

## RESEARCH PAPER

# A decision-making method for consensus building applied to increase the chance of decision implementation in NPOs: the case of fundraising problem

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## ABSTRACT

**Goal:** The present research aimed to demonstrate the use of a decision-making method based on game theory to support the resolution of a usual NPO's management problem, which is the one of fundraising with different stakeholders' preferences.

**Design / Methodology / Approach:** The application of the method occurred within a NPO in the city of Ribeirão Preto, Brazil, and included: (i) a phase for structuring the problem in the form of a decision matrix; and (ii) a group decision phase for supporting the NPO's director board in their group decision-making process.

**Results:** The method predicted reasonably well the group decision, whose effects were demonstrated with a greater sense of justice. Two years after the decision made, the authors verified through a new visit to the NPO that the mix of the choice of the group and the method was indeed implemented.

**Limitations of the investigation:** It should be noted that, given the sample size, the results achieved in this study should be corroborated by other studies that eventually replicate the procedures proposed here.

**Practical implications:** It has been concluded that the use of a formal approach can contribute to the solution of the fundraising problem in NPOs environment, increasing the chances for decision's implementation.

**Originality / Value:** It is expected that the framework proposed can be used for other similar problems of group decision making in NPOs by the replication of the procedures presented in the paper.

**Keywords:** MCDM; game theory; utility function; group decision making.

## 1 INTRODUCTION

In the decision-making process of Nonprofit Organizations (NPO) the participation of different stakeholders is highly valuable (Defourny and Nyssens, 2008; Ohana et al., 2012). This participation is usually made viable through the board of directors, which is composed mainly by volunteers and has been the major point of interest in the economic thinking on nonprofit governance (Jegers, 2009). On the other hand, perceptions of the stakeholders regarded to the process and/or the group's decisions may have implications within the implementation phase (Li and Cropanzano, 2009; Druckman and Wagner, 2017; Park et al.,

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2016). According to Sharp and Brock (2012), when participation is neglected, the NPO risks to failure in the implementation of its strategies due to a lack of commitment of the stakeholders. Consequently, according to Chadwick-Coule (2011), a successful strategy for NPO's management should be the one that proportionate, through a well-structured decision-making process, means for the alignment of the different needs of the stakeholders, guaranteeing high levels of satisfaction and justice perception. Most importantly, it is assumed that "designing a delegation structure and its concomitant incentive system is in essence designing a governance structure at the organizational level" (Jegers, 2009, p. 145).

A common challenge in the management of NPOs is the one of fundraising, in which its director board should find the mix of funding sources that could produce financially stable revenue considering the risks involved (Kingma, 1993). To accomplishing that, according to Thornton (2006), it would be possible the adoption of different strategies. As an example, Tachizawa (2007) asserts that among the main alternatives for Brazilians' NPOs' fundraising there are: (i) private donations (from individuals or companies); (ii) support from funding agencies; (iii) support from international and/or national foundations; and/or (iv) governments support. Some of them might generate high levels of NPO's governments/foundations dependency while others can increase the participation of volunteers within NPOs activities (Sharp and Brock, 2012; Verschuere and De Corte, 2014). Therefore, it is expected that this kind of decision might generates conflicts among stakeholders. In this scenario, NPO's managers may face difficulties for implementing decisions, due to an eventual lack of satisfaction or justice sense that the stakeholders might eventually present. Consequently, an important question poses to be solved by NPOs' managers, which is "how a NPO could considers different stakeholders' preferences for solving its fundraising problem increasing the chances of decision implementation?". That is assumed to be possible by the adoption a formal approach for supporting the group decision making process (Ziotti and Leoneti, 2020). The rationale behind this assumption is that if "correct procedures and processes are fulfilled, the board will operate better and as a result will add value to the organization" (Brown, 2005, p. 324).

