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ZAKAT DISTRIBUTION DECISION BASED ON FUZZY EVALUATION APPROACH

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ABSTRACT

This paper proposes an evaluation using a fuzzy approach in zakat (obligatory charity) distribution decisions, based on existing practices, particularly in most states in Malaysia. The effort has focused on proposing and formulating a zakat distribution practice using the so-called Fuzzy Delphi Method (FDM). The method was designed based on a common criterion, known as the "had kifayah" (i.e., economic capability) of asnaf (qualified zakat recipients) background. There are five steps involved, which include the verification of the recipients, establishing the decision matrix, calculating the fuzzy average, unifying process, and defuzzification to derive the score rating. A numerical example was employed to show the applicability of the method. Based on the calculation results, it shows that the method can manage the uncertainty elements and well-represents the entire zakat distribution evaluation process. Other than that, the method is unique due to its ability to accommodate diverse types of criteria or had kifayah, ensuring that the zakat authorities can evaluate with more precision, and consistent decisions can be derived with ease.

1. Introduction

Zakat and Had Kifayah

Zakat is an obligation for all Muslims as the third of the five pillars of Islam. The order for Muslims to pay zakat has been stated in the Holy Quran: "And perform As-Salat and give zakat and bow down along with Ar-Raki`in" (Al-Baqarah, 43). The definition of zakat according to Sharia is to give a portion of one's property, with certain rates and conditions, to be given to the poor and unfortunate. In addition to infaq and sadaqah, which can be translated as voluntary giving, zakat is an essential form of Islamic charity or social finance that plays a substantial role in

reducing poverty (Al-Ayubi, Shalehanti, & Sakti, 2022). The implementation of zakat is necessary to achieve the objective of the wealthy helping the poor, preventing them from becoming even more deprived, which can foster an unbiased and rightful economic environment in society (Nor Paizin, 2021). Another necessity for zakat is that it helps to achieve socio-economic fairness, as well as having positive effects on total consumption, savings, and investment (Hambali, Hamzah, Daud, & Johari, 2016). Note that zakat is obligatory for Muslims who fulfil the *nisab* (the required minimum wealth owned by a Muslim to be obligated to pay zakat), and qualified individuals will be selected as recipients. Thus, to ensure a competent and fair zakat collection and distribution, it is crucial to thoroughly understand the criteria of qualified individuals as zakat payers and receivers (Ahmadun, Tarmudi, Matmali, Saili, & Mustapa, 2023).

On the other hand, Urif, Herwanti, and Huzaini (2018) asserted that the primary aim of zakat is to address various social issues, including unemployment and poverty, and to encourage the spirit of generosity and compassion in society, in addition to its beneficial impacts on overall consumption, savings, and investments. Notably, zakat needs mindful and careful management so that the deserving recipients can receive it. This allows the objective of zakat, which is to distribute wealth among Muslims to prevent the concentration of riches among a small number and to reduce the disparity between the affluent and the poor, to be accomplished properly. Usually, people have paid their zakat with little to no problem. However, after the pandemic in 2020, there was a decrease in the number of people able to pay their zakat due to reduced income and increased spending. Simultaneously, the number of asnaf, who are the people qualified to be zakat recipients, has increased since many people were or became unemployed during that time. Consequently, this makes it more challenging to collect and distribute zakat due to a sudden decrease in funds and an increase in the number of recipients. Hence, responsible institutions must have a robust system for zakat distribution to ensure that all recipients are treated fairly (Razali et al., 2022).

Alternatively, Mustapha, Ibrahim, Ibrahim, and Ayub (2024) concluded in their research on zakat distribution among asnaf that the number one problem is dishonesty or fraud. Due to their desire to receive zakat assistance despite being ineligible, some individuals may not be entirely truthful when reporting their suffering. Correspondingly, people responsible for allocating zakat must therefore exercise caution, use their best judgment, and consult with others to identify those who need it. They should investigate and ascertain individuals' eligibility for zakat, just as they do when someone seeks it. Consistent with this, monitoring must also be conducted thoroughly and openly to prevent problems such as fraud and other complications. Considering the substantial cost increases, it may be possible to conclude that assistance should be slightly enhanced, given that most recipients are impoverished, unemployed, and ill. Furthermore, the increasing complexity of modern economic systems necessitates a re-evaluation of traditional zakat distribution mechanisms to maximize their socio-economic impact (Roslan & Akbar, 2020).

