

# A Study on Graduate Students' Decision-Making in Selecting Career Avenues

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Received: 30-07-2022

Revised: 18-08-2022

Accepted: 29-08-2022

## ABSTRACT

Decision making is one of the most crucial aspects of any circumstances encountered by human beings. Moving from one phase of life to the other, leads to dramatic changes in the various internal and external environment, especially when it relates to making a career choice. Such crucial matter, demands rationality and commitment for the decision taken to successfully counter the dynamics of the changed circumstances/environment. Decisions are based on an individual's ability to take risk and rationale applied to opt for an alternative, amongst the various available. This paper develops a multi-criteria decision-making method (MCDM) to evaluate the graduate student's attitude towards selecting career options. Simple Additive Weighting (SAW) and Technique for Order Preference by similarity to an ideal solution (TOPSIS) is used for ranking the different career options available to students after graduation.

**Keywords:** decision-making, saw, spearman's rank correlation, topsis

## I. INTRODUCTION

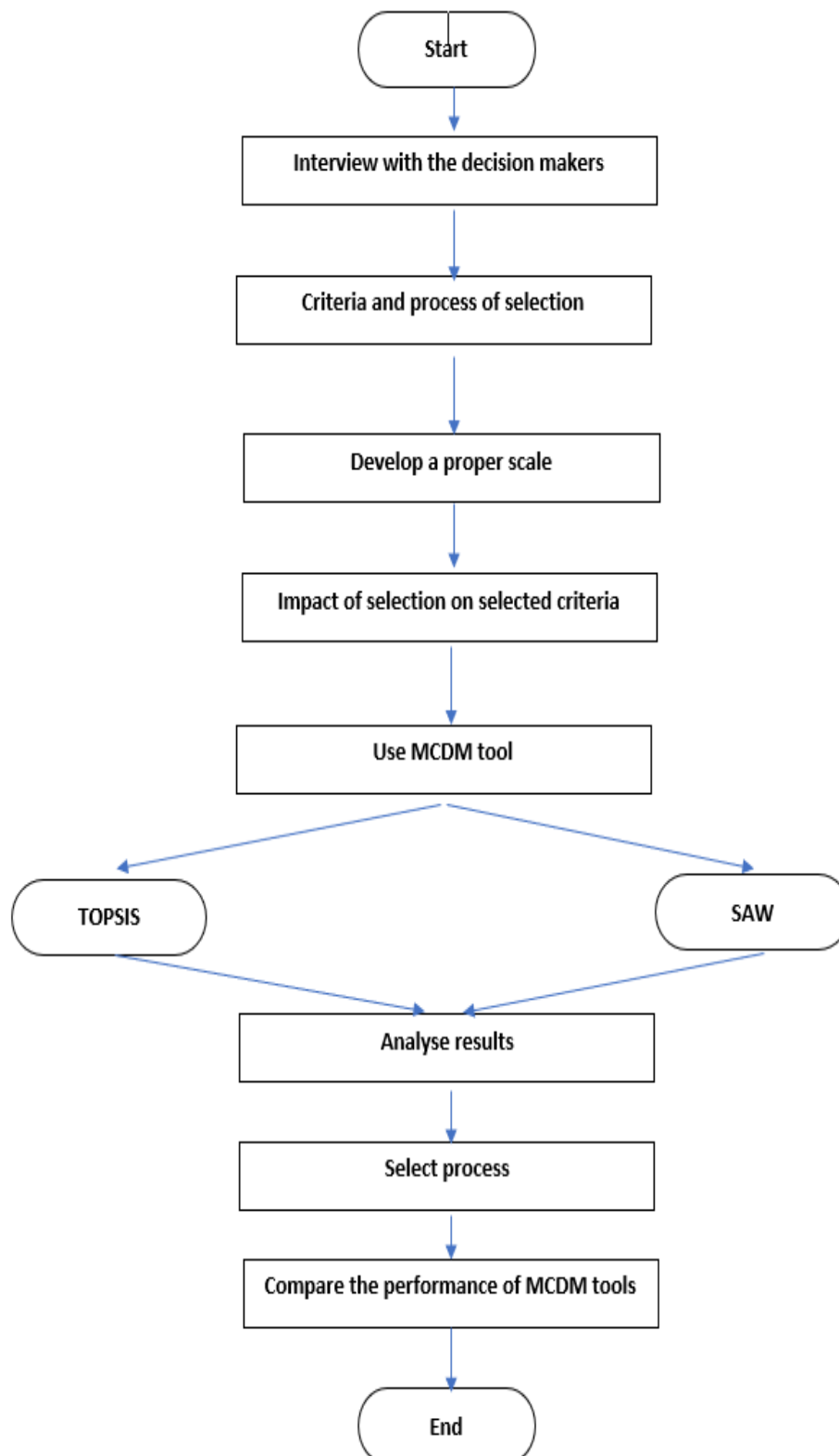
Decision-making is a critical skill which requires strong sense of observation, deep analysis and rationality in selecting among the best available alternatives. World has always been competitive and education sector has not been immune to it. In the light of rising expectations of the multi-dimensional taskforce by the industry, it is becoming more complex for graduate students to decide about their career. Moving from one phase of academic life to the other, leads to dramatic changes in the various internal and external environment, especially when it relates to making a career choice. Such crucial matter demands rationality and commitment for the decision taken to successfully counter the dynamics of the changed circumstances/environment. Decisions are based on an individual's ability to take risk and rationale applied to opt for selecting an alternative, amongst the various available. Every student believes to select a career path that will lead towards a bright future. Every decision has many criteria to decide upon, in which some criteria may overlap other criteria. The paper attempts to understand the inclination of the graduate students to select their career paths.