According to Sinuany-Stern and Sherman (2014), when choosing to adopt a formal approach, operational research techniques have become dominant for solving various decision's problems in NPOs. Among them, the technique of Data Envelopment Analysis (DEA) is mentioned as being the most used method. Furthermore, according to Sinuany-Stern and Sherman (2014), other operational research techniques are also commonly employed in NPOs, including: (i) deterministic optimization; (ii) linear and nonlinear optimization; (iii) multi objective optimization; (iv) simulation; (v) multicriteria decision making methods; (vi) networks analysis; and (vii) game theory. In this sense, it can be found in the literature examples of such operational research applications within NPOs. Baruch and Ramalho (2006) applied multivariate analysis for evaluating NPOs, using criteria such as efficiency and productivity, growth and market share, customer orientation, quality, public image and reputation, and social performance. Ruben and Schulpén (2009) presented a review in which the sensibility analysis was used to determine the eligibility of funding proposals from non-governmental development organizations. Muggy et al. (2014) present a review of game theory applications in the context of NPOs, including cost minimization, service efficiency, fundraising, demand and public awareness. Game theory was also used to study the utility function of NPOs' donors, in which the number of charitable contributions made by donors depends positively on the amount of disclosure made by the NPO (Zhuang et al., 2014).

However, considering that the main feature of NPOs highly deviates from the standard economic model of the firm (Helmig et al., 2004), such operational research techniques, which mainly aim for the search of optimized solutions, should eventually be replaced by others that provide a type of consensus-based solution. This is particular important to NPOs' managers since such organizations highly depends on the motivation and involvement of its volunteers and/or employees within the decision-making process and its subsequent decision's implementation (Sharp and Brock, 2012). Wellens and Jegers (2014) reinforces the importance of that necessity. By reviewing studies with regards to the governance in NPOs from a multiple stakeholder's perspective, the authors have concluded that NPOs' managers should, on the

one hand, strongly made viable the participation of key stakeholders in the decision-making process by identifying and considering their main objectives. Then, on the other hand, the authors emphasize that this process should be performed through governance structures that function as information exchange platforms, since in such platforms it would be possible the creation of mutual understanding and willingness of each other in order to achieve accountable decisions. It should be noted that this structure is particularly adherent to the one of the game-theoretical approach.

Considering the hypothesis that the participation of stakeholders, such as volunteers and/or employees, through a well-structured decision-making process can improve the chances of decision implementation in organizations (Ziotti and Leoneti, 2020), and particularly in NPOs (Ohana et al., 2012), the present research aims to investigate the impact of a decision making method that uses the concept of equilibrium to the search of a particular NPO's fundraising decision-making solution. Among other approaches that also use equilibrium concept solution within their procedures (Deng et al., 2014; Wibowo and Deng, 2013; Huang et al., 2013), we are using a method that transform the structure of a group multicriteria decision-making problem, represented by a decision matrix and the respective weight vectors, into a non-cooperative game where the principles of equilibrium solution can be applied for solving the game (Leoneti, 2016). Consequently, the method allows the equally consideration of all preferences of stakeholders involved in a group decision-making process, since the method has the feature of allowing to consider the heterogeneity of the agents' for searching a compromise decision without aggregation of their preferences. This is an important feature, since, as the "NPO is some nexus of stakeholders whose ideas and ambitions are embodied by the board of directors, one can consider this board as the appropriate instrument to implement a sound 'corporate governance' policy, balancing all relevant stakes and objectives, and imposing them as purely as possible to NPO management" (Helmig et al., 2004, p. 103).

Hence, despite the fact that on the search of the solution for the NPOs fundraising problem the stakeholder shares the common goal of the maintaining the NPO's activities, there might be different preferences over possible solutions. Furthermore, within such NPOs' group instances all stakeholders may have equal decision power without the possibility to veto, which eventually contemplate the concern with different aspects of the problem, e.g., social, economic, and environmental. According to Treinta et al. (2020) this is the instance where the NPOs can effectively capture all these aspects of sustainability for increases organizational legitimacy, transparency, and credibility, which is predominantly important in a scenario of increasing competitiveness among NPOs over progressively more scarce resources. Therefore, the NPO's fundraising problem is a good scenario to be seen in the perspective of a non-cooperative game, where each agent can, without any previous agreement made, eventually coordinate their strategies with his/her counterparts. This paper presents the modeling of such process.