Had kifayah is a benchmark for living conditions or criteria for adequate living requirements from the viewpoint of Islamic economics. This standard is worthy of being utilized as a reference for identifying the asnaf (eligible recipients of zakat) among the underprivileged and needy, which occasionally still varies among various aspects such as location or income. In particular, the primary life needs at present encompass six indicators: shelter, food, clothes, healthcare, education, and vehicles. Accordingly, *Had kifayah* considers the quantity of revenue and ensures the achievement of criteria for an improved quality of life in the upcoming times (Sugeng and Sya'di 2022).

Zakat Management and Administration

In Malaysia, the collection and distribution of zakat are authorized under the Islamic Council of each state. The categories of zakat that are gathered include zakat on salaries, businesses, savings, and assets (Yusoff & Densumite, 2012). Note that each state has its own institution that manages all matters related to zakat. Some have even undergone privatization or corporatization, aiming to provide top-notch quality services and prioritize customer satisfaction by implementing a professional strategy that incorporates the latest technology. This is while remaining consistent with Islamic principles (Punding, Sheikh Mohammad, & Abu Bakar, 2024). Meanwhile, research in Sarawak suggests that technological advancements have a significant impact on the distribution of zakat to students (Syed Yusuf et al., 2024). According to Hasan (2019), it is also asserted that the zakat institution in Malaysia should ensure that human resource management aligns with zakat collection and distribution goals to improve efficiency. This supports the notion that institutions and systems must adapt, improve, and include the latest technology to enhance the effectiveness of zakat distribution. The effective and equitable distribution of zakat, a crucial Islamic social fund, presents significant challenges due to the multifaceted needs of recipients and the diverse criteria for eligibility. Other countries, such as Indonesia, have attempted to collaborate among zakat institutions, using Information and communication technology (ICT) tools to help the collaboration improve their zakat management system by communicating and sharing information amongst themselves (Mutamimah, Alifah, Gunawan & Adnjani, 2021). This can be observed to enhance zakat distribution, ensuring that recipients receive their zakat funds efficiently.

In addition, many improvements have been made to zakat administration, particularly in standardized procedures, infrastructure, workforce development, service delivery systems, and transparency in governance. However, there remain unresolved matters requiring prompt attention to ensure transparency in zakat management, given that the fund is considered public property (Takril & Othman, 2020). For example, the '*muallaf*' (newly converted Muslims) community in Selangor has claimed that they are being unfairly treated due to not receiving the appropriate amount of zakat funds (Hambali, Hamzah, Daud, & Johari, 2016). They also require the institution to provide improved and more systematic guidelines and to disclose information transparently, enhancing the quality of zakat promotion, collection, and distribution.

Zakat management is a highly serious matter to guarantee the stability of yearly zakat distribution (Wahid, Osmera, & Noor, 2021). One of the concerns in zakat distribution is the remaining funds. The completion of zakat distribution can indicate the institution's devotion and proficiency. On the other hand, the representative who fails to distribute zakat will accumulate excess funds from undistributed zakat, which leads to accusations that the institution is incompetent and deceptive. Other past research has attempted to introduce a new financing scheme, previously implemented in Indonesia, to zakat institutions in Malaysia. However, the Micro Credit-Qard Hasan Financing through Zakat Fund (MCZF) is not widely received by the institutions in Malaysia (Asni, Zulkifli, & Yusli, 2024). The selection of asnaf with unverified eligibility has also tainted public perception towards zakat institutions regarding the fairness of zakat distribution (Hairunnizam, Sanep, & Radiah, 2009). Therefore, a reliable and inclusive zakat distribution model using the fuzzy approach is a vital key to overcoming the issues.

Comparison of Fuzzy Delphi Method, TOPSIS, and AHP-based Zakat Models

Earlier Zakat distribution research employed other methods, such as fuzzy AHP and fuzzy TOPSIS, to assess the eligibility of asnaf. These methods aim to quantify socioeconomic indicators, providing structured and clear rankings that help guide resource allocations. However,

compared to the proposed method in this paper, these methods differ significantly in terms of modeling expert judgment, handling uncertainty, and translating linguistic assessment into decisions.

