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## Decrypting the Journal Selection Criteria of Academicians with F-LMAW Method

*Akademisyenlerin Dergi Seçim Kriterlerinin F-LMAW Yöntemi ile Şifresinin Çözülmesi*

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### Abstract

Journals are platforms for sharing knowledge, shaping academic discourse and building reputation. For academics, the decision on where to publish their publications greatly influences the impact and reach of research. Evaluating journal selection criteria is critical for academics aiming to publish their research. Through this research, the paper aims to provide academics with valuable information and guide them toward informed decisions when selecting journals that best enhance the visibility, credibility and impact of their research contributions within their discipline. The main criteria examined include the reputation and impact of the journal, alignment with the research scope, peer review processes, accessibility through open access models, ethical standards, indexing in databases, publication costs, editorial board expertise and post-publication support. By exploring these criteria in detail, the article provides a nuanced understanding of the priorities and challenges researchers face in navigating the complex landscape of scholarly publishing. Fuzzy Logarithm Methodology of Additive Weights (LMAW) model was used to develop the scientific calculation of the weights of academics' journal selection criteria. The research shows that the scope and relevance criteria constitute the major weight in journal selection for academics.

**Keywords:** Journal selection, Fuzzy set, LMAW

### Öz

Dergiler bilgi paylaşımı, akademik söylemi şekillendirme ve itibar oluşturma platformlarıdır. Akademisyenler için yayınlarının nerede yayınlanacağına ilişkin karar, araştırmancının etkisini ve erişimini büyük ölçüde etkiler. Dergi seçim kriterlerinin değerlendirilmesi, araştırmalarını yayınlamayı hedefleyen akademisyenler için kritik öneme sahiptir. Bu araştırma aracılığıyla makale, akademisyenlere değerli bilgiler sağlamayı ve kendi disiplinlerindeki araştırma katkılarının görünürlüğünü, güvenilirliğini ve etkisini en iyi şekilde artıran dergileri seçerken onları bilinçli kararlara yönlendirmeyi amaçlamaktadır. İncelenen ana kriterler arasında derginin itibarı ve etkisi, araştırma kapsamına uygunluğu, hakem değerlendirme süreçleri, açık erişim modelleri aracılığıyla erişilebilirlik, etik standartlar, veritabanlarında indekslenme, yayın maliyetleri, yayın kurulu uzmanlığı ve yayın sonrası destek yer almaktadır. Makale, bu kriterleri ayrıntılı olarak inceleyerek, araştırmacıların bilimsel yayıncılığın karmaşık ortamında gezinirken karşılaştıkları öncelikler ve zorluklara ilişkin incelikli bir anlayış sağlıyor. Akademisyenlerin dergi seçim kriterlerinin ağırlıklarının bilimsel hesaplamasını geliştirmek için Bulanık Logaritma Toplama Ağırlıkları Metodolojisi (LMAW) modeli kullanıldı.

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Araştırma, akademisyenler için dergi seçiminde en önemli ağırlığı kapsam ve uygunluk kriterlerinin oluşturduğunu göstermektedir.

**Anahtar Kelimeler:** Dergi seçimi, Bulanık küme, LMAW

## 1. Introduction

Communication is a way of transferring valid information produced as a result of scientific research to people. Terminologically, communication refers to the process of sharing mutual knowledge, feelings and thoughts of a person or persons with each other. From the first human being to the present day, people have endeavored to share their knowledge with others in many different ways. The development of this situation over time is verbal or written communication. A scientist also wants to serve humanity by sharing his/her scientific results on national and international platforms. This is both a requirement of being a scientist and a sine qua non of scientific development. For this aim, scientific platforms are organized and research results are shared through oral presentations and posters at congresses. In addition, research results are published as articles in journals with proven scientific quality after certain referee processes, thus ensuring scientific communication. Therefore, the need and necessity to share the results obtained from scientific research, which is the most basic concern of a researcher, with the society is provided. From this point of view, the main purpose of conducting scientific research is to publish the results obtained. In other words, publishing the results of research means that the researcher documents in writing what he/she did, how he/she did it and what he/she learned from his/her colleagues.

In today's criteria, one of the basic conditions for scientific progress in the world is academic studies. For this reason, academic studies are carried out in every field, and the number of publications is tried to be increased by contributing to science. After devoted work, the results of academic research that requires labor, knowledge and time may be wasted and the results may be meaningless unless published in a good journal.

