2	7	7	5	11	5	7	7
US3	6	6	4	8	4	8	5
US4	5	2	6	2	7	5	8
US5	3	2	3	6	3	5	3
EU1	2	0	2	1	3	1	2
EU2	2	0	2	0	1	1	2
EU3	6	6	7	8	6	7	6
EU4	10	7	8	7	10	8	9
EU5	1	0	1	3	2	1	1

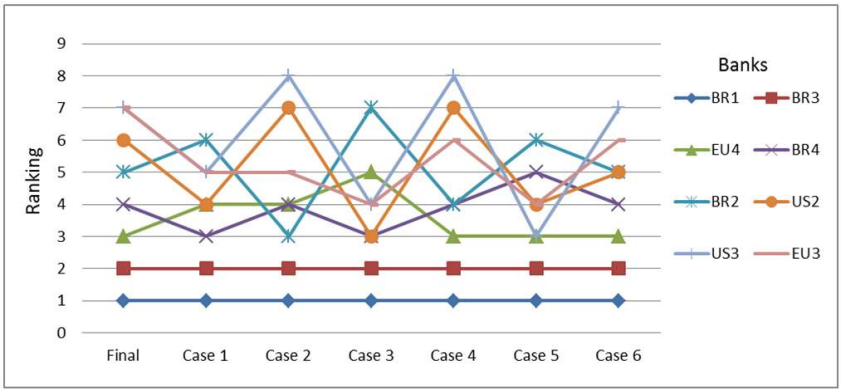

Fig. 5. Ranking variation

About these results, the integration of sustainability into the banking sector has taken two key directions:

- The pursuit of environmental and social responsibility in a bank's operations through environmental initiatives (such as recycling programs or improvements in energy efficiency) and socially responsible initiatives (such as support for cultural events, improved human resource practices and charitable donations);
- The integration of sustainability into a bank's core businesses through the integration of environmental and social considerations into product design, mission policy and strategies. Examples include the integration of environmental criteria into lending and investment strategy, and the development of new products that provide environmental businesses with easier access to capital.

The second of these categories has the potential to influence business on a larger scale. By integrating sustainability into a bank's business strategy and decision-making processes, institutions can support environmentally or socially responsible projects, innovative technologies and sustainable enterprises.

Multi-criteria analysis (MCA) is a valuable and increasingly widely-used tool to aid decision making where there is a choice to be made between competing options. It is particularly useful as a tool for sustainability assessment where a complex and inter-connected range of environmental, social and economic issues must be taken into consideration and where objectives are often competing, making trade-offs unavoidable. It provides a robust and transparent decision-making structure, making explicit the key considerations and the values attributed to them, and providing opportunities for stakeholder and community participation. MCA can be applied at all levels of decision-making, from the consideration of project alternatives to broad-reaching policy decisions guiding a transition towards sustainability and the green economy.

6. DATA COLLECTION UNCERTAINTIES

In the process of created the performance table of the analyzed banks (Table 1), various obstacles were faced during the data collection in the GRI reports, some of which have already been mentioned by authors such as [47]:

- Non-existence of sustainability report for every year;
- Absence of data reports related to determined indicators;
- Partially reported quantitative data or only existing in a qualitative form;
- Lack of clarity about how data was collected and aggregated;
- Performance values published with different measurement units for the same indicator;

The difficulties mentioned can make the data collection process imprecise and introduce uncertainties in calculations and subsequent results, compromising their reliability. Standardization of the data published in sustainability reports can contribute to mitigate these deficiencies. The combination of actions such as these tends to increase the reliability of information released and to raise to another level the assessment of corporate sustainability performance based on GRI reports.

7. CONCLUSION

The various assessment tools can generate different forms of measurement and aggregation of sustainability data. However, in this study the comparison of the sustainability of international banks can be adequately carried out using quantitative criteria taken from their GRI reports and used in a multi-criteria model. The ELECTRE III method was shown to be efficient, principally because of its possibilities for weightings and sensitivity analyzes. It allows the cross-tabulation of banks and indicators, which can be useful for future decision of companies in relation to sustainability.

The results of the study demonstrate that in the banking sector, there is still much space for improvements in relation to sustainability. This can be obtained, amongst other forms, by the integration of sustainability questions in corporate strategies.

The criteria presented and discussed were adequate for evaluating the companies in the finance sector, as they encompassed economic, environmental and social aspects for the study. It should be noted that, regarding the risks to the environmental criteria, there is need for a more accurate survey in the field, in order to evaluate all parameters that influence such a criterion, but for the present study, the evaluation performed was satisfactory. The study allowed analyzing

the companies, strategically, checking for their development and performance in the year studied. According to the criteria selected, these companies were ordered to obtain comparisons and improvements in their production processes.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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