Fuzzy AHP has frequently been adopted due to its structured pairwise comparison mechanism, first formalized through Saaty's foundational work and later extended through fuzzy set theory. While this method allows experts to express judgments linguistically, it requires extensive pairwise comparisons that scale quadratically with the number of criteria. This often results in cognitive burden and potential inconsistency. Fuzzy TOPSIS similarly incorporates fuzzy logic but depends heavily on predetermined weights, which were often derived through AHP, before calculating distances to ideal and negative-ideal solutions. As several studies have shown, these distance-based rankings can be sensitive to normalization schemes and weight selection. Meanwhile, the fuzzy evaluation model proposed in this study differs by employing the Fuzzy Delphi Method (FDM). Compared with the other methods, which used pairwise comparisons and distance-to-ideal measures, FDM focuses on achieving agreement regarding the linguistic meaning and TFN boundaries for criteria such as "Low," "Medium," and "High." This process reduces cognitive load while strengthening inter-expert consistency.

Another determining characteristic of the proposed method is its preservation of fuzziness throughout early and intermediate evaluation stages. By applying fuzzy averaging and a unification process, the method preserves fuzzy information and avoids a premature collapsing of linguistic judgments into crisp numerical values. This characteristic is particularly meaningful in zakat evaluation contexts, where socioeconomic data may be falsified or self-reported—an environment where uncertainty is inherent and must be managed appropriately. Unlike fuzzy TOPSIS, which evaluates alternatives based on relative distances to ideal constructs, the proposed approach aggregates fuzzy fulfillment across the had kifayah dimensions (shelter, food, clothing, healthcare, education, and transportation). As a result, the rankings are more natural and directly reflect how closely each candidate aligns with Islamic-defined minimum living standards rather than abstract ideal points. This method's characteristic enhances its interpretability for Zakat Administrators.

From a governance standpoint, AHP- and TOPSIS-based models are transparent enough in their calculations, but some problems may still arise. Pairwise logic may be non-intuitive to auditors who are unfamiliar with the method, while TOPSIS-based models' weights may still be the source of obscurity. On the other hand, the proposed approach strengthens transparency and accountability by naturally aligning linguistic TFNs with common terminology among zakat practitioners. The FDM-based consensus process produces a clear audit trail documenting how criteria and linguistic scales were defined. The final defuzzification step produces rankings that remain traceable to original expert assessments while providing actionable clarity.

Nevertheless, AHP- and TOPSIS-based models retain value in settings requiring strict policy-driven weighting structures or where compromise solutions among competing priorities are mandated. Hybrid approaches—such as fuzzy AHP to derive weights followed by fuzzy TOPSIS for ranking—remain effective when weight consistency is critical. To continue strengthening the present model, future work could compare rank stability across multiple MCDM frameworks, conduct sensitivity analyses on TFN boundaries, and incorporate Z-number reliability modeling, allowing uncertainty and confidence to be represented simultaneously.

Objectives

This paper aims to propose an evaluation using a fuzzy approach in zakat distribution decisions, based on the Fuzzy Delphi Method (FDM) and existing practices. Accordingly, this article is organized as follows: Section 1 presents the introduction, which discusses the zakat in terms of definition, background, problems, and findings from previous related research. Meanwhile, Section 2 concisely discusses the problem statement that was faced in the existing phenomenon and the suitability of using a fuzzy approach as a way to resolve the issue. Followed by the methodology, which focuses on the theoretical background and the proposed method and procedures in Section 3. Next is Section 4, where a detailed numerical example based on our proposed method is presented. The discussion and the conclusion have been made in the last part of this article, which is Section 5.