The application of such modeling was held within an NPO in the city of Ribeirão Preto, Brazil. The NPO selected is one of the oldest among the 46 NPOs registered in the city and provides social caring services for children, elderly, disabled, families in need and homeless, among others (DSW Ribeirão Preto, 2015). The *Círculo Operário* of *Vila Tibério*, COVT as it is known, was dealing with the choice of a funding source for maintaining its main activities and whose decision would go through a board of directors with potential different views to solve the problem.

## 2 METHODS

The application of the method included: (i) a phase for structuring the problem in the form of a decision matrix with alternative versus criteria; and (ii) a group decision phase for supporting the NPO's director board. Finally, the method's solution and the solution reached by the directors are compared through a qualitative discussion in order to reach a final decision. Details regarding the phases are discussed further in the following paragraphs.

## 2.1 Structuring the problem

An initial visit to the NPO was made by the present researchers to confirm the mutual interest in assisting the NPO's group decision making process. After mutual interest confirmed, a second visit occurred, this time with the participation of a director and the president of the COVT, for presentation of the method and for an interview that was conducted following the procedures of the Value Focused Thinking (VFT)<sup>1</sup> method (Keeney, 1996). The VFT approach provided the collection of information from which the researchers proposed criteria related to the values and objectives of the stakeholders. In a third meeting, these criteria were presented to the director and the president of COVT, which approved them. In the same meeting, from a brainstorming activity, the two COVTs members were asked about what would be viable alternatives to the problem. The chosen criteria and alternative were then used to create the decision matrix. In order to measure the performance of each alternative per criterion, it was requested to both director and the president of COVT a joint evaluation of the decision matrix. This joint evaluation contemplated a consensual performance measurement task, in which the the two COVTs' members were asked to translated into a scale from one to ten the performance of each criterion in relation to all alternatives, which is considered an indirect measure.

## 2.2 The group multicriteria decision making method

The decision matrix  $M$  was translated into a multicriteria decision game  $\langle P, A, C, \prec_i \rangle$ , where  $P$  is the set of  $p$  players,  $A$  is the set of  $m$  strategies (alternatives),  $C$  is the set of  $n$  criteria, and  $\prec_i$  is the preference set over  $A$  for each player  $i$ . For this, we use the numeric representation of the set of preferences jointly as a utility function  $\pi_i = \mathbb{R}_+^{p \times n} \rightarrow [0, 1]$  presented in Leoneti (2016), which calculates the payoff for an alternative  $x_i$  of player  $i$  when trading it with another alternative proposed by the other players  $j \neq i$ , given by the utility function presented in the Equation

$$\pi_i(x_i, x_{j \neq i}) = \varphi(x_i, IA) \cdot \prod_{i \neq j, j=1}^p \varphi(x_i, x_j) \cdot \varphi(x_j, IA) \quad (1)$$

where  $p$  is the number of players,  $x_i$  is a vector alternative composed by  $c$  criteria that represents the initial choice of an agent  $i$ ,  $x_{j \neq i}$  is the set of vector alternatives from the remaining  $p-1$  players,  $IA$  is the utopic alternative that the player  $i$  aim to reach (the alternative composed with the best scores for each criteria), and  $\varphi(x, y)$  is given by the pairwise comparison function  $\varphi$ , according to the Equation

$$\varphi(x, y) = \left[ \frac{\alpha_{xy}}{\|y\|} \right]^{\delta} \cdot \cos \theta_{xy}, \text{ and } \delta = \begin{cases} 1, & \text{if } \alpha_{xy} \leq \|y\| \\ -1, & \text{otherwise} \end{cases} \quad (2)$$

where,  $\alpha_{xy} = \|x\| \cos \theta_{xy}$  is the scalar projection of the alternative vector  $x$  onto the alternative vector  $y$ ,  $\cos \theta_{xy}$  is the angle between the two alternative vectors,  $\|y\| = \sqrt{y_1^2 + y_2^2 + \dots + y_n^2}$  is the norm of the respective vector. The image of  $\varphi$  (range of the function values) varies between

