

Combining AHP and Topsis to Select Eligible Social and Solidarity Economy Actors for a Call for Grants

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Abstract—The procedure for selecting projects in order to offer a grant for actors of the social and solidarity economy can be a delicate task for decision-makers (Public or Private Establishments), which is based on several eligibility and refusal criteria (economic, social and environmental); the task that can sometimes take several months before returning the results. This study proposes an integrated framework based on two multi-criteria decision methods, analytical hierarchy process (AHP) and technique for order performance by similarity to an ideal solution (TOPSIS), to select and rank viable projects to obtain a grant from the INDH (National Initiative for Human Development). Initially, the projects were randomly selected from a list of submitted projects to receive a grant. Later, AHP obtains weights of various criteria through pairwise comparison, and projects are ranked using TOPSIS. The proposed methodology is empirically applied to the social and solidarity economy sector and provides a detailed and effective decision-making tool for selecting suitable actors to obtain a grant. The results indicate that the conservation of natural resources and the rate of job creation are the essential criteria in the process of selecting projects.

Keywords—AHP; TOPSIS; project selection; decision making; multi criteria decision method

I. INTRODUCTION

To create wealth, develop the economic fabric of the country, and create new jobs, the state has implemented several initiatives to support entrepreneurship and the creation of new economic structures; these initiatives focus in particular on actors of the Social and Solidarity Economy who are present in all sectors of economic activity, from energy to culture and food.

Launched on May 18, 2005, by His Majesty King Mohammed VI, the National Initiative for Human Development aimed to fight against poverty and social exclusion [1]; during the first two phases, the INDH is focused on reducing the socio-economic deficit and especially the struggle against poverty in rural areas, exclusion in urban areas and precariousness with an envelope of 28 billion MAD between 2005 and 2018 [2], and has been classified according to the World Bank in 2015, among the top three best action programs and initiatives of general interest in the world [3].

By carrying out 43,000 human development projects, the INDH has simplified access to various resources, such as access to essential services (8,200 km of tracks and roads, 230,000 households served with drinking water, 60,000

households connected to electricity), access to care (519 health centers, 240 Dar al Oumouma, 1,150 ambulances, 560 medical caravans & health campaigns), economic inclusion (9,400 income-generating activities - 64% in rural areas, where 50% of beneficiaries are women) ... [3].

Launched on September 19, 2018, the 3rd phase aims to improve the economic and social situation of the population, particularly young people between 18 and 35 in vulnerable situations, through support and help for employment or entrepreneurship, with a budget of four billion dirhams.

However, each year several projects are submitted across the country to obtain a grant to help these actors start their businesses. The selection procedure becomes more and more complex, with the number of applications, the similarity between the projects, and the degree of innovation.

This implies that the response waiting time increases in parallel with the rise in the number of files submitted, this delay in response can have significant consequences for actors in the social and solidarity economy such as cooperatives, including the activity is often based on these grants and the amount offered.

The main objective of this study is to set up a decision-making tool which allows donors, investors, and public institutions to select and classify projects according to several economic, environmental, and social criteria, and this is through the combination between the AHP method and TOPSIS.

II. INSIGHT: CLASSICAL BUSINESSES VS. SOCIAL BUSINESSES

While classical businesses have several advantages and receive great public awareness nationally and internationally, the latter has the main objective of maximizing the profit of its shareholders ([4], [5], [6]) by putting set up a service or production project with specific customers and within a competitive market. Despite being considered a business, the social enterprise has a social mission that affects all aspects of its management, whose profits are a means of achieving its missions and not an end [7].

The creation of social enterprises plays a vital role in the development and revitalization of the economic fabric [8], as it makes it possible to reduce the unemployment rate, create new jobs, and reduce the informal economy, inactivity of young people, and to promote the spirit of solidarity ([9],[10]).

To establish an entrepreneurial culture among young people, and to create new innovative projects in promising sectors, to ensure integration and social growth, the governments of countries (industrialized and developing), in particular Morocco, have ensured the implementation of various public policies and initiatives, mainly for people in a situation of vulnerability (economic and social exclusion), whose central role is to provide these young people, in a case of unemployment, underemployment or those who carry out entrepreneurial activities (formal and informal), resources, means of financing, accompaniment and support [11].

These initiatives follow several stages in order to sort out the eligible projects for funding, support, and implementation, which can sometimes take up to six months or even one year.