Of course, as all stages of research should be in accordance with scientific principles, the publication stage should also be in accordance with certain principles. The information obtained as a result of the research is published to be presented to the scientific world through articles, papers, books, etc. as a result of certain stages. The quality and originality of a scientific product presented to the scientific world are seen as a contribution of the scientist and the university and the country to which he/she belongs. For this reason, while the quality and quantity of scientific studies are questioned on the one hand, the publication performance of countries and their contribution to world science comes to the fore on the other. The quality and quantity of the production of scientific knowledge is also a measure of the development of a country.

The remainder of this paper is organized as follows. Section 2 presents a comprehensive literature review of studies that analyze the performance of journal selection using various MCDM approaches and studies that apply the components of the proposed performance evaluation approach. Section 3 describes the procedure for the F-LMAW method in detail. Section 4 presents a case study. Finally, Section 5 presents conclusions, limitations and suggestions for future research.

## 2. Literature Review

This section consists of two parts. In the first part, we review the studies on journal selection using MCDM techniques. Previous studies on the application of the MCDM technique F-LMAW in the framework of the model we propose in this paper are reviewed in the second section.

### **2.1. Application of MCDM Methods in the Evaluation of Journal Selection**

The evaluation of journal selection has been investigated in previous literature using many MCDM tools. In this section, a brief literature review of integrated MCDM methods used for the evaluation problem of journal selection is presented. For example, in Oladipupo et al. (2023), journal selection and ranking are formulated as a multi-criteria decision-making problem and proposed for journal ranking based on the PSI method. Journal indexing, publisher, percentile, citation score and open access status were considered as journal criteria. Scopus and Science Citation Index Expanded journal datasets were used as sources. Özçil (2022), in his study, combined the evaluations of different decision-makers with the help of Plithogenic operators and performed the ranking of the alternatives with the Analytic Hierarchy Process (AHP) method of criteria weights and the Multi Attributive Ideal-Real Comparative Analysis (MAIRCA) method. Hamurcu and Eren (2017) used criteria such as the prestige of the journal, its relevance to the study, impact factor, and publication frequency. Six academic journals indexed in the Science Citation Index (SCI) were selected by ANP to select the best journal for the author.

### **2.2. Studies Applying the F-LMAW Method**

The fuzzy version of the LMAW method has been used to solve decision problems in various fields. Tešić et al. (2023) used the F-LMAW method for the weight coefficients of the criteria for the selection of dump trucks for the needs of army engineering units and the MARCOS method modified with interval grey numbers for ranking alternatives. Asadi et al. (2023) used the Delphi method to reduce the list of 42 criteria affecting blockchain adoption in SMEs to the 22 most important criteria. These criteria were then prioritized using the F-LMAW method based on expert preferences. Lukic (2023), a comparative analysis of the selection and ranking of the knowledge performance of companies in the European Union and Serbia was carried out based on the F-LMAW and MARCOS methods. Puška et al. (2022) used Z-numbers, the F-LMAW method in combination with the F-CRADIS method to eliminate the possibility of uncertainty in expert decision-making for the selection of a green supplier that will best assist agricultural producers in green agricultural production practices using uncertainty in decision making. Demir (2022) used the F-LMAW method to develop the scientific calculation of weights by evaluating the importance levels of the dimensions that make up the concept of poverty with expert opinions.

## **3. Research Methodology**

This section introduces the basic algorithm of the proposed approach. Since academics usually consider several key factors when selecting a journal, we measure and evaluate them.

### **3.1. Fuzzy Theory Set**

The fuzzy concept was suggested by Zadeh (1965) for uncertainties in variables and parameters. The triangular fuzzy figures have been employed in numerous investigations to transform qualitative statements into quantitative statements (Demir, 2023). In a triangular

fuzzy figure, each figure is represented by three numbers. The initial, second, and third numbers that characterize a fuzzy figure represent the lowest possible value, the most possible value, and the highest possible value, respectively.

If  $\tilde{A} = (a_l, a_m, a_u)$  and  $\tilde{B} = (b_l, b_m, b_u)$  are two triangular fuzzy numbers, the mathematical computations related to these are defined in Equations (1)-(4).

$$\tilde{A} + \tilde{B} = (a_l + b_l, a_m + b_m, a_u + b_u) \tag{1}$$

$$\tilde{A} - \tilde{B} = (a_l - b_u, a_m - b_m, a_u - b_l) \tag{2}$$

$$\tilde{A} \times \tilde{B} = (\min(a_l b_l, a_l b_u, a_u b_l, a_u b_u), a_m b_m, \max(a_l b_l, a_l b_u, a_u b_l, a_u b_u)) \tag{3}$$

$$\frac{\tilde{A}}{\tilde{B}} = \left( \min\left(\frac{a_l}{b_l}, \frac{a_l}{b_u}, \frac{a_u}{b_l}, \frac{a_u}{b_u}\right), \frac{a_m}{b_m}, \max\left(\frac{a_l}{b_l}, \frac{a_l}{b_u}, \frac{a_u}{b_l}, \frac{a_u}{b_u}\right) \right) \tag{4}$$