<sup>1</sup> The VFT is applied by a third party, usually named analyst, to an individual or group of individuals within a decision-making process in order to focus the decision on values. Initially, the analyst proposes to decision-makers to outline all the values they believe are involved in the problem, which can be done by a list of purposes. After this first stage, the analyst classifies between fundamental, means and ends objectives by ordering from the specific objectives to the more general objectives. Then, the analyst translates the mean objectives into attributes, also named criteria (Cuoghi and Leoneti, 2017).

zero and unity (due to the conditional  $\delta$ ), meaning the closer it is to unity, the more similar are the alternatives. The utility function  $\pi_i$  is defined therefore as the potential to swap  $x_i$  to  $x_{j \neq i}$ . The utility function provides the payoff values to all  $p$  players for every possible agreement that the group of agents might agree to, named henceforth the payoff tables.

### 2.3 Procedures for operationalizing the method

The calculation of the utility function presented in Leoneti (2016) was programed using an Excel spreadsheet. Within this spreadsheet, it was also programed the procedures for eliciting the preferences of the directors over the criteria using the Rank Order Centroid (ROC) method, since, according to Barron and Barrett (1996), the ROC method is more appropriate than other rank-based methods for eliciting agents' preferences in group decision making contexts. The Nash equilibrium concept (Nash, 1951) was implemented by the use of the NEFinder add in for Excel (Sugiyama and Leoneti, 2021). Because Nash equilibrium is a mathematical combination that would not have inherent meaning that guarantees commitment of the volunteers *a priori*, the average of utilities was also adopted for selecting the highest average among the equilibria, representing the so-called method's solution.

### 2.4 Researchers' roles

Two researchers conduct the group decision phase in different ways. One researcher was responsible for inputting data into the Excel spreadsheet that contained the formula for eliciting preferences by the ROC method and the method proposed by Leoneti (2016) to find the Nash equilibrium with highest average amongst the directors. Simultaneously, the other researcher observed the group discussions in order to create an observational report to document the environment of the discussion, such as engagement in the discussion, commitment to solving the problem, coalitions formation, etc.

### 2.5 Performance evaluation

After the announcement of the final decision, which was reached by the group after comparing the solution of the method with their agreement made, the directors answered two questions with the use of a seven-point Likert-type scale about how satisfied they were regarding to the final result and their perception of justice.

## 3 RESULTS AND DISCUSSIONS

The method was applied to the *Círculo Operário* of Vila Tibério- COVT, which is located in the district of Vila Tibério, in the city of Ribeirão Preto. Ribeirão Preto has its origins dated back in 1856 and, due to the exuberance of their lands, attracted families, both from Brazilian and foreign, for developing agriculture. This colonizing influx not only contributed to the agricultural and commercial expansion, but also influenced on social, spiritual and social progress of the city (Emboaba, 1955). Initially composed of farms, it was from the subdivision from one of them, the Fazenda Laureano, that the village named Vila Tibério, named after Tibério Augusto Garcia de Senne, was founded in the 1920's (Marcussi and Espírito Santo, 2011). The village was a typically working-class neighborhood and had a large number of immigrants (Marcussi and Espírito Santo, 2011). The COVT was founded on November 29th 1960 by local workers union and had developed activities until the year 2000, at which time its activities stopped. In 2005, a group of voluntaries took the challenge to restart the institution. On May 13, 2008, a new voluntary board was elected and on October 29, 2009 COVT restarted its activities.

Since then, COVT had been mainly maintained by municipal government funds, although not receiving that support in the year that this research occurred. One of other COVT's main

sources of income, the *Nota Fiscal Paulista*<sup>2</sup>, was subject of future changes, risking this funding source to the NPO. Thus, the president and the board of directors, all volunteers of the NPO, was searching for a solution to carry on the COVT's activities in the subsequent year. This was a critical decision, since COVT stopped its activities earlier due to financial instability. The president announced the problem during a monthly meeting with the volunteer's members. The presence of a researcher from University of São Paulo in the COVT's director board, made it possible a university extension activity. The next sections present the details regarding the support provided and the results of the application.

