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## Conceptual design of a Decision Support System for the economic sustainability of nonprofit organizations

Massimo Rinaldi\*, Chiara Parretti, Lorenzo Bartolini Salimbeni, Paolo Citti

*Department of Technologies and Innovation Development, Guglielmo Marconi University, Via Plinio 44 - 00193 Rome, Italy*

\* Corresponding author. Tel.: +39-06-377-2511; fax: +39-06-377-25647. E-mail address: [m.rinaldi@unimarconi.it](mailto:m.rinaldi@unimarconi.it)

### Abstract

In Italy, a continuous growth of nonprofit organizations has occurred in the last years. These organizations have been favoured by the concomitant reduction of direct public intervention (due to spending review) and the effect of the economic crisis on the business system. Despite their growth, nonprofit organizations present usually a critical lack in financial and economic management. In other words, their management does not consider all the factors related to economic balance, social success, reputation and promotion of their projects. The managerial role appears often to be overlooked compared to the actual needs and this results in a real limit for the growth and sustainability of these organizations. The present paper introduces a complete management review for the nonprofit using an Axiomatic Design based on the case study of one "Misericordia" located in Florence: it is one of the most important nonprofit organization in Italy. The proposed application leads to the definition of the minimum set of assessment tools that have to be considered and used as a Decision Support System (DSS) to support the management in a nonprofit organization. The DSS is developed as an integrated system of tools which allows a systemic approach tailored to meet the specificity of this kind of organization.

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### 1. Introduction

The Italian National Institute of Statistics (ISTAT) in its last census underlines how the nonprofit sector [1] has increased by 28% over the past decade reaching a number of 301.191 organizations which employ 438.000 volunteers, 42.000 internal and 19.000 external employees.

At a European level, a recent sample survey [2] and other studies [3], highlighted how Community nationals acknowledge the leading role played by nonprofit organizations in strengthening social cohesion and the fundamental values of solidarity which characterize the European Union. The sample represented approximately 27.000 European citizens older than 15 years old, the 24% of the interviewees declared to volunteer "occasionally or regularly" for sport clubs (24%), cultural associations (20%) and charitable, humanitarian associations or NGOs (16%).

Focusing on Italy, we find a situation that despite being rooted in the Roman era and the Middle Ages [4], has been able to adapt to new realities since the Twentieth Century.

The purpose of this paper is to provide a small, yet innovative set of ideas to nonprofit organizations' managers in order to solve the problems of their management. The proposal originates from a research aimed at identifying an integrated system of tools which supports a nonprofit organization both to remain in the market in an efficient and competitive way and to limit the financial riskiness of the Italian Country system. It has been studied at conceptual level, an innovative integrated system of tools, adaptable to one's own reality, which allows a new systemic approach to achieve a business management that optimizes both the efficiency of the organization and its relationship with stakeholders.

The methodology examined a case study related to the comprehensive analysis of the "Misericordia" organization to single out its problems and it went on reviewing its three civil

financial statements. In Italy, Misericordia is one of the most important nonprofit organization able to offer a wide range of social services, including medical assistance. The first one was established in 1244 with the foundation of Florence's Misericordia; they spread in Europe and throughout the world.

With its social value play an important role in the Italian welfare system

In order to analyze these financial statements, a set of different indicators has been created drawing from the examination of the for-profits' experience. The most suitable indicators in some cases matched those used by for-profits, in other cases they have been created and adapted based on the needs of nonprofits.

At a later stage we compared the financial statements with those produced by 3 similar "Misericordia", using the previous indicators. Carrying on studying the similarities and differences between for-profits and nonprofits, we now focus on identifying an integrated system of tools which is useful to gain a new systemic approach, to foster the birth of structured governance mechanisms that interface with the different actors of the social, political and economic world.

We have to say that the nonprofits produce a new wealth which is not expressed in monetary terms, so it is more difficult to measure [5]; indeed, a tool able to quantify this produced wealth does not exist [6]. As a consequence, the managerial attitude favors the implementation of management tools which are partly inadequate and unable to solve issues that arise at the global level of the organization. Failure to update the management, as some local and national news have already shown, will result over time in the inability of many nonprofit organizations to keep their growth potentials over time [7] and to pursue their own social mission.

