

Optimizing University Program Selection: A Comparative Study of Multi-Criteria Methods

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Abstract. This paper aims to present a comparative study of multi-criteria decision-making methods to optimize the selection of university programs. The results of implementing five MCDM methods are compared by evaluating each method using a hierarchical model, which is decomposed into a set of criteria. These criteria include the reputation of the university, the quality of teaching, career prospects, financial costs, the adaptability of the program, and the personal preferences of the student. The results indicate that there are both similarities and differences in the ranking of university programs. This study presents a hierarchical model for evaluating university programs according to the preferences of individual students. It offers an in-depth perspective on the benefits and limitations of each method in the decision-making process.

Keywords: criteria; model; university program selection; decision making; alternatives.

1 Introduction

The selection of a university program is a pivotal decision for students [1], particularly in globalization, where educational choices profoundly impact both professional and personal trajectories. In Morocco [2], the higher education system is undergoing a period of rapid expansion, with an increasing diversity of university programs becoming available. However, the proliferation of options has the effect of rendering the selection process increasingly complex for both students and academic advisors. The complexity of the decision-making process is further compounded by the necessity of considering a multitude of criteria at the same time [3].

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The absence of a comprehensive decision-making model tailored to the Moroccan context highlights the necessity for the development of robust and contextualized decision-support tools [4] [5]. In this regard, this study proposes a hierarchical model that integrates a broad spectrum of relevant criteria (sub-criteria) for selecting university programs in Morocco [6] [7]. The main purpose of this model is to provide a logical and coherent structure for the prioritization of decision criteria (sub-criteria), thus facilitating a comparative evaluation of university programs [8].

Furthermore, to optimize this selection process, it is imperative to conduct an exhaustive comparative analysis of multi-criteria decision-making methods [9]. This study focuses on the application and evaluation of five well-established methods from the literature: the Weighted Sum Method (WSM), the Weighted Product Method (WPM), the Analytical Hierarchy Process (AHP), the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS), and the Simple Multi-Attribute Rating Technique (SMART). This study aims to identify the most effective method for selecting university programs in Morocco. To this end, the performance of five well-established methods will be compared to identify the one that offers the best performance.

This paper is organized as follows: the second section presents a literature review on university program selection models and multi-criteria decision-making methods; the third section details the research methodology adopted, justifying the proposed hierarchical model; the fourth section is dedicated to the case study, where the proposed model is applied to a dataset collected through an online questionnaire. Finally, the article concludes with a discussion of the results obtained, followed by recommendations for students and decision-makers and perspectives for future research.

2 Literature review

2.1 University Choice Process Models

Selecting a university program is a critical decision that can profoundly influence a student's academic and career trajectory [10]. To guide this complex decision, various choice models have been developed to evaluate higher education institutions. These models range from traditional approaches based on rankings and accreditations to more sophisticated models using data analytics and multiple criteria. Most studies on the university choice process are based on one of four models [11]: economic, sociological, combined, or a marketing approach. The economic model [12], often based on rational choice theory, considers that students make decisions by maximizing their economic utility. This model focuses on the costs and benefits associated with each university option. Students evaluate tuition fees, scholarship opportunities, living expenses, and potential future earnings to choose the university that offers the best return on investment. This model is useful for understanding decisions based on financial and economic considerations. The sociological model [13], examines the influence of social and cultural factors in the decision-making process. It emphasizes the impact of family, peers, teachers, and community on university choice. Social expectations, cultural norms, and recommendations play a crucial role. For instance, students might choose universities based on family expectations or peer influence. The combined model [13], is relevant for understanding how social and cultural contexts influence students' choices. This model combines multiple decision factors, integrating economic, psychological, social, and academic elements. It acknowledges that the decision-making process is complex and that students consider a variety of criteria simultaneously. For example, a student might evaluate the academic quality of a university, career opportunities, costs, and peer influence in an integrated manner. This model is useful for a comprehensive,

multidimensional decision-making process analysis. Finally, the marketing mix model (or 4Ps: Product, Price, Place, Promotion) [14], applies marketing principles to students' decisions. It examines how the following aspects influence university choice:

- Product: Academic quality, programs offered, and services.
- Price: Tuition fees, financial aid, and additional costs.
- Place: University location, facilities, and proximity.
- Promotion: Communication and recruitment strategies, reputation, and university marketing. This model is useful for understanding how universities position and differentiate themselves in the market to attract students.

