



An assessment of alternative social banking systems using T-Spherical fuzzy TOP-DEMATEL approach

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ABSTRACT

Assessment of alternative banking systems is a difficult problem with multiple and conflicting criteria. This study proposes a multi-criteria decision-making (MCDM) model for evaluating alternative social banking systems (with no interest charges) using a T-Spherical fuzzy Decision-Making Trial and Evaluation Laboratory (DEMATEL) called TOP-DEMATEL. First, a comprehensive literature review determines the factors affecting the performance of alternative systems. An analysis is carried out with the help of the T-Spherical fuzzy TOP-DEMATEL approach to determine the importance weights of the factors under consideration. The alternative social banking systems with no interest charges are designed to minimize the negative effects of interest on the economy. The causality analysis shows that the effective risk analysis and employment of qualified personnel were the most effective criteria on all other factors. In addition, the improvement of the technological infrastructure is also affected by all other factors. Effective risk analysis is determined as the most important criterion for the performance of the alternative banking system. In this context, a comprehensive risk analysis is required for the success of the new alternative banking system.

1. Introduction

In today's economic system, interest is briefly defined as the price of money. Interest is classified under different names according to the institution in which it is used. Banks use two types of interest, which are deposits to savers and loans demanded from fund users [1]. The interest paid by the treasury in exchange for government bonds and treasury bills is called treasury interest [2]. The benchmark interest is the interest of the most traded government bonds in the secondary market, with a coupon payment every three or six months, with two years to maturity [3]. Policy rate is the rate applied to one-week repo transactions. The overnight rate is the interest charged to banks that want to borrow and lend overnight [4]. Late liquidity interest, on the other hand, is the amount paid by banks, which have difficulties in closing accounts or making payments at the end of the day, in return for the funds they receive [5].

The existence of interest in the economy creates disadvantages in some aspects. First, interest is prohibited in many religions. Therefore, people who are sensitive to these religious issues will not put their savings into the system in order not to earn interest income. This situation leads to a decrease in liquidity in the market [6]. In addition to this issue, it is known that high interest rates also cause some economic

problems. The higher the interest rate, the higher the investment cost [7]. This causes a decrease in industrial production. In other words, high interest rates make the country's economy more fragile [8]. In addition, interest also causes some social problems. Income inequality rises significantly in societies with high interest rates [9].

The above-mentioned problems deepen the need for an alternative financial system within the economy. In this framework, the participation banking system has been developed as an alternative to the existing system [10]. In this process, innovative financial products have been developed [11]. However, the aforementioned system was not sufficient to replace the classical system in practice. In this context, academic studies are carried out to improve the participation banking system [12]. In addition to the mentioned point, important studies are carried out to develop another alternative system [13]. Minimizing the problems caused by interest in the classical system is vital for economic development to be sustainable. In this direction, a new financial system, which will be developed owing to the new studies to be carried out, is seriously needed [14].

In this study, it is aimed to determine the priority issues to be considered to properly design the alternative banking system. In this framework, first, the factors that may affect the performance of the alternative system are determined by a comprehensive literature review.

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After that, an analysis has been carried out with the help of T-Spherical fuzzy TOP-DEMATEL method to determine the importance weights of the factors in question. In this way, priority issues will be determined for the effective implementation of alternative banking.

The main contributions of this study are indicated below.

- (i) The most important originality of this study is the proposal of a new alternative financial system without interest. Thanks to this new system to be developed, it will be possible to minimize the negative effects of interest in the economy.
- (ii) Another significant contribution of this study is creating a new technique with the name of TOP-DEMATEL. Despite various advantages, DEMATEL technique is criticized because of some issues. For example, when the sum of the symmetrical values around the diagonal are the same, the weights become equal. Thus, even the experts consider one factor superior to the other, the weights are computed as the same. This condition demonstrates that the results can become ineffective. To overcome this problem, a new model is generated in this study by integrating some steps of TOPSIS to DEMATEL technique so that new methodology is named as TOP-DEMATEL.
- (iii) Making evaluations for different t values is another superiority of this proposed model. This situation provides an opportunity for comparing the results according to different conditions. Hence, the reliability of the findings can be checked. Similarly, by using Spherical fuzzy sets, the hesitancy conditions can be taken into consideration in the analysis process so that more effective results can be obtained.
- (iv) Preferring the DEMATEL method in the analysis process also increases the power of the study. In the literature, there are many decision-making methods used to calculate the weights of criteria such as DEMATEL. On the other hand, the most important advantage of the DEMATEL method compared to the others is that the causality relationship between the criteria can be determined. The criteria that are effective on social banking can have significant effects on each other. Therefore, the cause-effect relationship between the criteria should also be taken into account in determining the most important criterion. Therefore, it is seen that it is necessary to consider the DEMATEL method in the analyzes to be made on the aforementioned subject.