The issues derived from this scenario can be summarized and analyzed within the three typical areas of any nonprofit organization:

human resources: a decrease in the number of volunteers at an executive and managerial level;

finances: the insufficiency of structured governance mechanisms and the lack of an efficient system to publish financial statements which ensures transparency;

communication and marketing: the continuous contraction of fundraising.

One of their major joint causes is due to the firm belief that the management and organization of the economic aspect and success (typical of for-profits) will make these organizations lose their identity value. Social success which characterizes nonprofits, is achieved by human resources who ultimately benefit from it.

Indeed, the management systems implemented by for-profits and their performance measurement tools are not suitable for nonprofits, since the former is income-oriented and follow managerial operational logics which are only partially compatible with nonprofits'.

Here introduce the paper, and put a nomenclature if necessary, in a box with the same font size as the rest of the paper. The paragraphs continue from here and are only separated by headings, subheadings, images and formulae. The section headings are arranged by numbers, bold and 10 pt. Here follows further instructions for authors.

## 2. An integrated system of tools

In order to meet the goal of building this system, summarized in figure 1, the selected tools have been divided in three application areas: human resources, finances and communication and marketing.



Fig. 1. The integrated system.

### 2.1. The Human Resources Area

The current economic crisis entails a further development of the structures which have always been based on the motivations, values and inclinations of their volunteers who replace the paid employees of a for-profit:

- **volunteer questionnaires:** whose recurring completion will ask to provide both assessments and suggestions for improvement;
- **operational data sheets for risk management planning:** risk management planning is a legal obligation on the roles at the top of the organizations even in the nonprofit sector; failure to comply, in almost every case, is due to a lack of knowledge of the regulation.

### 2.2. The Financial Area

It is necessary to implement a system of tools which makes the work of managers and auditors easier and more objective as well as providing donors and stakeholders with performance assessment tools:

- **economic performance assessment indicators:** in the present context of restructuring the spending review [8], it is not easy to implement indicators regarding economy and efficiency which are able to ensure a business management understood as "the ability of a firm to stay in the market by maximising the utility of its resources". Indeed an outer or strategic efficiency is favored as to prove the ability of goods and services produced to satisfy the community's needs [9];
- **nonprofit indicators:** to complete the commonly used indicators [10], we propose the implementation of the following indicators **average presence of volunteers** and **percentage of volunteers** which concern human resources;
- **a series of questions to frame the issue about creditworthiness:** it has been built a system of quantitative and qualitative information which the credit

body will request during the assessment phase. A system which by requiring all the available knowledge and skills gains a forecasting potentiality and increases the level of participation of the employees involved in the elaboration process;

- the **corporate dashboard** to display the chosen indicators: the **dashboard** created with **excel** will be employed as a concise system of corporate reporting aims at quickening the decision-making process based on the display of indicators faster;
- **benchmarking** to control the selected indicators comparing them with those expressed by similar organizations; to assess one's own placement in comparison to similar organizations during the period taken into exam;
- **Project Cycle Management**; it will be employed in order to overcome the problems which may arise during the management phase of social projects (so called project management) and to achieve every single project that is able to produce positive perspective margins which will finance the entire structural costs of the organization. The organization can be seen as the sum of its promoted, organized and managed social projects.

2.3. Communication and Marketing Area

R. Kaplan et al. [11] sum up the structure of the strategic map for nonprofit organizations by answering the following fundamental questions: mission oriented towards the client, internal processes, the trustee, growth and education. In order to support these activities, we propose the implementation of the following tools:

- A **communication plan**: as a corollary to each activity/project, it is useful to build a scheme which includes the following information: goals, tools, target, times, managers. It should be taken into account that the managers' tasks will be ensured by volunteers who do not always possess remarkable knowledge and skills;
- **Marketing plan**: starting from the analysis of the donor, the client and competition; a series of questionnaires concerning the **customer satisfaction** survey will be used to strengthen and improve the relationships with the beneficiaries of the service/product and to improve the quality of the service provided, which differ according to the type of service or product.

3. The Design of a Platform for a new Approach

The implementation of Axiomatic Design (AD) enables analysis of the logical coherence [12] of all the above mentioned tools, observed for our purposes, in order to maximize their use and to avoid gathering an excessive amount of information, thus offering to every nonprofit organization a dynamic and rational methodology to select the most suitable tools. The choice of the minimum set of tools to employ in our system will be determined by using sequentially the following axioms:

- **independence**, that determines the minimum number of tools which allows to analyze the problem;

- **information**, that selects among the aforesaid tools more apt to our purposes, defining them in terms of a higher probability to achieve its goal.