In Morocco, choosing a university program involves various criteria that students consider to make decisions. Different studies have highlighted key factors influencing university choices [15] [16] [17] [18], such as location, affordability, amenities, social environment, professor quality, education quality, professor choice for graduate-level applications, cost, facilities, mileage, quality, and location for private universities, university reputation, location, financial aspects, and ease of admission for U.S. universities offering industrial engineering doctorate degrees, and accreditation and brand image. These criteria play a crucial role in guiding students through the complex decision-making process of selecting a university that aligns with their academic, financial, and social preferences [2] [4] [5].

2.2 Multi-Criteria Decision-Making Process

2.2.1 Weighted Sum Method (WSM)

WSM is a multi-criteria decision-making technique used to evaluate and compare alternatives based on various criteria. Each criterion is assigned a weight reflecting its relative importance. For each alternative, a weighted score is calculated by multiplying the score of each criterion by its corresponding weight and then summing the results. For the case of n criteria and m alternatives, the best solution is obtained by the formula as follows [19]:

$$A_{WSM}^* = \max \sum_{i=1}^m a_{ij} w_j, \text{ for } i=1, 2, 3...m \quad (1)$$

Where: A_{WSM}^* present the WSM score of the best alternative, a_{ij} is the actual value of the i^{th} alternative of the j^{th} criterion and w_j is the weight of the j^{th} criterion.

2.2.2 Weighted Product Method (WPM)

WPM is a multi-criteria decision-making technique used to evaluate and compare multiple alternatives based on various criteria. Unlike the Weighted Sum Method, WPM involves multiplying the scores of each criterion raised to the power of their corresponding weights. The formula is as follows [20]:

$$R\left(\frac{A_K}{A_L}\right) = \prod_{j=1}^n \left(\frac{a_{Kj}}{a_{Lj}}\right)^{w_j} \quad (2)$$

Where: n is the number of criteria, a_{ij} is the actual value of the i^{th} alternative of the j^{th} criterion and w_j is the weight of the j^{th} criterion.

2.2.3 Analytical Hierarchy Process (AHP)

AHP is a structured multi-criteria decision-making technique that involves decomposing a complex decision problem into a hierarchy of subproblems, each of which can be analyzed

independently. The process involves comparing pairs of criteria and alternatives to establish their relative importance and assigning weights. The final decision is derived by synthesizing these weights. The formula for calculating the weighted score of an alternative is [21]:

$$A_{AHP}^* = \max \sum_{i=1}^m a_{ij} w_j, \text{ for } i=1, 2, 3...m \quad (3)$$

Where: A_{AHP}^* present the score of the best alternative, a_{ij} is the actual value of the i^{th} alternative of the j^{th} criterion and w_j is the weight of the j^{th} criterion.

2.2.4 Technique for the Order of Preference by Similarity to the Ideal Solution (TOPSIS)

TOPSIS is a multi-criteria decision-making method that identifies solutions from a finite set of alternatives based on their geometric distance from an ideal solution. The best alternative should have at the same time the closeness distance from the positive ideal solution and the farthest distance from the negative ideal solution. The method involves the following steps [22] :

$$r_{ij} = \frac{f_{ij}}{\sqrt{\sum_{j=1}^m f_{ij}^2}} \quad (4)$$

Where: f_{ij} is the i^{th} criterion value for alternative A_j ($j=1...m$ and $i=1...n$).

The normalized weighted values v_{ij} are calculated as follows:

$$v_{ij} = w_i * r_{ij} \quad (5)$$

The positive ideal A^+ and negative ideal A^- solutions are calculated as follows where I' and I'' are related to the positive and negative variables:

$$A^+ = \{v_1^+ \dots v_n^+\} = \left\{ \left(\max_j v_{ij}, i \in I' \right), \left(\min_j v_{ij}, i \in I'' \right) \right\} \quad (6)$$

$$A^- = \{v_1^- \dots v_n^-\} = \left\{ \left(\min_j v_{ij}, i \in I' \right), \left(\max_j v_{ij}, i \in I'' \right) \right\} \quad (7)$$