Triangular fuzzy numbers could be transformed into crisp numbers with the help of different equations. For this study, Equation (5) is employed to defuzzify a fuzzy number like  $\tilde{A} = (a_l, a_m, a_u)$ :

$$A = \frac{a_l + 4a_m + a_u}{6} \tag{5}$$

### 3.2. F-LMAW method

LMAW, which is employed to rank the decision alternatives and to find the weights of the evaluation criteria, was developed by Pamučar et al. (2021). The processing steps of the method are as follows (Božanić et al., 2022):

#### Step 1: Prioritising the criteria

The identified experts prioritise the criteria using linguistic terms given in the fuzzy scale in Table 1.

**Table 1.** Prioritization Scale (F-LMAW)

Fuzzy Linguistic Descriptive	Abbreviation	Fuzzy Number
Absolutely low	AL	(1,1,1)
Very low	VL	(1,1.5,2)
Low	L	(1.5,2,2.5)
Medium	M	(2,2.5,3)
Equal	E	(2.5,3,3.5)
Medium-high	MH	(3,3.5,4)
High	H	(3.5,4,4.5)
Very high	VH	(4,4.5,5)
Absolutely high	AH	(4.5,5,5)

**Source:** (Božanić et al., 2022)

Using the fuzzy linguistic scale, significant values are assigned to the criteria of greater importance, and conversely. For each specialist, the priority vectors are obtained individually  $\tilde{P}^e = (\tilde{\gamma}_{C_1}^e, \tilde{\gamma}_{C_2}^e, \dots, \tilde{\gamma}_{C_n}^e)$ .

#### Step 2: Determination of the fuzzy absolute anti-ideal point ( $\tilde{\gamma}_{AIP}$ )

This fuzzy number, which is smaller than the smallest value in the whole collection of priority vectors, is established by experts. Those who brought the method to the literature used it as  $\tilde{\gamma}_{AIP} = (0.5, 0.5, 0.5)$ .

**Step 3:** Determination of the fuzzy relationship vector ( $\tilde{R}^e$ )

The connection between the components of the priority vector and the exact opposite ideal point is computed using Eq. (6).

$$\tilde{\eta}_{C_n}^e = \left( \frac{\tilde{\gamma}_{C_n}^e}{\tilde{\gamma}_{AIP}} \right) = \left( \frac{\gamma_{C_n}^{(l)e}}{\gamma_{AIP}^{(r)}}, \frac{\gamma_{C_n}^{(m)e}}{\gamma_{AIP}^{(m)}}, \frac{\gamma_{C_n}^{(r)e}}{\gamma_{AIP}^{(l)}} \right) \tag{6}$$

**Step 4:** Computing the vectors ( $w_j^e$ ) of weight coefficients

Eq. (7) is utilized to acquire the fuzzy score of the weight coefficients of the criteria of every expert.

$$\tilde{w}_j^e = \left( \frac{\ln(\tilde{\eta}_{C_n}^e)}{\ln(\prod_{j=1}^n \tilde{\eta}_{C_n}^e)} \right) = \left( \frac{\ln(\eta_{C_n}^{(l)e})}{\ln(\prod_{j=1}^n \eta_{C_n}^{(r)e})}, \frac{\ln(\eta_{C_n}^{(m)e})}{\ln(\prod_{j=1}^n \eta_{C_n}^{(m)e})}, \frac{\ln(\eta_{C_n}^{(r)e})}{\ln(\prod_{j=1}^n \eta_{C_n}^{(l)e})} \right) \tag{7}$$

The weight factors of all experts are acquired in the shape of  $w_j^e = (\tilde{w}_1^e, \tilde{w}_2^e, \dots, \tilde{w}_n^e)^T$ .