The employment of these axioms helps us, in logical terms, to redesign our integrated system of tools to define the minimum set of tools which best of all realizes our goals.

In the case in exam, in order to create a new methodological approach we must consider:

- functional requirements  $\{FR_i\}$ , as object and goal of the assessment;
- project parameters  $\{DP_i\}$ , as assessment tools, represented in figure 2 and considered again in the matrix created in the figure 7.

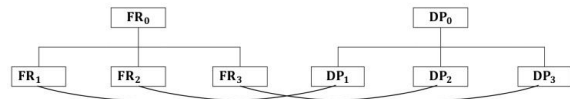


Fig. 2. correlation between  $\{FR_i\}$  and  $\{DP_i\}$ .

3.1. First level of the Matrix

The first level of the matrix, as shown in figure 3, is generated by the following assessment tools  $\{DP_i\}$ :

- tool 1, **Human Resources Indicators**;
  - tool 2, **Financial Indicators**;
  - tool 3, **Communication and Marketing Area**;
- matched by the following planning goals  $\{FR_i\}$ :

- goal 1 **Personnel assessment**: the activities are particularly fit to the introduction of goal-oriented management systems which presume the fulfillment of the task and the resulting specialisation for assignments in favor of the circulation of a corporate culture based on the achievement of goals and the spread of professional skills [13];
- goal 2, **Financial assessment**: to make the work of managers and auditors easier and more impartial and to provide donors and financial stakeholders with performance assessment tools;
- goal 3, **External Communication**: to build trust between the organization and its stakeholders on the basis of social, economic and financial results.

The matrix obtained at this level, being diagonal, shows that the tools and goals can be handled autonomously.

|                               |                 | Assessment tools           |                      |                              |
|-------------------------------|-----------------|----------------------------|----------------------|------------------------------|
|                               |                 | Human resources Indicators | Financial Indicators | Communication Marketing Area |
| Oby                           |                 | DP <sub>1</sub>            | DP <sub>2</sub>      | DP <sub>3</sub>              |
| Maximize Personnel Assessment | FR <sub>1</sub> | X                          |                      |                              |
| Maximize Financial Assessment | FR <sub>2</sub> |                            | X                    |                              |
| Ensure External Communication | FR <sub>3</sub> |                            |                      | X                            |

Fig. 3. Top level design matrix.

3.2. Second level of the Matrix

The examined block of the matrix, as shown in figure 4, is generated by dividing the assessment tool “Human Resources Indicators” in:

- tool 1, **Personnel Satisfaction Indicators**;
  - tool 2, **Penal risk**;
- which are matched respectively by the following planning goals:
- goal 1, **Personnel Satisfaction**: to increase the motivational variable [14] and to improve the relationship among volunteers;
  - goal 2, **Definition of Employees’ Activity**: based on legislative Decree 231/2001 [15] recognized and non-recognized associations are sanctioned directly in the case of committing certain violations to pursue their interest or their advantage, unless they implemented effectively some specific measures (organization and control models) to prevent criminal conducts.

The derived matrix, which is diagonal as the one in the first level, indicates that the tools and goals can be handled independently.

|                              |                   |                                   |                   |
|------------------------------|-------------------|-----------------------------------|-------------------|
|                              |                   | Assessment tools                  |                   |
|                              |                   | Personnel satisfaction Indicators | Penal Risk        |
| Oby                          |                   | DP <sub>1,1</sub>                 | DP <sub>1,2</sub> |
| Enjoy Personnel Satisfaction | FR <sub>1,1</sub> | X                                 |                   |
| Define Employees’ Activity   | FR <sub>1,2</sub> |                                   | X                 |

Fig. 4. Block of the second level of the matrix.

Analysing a further block, we can see (neither diagonal nor triangular) matrices concerning the Financial and Communication and Marketing areas which produce a negative assessment of the groups of reference indicators that cannot be reconsidered.