The separation from the positive and negative ideal solutions is calculated as follows:

$$D_j^+ = \sqrt{\sum_{i=1}^n (v_{ij} - v_i^+)^2} \quad (8)$$

$$D_j^- = \sqrt{\sum_{i=1}^n (v_{ij} - v_i^-)^2} \quad (9)$$

The relative closeness to the ideal solution of each alternative is calculated by the following equation:

$$C_j = \frac{D_j^-}{(D_j^+ + D_j^-)} \quad (10)$$

The alternative with the highest C_j^* value is considered the optimal choice, as it is closest to the ideal solution and farthest from the negative-ideal solution.

2.2.5 Simple Multi-Attribute Rating Technique (SMART)

SMART is a straightforward multi-criteria decision-making method designed to evaluate and rank alternatives based on multiple criteria. The process involves the following steps [23]:

-Identify the decision criteria: list all the criteria relevant to the decision;

- Assign weights to the criteria: determine the relative importance of each criterion, ensuring that the weights sum to 1 (or 100%);
- Rate the alternatives: assign scores to each alternative for each criterion, typically on a common scale (e.g., 0 to 100);
- Normalize the scores: convert the scores to a common scale, if necessary, to ensure comparability;
- Calculate the weighted scores: multiply the score of each alternative by the weight of the corresponding criterion.
- Sum the weighted scores: add the weighted scores for each alternative across all criteria to get the overall score for each alternative according to the following formula:

$$U(a_i) = \sum_{j=1}^n w_j U_j(a_i) \quad (11)$$

3 Methodology

3.1 Purpose of study

The main purpose of this study is to develop and propose a hierarchical model for selecting the optimal university program, specifically adapted to the Moroccan context, and subsequently conduct a comprehensive comparison of multi-criteria decision-making methods to evaluate and optimize the selection process. The model aims to assist students in making well-informed decisions by considering a range of academic, financial, geographical, and personal criteria [2] [4] [5]. The model offers a systematic and structured approach to optimize the selection of university programs, aligning them with the individual needs and preferences of students.

The selection of the hierarchical model is predicated on the necessity to encapsulate the nuances of the decision-making process entailed in the selection of an academic program. The hierarchical model was selected due to its capacity to deconstruct complex problems such as selecting optimal university programs into a series of levels of criteria and sub-criteria, thereby enabling a more comprehensive and sophisticated assessment of alternatives. The justification for choosing this model is also predicated on the absence of models tailored to the Moroccan context within the extant literature. The limits of traditional models include an inability to account for local specifics such as the availability of career opportunities, the presence of unique financial constraints, and the influence of cultural nuances.

Furthermore, the justification for the comparative study lies in the lack of comprehensive research that compares different multi-criteria decision-making methods in this context [8]. By evaluating several methods, the goal is to determine which method best optimizes the selection process within the proposed hierarchical model.

3.2 Proposed model

The proposed hierarchical model for the selection of the optimal university program is structured in three main levels, allowing a logical and methodical decomposition of the decision-making process:

- Main objective: this level defines the ultimate objective of the decision-making process, which is to select the most appropriate university program for a student, based on a series of interrelated criteria(sub-criteria);
- Main criteria: the proposed model is based on a detailed analysis of several main criteria, each playing a crucial role in the optimal selection of a university program: academic quality, university reputation, career opportunities, costs and financing, and geographical location;

-Sub-criteria: each main criterion is broken down into sub-criteria for a more detailed and specific evaluation as illustrated in Fig.1.