III. THE TRADITIONAL PROJECT SELECTION

The selection of eligible projects is made on four levels [12]:

- The launch of a call for applications: this call aims to determine the ideas for innovative projects as well as the potential beneficiaries.
- The selection of project ideas: the sorting and ranking of project ideas according to two main criteria, innovation and feasibility.
- Support and strengthening of project leaders: this stage aims to carry out the studies necessary to identify the feasibility, viability, and desirability of the project, as well as the establishment of market studies, the business model, and the business plan.
- Project selection: during this phase, to select the projects eligible and viable for financing, a committee of different actors and experts familiar with the local economic context is formed.
- The selection criteria are split into two categories:
- The eligibility criteria are economic, social, and environmental.
- The criteria for refusal include the risk to the environment, the professional status of the project leader, and obtaining public aid.

IV. THE DECISION MAKING

Roy [13] (1985) defines decision support as:

“Decision support is the activity of someone who, based on models that are clearly explained but not necessarily completely formalized, helps to obtain elements of answers to the questions posed by a participant in a decision-making process, elements to favor a behavior likely to increase the coherence between the evolution of the process, on the one hand, the objectives and the system of values in the service of which this participant finds himself placed on the other hand.”

The objective of decision support is to guide and enlighten the decision-maker throughout the decision-making process. However, any decision-making activity is based on two main actors, a decision-maker and a man of study; the first is always

present during the process, and the second, he is only present when the decision-maker calls on him [14].

These actors are not necessarily unique characters. The decision maker can be a board of directors, the managers of a company, a senior executive or manager, an individual, etc. Furthermore, the researcher can be made up of a team (engineers, mathematicians, economists, sociologists, doctors, etc.), and he is responsible for defining the decision model, the process, and the presentation of the results to the decision maker [15].

With each call for applications, several projects are submitted, even hundreds that span the whole country, making selecting and choosing eligible projects a mission that can take months to have a final answer.

In the case of the INDH ([11], [12]), and during the selection of projects, the first step consists in launching a call for the appointment of a service provider who will play the role of decision-maker and whose main tasks are the study and the sorting of ideas, the organization of support, reinforcement and orientation sessions for the selected projects. A committee composed of public and private actors proceeds to select viable projects; these projects must be subsequently confirmed by the PCHD (Provincial Committee for Human Development).

Several articles address the subject of project selection in the literature; however, when the research deepens in the literature, most works treat the subject either with a theoretical vision or they do not treat the subject as a whole and are interested in only one component, [16] determines the criteria that Istanbul technoparks companies take into consideration in their selection preferences and to select the most appropriate technopark based on these criteria, [17] combined the three methods (Delphi, AHP and TOPSIS) to provide decision methods to managers of projects in construction companies, [18] expose the selection of telecommunication projects by first using the Delphi method to convert the qualitative criteria into quantitative criteria and then, by applying the TOPSIS method.

Whereas [19] worked on combining Shannon Entropy to determine the weight of the criteria to apply the TOPSIS method thereafter to select eligible projects. [20], talk about the project selection, and evaluation process in Ivory Coast, the latter which follows the same process as mentioned in Section III, and this through several committees at each level to make a good selection, [21], in turn, discusses the process of selection of young project leaders, the expression decision-making committee and selection policy appear several times, and offer a grid of indicators that allow project leaders to be given a final note/score; the study [22], illustrates the project selection process by the BA from entrepreneurs' pitches and the decision to invest, and this selection in turn follows a process that spans four stages, and proposes an approach for assessment of investment criteria.

V. APPLICATION OF THE AHP AND TOPSIS METHODS

In order to be able to select the projects eligible for a grant, the study focused on three families of criteria, the economic, social and environmental criteria, taking into consideration the

eliminary criteria at the start [12]. Table I presents the project eligibility criteria and sub-criteria, based on the three main criteria.