2. Problem Statement

The effective and equitable distribution of zakat is a critical aspect of Islamic socio-economic welfare, aiming to alleviate poverty and achieve social justice. Zakat serves as a crucial mechanism for socio-economic welfare by redistributing wealth from affluent members to those in need (Jaenudin & Herianingrum, 2022). Traditional methods of zakat distribution often face challenges in precisely evaluating the eligibility of recipients and the optimal allocation of funds. This is largely due to the inherent vagueness, subjectivity, and imprecision in criteria such as recipients' needs, poverty levels, and socio-economic vulnerabilities. These qualitative factors are challenging to quantify using binary logic, which can lead to potential inaccuracies, inefficiencies, and inequities in the distribution process. Consequently, this can result in sub-optimal allocation of zakat funds, failing to fully achieve the intended socio-economic impact and potentially leading to dissatisfaction among both zakat payers and recipients. Moreover, there is a need for a more robust and adaptable framework for decision-making that is able to effectively oversee these subjective and uncertain variables to ensure a more precise, fair, and transparent zakat distribution.

In many cases, zakat management is governed and executed by the government in the majority of Islamic countries. The primary intention is to advance social justice and economic well-being. The overall welfare of Muslims can be enhanced by strengthening national zakat policies that can be implemented to collect, oversee, and distribute zakat to qualified recipients (Aslami et al., 2025). Despite its immense socio-economic potential for poverty alleviation and prosperity enhancement, the current mechanisms for zakat distribution frequently encounter challenges in ensuring transparency, accountability, and the productive impact of disbursed funds. However, the distribution of zakat has often faced scrutiny due to the absence of regular and open procedures, resulting in inefficiencies and disparities in its allocation. In line with this, Decision Makers (DMs) find it challenging to truly identify the asnaf background information attributable to the imprecision and uncertainty factors. This is a significant occurrence as it reflects the absence of understanding and the inability to predict the results of a zakat distribution process.

To ensure fairness and the prompt allocation of funds, especially in high-demand situations, it is imperative to highlight the crucial elements that can improve the zakat system. One such element is the proposal of flexible zakat distribution models that can effectively address the challenges by predicting eligibility and prioritizing zakat distribution efficiently (Mukhid, 2024). Additionally, by addressing the uncertainty and complexity of determining degrees of eligibility based on multiple criteria that reflect the nuances of poverty and need in the real world during crises, a previous study suggested the effectiveness of a fuzzy logic approach in real zakat

contexts, which may help to improve fairness in zakat distribution (Bouanani and Belhadj, 2019). Notably, by reducing human biases and inaccuracies present in manual evaluations, fuzzy logic can achieve a fair level of accuracy in autonomous decision rules, improving transparency and reliability.

Since Zadeh (1975) introduced the concept of a linguistic variable, researchers have aggressively developed computational linguistics, also known as processes of computing with words (CW), using this idea. Additionally, DMs find using simple, natural language more comfortable and user-friendly. Moreover, most existing approaches to developing zakat distribution systems slightly overlook the reliability element and uncertainty during the evaluation process. The inaccuracy it caused will eventually result in contradictory views between DMs and the stakeholders, particularly during the decision-making process. Therefore, this study employed the fuzzy approach using the FDM as it is believed to minimize the element of uncertainty and derive more precise decisions, easing the process for the zakat distribution decision.

3. Methodology

A. Preliminaries

In this research, various definitions, theoretical concepts, and procedures have been previously discussed. All these definitions and concepts are relevant to the topic throughout this methodology unless stated otherwise.

Definition 1: A fuzzy set A in the universe of discourse is summarized as:

$$A = \left\{ \left\langle x, \mu_x(x) \right\rangle \mid x \in X \right\},$$

which is indicated by a membership function, where $\mu_x(x)$ indicates the membership degree of the element x to the set A. In other words, the membership function is the key feature of a fuzzy set.

Definition 2: A fuzzy number $\tilde{A}$ is a fuzzy subset in the universe of a real number R that is both convex and normal (Sakawa, 1993).

Definition 3: A TFN $\tilde{A}$ can be written as (1) and can be defined by a triplet (a_1, a_2, a_3). The membership function $\mu_x(x)$ is defined as (Kaufman & Gupta, 1985).

$$\mu_{\tilde{A}}(x) = \left\{ 0, \;\; x < a_1, \; \frac{x - a_1}{a_2 - a_1}, \; a_1 \le x \le a_2, \; \frac{x - a_3}{a_2 - a_3}, \; a_2 \le x \le a_3, \; 0, \;\; x > a_3 \right\}. \tag{1}$$

A TFN is a type of fuzzy set composed of three real numbers that represent the variable's minimum, most likely, and maximum values. TFNs are utilized in fuzzy logic to interpret and model ambiguous or uncertain input, particularly when making decisions without access to precise numerical data (Feng, 2021).