## II. LITERATURE REVIEW

Arman Rasool Faridi 2011 presented a case study using the Simple Additive Weighting (SAW) method for selecting colleges for admission. A decision maker can easily add or remove criteria to get better results. In scenarios like college selection, SAW algorithms efficiently give optimal results. Yu-Wei Chang 2015 has explained the AHP and TOPSIS technique applied for employee performance appraisal in a logistics company. The author has discussed the calculation of weights for different criterions and these weights are used as inputs in TOPSIS technique which is further used for the performance order. R. M. Zulqarnain et. al. 2020 used the TOPSIS method for the selection of the best automotive car.

## III. METHODOLOGY

This paper develops a multi-criteria decision-making method (MCDM) to evaluate the graduate student's attitude towards selecting career options. MCDM techniques can calculate the impact of different criteria on decision making. Simple Additive Weighting (SAW) and Technique for Order Preference by similarity to an ideal solution (TOPSIS) is used for ranking the different career options available to students after graduation. The flowchart below provides the understanding of the research flow.



**Figure 1:** Flowchart of MCDM

### 3.1 Multi-Criteria Decision-Making (MCDM)

In multi-criteria environment, performance of alternatives in absolute sense is very difficult to measure. There are lot of criteria/factors/attributes exist that affect the performance Multiple criteria decision making can be employed to select and prioritize the alternatives in a set. Various multiple criteria analysis tools like TOPSIS and SAW are available for performance evaluation and ranking of alternatives. The decision-making process usually needs to consider multiple criteria at the same time, and requires multiple standard technologies to assist decision making. In the field of multi-criteria

decision-making conditions, decision makers should follow the principle of rationality when choosing the most suitable alternatives.

### 3.2 SAW

The simple additive weighting (SAW) is often also known as the weighted sum method. The basic concept of the SAW method is to find a weighted sum of the performance ratings for each alternative on all attributes. The SAW method requires the process of normalising the decision matrix (X) to a scale that can be compared with all existing alternative ratings (Windarto, 2017).

The formula used to normalise is as follows

$$R_{ij} = \left\{ \frac{x_{ij}}{\text{Max } x_{ij}} (\text{benefit}) \frac{\text{Min } x_{ij}}{x_{ij}} (\text{cost}) \right\} \quad (1)$$

Information:

$R_{ij}$  = The normalised performance rating from alternatives  $A_i$  on attribute  $C_j$ :  $i = 1, 2, \dots, m$  and  $j = 1, 2, \dots, n$

$\text{Max } x_{ij}$  = The biggest value of each criterion  $i$

$\text{Min } x_{ij}$  = The smallest value of each criterion  $i$

$x_{ij}$  = attribute value owned by each criterion

Benefit = If the biggest value is the best

Cost = If the smallest value is the best

The preference value for each alternative ( $V_i$ ) is given the following formula:

$$v_i = \sum_{j=1}^n w_j r_{ij} \quad (2)$$

Information:

$v_i$  = Ranking for each alternative

$w_j$  = Value of ranking weight (of each alternative)

$r_{ij}$  = Normalised performance rating value

A greater value of  $v_i$  indicates that the alternative  $A_i$  is preferred.

### 3.3 TOPSIS

Hwang and Yoon presented the TOPSIS (technique for order preference by similarity to an ideal solution) in 1981. It is a MCDM method. Based on the technique, the most preferred alternative should not have the shortest distance from the positive ideal solution but also the farthest distance from the negative ideal solution. An ideal solution is the solution that collects the ideal levels in all considered attributes. The method is presented in the following steps Yoon and Hwang, 1995,

1) Normalise the decision matrix

$$y_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^m x_{ij}^2}}, i = 1, 2, \dots, m; j = 1, 2, \dots, n \quad (3)$$

2) Form the weighted normalised decision matrix.