The second part focuses on the drawbacks of existing banking systems. Next, literature is evaluated. After that, the details of the alternative banking system are explained. In the following part, an examination has been made. The final sections focus on discussions and conclusion parts.

2. Negative effects of the existing banking system on the economy

It is possible to talk about the negative effect of interest on consumer behavior. If the change in interest rates has an effect that increases or decreases the price of the goods, it will also decrease or increase its quantity in the opposite direction. This will occur along the same demand curve. The effect of interest on quantity will vary depending on the price elasticity of demand [15]. However, if the change in interest rates affects other variables that are considered fixed, this time it will affect the demanded quantity of the existing goods at the same price level [16]. If the interest rate increases and affects other variables, an increase in the demand for the current goods will cause a decrease otherwise [17]. Consumers want to obtain maximum utility on the iso-utility curve at the same income level [18]. If the increase in interest rates negatively affects the disposable income levels of consumers, there will be a decrease in demand, which will cause a contraction in the market.

Interest also has negative effects on producer behavior. Depending on whether the change in interest rates will affect costs or revenue, it will have an impact on producer behavior [19]. An increase in interest, which will cause an increase in costs, will increase the price of the goods, thus reducing the amount of demand and reducing profitability.

In cases where the interest rates do not affect the cost but affect the purchasing budgets of consumers, an increase in interest will decrease the amount of demand, and a decrease in interest will increase the amount of demand [20]. This change in consumer behavior will indirectly affect producer behavior.

Changes in interest rates will have an impact on both financial markets and real markets. It is necessary to accept its effect on real markets as the sum of its effect on producer behavior. High interest rates will have both short-term and long-term effects [21,22]. The expectation that interest rates will remain high in the long run will reduce the investment tendency [23]. In the long run, this will cause production to remain stable or the rate of increase to decrease, which will cause prices to increase as a result of the decrease in supply. A second factor is the fact that the interest, which will be included in the investment cost, will be reflected in the prices as a cost element [24].

Interest also has negative effects on the country's budget balance. In a situation where public revenues are insufficient, the deficits in the budget increase. In other words, the public budget is constantly running short. Borrowing is increasing rapidly, the interest burden in domestic borrowing increases, interests are paid by borrowing and debts are used in a way that does not create repayment capacity [25]. Although no new financing is provided, debts increase, and the share of the public in the money market increases with the effect of the repetition of the cycle and the real high interest rate [26]. With the effect of the risk premium developed due to political instability, interest rates increase even more and very high real interest rates are in question in domestic borrowing [27]. Savings, which are already insufficient, are directed to speculative fields, and a significant part of them is used in government debt securities. Private investments and growth are excluded, and an unstable growth occurs [28].

3. Literature review

There is extensive literature on the criteria that affect the performance of the banking system. Making an effective risk analysis is one of the prominent issues in this process. The risk of non-repayment of loans is included in interest rates as a cost element. It is the risk that the given loans cannot be repaid on time or not at all due to various reasons by the borrowers when they are due [29]. This is a risk that reduces the profitability of the loan and increases the cost. It is desirable that the risk be low. This risk increases in times of economic contraction or crisis [30]. If the amount of unpaid loans due to non-repayment risk approaches the equity amount, the bankruptcy of the lender may be in question. Lenders have developed collateral methods to secure themselves against the risk of non-repayment. The risk of default is minimized in secured loans [31]. The costs arising from the non-repayment risk of the previous periods will emerge as factors affecting the amount, form and interest rate of the collateral in the loans to be given in the next period [32].

Liquidity risk is the type of risk examined under the heading of market risk. The risk is the risk that banks are exposed to because of incompatible maturities of asset and liability items [33]. As can be understood from the definition, liquidity risk is one of the most serious risks faced by banks [34]. As can be seen from some examples from the past, banks may go bankrupt even if their assets or profits are high in cases where the said risk is not well managed [35]. Liquidity risk is the risk of loss because of the bank's inability to turn its assets into cash when it needs cash [36]. In other words, the said risk is defined as the risk that the bank will not be able to fulfill its obligation when requested. The high liquidity risk causes the interest rates to increase as the maturity of the loans extended [37].