B. Fuzzy Delphi Method (FDM)

One of the popular traditional approaches for structured forecasting and decision-making techniques that has been used for many years is the Delphi method, which was first created by Dalkey and Helmer in 1963. Since then, numerous scholars have paid this approach considerable attention due to its capacity to re-examine and verify findings from an early analysis stage. It is also noted that this approach can be easily modified to fit the environment and decision-making needs without compromising its uniqueness. Furthermore, a variation on the classic Delphi technique, the FDM uses fuzzy logic and fuzzy set theory to address and analyze the ambiguity and uncertainty inherent in expert opinions and linguistic data. Experts enable more flexible and nuanced responses using linguistic variables that are transformed into fuzzy integers (values between 0 and 1) rather than exact "yes" or "no" answers. In various domains, including management, engineering, and education, this method yields more objective and trustworthy insights in forecasting, decision-making, and research. It also reduces the number of iterations needed to attain consensus and lowers expenses (Tang and Hafiz, 2024).

Note that Kaufman and Gupta (1988) proposed one of the major initiatives, which was deeply concerned with the element of fuzziness in datasets during the evaluation process. Hence, various applications have been applied in decision-making environments (Kahraman and Aydın, 2022; Nejah, 2021; Sajad, 2021; Jalal Sadeghi et al., 2021; Marcin, 2020; Nawaf, 2020; Mazidah et al., 2019), among others. For simplicity in this research, the consensus among the identified Decision Makers (DMs) was utilized. Thus, during the evaluation process, the seven types of linguistic variables based on TFNs were defined and applied, as summarized in Table 1.

Table 1
Seven Linguistic Variables for Evaluation

Linguistic variables	*Very High (VH)*	*High (H)*	*Medium High (MH)*	*Medium (M)*	*Medium Low (ML)*	*Low (L)*	*Very Low (VL)*
TFN's	(0.8,0.9,1.0)	(0.7,0.8,0.9)	(0.6,0.7,0.8)	(0.3,0.5,0.7)	(0.2,0.3,0.4)	(0.1,0.2,0.3)	(0,0.1,0.2)

C. An Analysis Procedure

Based on the proposed method that has been discussed in the earlier section, the five-step procedure is presented as follows:

Step 1: Verify the category of the recipient based on the main goal.
Since only the cost criteria are available in this study (i.e., all six *had kifayah*), it implies that the lower the value, the better for the DMs.

Step 2: Establish the decision matrix and quantify into TFNs ($P^{\sim}$) as:

$$\left(P^{\sim}\right)=\begin{bmatrix} \tilde{x}_{11} & \tilde{x}_{12} & \ldots & \tilde{x}_{1n} \\ \tilde{x}_{21} & \tilde{x}_{22} & \ldots & \tilde{x}_{2n} \\ \ldots & \ldots & \ldots & \ldots \\ \tilde{x}_{m1} & \tilde{x}_{m2} & \ldots & \tilde{x}_{mn} \end{bmatrix}, \quad (2)$$

where $x^{\sim}_{ij}=\left(a_{ij},b_{ij},c_{ij}\right);\ i=1,2,3,...,m$ and $j=1,2,3,...,n$.

Step 3: Calculate the fuzzy averaging.
The fuzzy averaging was calculated based on identified criteria.

Step 4: Unifying process.
The unifying process was performed based on fuzzy aggregation performance using equations (3) and (4), which were proposed by Fenton and Wang (2006), given as follows.