3) Calculate the Positive-Ideal (PIS) and Negative-Ideal Solution (NIS).

$$a^+ = \{v_1^*, v_2^*, \dots, v_j^*, \dots, v_n^*\} = \{(v_{ij} | j = J1), \{v_{ij} | j \in k1\} | i = 1, \dots, m\} \quad (4)$$

$$a^- = \{v_1^-, v_2^-, \dots, v_j^-, \dots, v_n^-\} = \{(v_{ij} | j = J1), \{ | j \in k2\} | i = 1, \dots, m\} \quad (5)$$

where  $k1$  belongs to the benefit attribute and  $k2$  belongs to cost attribute.

4) Calculate the distance between each alternative and PIS.

$$b_i^* = \sqrt{\sum_{j=1}^n (v_{ij} - v_j^*)^2}, i = 1, 2, \dots, m, V_j^* = V_{ij} \quad (6)$$

5) Calculate the distance between each alternative and NIS.

$$b_i^- = \sqrt{\sum_{j=1}^n (v_{ij} - v_j^-)^2}, i = 1, 2, \dots, m, V_j^- = V_{ij} \quad (7)$$

6) Calculate the similarities to PIS.

$$c_i^* = \frac{b_i^-}{(b_i^* + b_i^-)}, i = 1, 2, \dots, m \quad (8)$$

Where  $0 \leq c_i^* \leq 1, c_i^* = 0, a_i = a^-, c_i^* = 1$  when  $a_i = a^+$ .

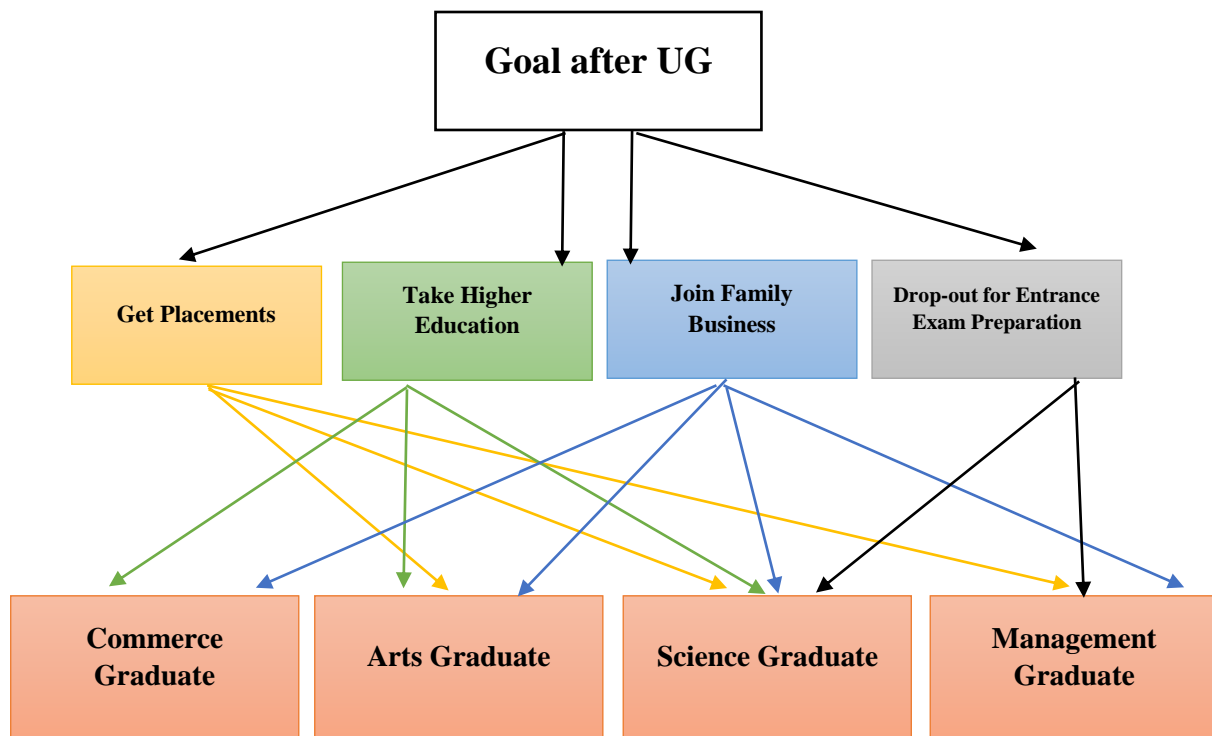
7) Rank the preference order.

