

Review Form 3

Journal Name:	Asian Journal of Probability and Statistics
Manuscript Number:	Ms_AJPAS_127412
Title of the Manuscript:	Using Fuzzy Clustering Analysis to Classify the Provinces of Iraq Based on Infrastructure Deprivation Levels
Type of the Article	

General guidelines for the Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound. To know the complete guidelines for the Peer Review process, reviewers are requested to visit this link:

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PART 1: Review Comments

Compulsory REVISION comments	Reviewer's comment	Author's Feedback (Please correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Please write a few sentences regarding the importance of this manuscript for the scientific community. Why do you like (or dislike) this manuscript? A minimum of 3-4 sentences may be required for this part.	The manuscript addresses a critical issue by focusing on infrastructure deprivation in Iraq using fuzzy clustering. This work has the potential to guide policymakers in prioritizing resources and interventions to reduce disparities across provinces. By employing various clustering methods, it highlights the versatility and applicability of fuzzy clustering in handling complex data with overlapping boundaries. However, further elaboration on the practical implications of these clusters and their relevance to policy planning would enhance its contribution.	
Is the title of the article suitable? (If not please suggest an alternative title)	Yes, the title is precise and reflects the key focus of the research. It accurately captures the use of fuzzy clustering for classifying provinces based on infrastructure deprivation levels, making it appropriate for the intended audience. No changes are necessary.	
Is the abstract of the article comprehensive? Do you suggest the addition (or deletion) of some points in this section? Please write your suggestions here.	The abstract provides a good summary of the research objectives, methodology, and findings. However, it would benefit from incorporating specific quantitative results, such as the silhouette score used for cluster validation (0.0390) and the average deprivation index of the most affected provinces (e.g., 84.7% for Cluster 1). Such details would strengthen the abstract's clarity and emphasize its practical significance. Consider adding a sentence that underscores how this research can influence infrastructure planning and equitable resource allocation.	
Are subsections and structure of the manuscript appropriate?	The subsections are well-organized and follow a logical structure. The methodology is detailed, particularly in explaining the application of the FCM algorithm and its validation through metrics like the partition coefficient ($D_c(U) = 0.9036$). However, the discussion section could better connect these findings to actionable insights, such as how provinces in Cluster 1 can prioritize specific infrastructure improvements.	
Please write a few sentences regarding the scientific correctness of this manuscript. Why do you think that this manuscript is scientifically robust and technically sound? A minimum of 3-4 sentences may be required for this part.	The manuscript employs scientifically sound methods, including fuzzy clustering with algorithms like FCM, Gustafson-Kessel, and Gath-Geva. The validation of cluster structure through silhouette scores (e.g., silhouette = 0.0390) and partition coefficients ($D_c(U) = 0.9036$) adds robustness. Additionally, the comparison of clustering results using multiple distance metrics (e.g., Euclidean and Mahalanobis) demonstrates methodological rigor.	
Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form.	While the references cover foundational studies and relevant methods, the manuscript would benefit from the inclusion of more recent works, particularly those published in the past five years, focusing on advancements in fuzzy clustering and its applications in socio-economic and infrastructure studies. For example, recent studies integrating fuzzy clustering with machine learning could provide complementary perspectives.	
Minor REVISION comments		
Is the language/English quality of the article suitable for scholarly communications?	<ol style="list-style-type: none"> 1. Improve language clarity in the abstract and introduction, focusing on grammar and flow to ensure readability for an international audience. 2. Verify that all figures and tables have clear labels and formatting consistency. Ensure all units and abbreviations are defined at first mention. 3. Expand the discussion section to connect findings explicitly to practical implications and recommendations for policymakers. 	
Optional/General comments	This manuscript explores an important topic and provides a valuable framework for understanding infrastructure deprivation using fuzzy clustering techniques. The inclusion of multiple clustering approaches enhances its robustness, but further discussion of real-world implications and practical applications would make the findings more impactful. Additionally, more recent references could situate the study within current research trends.	

PART 2:

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Are there ethical issues in this manuscript?	<i>(If yes, Kindly please write down the ethical issues here in details)</i>	

Reviewer Details:

Name:	Milad Khormali
Department, University & Country	Iran University of Science and Technology (IUST), Iran