**Step 5:** Calculating combined fuzzy vectors of weight coefficients.

The combined fuzzy vectors of the weight coefficients are determined by utilizing the Bonferroni aggregator relying on Eq. (8)  $w_j = (\tilde{w}_1, \tilde{w}_2, \dots, \tilde{w}_n)^T$ .

$$\tilde{w}_j = \left( \frac{1}{k(k-1)} \sum_{\substack{i,j=1 \\ i \neq j}}^k \tilde{w}_i^{e(p)} \tilde{w}_j^{e(q)} \right)^{\frac{1}{p+q}} = \left\{ \left( \frac{1}{k(k-1)} \sum_{\substack{i,j=1 \\ i \neq j}}^k w_i^{(l_e)p} w_j^{(l_e)q} \right)^{\frac{1}{p+q}}, \left( \frac{1}{k(k-1)} \sum_{\substack{i,j=1 \\ i \neq j}}^k w_i^{(m_e)p} w_j^{(m_e)q} \right)^{\frac{1}{p+q}}, \left( \frac{1}{k(k-1)} \sum_{\substack{i,j=1 \\ i \neq j}}^k w_i^{(r_e)p} w_j^{(r_e)q} \right)^{\frac{1}{p+q}} \right\} \tag{8}$$

**Step 6:** Computation of the ultimate value of the weighted criteria.

The final values of the weight coefficients of the criteria are obtained through clarification based on  $w_j = (w_1, w_2, \dots, w_n)^T$ , as illustrated in Eq. (5).

**4. Case Study**

**4.1. Defining the problem**

Academics usually consider several basic criteria when selecting a journal. These can be categorised as follows:

- Reputation and Influence Factor: (C1)
  - ✓ Journal Prestige: Reputation is vital. Academics often target well-established journals known for high quality content and rigorous peer review.
  - ✓ Impact Factor: A measure reflecting the average number of citations to recent articles in a journal and is often taken into account when assessing the importance of a journal within its field.
- Scope and Relevance: (C2)
  - ✓ Relevance: Researchers look for journals that are compatible with the topic of their study. A good fit ensures that the study reaches an interested audience.
  - ✓ Target Audience: Consideration of readership (whether the journal is aimed at researchers, practitioners or a wider audience) influences visibility and impact.
- Peer Review Process: (C3)
  - ✓ Rigour: Academics look for journals with a robust peer review process that ensures the quality and validity of published work.
  - ✓ Speed: The time taken to review and publish. Journals with faster turnaround times are often favoured, especially in fast-paced fields.
- Open Access and Accessibility: (C4)
  - ✓ Open Access (OA): The OA movement promotes research that is freely accessible. Academics may favour OA journals for wider distribution, but this often involves publication fees.
  - ✓ Accessibility: Accessibility to various target audiences, including international readership, language accessibility and indexing in databases, increases visibility.
- Ethical Standards and Policies: (C5)
  - ✓ Ethical Guidelines: Journals that follow ethical publishing practices are essential to protect against plagiarism, conflicts of interest and data fabrication.
  - ✓ Publication Policies: It is very important to understand a journal's policies on data sharing, copyright, and author rights before submission.
- Indexing and Impact Metrics: (C6)
  - ✓ Indexing Services: Inclusion in prestigious indexing databases such as PubMed, Scopus or Web of Science increases a journal's visibility and credibility.
  - ✓ Altmetrics: In addition to traditional impact factors, alternative metrics such as social media mentions and downloads provide broader measures of impact.
- Costs and Fees: (C7)
  - ✓ Publication Fees: Academics consider financial implications such as article processing charges (APCs), which vary widely between journals.
  - ✓ Exemptions and Discounts: Some journals alleviate financial burdens by offering waivers or discounts depending on the authors' affiliating institution or country of origin.
- Editorial Board and Leadership: (C8)
  - ✓ Expertise: A reputable editorial board demonstrates academic rigour and expertise in the field and attracts quality submissions.
  - ✓ Editorial Policies: Understanding the editorial direction and policies set by the journal's leadership helps authors align with the journal's expectations.
- Post Broadcast Support: (C9)

- ✓ **Publicity and Visibility:** Journals that offer support in promoting published work through press releases, social media or networking opportunities increase the impact of research.

Academics should carefully consider these criteria to maximise the visibility, impact and credibility of their research publications. The dynamic nature of academia, together with evolving publishing norms and technological advances, constantly influence the selection process. A thorough understanding of these criteria enables researchers to make informed decisions, ensuring that their contributions reach the right audience and have a meaningful impact in their field.

**4.2. F-LMAW method application results**

Before applying the F-LMAW algorithm, an evaluation committee was established. Detailed information about the 5 academicians selected to form the evaluation committee is given in Table 2.

**Table 2.** Profile of academicians

Decision Maker	Area	Number of Publications
A-1	Education Sciences	34
A-2	Science and Maths	45
A-3	Health Sciences	23
A-4	Social, Humanities and Administrative Sciences	28
A-5	Law	38

Using the opinions of five different decision makers, the priority vectors obtained for the criteria through Table 1 are presented in Table 3.