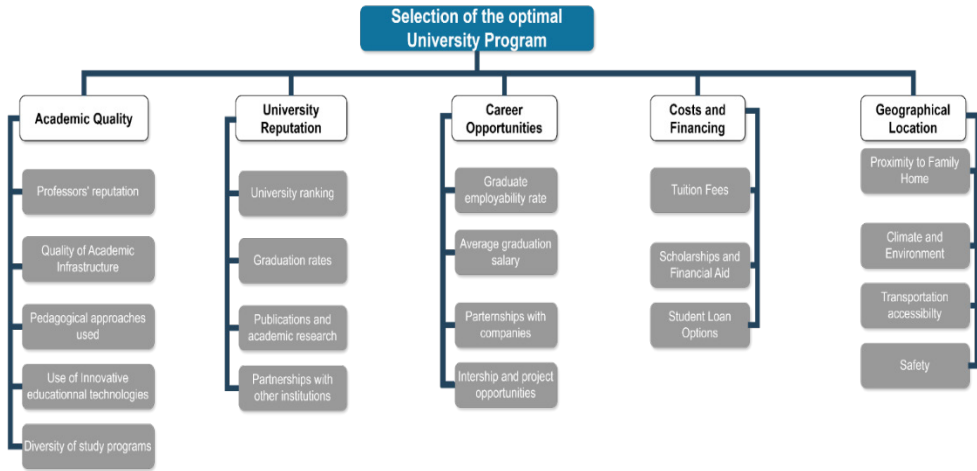


Fig. 1. The proposed hierarchical model

In this study, five multi-criteria decision-making methods (WSM, WPM, AHP, TOPSIS, and SMART) will be applied to the proposed hierarchical model to evaluate their respective effectiveness in the optimal selection of university programs. Each method will be applied to the proposed hierarchical model for a set of representative university program alternatives. The results will be evaluated to assess the robustness, simplicity, sensitivity to criteria, and ease of application of each method. The objective of this comparative analysis is to determine the most suitable method for optimizing the selection of university programs in the Moroccan context.

4 Case study

The objective of this study is to evaluate the effectiveness of the proposed hierarchical model for the selection of university programs through the collection of relevant data. The data were collected via an online form designed to obtain pertinent information regarding students' preferences and selection criteria. The form was distributed to a representative sample of students who were potential candidates for university programs in Morocco.

For this case study, ten different university programs were identified and selected to serve as alternatives in the analysis. These programs, which are representative of the options available to students in various disciplines and institutions in Morocco, will form the basis of our comparative evaluation using the multi-criteria decision-making methods discussed previously.

The collected data will be analyzed to rank the university programs (Table 1) according to the criteria defined in our hierarchical model (Table 2). This analysis will validate the effectiveness of the model and the methods used, and provide a clear perspective on the optimal choices for students under different scenarios.

Table 1. List of criteria

Symbol	Criterion	Signification
C_1	Academic Quality	Assesses the professors' reputation, quality of pedagogical approaches used and their innovation, diversity of proposed

		programs, and the quality of academic infrastructure (libraries, laboratories, etc.).
C_2	University Reputation	Measures the national and international recognition of the university, based on its ranking, publications, and academic partnerships.
C_3	Career Opportunities	Analyzes the professional prospects for graduates, including employability rates, internships, and connections with industry.
C_4	Costs and Financing	Considers the financial aspects related to enrollment, such as tuition fees, financial aid, and student loan options.
C_5	Geographical Location	Takes into account the university's location, including proximity to family, climate, accessibility, and safety.

Table 2. List of alternatives

Symbol	Alternative
A_1	University Program 1
A_2	University Program 2
A_3	University Program 3
A_4	University Program 4
A_5	University Program 5
A_6	University Program 6
A_7	University Program 7
A_8	University Program 8
A_9	University Program 9
A_{10}	University Program 10

5 Results and discussions

In this section, we present and analyze the results obtained by applying the five multicriteria decision-making methods (AHP, TOPSIS, WSM, WPM, and SMART) to the data collected through the case study of the 10 university programs. The comparative evaluation of the 10 alternatives representing the university programs was carried out using five methods, as shown by the table results (Table 3 and Table 4). The figure below shows the scores and rankings obtained for each method and alternative.