TABLE I. PROJECT ELIGIBILITY CRITERIA

Criteria	Sub criterion
Economic	Creation of added values
	Funding requirement
	Annual budget
	Financial resources
	Number of partners
	Execution period
	Achievement amount
Social	Job creation
	Working conditions
	Improvement of the status of women
	Respect for the rights of the child
	Activity area
Environmental	Number of beneficiaries
	Conservation of natural resources
	Maintaining biodiversity
	Environmental risk management
	Production methods
Environmental impact	

The refusal criteria designate the criteria that lead to the elimination of the file from the start, namely:

- Environmental risk: any project that has a negative impact on the environment, either through the use of chemicals, the alteration of natural resources or which has harmful effects on health;
- The carrier's profession: any project whose tenderer is a civil servant, an agent of a public institution or a private sector employee is automatically eliminated;
- Obtaining public aid: any project whose initiator has already benefited from public funding, either individually or within the framework of a group, is not eligible.

In this study, only three sub-criteria per criteria (Table III) were selected, which are frequently found in the literature to illustrate the approach.

The distinction between the favorable and unfavorable criteria (Negative and Positive), was made based on the literature, and on the opinion of the experts, Table II, presents the criteria by nature (favorable and unfavorable), for each favorable criterion, the higher the score, the more positive the criterion, likewise for each unfavorable criterion, the higher the value, the negative criterion.

The input matrix is made up of ten projects, which were randomly selected from a list of projects submitted to obtain a grant (INDH: National Initiative for Human Development), the values found in this matrix are obtained by the evaluation

of the projects, each project has a value per sub-criterion, as shown in Table III.

Table V presents the pairwise comparison matrix (AHP), which is based on the judgment of the decision makers on the importance of each criterion, by combining the literature with the opinion of several experts to determine the pairwise comparison between different families of criteria ([25], [26], [27]).

After having built the input matrix, the article proceeds by using the AHP method, to have consistent weights of the criteria, for this, the first step is to establish the comparison matrix by pair, based on the Saaty scale ([23],[24]) present in Table IV.

TABLE II. PROJECT ELIGIBILITY CRITERIA'S DESCRIPTION

Criteria	Sub-criterion	Coded	Nature	Comment
Economic	Funding requirement	Ec1	Unfavorable	The amount that the project leader requests in order to start his project.
	Financial resources	Ec2	Favorable	This criterion presents the own financial resources available to the project leader.
	Achievement amount	Ec3	Unfavorable	The Achievement Amount refers to the total cost of the project.
Social	Job creation	S1	Favorable	The number of new jobs that will be created following the completion of the project.
	Improvement of the status of women	S2	Favorable	Does the project take the gender-equality approach into consideration and propose solutions to help women?
	Number of beneficiaries	S3	Unfavorable	The number of people who will benefit from the project once implemented.
Environmental	Conservation of natural resources	En1	Favorable	Does the project make rational use of natural resources and aims to enhance them?
	Maintaining biodiversity	En2	Favorable	The protection of spaces and environments.
	Environmental impact	En3	Unfavorable	Does the project have a positive impact on the environment or not?

TABLE III. INPUT MATRIX

	N	P	N	P	P	N	P	P	N
	Ec1	Ec2	Ec3	So1	So2	So3	En1	En2	En3
Project 1	4	2	8	4	3	2	5	3	4
Project 2	2	3	6	5	1	5	2	1	1
Project 3	1	4	6	7	6	8	1	2	3
Project 4	5	5	5	3	2	3	6	5	2
Project 5	4	4	3	7	4	2	8	4	5
Project 6	5	8	7	5	2	3	6	5	2
Project 7	2	6	2	2	1	4	6	7	1
Project 8	3	1	4	4	5	5	5	3	6
Project 9	7	6	5	1	4	4	3	7	8
Project 10	8	3	6	8	5	8	7	5	2

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^n x_{ij}^2}} \quad (1)$$

Table VI shows the weighting of the criteria, again according to the AHP method [23].

This step consists in calculating the weight of each criterion, the following 3 steps summarize the procedure:

- 1) Sum of the values of each column.
- 2) Divide each element of the matrix by its column total.
- 3) Calculation of the average of the elements of each row of the matrix.

The central idea behind the TOPSIS method is to choose a solution that comes closest to the ideal solution (best on all criteria) and to move away as much as possible from the worst solution (which degrades all criteria) [28].

The normalization of the matrix is done based on the Euclidean distance, to obtain values between 0 and 1 according to equation 1, as indicated in Table VII.