The employment of qualified personnel is another issue that has an impact on the performance of the banking system. The personnel who will work in the banking system should have knowledge about different issues [38]. This is especially important for the new system to be developed. In this framework, banks should prefer personnel with

high knowledge [39]. In addition, it is very important to provide the necessary training to the personnel currently working in the bank [40]. In this process, the personnel should receive training in accordance with the job description [41]. Thanks to this situation, it will be possible to increase the performance of the newly developed banking system [42].

For the new banking system to be developed to be successful, the technological infrastructure must also be good. Especially with the increase of globalization, it is seen that competition in almost all sectors has increased significantly [43]. This situation had a significant impact on the banking sector as well. Local banks have now had to compete with large-scale international banks [44]. In this framework, banks also must strengthen their technological infrastructure to increase their competitiveness [45]. This situation is especially important for the new banking system to be established [46]. For the newly established banking system to survive in the sector, it is vitally important that its technological infrastructure is strong [47].

The results of the literature review are indicated as follows.

- (i) The criteria that affect the performance of the banking system were evaluated in many different studies.
- (ii) Most of the studies identified the key indicators of this situation, such as effective risk management, qualified employees, technological infrastructure.
- (iii) It is identified that classical banking system has some weaknesses that affect the economic development of the countries in a negative manner.
- (iv) There is a need for a new study which presents an alternative banking system which overcomes these problems.

By considering these issues, in this study, it is aimed to determine the priority issues to be considered to properly design the alternative banking system.

4. Details of the alternative social banking system

The details of the developed alternative banking system are given under the following sub-headings.

4.1. Founders and operating incomes

The question of who the capital of alternative banking will be is important. Those who intend to establish alternative banking can establish alternative banking without interest-free profit by obtaining the necessary permissions. Those who will establish alternative banking can be real persons with sufficient capital, as well as insurance funds, investment funds, foundations, pension funds, wealth/welfare funds, *karz-ı* hasen funds, chambers of commerce, commodity exchanges, organized chambers of industry, chambers and exchanges unions., the state or companies whose capital is provided by the state can be counted among the possible founders. The founders of alternative banking can be founders individually, or a few of them can become founders together.

In the proposed model, a bank model that will not generate any income is not meant. The alternative bank will be able to generate income from other banking activities other than lending. However, this income is not the interest, which is the profit expectation of the capital applied to the loans given as debt. It should generate income from the services it provides such as money storage, money transfer, foreign exchange transactions, collateral transactions, brokerage services, ATM services, internet banking services, mobile banking services. Adding the remaining distributable profit to its capital after deducting operating expenses and taxes from these incomes is important in terms of strengthening its capital. It has to pay transaction tax for paid services. With the legal regulation to be made, it will be a desirable incentive to exempt the profit from non-profit alternative banking activities from tax, provided that it is added to the funds or capital to be used.

4.2. Depositors and funders

One of the most important factors that make up the interest rate is the interest expectations of the lenders to existing banks, whether the money they give will not melt in the face of inflation or the expectation of additional income. It leaves the right of choice to those who deposit their money in an alternative bank so that alternative banking assets do not melt down in the face of inflation. Those who deposit their money will not be able to demand any interest from the alternative bank. On the other hand, their assets will not be in a certain amount as in existing banks but will be fully guaranteed. They can withdraw their assets over the same asset type they have deposited. They cannot demand an additional fee.

In fact, the interest rate is not only created by the profit expectation of the capitalist or the interest expectations of the depositors. The risks faced by the financial institutions that lend the deposits they collect also have the characteristic of determining the interest rates. In the previous section, the variables affecting the interest rate were measured both in terms of deposit banks and participation banks. In the new alternative banking to be established, the “zakat fund” will take its place as one of the most important institutions. The zakat fund is not the insurance of the capitalists, it is the insurance of the system. The zakat fund takes over the debts of the incapacitated people and even if these people lose their credibility, they pay their debts to the alternative bank, the debts of the defaulters are cleared and they do not face any enforcement proceedings. Alternative banking also does not lose its capital due to the risk of non-repayment thanks to the zakat fund.