### 3.1 Structuring the problem

The problem's structuring process was performed during and through two meetings with COVT's president and directors. In the first, the director and the president of COVT were asked about what they believe to be the main objectives of COVT in order to identify the values of the organization following the procedures of VFT. It was noticed by the researchers that the fundamental objective of the organization would be to improve community services, providing a greater volume of activity. This was named as the fundamental objective of the NPO, from which the mean and end objectives were derived through the researchers' interpretation of the COVT's director and president's verbal communication at this first meeting. Table 1 presents the fundamental, mean and end objectives of the organization through the application of VFT by the researchers.

**Table 1.** Fundamental, Mean and End Objectives

Fundamental	End	Mean
Improve community service	Meet stakeholder's expectations	Attract more volunteers
	Maintaining sufficient income and financial autonomy	Keep low costs
	Building institutional image	Empower employees and directors
	Increase the number of NGO partnerships	Strengthen existing partnerships
		Create communication with society

Source: developed by the authors based on the VFT with the directors of the NPO.

Following the procedures of VFT, criteria were created to be used for measuring the mean objectives. The researchers proposed the criteria and presented them in a second meeting with the director and the president of COVT. The selected criteria were: (i) financial return; (ii) risk; (iii) facility of implementation; (iv) number of people involved; (v) timing; (vi) return/cost; (vii) institutional image; and (viii) new partners, which were validated by the COVT's president and director at this second meeting. Table 2 describes the validated criteria.

**Table 2.** Criteria and definitions

Criteria	Description
Financial return (Indirect measure)	This criterion indicates the amount that exceeds the minimal for maintaining the basic activities of the NPO. On the scale of 1 to 10, it is highest when close to 10 (benefit criterion).
Risk (Indirect measure)	This is the chance of the funding source not be feasible. On the scale of 1 to 10, it is riskier when close to 1 (cost criterion).

<sup>2</sup> The *Nota Fiscal Paulista* is a São Paulo's State program to encourage consumers to demand the delivery of the tax document at the time of purchase. In addition, it aims to generate credits for consumers, citizens and state companies (São Paulo, 2021).



**Tabela 2.** Continued...

Criteria	Description
Facility of implementation (Indirect measure)	This shows how much control the directors of the NPO have over the alternative, as well as readiness to capture the resource. On the scale of 1 to 10, it is easier when assuming values close to 10 (benefit criterion).
Number of people involved (Direct measure)	This estimates the number of people directly involved in each alternative (benefit criterion).
Timing (Indirect measure)	This measures how long it is estimated from the start to the end of obtaining the funds. On the scale of 1 to 10, it is longer for obtain the financial resources when assuming values close to 10 (cost criterion).
Return/cost (Indirect measure)	This shows the relation between the return estimated and the costs involved, including financial but also for mobilization, etc. On the scale of 1 to 10, it provides better relationship when close to 10 (benefit criterion).
Institutional image (Indirect measure)	This is the opinion of employees, financiers, beneficiaries and the general public with regard to the organization. On the scale of 1 to 10, it is highest when close to 10 (benefit criterion).
New partners (Indirect measure)	This is the chance of building new partnerships through adopted alternatives. On the scale of 1 to 10, it is highest when close to 10 (benefit criterion).

Source: criteria developed by the authors based on the VFT with the directors of the NPO.

In the same meeting, in order to compose the alternatives to be considered as funding sources, a brainstorming activity was carried on, from which the following possibilities were raised: using existing financial resources, including tax coupons; social assistance from the city, etc.; promotions such as pizza party, bazaar, celebratory lunch and dinners; submitting investment projects, including projects for the state government (sports and culture); and new sources for raising funds, including international foundations, support from private companies, and starting to apply membership fees. Based on that information provided by the two COVTs members, the researchers consolidated the following alternatives: (i) projects to the State government, (ii) events organized and operated by volunteers, (iii) support from international foundations, (iv) support from private companies, and (v) membership fees, which were validated by the two COVTs members. Finally, at the ending of the second meeting, in order to value all alternatives within a criterion basis, the two COVT's members provided individual valuation based on a scale ranging from zero to ten, excepting for the criterion "Number of people involved", which was calculated by the estimative of people eventually implicated for alternative implementation (a direct measure). Table 3 presents the decision matrix after the joint evaluation of the two COVT's members, which was obtained through the arithmetic mean rounded to zero decimal cases.