The study then proceeds with the multiplication of the entries of the matrix by the weights associated with the criteria using Eq. 2, Table VIII exposes the results obtained.

$$R_{ij} = w_{ij} \times x_{ij} \quad (2)$$

TABLE IV. SAATY'S SCALE

Verbal scale	Numerical scale
Both elements are equal	1
A little more important	3
Most important	5
much more important	7
Absolutely more important	9

TABLE V. PAIRWISE COMPARISON MATRIX

	Ec1	Ec2	Ec3	So1	So2	So3	En1	En2	En3
E1	1.00	3.00	5.00	1.00	1.00	1.00	1.00	1.00	1.00
E2	0.33	1.00	3.00	1.00	1.00	1.00	1.00	1.00	1.00
E3	0.20	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00
S1	1.00	1.00	1.00	1.00	5.00	5.00	1.00	1.00	1.00
S2	1.00	1.00	1.00	0.20	1.00	2.00	1.00	1.00	1.00
S3	1.00	1.00	1.00	0.20	0.50	1.00	1.00	1.00	1.00
In 1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	7.00	5.00
In 2	1.00	1.00	1.00	1.00	1.00	1.00	0.14	1.00	3.00
En3	1.00	1.00	1.00	1.00	1.00	1.00	0.20	0.33	1.00
Sum	7.53	10.33	15.00	7.40	12.50	14.00	7.34	14.33	15.00

TABLE VI. WEIGHT OF CRITERIA

	Ec1	Ec2	Ec3	So1	So2	So3	En1	En2	En3	Sum	S/N
E1	0.13	0.29	0.33	0.14	0.08	0.07	0.14	0.07	0.07	1.32	0.15
E2	0.04	0.10	0.20	0.14	0.08	0.07	0.14	0.07	0.07	0.90	0.10
E3	0.03	0.03	0.07	0.14	0.08	0.07	0.14	0.07	0.07	0.68	0.08
S1	0.13	0.10	0.07	0.14	0.40	0.36	0.14	0.07	0.07	1.46	0.16
S2	0.13	0.10	0.07	0.03	0.08	0.14	0.14	0.07	0.07	0.82	0.09
S3	0.13	0.10	0.07	0.03	0.04	0.07	0.14	0.07	0.07	0.71	0.08
In 1	0.13	0.10	0.07	0.14	0.08	0.07	0.14	0.49	0.33	1.54	0.17
In 2	0.13	0.10	0.07	0.14	0.08	0.07	0.02	0.07	0.20	0.87	0.10
En3	0.13	0.10	0.07	0.14	0.08	0.07	0.03	0.02	0.07	0.70	0.08

TABLE VII. NORMALIZED MATRIX BY CRITERION (ATTRIBUTE)

Weight	0.15	0.10	0.08	0.16	0.09	0.08	0.17	0.10	0.08
Nature	N	P	N	P	P	N	P	P	N
	Ec1	Ec2	Ec3	So1	So2	So3	En1	En2	En3
Project 1	0.27	0.14	0.46	0.25	0.26	0.13	0.30	0.21	0.31
Project 2	0.14	0.20	0.35	0.31	0.09	0.33	0.12	0.07	0.08
Project 3	0.07	0.27	0.35	0.44	0.51	0.52	0.06	0.14	0.23
Project 4	0.34	0.34	0.29	0.19	0.17	0.20	0.36	0.34	0.16
Project 5	0.27	0.27	0.17	0.44	0.34	0.13	0.47	0.27	0.39
Project 6	0.34	0.54	0.40	0.31	0.17	0.20	0.36	0.34	0.16
Project 7	0.14	0.41	0.12	0.12	0.09	0.26	0.36	0.48	0.08
Project 8	0.21	0.07	0.23	0.25	0.43	0.33	0.30	0.21	0.47
Project 9	0.48	0.41	0.29	0.06	0.34	0.26	0.18	0.48	0.62
Project 10	0.55	0.20	0.35	0.50	0.43	0.52	0.41	0.34	0.16