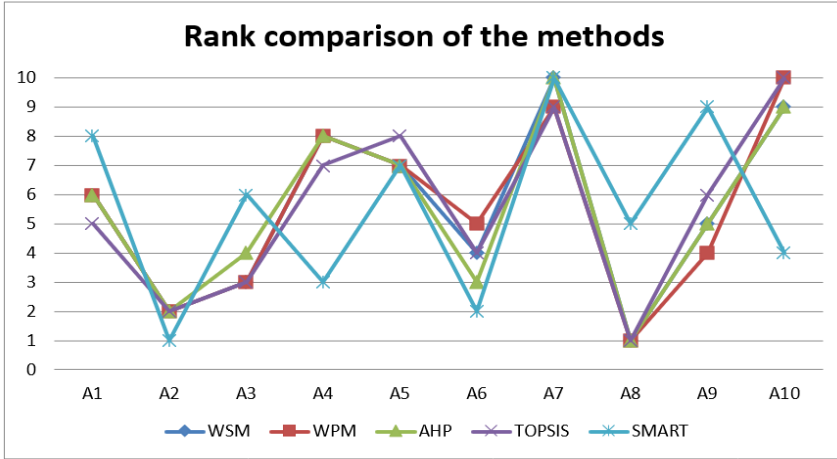


Fig. 2. Rank comparison of the studied methods

- WSM: known as one of the simplest methods, the results of this technique show that the best solution is alternative A_8 followed by A_2 ;
- WPM: very similar to WSM, according to this technique, the best alternative is A_8 since it is superior to all the others;
- AHP: When Equation (3) is applied to the data, the scores shown in Table 4 are derived. Therefore, the best alternative is A_8 followed by A_2 ;
- TOPSIS: according to this method, A_8 is still the best solution with the highest score;
- SMART: it ranks A_8 as the best alternative.

Table 3. Decision matrix and normalized weights

Alternatives/ Criteria	C_1	C_2	C_3	C_4	C_5
A_1	15	27	30	20	35
A_2	35	36	37	15	30
A_3	30	20	33	19	36
A_4	25	15	25	17	35
A_5	40	25	20	22	38
A_6	10	30	34	25	32
A_7	20	29	21	18	34
A_8	45	32	35	27	30
A_9	37	33	26	22	26
A_{10}	40	34	15	20	38
Normalized weights	0.14	0.09	0.54	0.19	0.04

Table 4. WSM, WPM, AHP, TOPSIS, and SMART results and rank

Alternatives	WSM		WPM	AHP		TOPSIS		SMART	
	Score	Rank	Rank	Score	Rank	Score	Rank	Score	Rank
A_1	25.93	6	6	0.097	6	0.593042	5	0.73	6

A_2	32.17	2	2	0.118	2	0.786369	2	0.88	2
A_3	28.87	3	3	0.107	4	0.725808	3	0.80	4
A_4	22.98	8	8	0.085	8	0.429029	7	0.64	8
A_5	24.35	7	7	0.091	7	0.352007	8	0.67	7
A_6	28.49	4	5	0.108	3	0.692027	4	0.81	3
A_7	21.53	10	9	0.081	10	0.284632	9	0.60	10
A_8	34.41	1	1	0.129	1	0.912336	1	0.95	1
A_9	27.41	5	4	0.102	5	0.539996	6	0.76	5
A_{10}	22.08	9	10	0.082	9	0.26545	10	0.61	9

Alternative A_8 emerges as the optimal choice, achieving the highest ranking in all five evaluation methods. It obtained a score of 34.41 with WSM, 0.129 with AHP, and 0.912336 with TOPSIS, confirming its superior performance in this case study. The consistent first-place ranking with WPM and SMART reinforces this dominant position, demonstrating that it is perceived as the optimal and best alternative on a global scale, irrespective of the evaluation method employed.

Alternative A_2 also demonstrates consistent performance, consistently ranking second across all methods. It has achieved high scores, including 32.17 with WSM, 0.786369 with TOPSIS, and 0.88 with SMART. This consistency in rankings demonstrates that A_2 is a reliable and competitive alternative in a variety of decision-making scenarios.

Alternatives A_3 and A_6 show similar performance, ranking third and fourth in most methods. A_3 ranks third in WSM, WPM, and TOPSIS, and fourth in AHP and SMART, with solid scores in all methods. A_6 ranks slightly lower, fourth in WSM and TOPSIS, but third in AHP, indicating its potential as a viable option.

Alternatives A_9 and A_5 are situated within the upper echelons of the rankings, occupying the fifth and seventh positions in WSM and the sixth and eighth positions in TOPSIS, respectively. Despite their comparatively lesser success, they remain viable options for certain candidates, contingent upon the specific criteria at hand.