**Table 3.** Decision Matrix with criteria performance

	<i>Financial return</i>	<i>Risk</i>	<i>Facility of implementation</i>	<i>Number of people involved</i>	<i>Timing</i>	<i>Return/cost</i>	<i>Institutional image</i>	<i>New partners</i>
<i>(1) Projects to the state government</i>	10	3	7	8	7	7	8	3
<i>(2) Events organized and operated by volunteers</i>	3	2	8	15	2	2	10	7
<i>(3) Support from international foundations</i>	8	5	5	5	8	6	10	10
<i>(4) Support from private companies</i>	5	4	6	10	7	9	10	10
<i>(5) Membership fees</i>	6	2	8	5	1	4	10	1

Source: developed by the authors based on the evaluations of the two COVT's members.

It should be noted that the decision matrix obtained in this research was similar to other decision matrices found in the literature. Tachizawa (2007), for instance, noticed that Brazilian's NPOs fundraising alternatives usually includes private donations (from individuals or companies), support from government institutions, and support from international and/or national foundations. This evidences that the application of the brainstorm with the COVT's members converged to the same type of solutions. It was also the case for the criteria obtained through the application of the VFT method. For instance, Ruben and Schulpen (2009) used criteria related to the quality, efficiency and sustainability of programs to assess the eligibility of co-financing organizations seeking to ensure more objective allocation of funds. Baruch and Ramalho (2006) used the criteria efficiency and productivity, growthy and market share, customer orientation, quality, public image and reputation, and social performance for evaluating business and NPOs in some publications. These criteria were also strongly related to those proposed through the VFT application.

In relation to the valuation of the decision matrix, it is particularly interesting to note the fact that the alternative "Projects to the State government" reached the highest score for the criterion "Financial return", which seems to demonstrate the level of importance of this alternative in relation to the others for fundraising. This kind of dependence is problematized in the literature by Verschuere and De Corte (2014) who state that the NPOs' dependence on public resources may cause a negative impact on the organizational autonomy, especially in regards to strategic decision-making for accomplish NPOs' mission. On the other hand, Verschuere and De Corte (2014) state that this negative impact could be minimized in the presence of volunteers acting in the NPO's. In this regards, Mitchell and Clark (2020) state that strong institutional image could increase the chances of the NPOs recruits new volunteers and makes higher the chance of commitment of them to the organization. In fact, it is similarly interesting to note that this conflict was internalized into the decision matrix, in which the alternative "Projects to the State government" has the lowest score for the criterion "New partners" and "Institutional image". These evidences allow to confirm the plausibility of the decision matrix created.

### 3.2 Group decision making session

With the problem structured in the form of a decision matrix, the president of COVT authorized the researchers to apply the method during one of the extraordinary meeting with the board of directors of COVT. The meeting was arranged by the COVT's president with three directors, all volunteers and members of the board (named A, B and C, for confidentiality), which were designated for solving the fundraising problem. This meeting was divided into two parts. Firstly, at the individual phase, the three directors evaluated and ranked the criteria of the decision matrix without any communication with each other. The criteria' rankings (from best to worst) were used to calculate the respective weightings vectors using the ROC method, which results can be seen in Table 4.

**Table 4.** Ranking of the criteria

Criteria	Director A		Director B		Director C	
	Rank	Weight	Rank	Weight	Rank	Weight
Financial return	1°	0.34	2°	0.21	2°	0.21
Risk	8°	0.02	6°	0.05	4°	0.11
Facility of implementation	4°	0.11	8°	0.02	3°	0.15
Number of people involved	2°	0.21	1°	0.34	8°	0.02
Timing	5°	0.08	5°	0.08	7°	0.03
Return/cost	7°	0.03	7°	0.03	5°	0.08
Institutional image	6°	0.05	3°	0.15	1°	0.34
New partners	3°	0.15	4°	0.11	6°	0.05

Source: obtained from the application of ROC method on the criteria' ranking from COVT directors.