People who have the potential to give zakat from alternative banking will be able to benefit from it to the extent of their wealth. Although zakat is an obligatory act of worship that cannot be changed as a divine order, it is an act that takes place in the world with its practical dimension. In this respect, it is closely related to the economic structure. According to the criteria determined by the science of fiqh, in order for a person to be a zakat payer, he must be considered rich, that is, he must have a certain level of wealth. The lower limit of this wealth is expressed with the concept of *quorum* in terms. As a fiqh term, the starting point and limit of being a zakat payer and being considered rich indicates the amount required for zakat to be obligatory. Although there are many verses about zakat in the Qur'an, no explanation has been made showing the limit of wealth.

4.3. Entrance and exit issues

Any individual who is of age and has assets within the scope of giving zakat can be included in the alternative banking system. People who can benefit from the system can borrow interest-free from the system in proportion to their income or wealth, provided that they do not exceed the upper limit that the bank can give to a person. Persons who have been removed from the system due to default can be re-entered into the system, provided that their economic situation improves over time and that the debt that was previously closed by the zakat fund is returned to the system. The refunded amount is returned to the zakat fund by alternative banking.

Conditional entry to the system may be possible for non-citizens who are in the country with a work permit and who work in foreign embassies, according to the conditions of the period and bilateral agreements. Here, the requirement to be a resident or citizen is a restriction both on the determination of the income and wealth of the person and the difficulty in determining the ability to repay. Whether individuals have the right to benefit from the system and their credit scores will be submitted to the information of authorized alternative bankers through a central system, provided that they are authorized each time from the borrower.

If the debtors who do not or cannot fulfill their obligations have lost their ability to give zakat, their debts will be paid by the zakat fund and they cannot borrow from the alternative banking system

again. However, their situation improves, and those who have repaid their debts paid by the zakat fund can re-enter the system. Alternative banking will be able to track whether people are in the system and their credit scores through a centralized system.

In the current banking system, those who issue bad checks with applications such as a credit rating or risk center report, those who cannot pay even though the letter of guarantee is turned into cash, those who default on their loan payments and those who default on paying their credit card debts are reported (Banking Law, 2011). In the current banking system, people who are stuck with these reports can either not benefit from the system at all or make limited use of it. There is no mechanism to save people who are in distress or incapacity. Both the principal and interest of the debts fall under follow-up, and as long as the debts cannot be paid, interest accrues and the debt grows. However, the effect of high interest and compound interest is great in reaching this stage. However, since there is no interest in the alternative banking system we propose, the debt does not grow even if it cannot be paid. In addition, if the person is incapacitated, the zakat fund comes into play and the financial problem is solved at the first stage. Financial problems are resolved quickly before they turn into alternative problems. Those who abuse the system will be removed from the system for a certain period of time and a criminal complaint will be made to the relevant public units.

Based on the amount and time given by those who deposited their assets in the alternative bank, the system provides interest-free loans with the same money measure, not exceeding this amount, to those who request a loan from the system. The system can lend money to more than one person depending on the size of the amount invested by a person, or it can also give the money deposited by more than one person to one person. However, no concessions can be made in the assets, collateral and repayment capabilities of the borrowers and arbitrary authority cannot be used. Authorities that will cause abuse cannot be given to the personnel. The money used from the system cannot be made into a pool system. They cannot be mixed with each other. Each money/asset deposited in the alternative bank is tracked separately in the system.

When the disbursement begins, the depositor is informed that his/her money/assets have started to be used by a needy person, with the user information being reserved in the alternative bank. The usage period cannot exceed the date when the money/asset depositor will get his money/asset back. If the depositor wishes, he can delay the period in which he will receive the money back. After stating this, this right can be made available to the current user, or this asset can be made available to a new owner, depending on the situation of the extended period.

5. An analysis of the factors affecting the alternative banking system

In this study, it is aimed to determine the issues that should be considered first in a new interest-free system to be developed as an alternative to the classical system. The details are presented in the following subtitles.

5.1. Proposed model

Decision making methods have been considered by many researchers together with fuzzy logic. With this situation, it is aimed both to minimize the uncertainty and to achieve more successful results [48]. With the increasing complexity of the problems, new numbers have been developed [49]. Spherical fuzzy numbers (A) have also been developed as sets that take hesitancy into account [50]. Eq. (1) explains these sets in which μ, η and ν refer to the membership, non-membership and hesitancy degrees [51].

$$0 \leq \mu'_A(u) + \eta'_A(u) + \nu'_A(u) \leq 1 \tag{1}$$

Table 1
Scales and fuzzy numbers.