The remaining alternatives, A_1 , A_4 , and A_{10} , are situated at relatively lower positions in the ranking. A_1 is situated in the intermediate position, with a ranking of sixth in WSM and fifth in TOPSIS. In contrast, A_4 is ranked eighth in all methods except TOPSIS, where it is seventh. In contrast, A_{10} is ranked tenth in WPM and TOPSIS, ninth in WSM and AHP, and exhibits comparatively weaker performance across all methods.

Ultimately, Alternative A_7 is consistently positioned as the least favourable option across the majority of evaluation methods, ranking in the ninth or tenth position overall.

The results of this case study demonstrate a general consistency in rankings across methods, with A_8 and A_2 emerging as the most favourable alternatives across all methods. In contrast, A_7 and A_{10} are regarded as the least effective alternatives, indicating that they provide less benefit following the criteria employed in this comparative study.

The discrepancies between the methodologies can be attributed to how each method addresses the criteria and assigns relative weights to the alternatives. To illustrate, the AHP is founded upon a sophisticated hierarchical model, whereas the TOPSIS assesses each program by its proximity to an optimal solution. Similarly, the WSM and WPM methods employ an additive or multiplicative scoring system, which can accentuate discrepancies between the alternatives.

The results obtained from the case study demonstrate that each of the multi-criteria methods provides a distinct perspective on the performance of university programs. While there are

points of convergence, the noted differences underscore the importance of selecting an appropriate method under the specific selection objectives.

6 Conclusion

This study conducted an in-depth comparative analysis of five multi-criteria methods (WSM, WPM, AHP, TOPSIS, and SMART) applied to the selection of university programs. The objective was to evaluate the effectiveness of these methods in the context of academic decision-making, thereby providing students and decision-makers with reliable tools to make an informed choice. The results demonstrate a notable consistency in the rankings of the alternatives across the various methods, with Alternative A₈ consistently identified as the optimal option. Additionally, Alternative A₂ demonstrated noteworthy performance, consistently ranking second. These findings underscore the value of a multi-criteria approach in decision-making for complex choices, such as those related to university programs. It is important to note, however, that each method has its specific characteristics and may favor some criteria over others, thus influencing the final rankings. Accordingly, the method to be employed will be contingent upon the particular priorities and requirements of the decision-makers. For instance, the Technique for Order of Preference by Similarity to the Ideal Solution (TOPSIS) identifies the option that is most closely aligned with the ideal solution, whereas the Analytic Hierarchy Process (AHP) facilitates a more precise hierarchical evaluation of the criteria. In conclusion, this research not only provides practical results for the selection of university programs but also offers an analytical framework for future research on the optimization of decision-making processes in the field of education. Further research could investigate the integration of additional multi-criteria methods or the expansion of this approach to other geographical contexts and academic disciplines.

References

1. G. Bahadir et M. Pinar, «MULTI- CRITERIA DECISION MAKING AND THE CHOICE OF UNIVERSITY IN EDUCATION,» *International Journal of Business Tourism and Applied Sciences*, vol. 7, n° 11, pp. 32-38, 2019.
2. N. Amini, Y. Sefri et M. Radid, «Factors affecting students' career choices in Morocco,» *International Journal of Evaluation and Research in Education (IJERE)*, vol. 12, n° 11, pp. 337-345, 2023.
3. M. R. Siddiky et S. Akter, «The students' career choice and job preparedness strategies: A social environmental perspective,» *International Journal of Evaluation and Research in Education (IJERE)*, vol. 10, n° 12, pp. 421-431, 2021.
4. K. Sellamy, Y. Fakhri et A. Moumen, «What Factors Determine the Academic Orientation in Moroccan Higher Education?,» *Sustainability*, vol. 15, n° 16866, pp. 1-11, 2023.
5. M. Achamrah, «Factors influencing Moroccan University students' choice of academic majors: Mohammed V University, FLHS in Rabat as a case study,» *World Journal of Advanced Research and Reviews*, vol. 14, n° 102, pp. 185-195, 2022.
6. R. Boukbech et M. Liouaeddine, «Evaluating the impact of adult education programs in Morocco: a quasi-experimental approach,» *Quality Education for All*, vol. 1, n° 12, pp. 112-133, 2024.
7. A. Sadqui, M. Ertel, H. Sadiki et S. Amali, «Evaluating Machine Learning Models for Predicting Graduation Timelines in Moroccan Universities,» *International Journal of*