It is interesting to note that there is a significative divergence among the directors B and C with regards to the values that should be primordially taken into account for finding the solution to the fundraising problem. While the Director B thought it is very important the number of people involved in the solution of the fundraising problem, the Director C considered that it would be the least important criterion in his view. It was expected that this divergence could cause a conflictive scenario in which the different opinions should be carefully considered in order to achieve satisfactory levels of satisfaction with the group decision in order to favor the implementation of the solution (Jegers, 2009). Finally, each director was also asked to rank the alternatives (from best to worst), whose results are presented in Table 5. It can be seen, for instance, that the Director A prefers “support from private companies” more than “events organized and operated by volunteers”. As expected, the directors B and C demonstrated very different rankings for the alternatives. Therefore, these rankings evidenced the different views of the directors regarding to the solution to the problem, which was due to the different preferences over the criteria.

**Table 5.** Ranking of the alternatives

Alternatives	Director A	Director B	Director C
(1) Projects for the state government	3°	3°	1°
(2) Events organized and operated by volunteers	2°	1°	4°
(3) Support from international foundations	4°	5°	3°
(4) Support from private companies	1°	2°	2°
(5) Membership fees	5°	4°	5°

Source: alternatives' ranking from COVT directors.

One of the researchers inputted the weighting vectors generated by the ROC method into the Excel spreadsheet that contained the method proposed by Leoneti (2016). For doing that, each cost criterion (the more the worse) of the decision matrix was transformed into benefit criterion (the more the better) by means of the formula  $\frac{1}{x}$ , where  $x$  was the respective cost criterion. Therefore, the decision matrix inserted into the Excel spreadsheet containing only benefit criteria. Meanwhile, the group phase started, with the group of three directors discussing their preferences about the best alternative to be adopted as the solution to the NPO fundraising problem, which was observed by the second researcher.

From the group phase, it was noted that Director C presented strong arguments for prioritization of projects that receive funding from the government, especially because these projects run with a fixed annual budget, which would give greater financial stability to the NPO (less risky). Director A, more focused on the relationship with private companies and entrepreneurs who donate to the NPOs, stated that the facility and the corporate image are very important and should be considered. Director B emphasized the importance of participation of volunteers in the mission to raise funds for the institution. It is interesting to note that the dependency problem reported by Verschuere and De Corte (2014) was strongly present in the discussion. The national economic crisis in the period of the application also guided the arguments, which emphasizes the concern related by Treinta et al. (2020) with regards to the competition for scarce resources. Finally, the group reached a solution that included two alternatives with different priorities, namely: (1st) support from private companies, and (2nd) projects for the state government. This mixed solution was hereafter called group solution.

In parallel, the analytic solution was obtained from the Excel spreadsheet. The solution was obtained using the weighting vector generated by the application of ROC procedure on the rankings presented in Table 4, for standardize the decision matrix of Table 3. Following, in each standardized decision matrix the Equation 2 was used for calculate the factors of Equation 1 and to calculate the payoff table for each player based on the utility function calculation. Finally, Nash equilibria were searched by means of the NEFinder add-in for Excel

(Sugiyama and Leoneti, 2021). For each Nash equilibrium found, the average among the payoffs of Director A, B and C were calculated and ranked in a descending order. Table 6 presents the solution found by the application of the Nash equilibrium, which was ranked based on the average value.

**Table 6.** Results based on the average utility

Equilibrium's ranking	Alternatives			Payoffs			Average
	Director A	Director B	Director C	Director A	Director B	Director C	
1 <sup>st</sup>	Altern. 1	Altern. 1	Altern. 1	0.348	0.190	0.568	0.369
2 <sup>nd</sup>	Altern. 4	Altern. 4	Altern. 4	0.207	0.249	0.418	0.292
3 <sup>rd</sup>	Altern. 3	Altern. 3	Altern. 3	0.227	0.080	0.513	0.273
4 <sup>th</sup>	Altern. 5	Altern. 5	Altern. 5	0.107	0.066	0.505	0.226

Source: developed by the authors based on the method results.

It can be seen that the best ranked equilibria involved the following alternatives: (1st) projects for the state government, followed by (2nd) support from private companies. These two alternatives were named the analytic solution based on the average of utilities calculated using the utility function. The analytic solution was disclosed to the three directors, which were asked to compare both group and analytic solutions and a second round of negotiation started. Then, in the second round of negotiation, the directors discussed the priority order of both group and analytic solutions. The directors decided to adopt the mix of the two alternatives that were presented in both solution, namely: support from private companies and projects for the state government.