TABLE VIII. NORMALIZED AND WEIGHTED MATRIX

Weight	0.15	0.10	0.08	0.16	0.09	0.08	0.17	0.10	0.08
Nature	N	P	N	P	P	N	P	P	N
	Ec1	Ec2	Ec3	So1	So2	So3	En1	En2	En3
Project 1	0.04	0.01	0.04	0.04	0.02	0.01	0.05	0.02	0.02
Project 2	0.02	0.02	0.03	0.05	0.01	0.03	0.02	0.01	0.01
Project 3	0.01	0.03	0.03	0.07	0.05	0.04	0.01	0.01	0.02
Project 4	0.05	0.03	0.02	0.03	0.02	0.02	0.06	0.03	0.01
Project 5	0.04	0.03	0.01	0.07	0.03	0.01	0.08	0.03	0.03
Project 6	0.05	0.05	0.03	0.05	0.02	0.02	0.06	0.03	0.01
Project 7	0.02	0.04	0.01	0.02	0.01	0.02	0.06	0.05	0.01
Project 8	0.03	0.01	0.02	0.04	0.04	0.03	0.05	0.02	0.04
Project 9	0.07	0.04	0.02	0.01	0.03	0.02	0.03	0.05	0.05
Project 10	0.08	0.02	0.03	0.08	0.04	0.04	0.07	0.03	0.01

For each criterion, the most favorable associated value A^+ is calculated, by applying Eq. 3, depending on the nature of the criterion (favorable, unfavorable).

- Favorable criterion: the maximum value of each column.
- Unfavorable criterion: the minimum value of each column.

$$A^+ = \left\{ \max x_{ij} (i \in J^+) \mid \min x_{ij} (i \in J^-) \right\} \quad (3)$$

Table IX and X, show the results of calculation of the ideal favorable solution A^+ and the least favorable solution A^- .

For each criterion, the least favorable associated value A^- is calculated, by applying equation 4, depending on the nature of the criterion (favorable, unfavorable).

- Favorable criterion: the minimum value of each column.
- Unfavorable criterion: the maximum value of each column.

$$A^- = \left\{ \min x_{ij} (i \in J^+) \mid \max x_{ij} (i \in J^-) \right\} \quad (4)$$

All the deviations are expressed by the vector E^+ , Each deviation is expressed as a Euclidean distance between the value of each associated criterion and the associated value of A^+ , following Eq.5.

The calculation of E^- is done in the same way as E^+ . E^- is expressed as the Euclidean distance between the value of each associated criterion and the associated value of A^- , following Eq. 6, the results are shown in Table XI.

$$E^+ = \sqrt{\sum_{i=0}^n (A^+ - r_{ij})^2} \quad (5)$$

$$E^- = \sqrt{\sum_{i=0}^n (A^- - r_{ij})^2} \quad (6)$$

The last step consists in calculating the coefficient associated with each alternative, which determines its rank. Each coefficient is calculated from the components associated with the vectors E^- and E^+ according to the quotient expressed in Eq. 7.

$$C_p = \frac{E^-}{E^- + E^+} \quad (7)$$

TABLE IX. CALCULATION OF THE IDEAL FAVORABLE SOLUTION A+

Weight	0.15	0.10	0.08	0.16	0.09	0.08	0.17	0.10	0.08
Nature	N	P	N	P	P	N	P	P	N
	Ec1	Ec2	Ec3	So1	So2	So3	En1	En2	En3
Project 1	0.040	0.014	0.035	0.040	0.023	0.010	0.051	0.020	0.024
Project 2	0.020	0.020	0.026	0.051	0.008	0.026	0.020	0.007	0.006
Project 3	0.010	0.027	0.026	0.071	0.047	0.041	0.010	0.013	0.018
Project 4	0.050	0.034	0.022	0.030	0.016	0.015	0.061	0.033	0.012
Project 5	0.040	0.027	0.013	0.071	0.031	0.010	0.081	0.027	0.030
Project 6	0.050	0.054	0.031	0.051	0.016	0.015	0.061	0.033	0.012
Project 7	0.020	0.041	0.009	0.020	0.008	0.020	0.061	0.047	0.006
Project 8	0.030	0.007	0.018	0.040	0.039	0.026	0.051	0.020	0.036
Project 9	0.070	0.041	0.022	0.010	0.031	0.020	0.030	0.047	0.049
Project 10	0.080	0.020	0.026	0.081	0.039	0.041	0.071	0.033	0.012
A+	0.010	0.054	0.009	0.081	0.047	0.010	0.081	0.047	0.006