The correlation between assessment tools and their relating goals is shown in figure 5.

|                                 |                   |                     |                   |                       |
|---------------------------------|-------------------|---------------------|-------------------|-----------------------|
|                                 |                   | Assessment tools    |                   |                       |
|                                 |                   | Communication plans | Marketing plans   | Customer Satisfaction |
| Oby                             |                   | DP <sub>3,1</sub>   | DP <sub>3,2</sub> | DP <sub>3,3</sub>     |
| Improve Service and Donation    | FR <sub>3,1</sub> | X                   | X                 |                       |
| Develop Attraction for Donors   | FR <sub>3,2</sub> | X                   | X                 |                       |
| Guarantee Customer Satisfaction | FR <sub>3,3</sub> | X                   | X                 | X                     |

Fig. 5. Initial design matrix decomposition for FR<sub>2</sub> before the Analysis.

For instance, with regard to **Communication and Marketing Area** we can remove a group of elements between **Marketing plans** and **Communication**; thus aligning the triangular submatrix to the principle of **independence**.

The **Information** axiom allows us to choose among different and reciprocally alternative planning solutions, the most suitable ones which are defined as a set of {DP<sub>i</sub>} that minimizes the content of information of the overall system.

Moving on to the technique of adapting assessment tools to the context, let’s look at those concerning the Marketing area. Each assessment tool (**Communication plans**, **Marketing Plans** and **Customer satisfaction**) is matched by a precise goal.

We can see clearly that the assessment tools **DP<sub>3,1</sub>** and **DP<sub>3,2</sub>** are in conflicts, since the correlation matrix is Coupled; therefore we need to decide whether to employ the tools relating to **Communication Plans** or **Marketing Plans**.

In this case the firm will have to choose between the following alternatives:

- increasing the number of clients and donors, promoting services and donations through an advertising campaign;
  - increasing the number of donors, but not that of clients.
- If one is unable to decide directly, the **information** axiom can be employed to reach a decision.

To be more specific, between **DP<sub>3,1</sub>** and **DP<sub>3,2</sub>** we choose the set of tools which has a higher probability to meet our goals. Implementing option 2 entails the following reduction of the matrix, as shown in figure 6.

|                                 |                   |                   |                       |
|---------------------------------|-------------------|-------------------|-----------------------|
|                                 |                   | Assessment tools  |                       |
|                                 |                   | Marketing plans   | Customer Satisfaction |
| Oby                             |                   | DP <sub>3,2</sub> | DP <sub>3,3</sub>     |
| Develop Attraction for Donors   | FR <sub>3,2</sub> | X                 |                       |
| Guarantee Customer Satisfaction | FR <sub>3,3</sub> | X                 | X                     |

Fig. 6. Design matrix decomposition for FR<sub>2</sub> before the Analysis.

In this case the matrix following the **independence** axiom regarding **Communication and Marketing Area** enables the implementation of **Marketing Plans** and **Customer Satisfaction**.

The selection process of assessment tools can go on until the required level of detail; that’s the reason why for a need of an oversimplification, but essentially for this article, we jumped the analysis from **FR<sub>2,1</sub>** to **FR<sub>2,6</sub>**.

4. Conclusions

The introduction of decision-making techniques based on Axiomatic Design allows us to identify the most efficient set of assessment tools among all the possible ones, within the current framework characterized by an extreme organizational

complexity and variability of the political, legislative and economic context. In this heterogeneous and unpredictable context, the concrete benefit is given by a new approach; this approach leads to possess the essential tools to control nonprofit organizations and to employ a methodology which offers the following advantages:

- deletion of redundant and often contrasting information which are misleading during the decision-making phase;
- flexibility of the integrated system of tools following the change of a particular decision-making context, by defining a set of specific tools;
- support given to managers through logical and clear principles based on the **independence** and **information** axioms and their respective corollaries;
- financial resources saving, since the reconfiguration of the assessment system aims at identifying a set of tools which besides being solid, is also kept at a minimum for the manager's goals.

In a future perspective, through the analysis of the evolution of the corporate activity and the achievement of set goals, it will be possible to change the decisions taken and to undertake the necessary actions [16] to pursue social and economic success.

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- [15] ART. 1 – Subjects The present legislative decree regulates the responsibility of organizations regarding administrative offenses caused by a felony. Its dispositions are applied to those organizations with a legal status and to firms and associations even those which do not have a legal status. They are not applied to either the State, local public organizations,

other non-economic public organizations or organizations which carry out constitutional functions.