- Advanced Computer Science and Applications (IJACSA), vol. 14, n° 17, pp. 304-310, 2023.
8. A. Daghour, K. Mansouri et M. Qbadou, «Multi Criteria Decision Making methods for Information System Selection: A Comparative Study,» chez *International Conference on Electronics, Control, Optimization and Computer Science (ICECOCS)*, Kenitra, Morocco, 2018.
 9. S. R. Nabavi, Z. Wang et G. P. Rangaiah, «Sensitivity Analysis of Multi-Criteria Decision-Making Methods for Engineering Applications,» *Industrial & Engineering Chemistry Research*, vol. 62, n° 117, pp. 6707-6722, 2023.
 10. M. Mutanga, P. Piyose et S. Ndovela, « Factors Affecting Career Preferences and Pathways: Insights from IT Students,» *Journal of Information Systems and Informatics*, vol. 5, n° 13, pp. 1111-1122, 2023.
 11. T. O. Aydin, «University Choice Process: A Literature Review on Models and Factors Affecting the Process,» *Yükseköğretim*, 2015.
 12. R. Lakshmi, S. Sampath et E. Lalith, «A literature review on students university choice and satisfaction,» *International Journal of Educational Administration and Policy Studies*, vol. 15, n° 12, pp. 71-87, 2023.
 13. P. Narith, S. Chanminea et M. Soheat, «Factors influencing students' decision in choosing universities: build bright university students,» *Jurnal As-Salam*, vol. 8, n° 11, pp. 1-15, 2024.
 14. M. Czajkowski, T. Gajderowicz, M. Giergiczy, G. Grotkowska et U. Sztandar-Sztanderska, «Choosing the Future: Economic Preferences for Higher Education Using Discrete Choice Experiment Method,» *Research in Higher Education*, vol. 61, pp. 510-539, 2020.
 15. M. S. Do Musa et H. Hasan, «EXPLORING THE FACTORS SHAPING STUDENT CHOICES IN HIGHER EDUCATION PROGRAMS,» chez *Proceeding 3rd International Conference on Business & Social Sciences (ICOBUSS)*, Surabaya, 2023.
 16. N. N. Al Tamimi, O. M. Al Mashrafi et M. M. Thottoli, «Exploring the Factors that Influence University Selection:,» *Journal of Business And Management Review*, vol. 4, n° 16, pp. 439-454, 2023.
 17. A. Echhabi et S. Al-Hajri, «Factors influencing students' selection of universities: The case of Oman,» *Journal of Educational Research and Evaluation*, vol. 2, n° 12, pp. 83-88, 2018.
 18. E. ŞIŞCAN, «KEY FACTORS IN SELECTING ECONOMIC HIGHER EDUCATION INSTITUTION: REPUBLIC OF MOLDOVA CASE STUDY,» *Eastern European Journal of Regional Studies*, vol. 9, n° 11, pp. 77-85, 2023.
 19. D. Stanujkic, G. Popovic, D. Karabasevic, I. Meidute-Kavaliauskiene et A. Ulutaş, «An Integrated Simple Weighted Sum Product Method—WISP,» *IEEE Transactions on Engineering Management*, vol. 70, n° 15, pp. 1933-1944, 2023.
 20. C. Sivaji, M. Ramachandran, K. Ramu et S. Sriram, «A Review on Weight Process Method and Its Classification,» *Data Analytics and Artificial Intelligence*, vol. 1, n° 11, pp. 01-08, 2021.
 21. J. Gyani, A. Ahmed et M. A. Haq, «MCDM and Various Prioritization Methods in AHP for CSS: A Comprehensive Review,» *IEEE Access*, vol. 10, pp. 33492-33511, 2022.
 22. M. Amudha, M. Ramachandran, V. Saravanan, P. Anusuya et R. Gayathri, «A Study on TOPSIS MCDM Techniques and Its Application,» *Data Analytics and Artificial Intelligence*, vol. 1, n° 11, pp. 09-14, 2021.

23. A. S. Yalcin, H. S. Kilic et D. Delen, «The use of multi-criteria decision-making methods in business analytics: A comprehensive literature review,» *Technological Forecasting and Social Change*, vol. 174, 2022.