Scales	μ	η	ν
4	.85	.15	.45
3	.6	.2	.35
2	.35	.25	.25
1	0	.3	.15
0	0	0	0

Eq. (2) gives information about the refusal degree (r).

$$r_A(u) = \sqrt[3]{1 - (\mu'_A(u) + \eta'_A(u) + \nu'_A(u))} \tag{2}$$

Weighted mean is shown in Eq. (3).

$$TSFWAM_W(\tilde{A}_{S1}, \tilde{A}_{S1}, \dots, \tilde{A}_{Sn}) = \left\{ \left[1 - \prod_{i=1}^n (1 - \mu_{\tilde{A}_{Si}}^t)^{w_i} \right]^{\frac{1}{t}}, \prod_{i=1}^n \eta_{\tilde{A}_{Si}}^{w_i}, \prod_{i=1}^n \nu_{\tilde{A}_{Si}}^{w_i} \right\} \tag{3}$$

Spherical fuzzy sets are integrated with a new generated technique (TOP-DEMATEL) in this study [52]. In spite of many advantages, there are also some criticisms regarding DEMATEL technique. For instance, when the sum of the symmetrical values around the diagonal are the same, the weights become equal [53]. It is seen that even the experts consider one factor superior to the other, the weights are computed as the same [54]. This situation denotes that the results can become ineffective. To overcome this problem, a new model is generated in this study by integrating some steps of TOPSIS to DEMATEL technique so that new methodology is named as TOP-DEMATEL. Additionally, a new model is proposed in this study by considering Spherical fuzzy sets with TOP-DEMATEL [55,56]. The details of this new technique are demonstrated below [57].

Step 1: Evaluations are collected by considering the scales stated in Table 1.

Step 2: Direct relation matrix (D) is generated by using the average of the evaluations [58].

Step 3: Sub matrixes are created and normalized as in Eqs. (4) and (5).

$$X = sD \tag{4}$$

$$s = \min \left[\frac{1}{\max_i \sum_{j=1}^n |d_{ij}|}, \frac{1}{\max_j \sum_{i=1}^n |d_{ij}|} \right] \tag{5}$$

Step 4: Total relation matrix (T) is constructed with Eq. (6).

$$T = X * (1 - X)^{-1} \tag{6}$$

Step 5: Sub matrixes are combined, and T matrix is generated with Eq. (7).

$$T = \begin{bmatrix} 0 & \dots & (\mu_{1n}^T, \eta_{1n}^T, \nu_{1n}^T) \\ \vdots & \ddots & \vdots \\ (\mu_{n1}^T, \eta_{n1}^T, \nu_{n1}^T) & \dots & 0 \end{bmatrix} \tag{7}$$

Step 6: The values are defuzzified in Eq. (8).

$$Score = \mu^t - \eta^t - \nu^t \tag{8}$$

Step 7: Equations (9)–(15) are used to compute the weights. C*/C- shows the sum of the distance to the positive/negative ideal on a column basis. R*/R- identifies this situation on a row basis.

$$C^*_j = \sqrt{\sum_{i=1}^n (t_i - \max_j t_i)^2} \quad j = 1, 2, \dots, n \tag{9}$$

Table 2
Issues affecting the performance of the alternative banking system.

Variables	Supported literature
Effective Risk Analysis (ERY)	Fang et al. [59]
Employment of Qualified Personnel (KIE)	Baş and Canöz [60]
Clear Disclosure of the Process to Investors and Users (SNS)	Yiğit and Canöz [61]
Improvement of Technological Infrastructure (TYI)	Meng et al. [62]

$$C^-_j = \sqrt{\sum_{i=1}^n (t_i - \min t_i)^2} \quad j = 1, 2, \dots, n \quad (10)$$

$$R^*_i = \sqrt{\sum_{j=1}^n (t_j - \max t_j)^2} \quad i = 1, 2, \dots, n \quad (11)$$

$$R^-_i = \sqrt{\sum_{j=1}^n (t_j - \max t_j)^2} \quad i = 1, 2, \dots, n \quad (12)$$

$$S^*_i = C^*_i + R^*_i \quad (13)$$

$$S^-_i = C^-_i + R^-_i \quad (14)$$

$$W_i = \frac{S^-_i}{S^-_i + S^*_i} \quad (15)$$

5.2. Definition of the criteria

Considering the issues mentioned in the previous sections of the study, a list of criteria that are effective on the alternative banking system to be developed has been determined. Details of these criteria are shown in Table 2.