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Oby

|  |
|--|
| Define Analysis                        |
| Maximize Personnel Assessment          |
| Maximize Financial Assessment          |
| Ensure External Communication          |
| Enjoy Personnel Satisfaction           |
| Define Employees' Activity             |
| Refine Management Analysis             |
| Set up Global Management Control       |
| Set up Corporate Rating towards Banks  |
| Improve benchmarking                   |
| Provide Synthetic data for Management  |
| Support Management Planning            |
| Improve Service and Donation Promotion |
| Develop Attraction for Donors          |
| Guarantee Customer Satisfaction        |

| Assessment tools  | Assessment tools |                            |                      |                                  |                                   |                   |                                 |                       |                               |                   |                     |                          |                     |                   |                       |  |
|-------------------|------------------|----------------------------|----------------------|----------------------------------|-----------------------------------|-------------------|---------------------------------|-----------------------|-------------------------------|-------------------|---------------------|--------------------------|---------------------|-------------------|-----------------------|--|
|                   | Tools            | Human Resources Indicators | Financial Indicators | Communication and Marketing Area | Personnel satisfaction Indicators | Penal Risk        | Economic Performance Indicators | Non profit Indicators | Questions on Creditworthiness | Benchmarking      | Corporate dashboard | Project Cycle Management | Communication plans | Marketing plans   | Customer Satisfaction |  |
|                   | DP <sub>0</sub>  | DP <sub>1</sub>            | DP <sub>2</sub>      | DP <sub>3</sub>                  | DP <sub>1,1</sub>                 | DP <sub>1,2</sub> | DP <sub>2,1</sub>               | DP <sub>2,2</sub>     | DP <sub>2,3</sub>             | DP <sub>2,4</sub> | DP <sub>2,5</sub>   | DP <sub>2,6</sub>        | DP <sub>2,7</sub>   | DP <sub>2,8</sub> | DP <sub>2,9</sub>     |  |
| FR <sub>0</sub>   | X                |                            |                      |                                  |                                   |                   |                                 |                       |                               |                   |                     |                          |                     |                   |                       |  |
| FR <sub>1</sub>   |                  | X                          |                      |                                  |                                   |                   |                                 |                       |                               |                   |                     |                          |                     |                   |                       |  |
| FR <sub>2</sub>   |                  |                            | X                    |                                  |                                   |                   |                                 |                       |                               |                   |                     |                          |                     |                   |                       |  |
| FR <sub>4</sub>   |                  |                            |                      | X                                |                                   |                   |                                 |                       |                               |                   |                     |                          |                     |                   |                       |  |
| FR <sub>1,1</sub> |                  |                            |                      |                                  | X                                 |                   |                                 |                       |                               |                   |                     |                          |                     |                   |                       |  |
| FR <sub>1,2</sub> |                  |                            |                      |                                  |                                   | X                 |                                 |                       |                               |                   |                     |                          |                     |                   |                       |  |
| FR <sub>2,1</sub> |                  |                            |                      |                                  |                                   |                   | X                               |                       |                               | X                 | X                   |                          |                     |                   |                       |  |
| FR <sub>2,2</sub> |                  |                            |                      |                                  |                                   |                   |                                 | X                     |                               | X                 | X                   |                          |                     |                   |                       |  |
| FR <sub>2,3</sub> |                  |                            |                      |                                  |                                   |                   | X                               |                       | X                             |                   |                     |                          |                     |                   |                       |  |
| FR <sub>2,4</sub> |                  |                            |                      |                                  |                                   |                   | X                               |                       |                               | X                 | X                   | X                        |                     |                   |                       |  |
| FR <sub>2,5</sub> |                  |                            |                      |                                  |                                   |                   | X                               | X                     | X                             | X                 | X                   |                          |                     |                   |                       |  |
| FR <sub>2,6</sub> |                  |                            |                      |                                  |                                   |                   |                                 |                       | X                             | X                 | X                   | X                        |                     |                   |                       |  |
| FR <sub>2,7</sub> |                  |                            |                      |                                  |                                   |                   |                                 |                       |                               |                   |                     |                          | X                   | X                 |                       |  |
| FR <sub>2,8</sub> |                  |                            |                      |                                  |                                   |                   |                                 |                       |                               |                   |                     |                          | X                   | X                 |                       |  |
| FR <sub>2,9</sub> |                  |                            |                      |                                  |                                   |                   |                                 |                       |                               |                   |                     |                          | X                   | X                 | X                     |  |

Fig. 7. Conceptual matrix design of the new method to manage nonprofits.