Let $\tilde{x}_{ij} = \left(a_{ij}, b_{ij}, c_{ij}\right); i = 1,2,3,...,n; j = 1,2,3,...,m$, the normalization can be obtained as:

$$\tilde{U} = \left(\tilde{u}_{ij}\right)_{m \times n}, \tag{3}$$

$$where\ \tilde{u}_{ij} = \left(\frac{N - c_{ij}}{N}, \frac{N - b_{ij}}{N}, \frac{N - a_{ij}}{N}\right); \quad i = 1,2,...,n; j \in \omega_2 \quad N = \max_i c_{ij}, j \in \omega_2 . \tag{4}$$

Step 5: Defuzzification and derive the score and rating.
The defuzzification ($\boldsymbol{S}_{TP}$) process was performed based on (5). The rating can easily Identify:

$$S_{TP} = \frac{1}{4}\left[\left(a + 2b + c\right)\right], i = 1,2, ...,n \ . \tag{5}$$

For instance, $\boldsymbol{S}_{TP}$ if R_1 Ɔ R_2 Ɔ……Ɔ R_n, then R_1 is superior compared to R_2, … R_n, where the symbol "Ɔ" means "is superior to."

4. Numerical Example

For simplicity and to demonstrate the proposed method, an illustrative example was adopted. Suppose the zakat authority had limited funds available and decided to identify the three most eligible asnaf (i.e., poorer) among the community to consider for the allocation of the funds. Accordingly, the four potential receivers (R_1, R_2, R_3, and R_4) have been identified and shortlisted based on six "*had kifayah*" (i.e., economic capability) from JAWHAR (2017). Meanwhile, the six criteria (*had kifayah*) (in RM) are shelter (C_1), food (C_2), clothes (C_3), healthcare (C_4), education (C_5), and transportation (C_6). Thus, based on this initial information, a fuzzy evaluation has been designed and formulated using the proposed method discussed in the previous section. The detailed step-by-step calculation procedures are provided as follows:

Step 1: Verify the asnaf category based on the main goal (i.e., poorer).
The main goal is to select the three eligible among the four asnaf available based on six identified *had kifayah* or criteria (C_1,…, C_6).

Step 2: Establish the decision matrix based on linguistic expressions from Table I and quantify into TFNs form ($\tilde{P}$), as presented in Table 2 and Table 3, respectively.

Table 2
The Quantifying Process into TFNs is Derived from Table 2

	R_1	R_2	R_3	R_4
C_1	VH	M	ML	H
C_2	L	M	M	MH
C_3	VH	MH	ML	H
C_4	ML	MH	ML	MH
C_5	H	ML	L	M
C_6	VH	M	ML	M

Table 3
The Linguistic Assessment Based on the Definition from Table 2

	R_1	R_2	R_3	R_4
C_1	(0.8, 0.9, 1)	(0.3, 0.5, 0.7)	(0.2, 0.3, 0.4)	(O.7, 0.8, 0.9)
C_2	(0.1, 0.2, 0.3)	(0.3, 0.5, 0.7)	(0.3, 0.5, 0.7)	(0.6, 0.7, 0.8)
C_3	(0.8, 0.9, 1)	(0.6, 0.7, 0.8)	(0.2, 0.3, 0.4)	(0.7, 0.8, 0.9)
C_4	(0.2, 0.3, 0.4)	(0.6, 0.7, 0.8)	(0.2, 0.3, 0.4)	(0.6, 0.7, 0.8)
C_5	(0.7, 0.8, 0.9)	(0.2, 0.3, 0.4)	(0.1, 0.2, 0.3)	(0.3, 0.5, 0.7)
C_6	(0.8, 0.9, 1)	(0.3, 0.5, 0.7)	(0.2, 0.3, 0.4)	(0.3, 0.5, 0.7)

Step 3: Calculate the fuzzy average.
The fuzzy average is calculated based on the entire six *had kifayah* (i.e., criteria), and the result is obtained as presented in Table 4.

Table 4
The Fuzzy Average

	R_1	R_2	R_3	R_4
Had kifayah	(0.57, 0.67, 0.77)	(0.38, 0.53, 0.68)	(0.20, 0.32, 0.43)	(O.53, 0.67, 0.80)

Step 4: Unify the fuzzy average (***P***i; i =1,2,3,4).
The unifying process and total aggregation were conducted, as outlined in Table 5.