By the end, the satisfaction and sense of justice of each director were measured. The satisfaction was related to the final choice of the group, while the sense of justice was related to the decision-making process in general. Specifically, the three directors were asked how they were satisfied and their level of sense of justice with relation to the final result using a Likert-type scale, where one mean strongly disagree and seven means strongly agree, shown in Table 7.

**Table 7.** Satisfaction and sense of justice

	Director A	Director B	Director C
Satisfaction	6	6	5
Sense of Justice	7	6	6

Source: developed by the authors based on the method results.

According to Kingma (1993), the financial stability of NPOs can eventually be achieved through the increase of government financial participation, which would be considered a relatively stable source of funding. In this sense, the analytic solution would evidence more alignment with the theory of NPO's management. However, at the second round of negotiation, after both group and analytic solution being disclosed, the board of directors preferred the order of priority of the group solution. That is, therefore, in accordance with Treinta et al. (2020) that problematized the dependency of NPO's from government funding. Therefore, directors felt differently satisfied regarding this final solution. Specifically, Director A and B felt highly satisfied, while Director C felt satisfied with less intensity than the others did. On the other hand, all directors presented a high and balanced sense of justice perception, corroborating Chadwick-Coule (2011) that a well-structured decision-making process can guarantee higher levels of justice perception even with different expectative of stakeholders. In this way, it was expected that the chances of implementing the decision would be high, since the alternatives presented in the final solution were very well evaluated by each

director in the beginning of the negotiation process and also by the method, which also suggests that the method predicted the outcomes reasonably well.

### **3.3 Decision implementation**

Two years after the solution made, the authors verified through a new visit to the NPO that the mix of the choice of the group and the method was indeed implemented, that is, the support from private companies and projects with the government. The COVT had got the approval of a project by the City Council and it had already been implemented by the time of the new visit. Another project, regarded to sports, was also approved for two years, although with not enough funds to cover all costs of the COVT. In this sense, participation of the private companies was also important to the fundraising by the collection of invoices and donations, since there was not a unique and sufficient partnership that would cover all fixed costs of the NPO either. The adopting of the mixed solution corroborates Kingma (1993), who affirms that a unique source for fund raising would be riskier than a mix of these to NPOs. The NPO had not charged membership and users and did not demonstrated any intention to implement any other alternative in the short run.

## **4 CONCLUSION**

We evaluated a group decision-making process with the support of a decision-making method based on game theory. Particularly, we evaluated the effectiveness in aiding directors of a Brazilian NPO for choosing an alternative for the fundraising problem through a well-structure method that provides equilibrium solutions. The problem was critical to the NPO studied, since at the period of this study the president and director board of the NPO were concerned whether they could or could not to carry on the NPO's activities in the following years. The method predicted reasonably well the group decision, whose effects were demonstrated with a greater sense of justice and, consequently, its implementation. After the period of two years, all directors that participated in the decision-making process were involved in the implementation of the alternatives chosen.

Current international research using multicriteria methods and frameworks to aid group decision making process in NPOs and application of decision methods in cases similar to that presented here is limited. We believe, therefore, that present study, using a group multicriteria decision making method based on game theory can contributes to fundraising decision making in NPOs environment through a participative decision making process considering the conflicts generated by the diversity of stakeholders' preferences, increasing the chances for decision implementation. It is noteworthy, however, that the framework proposed here can be used for other situations of group decision making in NPOs, for instance, resource allocation, fundraising effectiveness, budget allocation, socially responsible investments, and other situations where collective purposes and shared visions through consensus toward commitment and successful implementation are required.

Some limitations of the research should be also discussed. A first issue that may difficult to put our findings into a broader perspective is related to the sample size. In this sense, it should be noted that the results achieved in this study should be corroborated by other studies that eventually replicate the procedures proposed here for verification of the main hypothesis. Other issue is the use of Nash equilibrium as the concept solution, since Nash equilibrium is a hard computational problem to be solved. Other types of equilibria could be investigated in future researches.

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