For the newly developed alternative banking system to be successful, an effective risk analysis must be done first. In addition, employing qualified personnel is also important in this process. In addition, for the social banking system to be developed to be successful, the process must be clearly explained to investors and users. Finally, the improvement of the technological infrastructure has a very important role in this process.

5.3. Analysis results and discussions

The criteria specified in Table 2 were turned into questions. These questions were then asked to the experts. The expert team consists of three academics with more than 27 years of experience in the subject. These individuals used five different scales specified in Step 1 when evaluating the criteria. Obtained expert opinions are shared in Table 3.

In the analysis process, the steps of T-Spherical fuzzy DEMATEL are implemented. The analysis results of “t = 2” are presented below. Decision matrix is demonstrated in Table 4.

After that, these values are normalized as in Table 5.

On the other side, Table 6 gives information about the total relation matrix.

By using these values, the weights of the criteria are computed. The findings are presented in Table 7.

Effective risk analysis is the most important criterion for the performance of the alternative banking system to be developed. The employment of qualified personnel is another important variable in this process. In this context, a comprehensive risk analysis is required for the success of the alternative banking system to be developed. On the other hand, it is vital to employ qualified personnel to carry out this process effectively. Moreover, the weights of the criteria are also calculated for different t values. This situation provides an opportunity for checking the reliability of the results. Table 8 explains the results for different t values.

It is seen that the results are quite similar for different t values. Hence, it is understood that the results of the proposed model are coherent and reliable.

Table 3
Expert evaluations.

Expert 1				
	ERY	KIE	SNS	TYI
ERY	0	3	3	4
KIE	4	0	2	4
SNS	2	2	0	1
TYI	3	2	2	0
Expert 2				
	ERY	KIE	SNS	TYI
ERY	0	4	3	3
KIE	3	0	2	3
SNS	2	3	0	2
TYI	2	1	2	0
Expert 3				
	ERY	KIE	SNS	TYI
ERY	0	3	4	4
KIE	2	0	3	2
SNS	3	2	0	3
TYI	2	1	1	0

Table 4
Decision matrix.

	ERY	KIE	SNS	TYI								
ERY	.00	.00	.00	.72	.18	.38	.72	.18	.38	.80	.17	.41
KIE	.68	.20	.34	.00	.00	.00	.46	.23	.28	.68	.20	.34
SNS	.46	.23	.28	.46	.23	.28	.00	.00	.00	.42	.25	.24
TYI	.46	.23	.28	.21	.28	.18	.29	.27	.21	.00	.00	.00

Table 5
Normalized sub matrixes.

X ^M	ERY	KIE	SNS	TYI
ERY	.00	.32	.32	.36
KIE	.30	.00	.21	.30
SNS	.21	.21	.00	.19
TYI	.21	.09	.13	.00
X ^U	C1	C2	C3	C4
ERY	.00	.23	.23	.21
KIE	.25	.00	.30	.25
SNS	.30	.30	.00	.32
TYI	.30	.36	.34	.00
X ^L	C1	C2	C3	C4
ERY	.00	.32	.32	.35
KIE	.29	.00	.24	.29
SNS	.24	.24	.00	.20
TYI	.24	.15	.18	.00

Table 6
Total relation matrix.

	ERY	KIE	SNS	TYI								
ERY	.49	.36	.50	.70	.43	.65	.68	.43	.64	.66	.43	.63
KIE	.62	.49	.57	.41	.42	.42	.56	.50	.54	.57	.50	.54
SNS	.47	.54	.49	.48	.54	.49	.32	.46	.36	.43	.56	.46
TYI	.39	.58	.44	.33	.59	.40	.35	.59	.41	.24	.50	.31

Table 7
Weights.

Criteria	S*	S-	Weights
ERY	.45	.66	.253
KIE	.56	.79	.251
SNS	.61	.88	.252
TYI	.62	.82	.244

“Alternative Banking” refers to a system that provides basic banking functions, such as the storage, transfer, and convertibility of money market instruments, as well as the provision of surplus funds to those in need with interest-free methods. Since the capitalists, cash foundations, takaful companies, pilgrimage fund, those who donate their cash assets

Table 8
Weights for different t values.

	t values					
	2		3		4	
	Weights	Ranking	Weights	Ranking	Weights	Ranking
ERY	.25335	1	.25495	1	.25446	1
KIE	.25065	3	.24861	3	.24707	3
SNS	.25217	2	.25159	2	.2518	2
TYI	.24382	4	.24485	4	.24667	4

and alternative banks, which may be public institutions, do not have a profit motive, they will be able to make the funds they use as cheap as the profit expectation of the capital compared to deposit banks and participation banks. In addition, since the zakat fund or the non-repayment insurance fund will cover the risk of non-repayment, the risk of non-repayment will be zero. Since all its assets will be indexed to assets that maintain their value such as gold, silver, dollar and euro, it will also be minimally affected by inflation.