Table 5
The Aggregation Scores

Asnaf	***P_i ; i =1,2,3,4***
R_1	(0.0375, 0.1625, 0.2875)
R_2	(0.1500, 0.3125, 0.5250)
R_3	(0.4625, 0.6000, 0.7500)
R_4	(0.0, 0.1625, 0.3375)

Step 5: A defuzzification process is applied, and the most eligible asnaf is identified based on its rating.
The defuzzification is calculated based on Table 5 using equation (5), and the crisp performance score (T_P) is obtained, as outlined in Table 6. Finally, the rating of the asnaf can be determined easily (see last column).

Table 6
The Crisp Performance Score and Rating

	Asnaf	***Scores***	***Rating***
T_{pi} (i = 1, 2, 3, 4)	R_1 R_2 R_3 R_4	0.163 0.325 0.603 0.166	R_3 Ↄ R_2 Ↄ R_4 Ↄ R_1

Note: Symbol "Ↄ" means is superior to.

From Table 6, it is clearly observed that R_3, R_2, and R_4 are the top three eligible recipients to receive the funds. However, the first asnaf (R_1) is not eligible due to its rating in the last position and the lowest score.

Additionally, the Sensitive Analysis (SA) is performed to demonstrate that the proposed method yields consistent results. Thus, the input datasets (see Table 2) were adjusted slightly, with one level increased and one level decreased based on the definitions of the seven linguistic variables in Table 1. Consequently, the five-step-by-step analysis was repeated, and the scores and final rating were obtained as shown in Table 7. The results demonstrate that the method offers a consistent rating of all the alternatives. Although the final scores are slightly changed, all the ratings are unchanged and remain consistent, which is the same as R3 Ↄ R2 Ↄ R4 Ↄ R1.

Table 7
The SA results after changing one level increase and decrease of the input datasets based on the definition in Table 1

Asnaf	***R_1***	***R_2***	***R_3***	***R_4***
		Scores		
One level increase in the input datasets	0.239	0.411	0.68	0.288
One level decrease in the input dataset	0.151	0.299	0.570	0.160
Rating		R3 Ↄ R2 Ↄ R4 Ↄ R1		

5. Discussion and Conclusion

In this paper, the analysis commenced by establishing the main objective, which identified the category of the asnaf, followed by the evaluation process using seven linguistic variables and quantifying them into TFNs. The analysis example in this paper relies on criteria (i.e., *had kifayah*) that were determined previously to select the top three qualified zakat recipients. Concurrently, this method is enhanced by a straightforward evaluation technique utilizing linguistic expressions, offering additional advantages in the evaluation approach for DMs during the decision-making process. Subsequently, defuzzification processes are employed to ascertain the rating of the most qualified recipient (i.e., asnaf). This analysis presents a simple technique that is both easy to comprehend and thorough in its assessment method. In addition, the method includes a distinctive instrument that allows for re-examination steps (if necessary) in the entire process for verification purposes. This instrument is particularly crucial to prevent the loss of information that may occur during the evaluation process. Furthermore, as illustrated by the results presented in Table 6, the top three highest scores are eligible to receive the zakat allocation due to limited funds available from the zakat authority.

The challenge is to create a comprehensive framework that leverages the advantages of fuzzy evaluation. This includes its ability to manage subjectivity and imprecision, enhancing the equity, efficacy, and overall impact of zakat distribution, and ultimately maximizing its socio-economic impact. These difficulties highlight a crucial weakness in the current zakat distribution systems, namely the incapacity to adequately model and control the ambiguity and uncertainty involved in assessing a variety of beneficiary profiles and the ensuing effects on equity and public confidence. As a result, a more thorough, sophisticated, and methodical methodology for determining zakat distribution is urgently needed.

The proposed method has demonstrated its capability to address uncertain information, particularly during the evaluation process, with enhanced efficiency, and it well represents the entire zakat distribution evaluation process. On top of this, the method is also unique due to its ability to accommodate the diversity of had kifayah types. Hence, it provides additional guidance for zakat authorities, enabling them to make an evaluation and decision process with consistency, ease, and greater precision. Lastly, our subsequent endeavours in this research are to refine the existing method by incorporating the Z-number valuation concept. It particularly aims to manage uncertain information and to include the contraindication criteria (if necessary) within the unifying analysis process to standardize. Nevertheless, this initiative will be reserved for future research endeavours.

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Conflict of Interest

The authors confirm that there is no conflict of interest associated with this publication.

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