**Table 3.** Priority vectors of the criteria

	C1	C2	C3	C4	C1	C6	C7	C8	C9
A-1	AH	VH	AH	H	VH	H	VH	H	H
A-2	H	H	L	AH	H	AH	M	AH	AH
A-3	L	VH	H	H	M	H	L	E	L
A-4	H	AH	VH	VH	H	VH	VH	AH	VH
A-5	M	AH	VH	H	AH	AH	M	AH	M

Then, the value of the absolute fuzzy anti-ideal point was defined by the consumers as follows  $\tilde{\gamma}_{AIP} = (0.5, 0.5, 0.5)$ . For example, the relationship between the priority vector elements defined by A-1 and the absolute anti-ideal point is calculated as follows.

$$\tilde{\eta}_{C1}^{A-1} = \left( \frac{4,5}{0,5}, \frac{5}{0,5}, \frac{5}{0,5} \right) = (9,10,10), \dots, \tilde{\eta}_{C9}^{A-1} = \left( \frac{3,5}{0,5}, \frac{4}{0,5}, \frac{4,5}{0,5} \right) = (7,8,9).$$

For other consumers, calculations are made similarly. Determination of the weight coefficients vector was done by applying Eq. (6). The computation of the aggregated fuzzy vectors of the weight coefficients is done with the help of Eqs. (7) - (8) and (5). The final values of the weight coefficient from F-LMAW are as follows.

$$w_{C1-C9}^{F-LMAW} = (0,0932 \ 0,1307 \ 0,1095 \ 0,1231 \ 0,1112 \ 0,1299 \ 0,0847 \ 0,1222 \ 0,0955)^T$$

Among the criteria, C2 (scope and relevance) is considered as the most important criteria. Importance ranking of the criteria;  $C2 > C6 > C4 > C8 > C5 > C3 > C9 > C1 > C7$ .

This ranking can help a researcher to prioritise when choosing a journal. C2 emphasises focusing on the topic and target audience of the research. This is important to ensure that the

work reaches a relevant readership. C6 ranks second because indexing and impact metrics increase the visibility and reputation of a journal. C4 addresses open access and accessibility issues, which can help research reach a wider audience. C8 is important as it relates to the expertise of the editorial board and the governance policies of the journal. C5 addresses the ethical standards and publication policies of the journal. C3 emphasises the rigour and speed of the peer review process. C9 emphasises the impact of providing support for the promotion of published work. C1 focuses on a journal's reputation and impact factor, while C7 emphasises the importance of publication fees and discounts on these fees. This ranking can be useful in determining a researcher's priorities, as it shows in a sequential way the various factors in journal selection, starting with the relevance of the study.

## 5. Conclusion

The complex web of criteria influencing academics' journal selection reflects the evolving landscape of scholarly communication. The journey to select the right publishing organisation requires a delicate balance between many important considerations. From pursuing reputable journals that match the scope of research to navigating the intricacies of peer review processes and ethical publishing standards, academics face a complex set of decisions. The interplay of impact factors, open access initiatives, indexing services and editorial board expertise shape the trajectory of scholarly work within the global academic community. This assessment underlines the important role these criteria play not only in determining where research is found, but also in defining its visibility and impact. As academia continues to evolve, embracing the principles of open science, technological advances and the changing scientific landscape, journal selection criteria remain fluid, adapting to these transformations. Scope and relevance (C2) criterion is the most important criterion for academicians in journal selection. The reason why researchers search for journals compatible with the subject of their studies is to ensure that the study reaches a relevant audience. Consideration of readership (whether the journal is aimed at researchers, practitioners or a wider audience) influences visibility and impact. The third most important criterion was open access and accessibility (C4). Since OA includes freely accessible research, academics may favour such journals for wider distribution, but this usually involves a publication fee. Language accessibility, indexing in databases and accessibility to a variety of audiences increase international visibility. Empowering academics with a deep understanding of these criteria encourages informed decision-making and strategic navigation through the maze of publishing options.

Ultimately, it is this thoughtful consideration of various factors that increases the resonance and significance of scholarly contributions, enriches scholarly discourse, and advances interdisciplinary knowledge. As we move forward in this dynamic environment, the ongoing dialogue and critical evaluation of these criteria will continue to shape the future of scholarly publishing and ensure that influential and rigorously reviewed research is disseminated to audiences worldwide.

The study is limited to the criteria and method used. Different criteria can be added and developed with different fuzzy models.

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