Since all of its funds are interest-free deposits or equity, there will be no additional fund usage costs. In the financing of farmers for a period of less than one year between the sowing period and the harvest period, the period between the establishment and running of the business and the working period of the small investor, the period between the working period and the salary period of the employees, the period between the birth period and the slaughter period of the livestock breeders, the need it will be a system that will meet the financial needs of its owners during the period they meet their needs and during their working periods. Alternative banking is initially designed as a micro-finance system as a system that only lends to individuals. Yang et al. [63] made a study regarding the problems in the classical banking system. For this purpose, they have proposed an alternative banking system to handle these problems. They have also underlined the significance of these issues.

When this system reaches large enough capital accumulations, it will reach a system that can finance SMEs and trade, and in time, finance large investments. When it has a large capital accumulation, it will be a system that is free from the problems of conventional banking that increase the costs. It will be a real interest-free banking model that is non-profit, shares both profit and loss, insured the risk of non-payment. The benefits of alternative banking for individuals will primarily be a system where they can keep their interest-free and idle funds for the benefit of society. Individuals will have the opportunity to use funds in the future as much as the amount and duration of the funds they keep in the system. In addition, as long as they do not default, their credibility in the system will increase. It will be a system where they can meet their needs without interest. Nor [64] and Saiti et al. [65] also highlighted the significance of this situation.

Since there is no financing cost for the producers, it will not have an inflationary effect on the prices. In addition, since it finances consumers, there will be no collection problems for producers. It will not cause an inflationary effect in terms of the economy in general. It will enable to increase social welfare, to prevent the savings from being idle, to bring them into the economy and to serve them to the society. The zakat fund, qard hasen, will also allow social cohesion and cooperation in terms of expanding the opportunities to borrow and lend without interest. Almulla and Aljughaiman [66] also focused on the details of the alternative banking system. They reached a conclusion that technological infrastructure plays a critical role in the development of this system.

6. Conclusions

In this study, it is aimed to determine the priority issues to be considered to properly design the social banking system to be developed as an alternative to the existing system. First, the factors that may

affect the performance of the alternative system were determined by a comprehensive literature review. In this context, effective risk analysis, employment of qualified personnel, clear explanation of the process to investors and users, and improvement of technological infrastructure have been determined as criteria. After that, an analysis was carried out with the help of T-Spherical fuzzy TOP-DEMATEL method to determine the importance weights of the factors in question. In this way, it was possible to determine the priorities for the effective implementation of social banking.

As a result of the causality analysis, it was understood that the criteria of effective risk analysis and employment of qualified personnel were effective on all other variables. On the other hand, the improvement of the technological infrastructure is also affected by all other factors. Effective risk analysis is the most important criterion for the performance of the alternative banking system to be developed. The employment of qualified personnel is another important variable in this process. In this context, a comprehensive risk analysis is required for the success of the new social banking system to be developed. In addition to the mentioned issues, it is vital to employ qualified personnel to carry out this process effectively.

The most important originality of this study is the proposal of a new alternative financial system without interest. Thanks to this new system to be developed, it will be possible to minimize the negative effects of interest in the economy. The preference of the DEMATEL method in the analysis process is another issue that increases the originality of the study. The most important limitation of the study is that numerical data were not used in the analysis process. In this context, an econometric analysis of the factors affecting the interest rate can be made in future studies. In this way, it will be possible to compare the results obtained in both studies.

The main limitation of this study is that a hybrid fuzzy decision-making model is not proposed. Instead of this situation, only the criteria are weighted. Hence, in future studies, a hybrid model can be constructed. In this context, different country groups can be ranked with respect to the performance of risk management in banking implementation. For this purpose, TOPSIS or VIKOR model can be taken into consideration for the aim of ranking the countries. Hence, it can be understood which countries are more successful in risk management issues for alternative banking system.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

No data was used for the research described in the article.

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