## IV. EMPIRICAL STUDY

For the purpose of research, a survey was conducted from the pass-out graduate students for the academic year 2021-22. A survey was designed to collect the information about the career options most preferred by the students after completing the graduation degree. The survey was administered in the comfort place to reduce the respondent biasness on

502 the pass-out graduate students for the academic year 2021-22 in Commerce, Arts, Science and Business Administration. In the survey students were given the choice to select any one of the four options to pursue in their future, i.e., Pursue Higher Education, Placement, Drop-out for joining Family Business, Drop-out for Entrance Exam preparation. Among the 502 respondents, 249 (49.60%) students selected to drop-out for the preparation of various competitive entrance examinations, 162 (32.28%) have joined institute for pursuing higher education, 46 (9.16%) respondents made the choice to drop-out for joining the family business and remaining 45 (8.96%) preferred job or were either employed and therefore decided to continue the job.

The figure 2 below reflects the career choice of the students from irrespective of their different streams in graduation.



**Figure 2:** Flowchart of preferred career option after graduation

In this paper we have assigned equal weights to the criteria which is being further used to find the rank using SAW and TOPSIS method.

After assigning the weights of each criterion, SAW and TOPSIS are used to evaluate and compare all options opted by the students.

In the SAW method, the preference value of each alternative is calculated:

$$v_i = (0.2193, 0.6609, 0.1952, 0.9206)$$

According to these values, the preference order is “Drop-out for Entrance Exam Preparation”, “Pursuing Higher Education”, “Drop-out for joining Family Business”, “Placement”.

In the TOPSIS method, firstly, the PIS (A+) and NIS(A-) are calculated:

$$A^+ = (0.2127, 0.2098, 0.2036, 0.1898) \text{ and } A^- = (0.0347, 0.0311, 0.00, 0.0542)$$

And distance between each alternative and PIS and NIS are calculated:

$$b_i^* = (0.3270, 0.1426, 0.3240, 0.1005) \text{ and } b_i^- = (0.0543, 0.2684, 0.0559, 0.2957)$$

Finally, the similarities to PIS are calculated.

$$c_i^* = (0.1426, 0.6530, 0.1473, 0.7462)$$

Based on the results, it shows that the students select the career option in order of “Drop-out for Entrance Exam Preparation”, “Pursuing Higher Education”, “Drop-out to join Family Business”, “Placement”.

**Table 1: Overall Score of Career option using SAW and TOPSIS**

Career option	SAW		TOPSIS	
	Score	Rank	Score	Rank
Placement	0.2141	4	0.1426	4
Drop-for joining Family Business	0.2419	3	0.1473	3
Drop-out for Entrance Exam Preparation	0.8203	1	0.7462	1
Pursuing Higher Education	0.7620	2	0.6530	2

**Table 2: Spearman's Correlation between the rank of SAW and TOPSIS**

	SAW	TOPSIS
SAW	<b>1</b>	<b>1</b>
TOPSIS	<b>1</b>	<b>1</b>

## V. CONCLUSION

There are many options available for the students after completing graduation, however, the students have opted to drop-out from the academics to pursue their interest areas. During the survey, it was observed that students were inclined to take the risk of dropping-out for atleast an year or two before they decided to pursue higher education. Total 340 respondents were strongly determined to drop-out for the purpose of either competitive exams preparations (including CDS, Banking, Insurance or MBA entrance exams for study-abroad or targeting only top-notch institutes like IIMs), or they would prefer to explore any job opportunity that would be offered or they preferred to join family business either to financial support the family or they were uninterested to pursue any further studies. The problem is evaluated based on the MCDM, since it involves student's preference towards multiple attributes. This paper proposes an effective and simple method that combines both SAW and TOPSIS for the graduate student for selecting their career option. Rank is calculated using both SAW and TOPSIS. Spearman's Rank correlation is calculated to test the degree of correlation between SAW and TOPSIS. Which results there is high degree of correlation between the rank obtained from SAW and TOPSIS method. As expressed in the statistical calculation that there is a significant increase in the number of students preferring to drop-out after graduation for various reasons which is a situation of concern thus, calling for the prompt action by the policy-makers, academic institutions, faculties and parents. The paper intends to conclude that there is a strong scope for the career counselling, psychological training, skilling courses for making the youngster industry ready and other technical or up-trends courses to attract the young minds towards entrepreneurship or other employment generating opportunities in order to provide direction to the youth wealth of the nation, which otherwise is getting diverted from pursuing the traditional higher education courses.

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