TABLE X. CALCULATION OF THE IDEAL FAVORABLE SOLUTION A-

Weight	0.15	0.10	0.08	0.16	0.09	0.08	0.17	0.10	0.08
Nature	N	P	N	P	P	N	P	P	N
	Ec1	Ec2	Ec3	So1	So2	So3	En1	En2	En3
Project 1	0.040	0.014	0.035	0.040	0.023	0.010	0.051	0.020	0.024
Project 2	0.020	0.020	0.026	0.051	0.008	0.026	0.020	0.007	0.006
Project 3	0.010	0.027	0.026	0.071	0.047	0.041	0.010	0.013	0.018
Project 4	0.050	0.034	0.022	0.030	0.016	0.015	0.061	0.033	0.012
Project 5	0.040	0.027	0.013	0.071	0.031	0.010	0.081	0.027	0.030
Project 6	0.050	0.054	0.031	0.051	0.016	0.015	0.061	0.033	0.012
Project 7	0.020	0.041	0.009	0.020	0.008	0.020	0.061	0.047	0.006
Project 8	0.030	0.007	0.018	0.040	0.039	0.026	0.051	0.020	0.036
Project 9	0.070	0.041	0.022	0.010	0.031	0.020	0.030	0.047	0.049
Project 10	0.080	0.020	0.026	0.081	0.039	0.041	0.071	0.033	0.012
A-	0.080	0.007	0.035	0.010	0.008	0.041	0.010	0.007	0.049

TABLE XI. CALCULATION OF THE DEVIATION OF THE A+ AND A-

E+	E-
0.08607238	0.07852778
0.0976075	0.08748451
0.09157769	0.10753217
0.07979439	0.08687467
0.05473111	0.11591278
0.06800374	0.10073323
0.07738846	0.10934368
0.0850532	0.08311161
0.11704446	0.06632803
0.08775722	0.1094154

TABLE XII. CALCULATION OF THE PROXIMITY COEFFICIENT OF THE IDEAL SOLUTION AND RANKING IN ORDER OF CHOICE

	CP	Order of choice	Distribution of coefficients
Project 5	0.68	1	0.129
Project 6	0.60	2	0.113
Project 7	0.59	3	0.111
Project 10	0.55	4	0.105
Project 3	0.54	5	0.102
Project 4	0.52	6	0.099
Project 8	0.49	7	0.094
Project 1	0.48	8	0.090
Project 2	0.47	9	0.089
Project 9	0.36	10	0.068

The proximity coefficient of each alternative, as its name suggests, measures the rate of proximity of the most unfavorable ideal solution A- compared to the most favorable ideal solution A+. It is a matter of choosing the one which is the furthest possible from the unfavorable ideal solution A- and the closest to the favorable ideal solution A+.

Note that the most favorable and worst solutions are fictitious and do not represent real alternatives. They constitute benchmarks for comparing the distances of all the alternatives.

VI. DISCUSSION

In order to have a coherent result, we opted for the use of AHP in order to calculate the weights of the criteria, after having determined the weight of the criteria using AHP, we proceeded to the normalization and the weighting of the matrix according to the TOPSIS method, then the calculation of the ideal favorable solution A+ and A-, then we calculated for each alternative, its deviation from the most favorable value, and the last step consisted in calculating the coefficient associated with each alternative, which determines its rank.

The results exposed in Table XII, the outcome obtained at the end of the application of the TOPSIS method, are ranked according to the proximity of the alternative to the ideal solution, so the projects are ranked in order of preference with project five being ranked first, project six and seven in second and third place respectively.

The combination of these two methods can have different applications, depending on the sector of activity, in this article, the emphasis has been placed on the criteria considered by the INDH, the same approach can also be applied to other set of criteria or even add more criteria to have a more specific result, or even to distribute a grant according to the order obtained at the end.

VII. CONCLUSION

The article exposed the use of the AHP method combined with the TOPSIS method in order to make the choice between 10 projects eligible for obtaining a grant. These methods, despite being simple in their use and facilitating decision-making among several alternatives, have some limits, in particular for the quantification of the parameters by the experts or the men of studies, especially at the level of the matrix of comparison of the AHP method.

In order to make this approach more solid, the consideration of combining a machine learning method, or using a method like BOCR (Benefit, Opportunity, Cost, and Risk) is in perspective, which allows the results to be more focused on the aspects of risk, benefits, opportunity and cost, which in the case of the selection of financing projects, can give a better result, similarly, in cases where we want to share the grant between the different actors according to their ranking and the importance of their project.

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Scientific and Technical Research (CNRST) of Morocco (Smart DLSP Project - AL KHAWARIZMI IA-PROGRAM).

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